Command Line Interface Reference, Modes A - B, StarOS Release 21.28

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About this Guide

Note Control and User Plane Separation (CUPS) represents a significant architectural change in the way StarOS-based products are deployed in the 3G, 4G, and 5G networks. Unless otherwise specified, it should not be assumed that any constructs (including, but not limited to, commands, statistics, attributes, MIB objects, alarms, logs, services) referenced in this document imply functional parity between legacy/non-CUPS and CUPS products. Please contact your Cisco Account or Support representative for any questions about parity between these products.

Note The documentation set for this product strives to use bias-free language. For purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, ethnic identity, sexual orientation, socioeconomic status, and intersectionality. Exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product software, language used based on RFP documentation, or language that is used by a referenced third-party product.

Note The ASR 5000 hardware platform has reached end of life and is not supported in this release. Any references to the ASR 5000 (specific or implied) or its components in this document are coincidental. Full details on the ASR 5000 hardware platform end of life are available at: https://www.cisco.com/c/en/us/products/collateral/wireless/asr-5000-series/eos-eol-notice-c51-735573.html.

Note The HA, HSGW, PDSN, and SecGW products have reached end of life and are not supported in this release. Any references to these products (specific or implied) their components or functions including CLI commands and parameters in this document are coincidental and are not supported. Full details on the end of life for these products are available at: https://www.cisco.com/c/en/us/products/collateral/wireless/asr-5000-series/eos-eol-notice-c51-740422.html.

This preface describes the *Command Line Interface Reference* and its document conventions.

This reference describes how to use the command line interface (CLI) to interact with the products supported by the StarOS™. The CLI commands are organized by command modes in the code and in this reference. The

command modes are presented alphabetically. The description of each command states the command's function, describes its syntax, presents limitations when applicable, and offers an example of its usage.

- CLI Command Sections, on page xliv
- Conventions Used, on page xliv
- Supported Documents and Resources, on page xlvi
- Contacting Customer Support, on page xlvi

CLI Command Sections

The following table describes the individual sections in the command descriptions presented in this reference.

Section	Description
Product	The product(s) supporting the CLI command.
Privilege	The user privilege levels having access to the CLI command. For more information on user types and user privileges, refer to the *CLI Administrative Users* section in the *Command Line Interface Overview* chapter.
Mode	The command and configuration mode sequences to the CLI configuration mode for the CLI command. For more information on command modes, refer to the *CLI Command Modes* section in the *Command Line Interface Overview* chapter.
Syntax	The command's syntax. For more information on CLI command syntax, refer to the *CLI Command Syntax* section in the *Command Line Interface Overview* chapter.
	Description of the keyword(s) and variable(s) in the command.
Usage	Information about the command's usage including dependencies and limitations, if any.
Example	Example(s) of the command.

Conventions Used

The following tables describe the conventions used throughout this documentation.

Notice Type	Description
Information Note	Provides information about important features or instructions.
Caution	Alerts you of potential damage to a program, device, or system.
Warning	Alerts you of potential personal injury or fatality. May also alert you of potential electrical hazards.

Typeface Conventions	Description
Text represented as a `screen display`	This typeface represents displays that appear on your terminal screen, for example: `Login:`
Text represented as **commands**	This typeface represents commands that you enter, for example: **show ip access-list** This document always gives the full form of a command in lowercase letters. Commands are not case sensitive.
Text represented as a **command** *variable*	This typeface represents a variable that is part of a command, for example: **show card** *slot_number* *slot_number* is a variable representing the desired chassis slot number.
Text represented as menu or sub-menu names	This typeface represents menus and sub-menus that you access within a software application, for example: Click the **File** menu, then click **New**

Command Syntax Conventions	Description
{ keyword or *variable* **}**	Required keyword options and variables are those components that are required to be entered as part of the command syntax. Required keyword options and variables are surrounded by grouped braces { }. For example: **sctp-max-data-chunks { limit** *max_chunks* **| mtu-limit }** If a keyword or variable is not enclosed in braces or brackets, it is mandatory. For example: **snmp trap link-status**
[keyword or *variable* **]**	Optional keywords or variables, or those that a user may or may not choose to use, are surrounded by brackets.

Command Syntax Conventions	Description
|	Some commands support multiple options. These are documented within braces or brackets by separating each option with a vertical bar. These options can be used in conjunction with required or optional keywords or variables. For example: **action activate-flow-detection { intitiation | termination }** or **ip address [count** *number_of_packets* **| size** *number_of_bytes* **]**

Supported Documents and Resources

Related Documentation

The most up-to-date information for this product is available in the product *Release Notes* provided with each software release.

The following related product documents are also available:

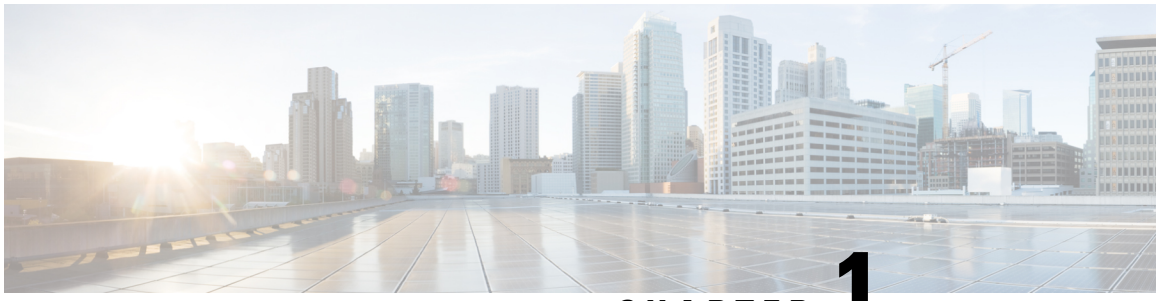
- *AAA Interface Administration and Reference*
- *GTPP Interface Administration and Reference*
- *IPSec Reference*
- Platform-specific System Administration Guides
- Product-specific Administration Guides
- *Release Change Reference*
- *SNMP MIB Reference*
- *Statistics and Counters Reference*
- *Statistics and Counters Reference - Bulk Statistics Descriptions*
- *Thresholding Configuration Guide*

Contacting Customer Support

Use the information in this section to contact customer support.

Refer to the support area of http://www.cisco.com for up-to-date product documentation or to submit a service request. A valid username and password are required to access this site. Please contact your Cisco sales or service representative for additional information.

About this Guide



CHAPTER 1

Command Line Interface Overview

Note The ASR 5000 hardware platform has reached end of life and is not supported in this release. Any references to the ASR 5000 (specific or implied) or its components in this document are coincidental. Full details on the ASR 5000 hardware platform end of life are available at: https://www.cisco.com/c/en/us/products/collateral/wireless/asr-5000-series/eos-eol-notice-c51-735573.html.

This chapter describes the numerous features in the command line interface (CLI). It includes information about the architecture of the CLI, its command modes and user privileges, how to obtain help within the CLI, and other key items.

The operating system (StarOS™) controls the overall system logic, control processes, and the CLI. The CLI is a multi-threaded user interface that allows you to manipulate, configure, control and query the hardware and software components that make up the system and its hosted services. In addition, the CLI can host multiple instances of management and service configuration sessions. This allows multiple users to simultaneously access and manage multiple hosted services.

This section provides the following information about the CLI:

- CLI Structure, on page 1
- CLI Command Modes, on page 2
- CLI Administrative Users, on page 2
- CLI Contexts, on page 7
- Understanding the CLI Command Prompt, on page 8
- CLI Command Syntax, on page 8
- Entering and Viewing CLI Commands, on page 9
- Obtaining CLI Help, on page 13
- Exiting the CLI and CLI Command Modes, on page 13
- IP Address Notation, on page 14
- Alphanumeric Strings, on page 16

CLI Structure

CLI commands are strings of commands or keywords and user-specified arguments that set or modify specific parameters of the system. Commands are grouped by function and the various command modes with which they are associated.

The structure of the CLI is hierarchical. All users begin at a specific entry point into the system, called the Exec (Execute) Mode, and then navigate through the CLI according to their defined user privileges (access level) by using other command modes.

CLI Command Modes

There are two primary CLI command modes:

- **Exec (Execute) Mode:** The Exec Mode is the lowest level in the CLI. The Exec Mode is where you execute basic commands such as **show** and **ping**. When you log into the CLI, you are placed in this mode by default.
- **Config (Configuration) Mode:** The Config mode is accessible only by users with administrator and security administrator privileges. If you are an administrative user, in this mode you can add and configure contexts and access the configuration sub-modes to configure protocols, interfaces, ports, services, subscribers and other service-related items.

The entry point into the CLI is called Exec Mode. In the initial CLI login, all users are placed into the default local context, which is the CLI's default management context. From this context, administrative users can access the Config Mode and define multiple service contexts.

Refer to the mode entry-path diagrams at the beginning of each mode chapter in the *Command Line Interface Reference*.

Important The commands or keywords/variables that are available to the user vary based on platform type, StarOS version and installed license(s).

CLI Administrative Users

This section contains information on the administrative user types and privileges supported by the system.

Administrative User Types

There are two types of administrative users supported by the system:

- **Context-level administrative users:** This user type is configured at the context-level and relies on the AAA subsystems for validating user names and passwords during login. This is true for both administrative user accounts configured locally through a configuration file or on an external RADIUS or TACACS+ server. Passwords for these user types are assigned once and are accessible in the configuration file.
- **Local-users:** This user type supports ANSI T1.276-2003 password security protection. Local-user account information, such as passwords, password history, and lockout states, is maintained in /flash. This information is maintained in a separate local user database subject to AAA based authentication and is not used by the rest of the system. As such, configured local-user accounts are not visible with the rest of the system configuration.

Important In release 20.0 and higher Trusted StarOS builds, the local user database is disabled. The Global Configuration mode **local-user** commands, and Exec mode **show local-user** and **update local-user** commands are unavailable. For additional information on Trusted builds, see the *System Administration Guide*.

Local-user and context-level administrative accounts can be used in parallel. However, a mechanism is provided to de-activate context-level administrative user accounts, thereby providing access only to local-user accounts.

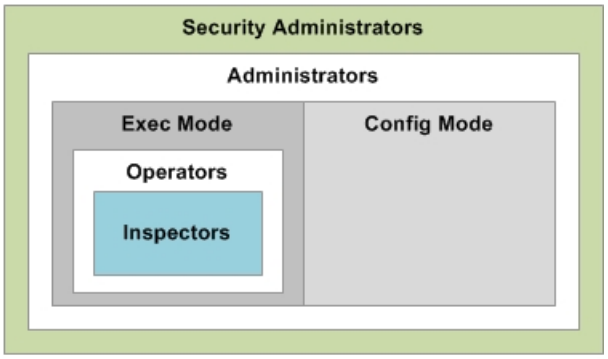
Administrative User Privileges

Regardless of the administrative user type, the system supports four user privilege levels:

- **Inspector**: Inspectors are limited to a small number of read-only Exec Mode commands. The bulk of these are show commands for viewing a variety of statistics and conditions. The Inspector cannot execute show configuration commands and does not have the privilege to enter the Config Mode.
- **Operator**: Operators have read-only privileges to a larger subset of the Exec Mode commands. They can execute all commands that are part of the inspector mode, plus some system monitoring, statistic, and fault management functions. Operators do not have the ability to enter the Config Mode.
- **Administrator**: Administrators have read-write privileges and can execute any command in the CLI except for a few security-related commands that can only be configured by Security Administrators. Administrators can configure or modify system settings and can execute all system commands, including those available to the Operators and Inspectors.
- **Security Administrator**: Security Administrators have read-write privileges and can execute all CLI commands, including those available to Administrators, Operators, and Inspectors.

The following figure represents how user privileges are defined in the CLI configuration modes.

Figure 1: User Privileges



Though the privilege levels are the same regardless of user type, the corresponding user type names differ slightly. The following table displays the privilege level to administrative user type mappings:

Table 1: User Privilege to User Type Mapping

User Type as Defined by T1.276-2003	Local-User Level User	Context-Level User
System Security Administrator	Security Administrator	Administrator

User Type as Defined by T1.276-2003	Local-User Level User	Context-Level User
Application Security Administrator	Security Administrator	Administrator
System Administrator	Administrator	Config-Administrator
Application Administrator	Administrator	Config-Administrator
Application User/Operator	Operator	Operator
not applicable	Inspector	Inspector

Configure context-level administrative users in the Context Configuration Mode with the **administrator**, **config-administrator**, **operator**, and **inspector** commands.

Configure local-user administrative users at the Global Configuration Mode with the **local-user username** command.

Important In release 20.0 and higher Trusted StarOS builds, the Global Configuration mode **local-user** commands are unavaible.

You can further refine administrative levels to include access to certain features with the following feature-use administrative user options:

- **Lawful Intercept (LI) Administrative User:** To configure and manage LI-related issues, configure at least one administrative user account with LI functionality privileges.

Important This privilege is available only for context-level administrative users. In addition, to ensure security in accordance with the standards, LI administrative users must access the system through the Secure Shell Protocol (SSH).

- **Enhanced Charging Service (ECS) Administrative User:** To log in and execute ECS-related commands, configure at least one administrative user account with ECS functionality privileges.

All system users can be configured within any context. However, it is recommended that you configure users in the system's management context called local. Refer to sections later in this chapter for additional information about contexts.

Allowed Commands per User Type

With the exception of security administrators, all other management users are limited to a subset of the entire command list. This section defines the commands allowed for each management user type.

Inspector Mode Commands

In the Exec Mode, system inspectors can access the following commands:

- **abort**
- **autoconfirm**

- **context**
- **default terminal**
- **exit**
- **help**
- **logs checkpoint**
- **no logging active**
- **no logging trace**
- **no reveal disabled commands**
- **no timestamps**
- **no autoconfirm**
- **ping**
- **reveal disabled commands**
- **show** (except **show snmp communities** and **show snmp transports**)
- **sleep**
- **start crypto security-association**
- **terminal length**
- **terminal width**
- **timestamps**
- **traceroute**

Operator Mode Commands

In the Exec Mode, system operators can access all inspector mode commands plus the following commands:

- **aaa test**
- **alarm cutoff**
- **bulkstats force**
- **card**
- **clear** (a subset of all **clear** command variations)
- **debug**
- **dhcp test**
- **gtpc test**
- **gtpp interim**
- **gtpp test**

- **gtpu test**
- **gtpv0 test**
- **host**
- **logging active**
- **logging filter**
- **logging trace**
- **monitor protocol**
- **monitor subscriber**
- **newcall**
- **no card**
- **no debug**
- **no newcall policy**
- **port**
- **ppp echo-test**
- **radius interim accounting**
- **radius test**
- **rlogin**
- **show access-group**
- **show access-list**
- **show access-flow**
- **show access statistics**
- **show configuration**
- **show snmp transports**
- **ssh**
- **telnet**
- **test alarm**

Administrator Mode Commands

Administrators can access all system commands except:

- Context Configuration Mode:
  - **config-administrator**
  - **operator**

- **inspector**
- **administrator**

- Global Configuration Mode:
  - **snmp community**
  - **snmp user**
  - **local-user**
  - **suspend local-user**

- Exec Mode:
  - **show snmp communities**
  - **clear** (all **clear** command variations)
  - **show local-user**
  - **password change local-user**

Security Administrator Mode Commands

Security administrators can access all system commands.

Important A security administrator cannot access the shell or monitor debug port output in Debug Mode through non-local context login.

CLI Contexts

A context is a group of configuration parameters that apply to the ports, interfaces, and protocols supported by the system. You can configure multiple contexts on the system, each of which resides as a separate, logically independent instance on the same physical device. The CLI can host multiple contexts within a single physical device.

This allows wireless service providers to use the same system to support:

- Different levels of service
- Multiple wholesale or enterprise customers or customer groups
- Different classes of customers based on defined Class of Service (CoS) parameters
- IP address pools across multiple contexts, thus saving IP address allocation
- Enhanced security

Each defined context operates independently from any other context(s) in the system. Each context contains its own CLI instance, IP routing tables, access filters, compression methods, and other configured data.

By default, a single system-wide context called "local", is used exclusively for the management of the system. Think of the local context as the root directory of the system, since you can define and access all other contexts from this point. You cannot delete the local context.

From this location in the CLI, you can:

- Create and configure other service contexts that contain different service configurations
- Configure system-wide services such as CORBA and SNMP management interfaces, physical management ports, system messages, and others

Important The system requires that you define at least one context in addition to the local context. This isolates system management functions from application or service functions.

Administrative users add contexts through the Global Configuration Mode. A substantial advantage of configuring numerous service contexts is that it allows operators to broadly distribute different subscribers across the system. This greatly enhances the performance of the system and minimizes the loss of sessions should a failure occur.

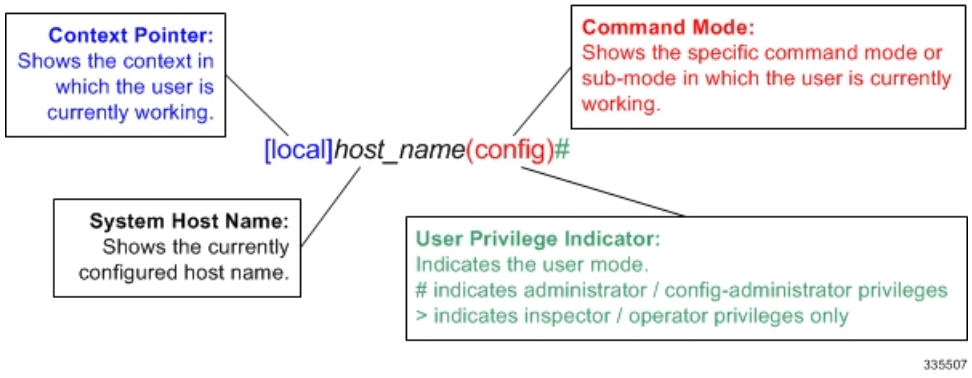
Understanding the CLI Command Prompt

The CLI provides an intuitive command prompt that informs you of:

- Exactly where you are located within the CLI
- The command mode you are using
- Your user privilege level.

The following figure shows the various components of the command prompt.

Figure 2: CLI Command Prompt



CLI Command Syntax

This section describes the components of the CLI command syntax that you should be familiar with prior to using the CLI. These include:

- **Commands**: Specific words that precede, or initiate, a specific function.
- **Keywords**: Specific words that follow a command to more clearly dictate the command's function.
- **Variables**: Alphanumeric values that are user-supplied as part of the command syntax. Sometimes referred to as arguments, these terms further specify the command function.
- **Repetitive keywords (+)**: Specific keyword, that when followed by a plus (+) sign, indicates that more than one of the keywords can be entered within a single command.

In the following example, *port_number* and *slot_number* are the command variables for the **info** keyword:

show port info *slot_number*/*port_number*

port_number/*slot_number* is a variable representing a particular Ethernet slot/port on an ASR 5500 or vitualized platfrom. See the *System Administration Guide* specific to the platform type for actual slot/port ranges.

A keyword that was supported in a previous release may be concealed in subsequent releases. StarOS continues to parse concealed keywords in existing scripts and configuration files created in a previous release. But the concealed keyword no longer appears in the command syntax for use in new scripts or configuration files. Entering a question mark (?) will not display a concealed keyword as part of the Help text.

Entering and Viewing CLI Commands

This section describes various methods for entering commands into the CLI.

Typing each command keyword, argument, and variable can be time-consuming and increase your chance of making mistakes. The CLI therefore, supports the following features to assist you in entering commands quickly and more accurately. Other features allow you to view the display and review previously entered commands.

Entering Partial CLI Commands

In all of the modes, the CLI recognizes partially-typed commands and keywords, as long as you enter enough characters for the command to be unambiguously recognized by the system. If you do not enter enough characters for the system to recognize a unique command or keyword, it returns a message listing all possible matches for the partial entry.

If you enter the partial command **conf** and press **Enter**, you enter the Global Configuration Mode. If you were to enter only **c**, the system would respond with the message:

```
Ambiguous Command
```

CLI Command Auto-completion

Use the command auto-completion feature to automatically complete unique CLI commands. Press the **Tab** key after entering enough characters to enable this feature.

```
[local]host_name# sho<Tab>
[local]host_name# show
```

If you do not enter enough characters to allow the CLI to determine the appropriate command to use, the CLI displays all commands that match the characters you entered with auto-completion:

Important If you enter a partial keyword for a keyword that is concealed in this release, pressing **Tab** will not complete the concealed keyword. You must type in the complete keyword to display/execute a concealed keyword.

```
[local]host_name# sh<Tab>
show     shutdown
[local]host_name#
```

Enter a question mark (?) after a partial command to display all of the possible matching commands, and their related help text.

```
[local]host_name# sh?
shutdown - Terminates execution of all tasks within the entire chassis
show - Displays information based on a specified argument
[local]host_name#
```

Important Entering"?" will not display keywords that have been concealed in this release.

Using CLI Auto-Pagination

When you enter commands whose expected results exceed the terminal window's vertical display, the auto-pagination function pauses the display each time the terminal window reaches its display limit. Press any key to display the next screen of results.

By default, auto-pagination functionality is disabled. To enable auto-pagination, type the pipe command: **| more**.

```
[local]host_name# show configuration | more
```

Important When auto-pagination is enabled, if a command's output exceeds the terminal window's vertical display parameters, you can exit by entering "**q**". This returns you to the CLI prompt.

Using CLI Autoconfirmation

By default, the system is configured to prompt all administrative users with a confirmation prior to executing certain commands. This functionality serves two purposes:

- Helps ensure that you do not execute an unwanted configuration change.

For example, to save a configuration:

```
[local]host_name# save configuration
Are you sure ? [Yes | No]:
```

- Indicates potential misspellings of names during configuration. The first time you configure an element name (context, subscribers, services, etc.), the prompt is displayed. The prompt is not displayed for subsequent entries of the name. Therefore, if you see the confirmation prompt after entering the name of a previously configured element, it is likely that you misspelled the name.

You create a context named *newcontext*:

```
[local]host_name(config)# context newcontext
Are you sure ? [Yes | No]: yes
[newcontext]host_name(config-ctx)#
```

You revisit the context named *newcontext*:

```
[local]host_name(config)# context newcontext
[newcontext]host_name(config-ctx)#
```

On another occasion, you misspell the context named *newcontext*:

```
[local]host_name(config)# context mewcontext
Are you sure ? [Yes | No]:n
Action aborted
[local]host_name(config)#
```

After aborting the above action, you can again revisit *newcontext*:

```
[local]host_name(config)# context newcontext
[newcontext]host_name(config-ctx)#
```

You can control CLI autoconfirmation at the following levels:

- **Specific administrative user sessions:** To enable or disable autoconfirmation, use the **[no] autoconfirm** commands while in the Exec Mode.
- **All Future Sessions:** To disable or re-enable autoconfirmation for all future sessions, use the **[no] autoconfirm** commands while in the Global Configuration Mode.
- **For specific commands:** Disable autoconfirmation for various commands that support the **-noconfirm** keyword, such as the save configuration or card reboot commands.

Regulating the Command Output

For many CLI commands, you can use **| grep** and/or **| more** keywords to regulate or control the command's output.

grep for Regular Expressions

Use the **| grep** keyword to filter through a command's output for certain expressions or patterns. Only those portions of the output that contain or exclude the pattern are displayed. The **| grep** has the following syntax:

| grep [-E | -i | -n |-v | --extended-regexp | --**ignore-case | --invert-match | --line-number]** *expression*

Table 2: grep Options

Alternative Keyword	Description
-E	Match using extended regular expressions (EREs). Treat each pattern specified as ("IEEE Std 1003.1-2001, Section 9.4, Extended Regular Expressions"). If any enti pattern matches some part of an input line excluding the terminating <newline>, th shall be matched. A null ERE shall match every line.
-i	Perform pattern matching in searches without regard to case. Lower case matches t as upper case.

Alternative Keyword	Description
-n	Precede each output line by its relative line number in the file, each file starting at line The line number counter is reset for each file processed.
-v	Select lines not matching any of the specified patterns. If the -v option is not specified selected lines shall be those that match any of the specified patterns.
--extended-regexp	The long form of the **-E** option.
--ignore-case	The long form of the **-i** option.
--invert-match	The long form of the **-v** option.
expression	Specifies the character pattern to find in the command's output as an alphanumeric strin 1 to 256 characters.

A regular expression is a pattern that describes a set of strings. Regular expressions are constructed analogously to arithmetic expressions, by using various operators to combine smaller expressions. For additional information, refer to *ISO/IEC/IEEE 9945:2009 Information technology – Portable Operating System Interface (POSIX®) Base Specifications, Issue 7*.

more Command

Use the **| more** keyword to pause the terminal each time the terminal window reaches its display limit. Press any key to display the next screen. The function of this keyword is identical to the **autoless** command, except that you must manually enter it on a command-by-command basis.

Viewing Command History

To view a history of all commands line by line, simply scroll up or down with the <**up arrow**> and <**down arrow**> cursor keys on the keyboard.

The operating system supports EMACS-style text editing commands. This standard UNIX text editor format allows you to use keyboard-based shortcut keys for maneuvering around the CLI. The following table lists these available shortcut keys.

Table 3: EMACS Shortcut Keystrokes

Shortcut Keys	Description
<Ctrl + p> and <up arrow>	Recalls previous command in the command history
<Ctrl + n> and <down arrow>	Recalls next command in the command history
<Ctrl + f> and <right arrow>	Moves cursor forward by one character in command line
<Ctrl + b> and <left arrow>	Moves cursor backward by one character in command line
<Esc> + <f>	Moves cursor forward by one word in command line
<Esc> + <b>	Moves cursor backward by one word in command line
<Ctrl> + <a>	Moves cursor to the beginning of the command line
<Ctrl> + <e>	Moves cursor to the end of the command line
<Ctrl> + <k>	Deletes the current command line from the insertion point to the end of the line

Shortcut Keys	Description
<Ctrl> + <u>	Deletes the current command line from the insertion point to the beginning of the line
<Ctrl> + <d>	Deletes a single character in the current command line
<Esc> + <d>	Deletes a word in the current command line
<Ctrl> + <c>	Quits editing the current line
<Ctrl> + <l>	Refreshes the display
<Ctrl> + <t>	Transposes (or switches) the two characters surrounding the insertion point

Obtaining CLI Help

The CLI provides context-sensitive help for every command token and keyword available to you. To obtain, use one of these methods:

- **Command Help:** Command help provides assistance for a specific command. Type a question mark (?) at the end of the specific command to accesses help.

```
[local]host_name# test?
  test - Performs test on followed mechanism
```

- **Keyword Help:** Keyword help provides assistance in determining the next keyword, argument, or option to use in the command syntax. Enter the command keyword, enter a space, and then type a question mark (?).

```
[local]host_name# test alarm ?
  audible - Tests internal audible alarm buzzer on SPC
  central-office - Tests specified central office alarm relays
  <cr> - newline
```

- **Variable Help:** Variable help provides the correct format, value, or information type for each variable that is part of the command syntax. For commands with variables, enter the command keyword, enter a space, and then type a question mark (?).

```
[local]host_name# show card info ?
<Enter card number as an integer ranging 1 to n>
  | - Pipeline
  <cr> - Carriage Return or <Enter> key
```

Exiting the CLI and CLI Command Modes

A CLI session is defined as the successful login into the CLI. When you establish a CLI session, you are placed into the system's Exec Mode. Depending upon your user privilege level, you can:

- Use the *local* context to perform system management functions.
- Move to an assigned context and work in Exec Mode.
- Move to an assigned context as an administrative user and work in Global Configuration Mode or other configuration sub-mode.

This section addresses how to properly exit the various modes and the CLI.

Exiting Configuration Sub-modes

To exit a configuration sub-mode and return to the next highest configuration sub-mode or Global Configuration Mode, type the exit command at the system prompt.

```
[context_name]host_name(config-ctx)# exit
[local]host_name(config)#
```

Important The CLI supports implicit mode-exits when using configuration files. Therefore, configuration files do not have to contain all of the required **exit** commands for you to leave various sub-config modes.

To exit a sub-mode and return to the Exec Mode, enter the **end** command.

```
[local]host_name(config-ctx)# end
[local]host_name#
```

Exiting Global Configuration Mode

To exit Global Configuration Mode, and return to the Exec Mode prompt, type the **exit** command at the prompt.

Ending a CLI Session

To end a CLI session and exit the CLI, type the **exit** command at the Exec Mode prompt.

IP Address Notation

When configuring a port interface via the CLI you may be required to enter an IP address. The CLI always accepts an IPv4 address, and in some cases accepts an IPv6 address as an alternative.

For some configuration commands, the CLI also accepts CIDR notation when entering an IP address. Always view the online Help for the CLI command to verify acceptable forms of IP address notation.

IPv4 Dotted-Decimal Notation

An Internet Protocol Version 4 (IPv4) address consists of 32 bits divided into four octets. These four octets are written in decimal numbers, ranging from 0 to 255, and are concatenated as a character string with full stop delimiters (dots) between each number.

For example, the address of the loopback interface, usually assigned the host name localhost, is 127.0.0.1. It consists of the four binary octets 01111111, 00000000, 00000000, and 00000001, forming the full 32-bit address.

IPv4 allows 32 bits for an Internet Protocol address and can, therefore, support 2^32 (4,294,967,296) addresses

IPv6 Colon-Separated-Hexadecimal Notation

An Internet Protocol Version 6 (IPv6) address has two logical parts: a 64-bit network prefix, and a 64-bit host address part. An IPv6 address is represented by eight groups of 16-bit hexadecimal values separated by colons (:).

A typical example of a full IPv6 address is 2001:0db8:85a3:0000:0000:8a2e:0370:7334

The hexadecimal digits are case-insensitive.

The 128-bit IPv6 address can be abbreviated with the following rules:

- Leading zeroes within a 16-bit value may be omitted. For example, the address fe80:0000:0000:0000:0202:b3ff:fe1e:8329 may be written as fe80:0:0:0:202:b3ff:fe1e:8329
- One group of consecutive zeroes within an address may be replaced by a double colon. For example, fe80:0:0:0:202:b3ff:fe1e:8329 becomes fe80::202:b3ff:fe1e:8329

IPv6 allows 128 bits for an Internet Protocol address and can support 2^128 (340,282,366,920,938,000,000,000,000,000,000,000,000) internet addresses.

CIDR Notation

Classless Inter-Domain Routing (CIDR) notation is a compact specification of an Internet Protocol address and its associated routing prefix. It is used for both IPv4 and IPv6 addressing in networking architectures.

CIDR is a bitwise, prefix-based standard for the interpretation of IP addresses. It facilitates routing by allowing blocks of addresses to be grouped into single routing table entries. These groups (CIDR blocks) share an initial sequence of bits in the binary representation of their IP addresses.

CIDR notation is constructed from the IP address and the prefix size, the latter being the number of leading 1 bits of the routing prefix. The IP address is expressed according to the standards of IPv4 or IPv6. It is followed by a separator character, the slash (/) character, and the prefix size expressed as a decimal number.

Important On the ASR 5000, routes with IPv6 prefix lengths less than /12 and between the range of /64 and /128 are not supported.

The address may denote a single, distinct, interface address or the beginning address of an entire network. In the latter case the CIDR notation specifies the address block allocation of the network. The maximum size of the network is given by the number of addresses that are possible with the remaining, least-significant bits below the prefix. This is often called the host identifier.

For example:

- the address specification 198.51.100.1/24 represents the given IPv4 address and its associated routing prefix 198.51.100.0, or equivalently, its subnet mask 255.255.255.0.
- the IPv4 block 198.51.0.0/22 represents the 1024 IPv4 addresses from 198.51.0.0 to 198.51.3.255.
- the IPv6 block 2001:DB8::/48 represents the IPv6 addresses from 2001:DB8:0:0:0:0:0:0 to 2001:DB8:0:FFFF:FFFF:FFFF:FFFF:FFFF.
- ::1/128 represents the IPv6 loopback address. Its prefix size is 128, the size of the address itself, indicating that this facility consists of only this one address.

The number of addresses of a subnet defined by the mask or prefix can be calculated as $2^{\text{address size - mask}}$, in which the address size for IPv4 is 32 and for IPv6 is 128. For example, in IPv4, a mask of /29 gives 8 addresses.

Alphanumeric Strings

Some CLI commands require the entry of a string of characters that can contain a contiguous collection of alphabetic, numeric, or alphanumeric characters with a defined minimum and maximum length (number of characters)

Character Set

The alphanumeric character set is a combination of alphabetic characters (Latin letters) and numeric characters (Arabic numerals). The set consists of the letters A to Z (uppercase) and a to z (lowercase) and the numbers 0 to 9. The underscore character (_) and dash/hyphen character (-) can also be used.

Blank spaces (whitespaces or SPACE characters) should mostly be avoided in alphabetic, numeric, and alphanumeric strings, except in certain ruledef formats, such as time/date stamps.

The following special characters can be used in ruledefs, APNs, license keys and other configuration/display parameters:

- < > (arrow brackets) [less than or greater than]
- * (asterisk) [wildcard]
- : (colon)
- $ (dollar sign) [wildcard]
- . (dot)
- = (equals sign)
- ! (exclamation point)
- % (percent)
- / (slash - forward)
- | (vertical bar)

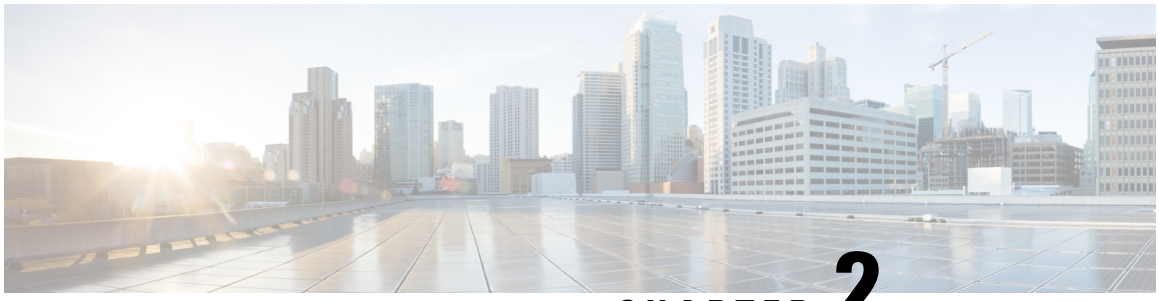
The following special characters can be used to delimit the domain from the user name for global AAA functions:

- @ (at sign)
- - (dash or hyphen)
- # (hash or pound sign)
- % (percent)
- \ (slash - backward) [must be entered as double slash \\]
- / (slash - forward)

Quoted Strings

If descriptive text requires the use of spaces between words, the string must be entered within double quotation marks (" ").

```
interface "Rack 3 Chassis 1 port 5/2"
```



CHAPTER 2

AAA Server Group Configuration Mode Commands

The AAA Server Group Configuration Mode is used to create and manage the Diameter/RADIUS server groups within the context or system. AAA server group facilitates management of group (list) of servers at per subscriber/APN/realm level for AAA functionality.

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aaa-group)#`

Important As AAA applications do not support the indirectly connected hosts, configure only the directly connected host.

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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description

Allows you to enter descriptive text for this configuration.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

description *text*
no description

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines

The description should provide useful information about this configuration.

diameter accounting

This command configures Diameter accounting parameters.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
diameter accounting { dictionary { aaa-custom1 | aaa-custom10 | aaa-custom2
 | aaa-custom3 | aaa-custom4 | aaa-custom5 | aaa-custom6 | aaa-custom7 |
 aaa-custom8 | aaa-custom9 | dynamic-load | nasreq | rf-plus } | endpoint
 endpoint_name | hd-mode fall-back-to-local | hd-storage-policy hd_policy |
max-retries max_retries | max-transmissions max_transmissions | request-timeout
 request_timeout_duration | sdc-integrity | server host_name priority priority |
upgrade-dict-avps { 3gpp-rel10 | 3gpp-rel9 } }
default diameter accounting { dictionary | hd-mode | max-retries |
max-transmissions | request-timeout | upgrade-dict-avps }
no diameter accounting { endpoint | hd-mode | hd-storage-policy |
max-retries | max-transmissions | sdc-integrity | server host_name |
upgrade-dict-avps }
```

no diameter accounting { endpoint | hd-mode | hd-storage-policy | max-retries | max-transmissions | sdc-integrity | server *host_name* | upgrade-dict-avps }

endpoint: Removes the configured accounting endpoint, and the default accounting server configured in the default AAA group will be used.

hd-mode: Sends records to the Diameter server, if all Diameter servers are down or unreachable, then copies records to the local hard disk drive (HDD) and periodically retries the Diameter server.

hd-storage-policy: Disables use of the specified HD storage policy.

max-retries: Disables the configured retry attempts for Diameter accounting in the current AAA group.

max-transmissions: Disables the configured maximum transmission attempts for Diameter accounting in the current AAA group.

sdc-integrity: Excludes the "SDC-Integrity-Grouping" Diameter AVP in the ACR message even if present in the "aaa-custom4" dictionary.

server *host_name*: Removes the configured Diameter host *host_name* from this AAA server group for Diameter accounting.

upgrade-dict-avps: Sets the release version to 3GPP Rel. 8 for upgrading Diameter accounting dictionary in the current AAA group.

default diameter accounting { dictionary | hd-mode | max-retries | max-transmissions | request-timeout | upgrade-dict-avps }

dictionary: Sets the context's dictionary as the system default.

hd-mode: Sends records to the Diameter server, if all Diameter servers are down or unreachable, then copies records to the local HDD and periodically retries the Diameter server.

max-retries: Sets the retry attempts for Diameter accounting in the current AAA group to default 0 (disable).

max-transmissions: Sets the configured maximum transmission attempts for Diameter accounting in the current AAA group to default 0 (disable).

request-timeout: Sets the timeout duration, in seconds, for Diameter accounting requests in the current AAA group to default 20.

upgrade-dict-avps: Sets the release version to 3GPP Rel. 8 for upgrading Diameter accounting dictionary in the current AAA group.

dictionary { aaa-custom1 | aaa-custom10 | aaa-custom2 | aaa-custom3 | aaa-custom4 | aaa-custom5 | aaa-custom6 | aaa-custom7 | aaa-custom8 | aaa-custom9 | dynamic-load | nasreq | rf-plus }

Specifies the Diameter accounting dictionary.

aaa-custom1 ... aaa-custom10: Configures the custom dictionaries. Even though the CLI syntax supports several custom dictionaries, not necessarily all of them have been defined. If a custom dictionary that has not been implemented is selected, the default dictionary will be used.

dynamic-load: Configures the dynamically loaded Diameter dictionary. The dictionary name must be an alphanumeric string of 1 through 15 characters. For more information on dynamic loading of Diameter dictionaries, see the **diameter dynamic-dictionary** in the *Global Configuration Mode Commands* chapter of this guide.

nasreq: nasreq dictionary—the dictionary as defined by RFC 3588.

rf-plus: RF Plus dictionary.

endpoint *endpoint_name*

Enables Diameter to be used for accounting, and specifies which Diameter endpoint to use.

endpoint_name must be a string of 1 through 63 characters.

hd-mode fall-back-to-local

Specifies that records be copied to the local HDD if the Diameter server is down or unreachable. CDF/CGF will pull the records through SFTP.

hd-storage-policy *hd_policy*

Associates the specified HD Storage policy with the AAA group.

hd_policy must be the name of a configured HD Storage policy, and must be an alphanumeric string of 1 through 63 characters.

HD Storage policies are configured through the Global Configuration Mode.

This and the **hd-mode** command are used to enable the storage of Rf Diameter Messages to HDD in case all Diameter Servers are down or unreachable.

max-retries *max_retries*

Specifies how many times a Diameter request should be retried with the same server, if the server fails to respond to a request.

max_retries specifies the maximum number of retry attempts, and must be an integer from 1 through 1000.

Default: 0

max-transmissions *max_transmissions*

Specifies the maximum number of transmission attempts for a Diameter request. Use this in conjunction with the **max-retries** *max_retries* option to control how many servers will be attempted to communicate with.

max_transmissions must be an integer from 1 through 1000.

Default: 0

request-timeout *request_timeout_duration*

Specifies the number of seconds the system will wait for a response from a Diameter server before re-transmitting the request.

request_timeout_duration specifies the number of seconds, and must be an integer from 1 through 3600.

Default: 20

sdc-integrity

This keyword enables the SDC Integrity feature. When enabled, SDC-Integrity-Grouping AVP is included in the ACR message. This AVP contains the number of Service Data Containers (SDCs) included by P-GW and the checksum as calculated by the previously defined algorithm. The checksum calculation is done only if the AVP is included. By default, this feature is disabled i.e. the grouped AVP is not included in the ACR message even if present in the "aaa-custom4" dictionary. The CLI command will have no effect if the dictionary does not contain the SDC-Integrity-Grouping AVP.

Important This feature is customer-specific. For more information, contact your Cisco Account representative.

P-GW generates the charging data and creates a new ACR with individual SDCs based on Rating Groups, and then sends the ACR message directly to Charging Collection Function (CCF). When an intermediate node is inserted between P-GW and CCF, the node appends more SDCs in the charging record sent by P-GW through the Rf interface.

To protect the integrity of SDCs, P-GW counts the number of SDCs, runs a checksum algorithm against the bytes within the SDCs, and then adds the "SDC-Integrity-Grouping" AVP with these two values in the ACR message. This grouped AVP is optional and defined in "aaa-custom4" dictionary only. This vendor-specific AVP can be enabled only when the peer supports the vendor ID. This feature helps CCF to distinguish the SDCs included by the intermediate node.

For this feature to work, the CLI control must be enabled and "aaa-custom4" dictionary containing the grouped AVP should be used and associated with the appropriate AAA group. When this feature is enabled, there might be minimal performance impact on P-GW specifically on AAA Manager tasks due to checksum calculation.

server *host_name* priority *priority*

Specifies the current context Diameter accounting server's host name and priority.

host_name specifies the Diameter host name, and must be an alphanumeric string of 1 through 63 characters.

priority specifies the relative priority of this Diameter host. The priority is used in server selection. The priority must be an integer from 1 through 1000.

upgrade-dict-avps { 3gpp-rel10 | 3gpp-rel9 }

Specifies to upgrade Diameter accounting dictionary to 3GPP Rel. 9 version or 3GPP Rel. 10 version.

3gpp-rel10: Upgrades the dictionary to 3GPP Rel. 10 version.

3gpp-rel9: Upgrades the dictionary to 3GPP Rel. 9 version.

Default: Sets the release version to 3GPP Rel. 8

Usage Guidelines

Use this command to manage the Diameter accounting options according to the Diameter server used for the context.

Example

The following command configures the Diameter accounting dictionary, *aaa-custom10*:

```
diameter accounting dictionary aaa-custom10
```

The following command configures the Diameter endpoint, *EAP1*:

```
diameter accounting endpoint EAP1
```

The following commands configure Diameter accounting options:

```
diameter accounting max-retries 4
diameter accounting max-transmissions 2
diameter accounting request-timeout 10
diameter accounting server svc priority 1
```

diameter accounting interim

This command configures Diameter accounting interim interval to be sent to the server independently from RADIUS accounting interim interval.

Product

GGSN

P-GW

HSGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

diameter accounting interim interval *interim_interval*
no diameter accounting interim interval

no

Disables Diameter interim accounting.

interim

Specifies when system should send an interim accounting record to the server.

interval *interim_interval*

Specifies the time interval, in seconds, between sending interim accounting records. *interim_interval* must be an integer from 50 through 40000000.

Usage Guidelines

Use this command to separately configure Diameter accounting interim interval for Rf interface.

In case Diameter interim interval CLI is not configured, the P-GW retains the older behavior where Diameter accounting uses the same interim interval value configured for RADIUS accounting.

Once Diameter configuration takes effect, any change to RADIUS configuration will not affect Diameter configuration and vice versa.

Example

The following command sets the interval between sending interim accounting records to 15 minutes (900 seconds):

diameter accounting interim interval 900

diameter accounting duplicate-record

This command enables the system to create a secondary feed of Rf records and send them to the secondary AAA group.

Product

GGSN

HSGW

P-GW

S-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

[no] diameter accounting duplicate-record

duplicate-record

This keyword creates an additional copy of Rf records and sends the duplicate Rf records to the configured secondary AAA group.

no

This keyword disables the Duplicate Rf Record Generation feature. This is the default configuration.

Usage Guidelines

Use this command to create duplicate Rf records and send them to the configured secondary AAA group.

The secondary aaa group must be configured under APN configuration mode before enabling the **diameter accounting duplicate-record** CLI command.

In releases prior to 21, gateway allows only one AAA group configuration per APN for Rf accounting. The AAA group is configured to load balance across multiple servers to pass the Rf traffic and also expect an accounting answer. Note that the secondary AAA group configuration is allowed currently but is restricted to only RADIUS accounting.

In release 21 and beyond, the gateway is provided with the ability to configure a secondary AAA group per APN for the Rf interface, and send the duplicate Diameter Rf accounting records to the secondary AAA group servers. The secondary AAA group is used for non-billing purposes only.

Important The failed duplicate records will neither be written to HDD nor added to the archival list.

For more information on this feature, see the *Rf Interface Support* chapter of the administration guide for the product you are deploying.

Example

The following command enables the system to send duplicate Rf records to secondary AAA group:

diameter accounting duplicate-record

diameter authentication

This command configures Diameter authentication parameters.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
diameter authentication { allow any-host | dictionary { aaa-custom1 |
aaa-custom10 | aaa-custom11 | aaa-custom12 | aaa-custom13 | aaa-custom14
 | aaa-custom15 | aaa-custom16 | aaa-custom17 | aaa-custom18 | aaa-custom19
 | aaa-custom2 | aaa-custom20 | aaa-custom3 | aaa-custom4 | aaa-custom5
| aaa-custom6 | aaa-custom7 | aaa-custom8 | aaa-custom9 | dynamic-load |
 nasreq } | encode-supported-features pcscf-restoration-indication |
endpoint endpoint_name | max-retries max_retries | max-transmissions
max_transmissions | redirect-host-avp { just-primary | primary-then-secondary
 } | request-timeout request_timeout_duration | server host_name priority priority
 | upgrade-dict-avps { 3gpp-rel10 | 3gpp-rel9 } }
default diameter authentication { dictionary | encode-supported-features
 | max-retries | max-transmissions | redirect-host-avp | request-timeout
 | upgrade-dict-avps }
no diameter authentication {allow any-host encode-supported-features |
endpoint | max-retries | max-transmissions | server host_name |
upgrade-dict-avps }
```

no diameter authentication { allow any-host| encode-supported-features | endpoint | max-retries | max-transmissions | server*host_name* | upgrade-dict-avps }

allow any-host: Disables the assigned values which are applicable in diameter authentication procedures.

encode-supported-features: Disables the CLI command to not send the Supported-Features AVP.

endpoint: Removes the configured authentication endpoint, and the default server configured in default AAA group will be used.

max-retries: Disables the configured retry attempts for Diameter authentication in the current AAA group.

max-transmissions: Disables the configured maximum transmission attempts for Diameter authentication in the current AAA group.

server *host_name*: Removes the configured Diameter host *host_name* from this AAA server group for Diameter authentication.

upgrade-dict-avps: Sets the release version to 3GPP Rel. 8 for upgrading Diameter authentication dictionary in the current AAA group.

default diameter authentication { dictionary | encode-supported-features | max-retries | max-transmissions | redirect-host-avp | request-timeout | upgrade-dict-avps }

dictionary: Sets the context's dictionary as the system default.

encode-supported-features: Configures the default setting, that is not to send the Supported-Features AVP in AAR message.

max-retries: Sets the retry attempts for Diameter authentication requests in the current AAA group to default 0 (disable).

max-transmissions: Sets the configured maximum transmission attempts for Diameter authentication in the current AAA group to default 0 (disable).

redirect-host-avp: Sets the redirect choice to default (just-primary).

request-timeout: Sets the timeout duration, in seconds, for Diameter authentication requests in the current AAA group to default 20.

upgrade-dict-avps: Sets the release version to 3GPP Rel. 8 for upgrading Diameter authentication dictionary in the current AAA group.

allow any-host

Accepts the response from any-host.

dictionary { aaa-custom1 | aaa-custom10 | aaa-custom11 | aaa-custom12 | aaa-custom13 | aaa-custom14 | aaa-custom15 | aaa-custom16 | aaa-custom17 | aaa-custom18 | aaa-custom19 | aaa-custom2 | aaa-custom20 | aaa-custom3 | aaa-custom4 | aaa-custom5 | aaa-custom6 | aaa-custom7 | aaa-custom8 | aaa-custom9 | dynamic-load | nasreq }

Specifies the Diameter authentication dictionary.

aaa-custom1 ... aaa-custom8, aaa-custom10 ... aaa-custom20: Configures the custom dictionaries. Even though the CLI syntax supports several custom dictionaries, not necessarily all of them have been defined. If a custom dictionary that has not been implemented is selected, the default dictionary will be used.

Important **aaa-custom11** dictionary is only available in StarOS 8.1 and later releases. **aaa-custom12** to **aaa-custom20** dictionaries are only available in StarOS 9.0 and later releases.

aaa-custom9: Configures the STa standard dictionary.

dynamic-load: Configures the dynamically loaded Diameter dictionary. The dictionary name must be an alphanumeric string of 1 through 15 characters. For more information on dynamic loading of Diameter dictionaries, see the **diameter dynamic-dictionary** in the *Global Configuration Mode Commands* chapter of this guide.

nasreq: nasreq dictionary—the dictionary as defined by RFC 3588.

encode-supported-features

Encodes Supported-Features AVP.

pcscf-restoration-indication

Enables the P-CSCF Restoration Indication feature. By default, this feature is disabled.

Important This keyword is license dependent. For more information, contact your Cisco account representative.

For more information on this feature, see the *Gx Interface Support* chapter in the administration guide of the product you are deploying.

endpoint *endpoint_name*

Enables Diameter to be used for authentication, and specifies which Diameter endpoint to use.

endpoint_name must be an alphanumeric string of 1 through 63 characters.

max-retries *max_retries*

Specifies how many times a Diameter authentication request should be retried with the same server, if the server fails to respond to a request.

max_retries specifies the maximum number of retry attempts, and must be an integer from 1 through 1000.

Default: 0

max-transmissions *max_transmissions*

Specifies the maximum number of transmission attempts for a Diameter authentication request. Use this in conjunction with the "**max-retries** *max_retries*" option to control how many servers will be attempted to communicate with.

max_transmissions specifies the maximum number of transmission attempts, and must be an integer from 1 through 1000.

Default: 0

redirect-host-avp { just-primary | primary-then-secondary }

Specifies whether to use just one returned AVP, or use the first returned AVP as selecting the primary host and the second returned AVP as selecting the secondary host.

just-primary: Redirect only to primary host.

primary-then-secondary: Redirect to primary host, if fails then redirect to the secondary host.

Default: just-primary

request-timeout *request_timeout_duration*

Specifies how long the system will wait for a response from a Diameter server before re-transmitting the request.

request_timeout_duration specifies the number of seconds the system will wait for a response from a Diameter server before re-transmitting the request, and must be an integer from 1 through 3600.

Default: 20 seconds

server *host_name* priority *priority*

Specifies the current context Diameter authentication server's host name and priority.

host_name specifies the Diameter authentication server's host name, and must be an alphanumeric string of 1 through 63 characters.

priority specifies the relative priority of this Diameter host. The priority is used in server selection. The priority must be an integer from 1 through 1000.

upgrade-dict-avps { 3gpp-rel10 | 3gpp-rel9 }

Specifies to upgrade Diameter authentication dictionary to 3GPP Rel. 9 version or 3GPP Rel. 10 version.

3gpp-rel10: Upgrades the dictionary to 3GPP Rel. 10 version.

3gpp-rel9: Upgrades the dictionary to 3GPP Rel. 9 version.

Default: Sets the release version to 3GPP Rel. 8

Usage Guidelines

Use this command to manage the Diameter authentication options according to the Diameter server used for the context.

Example

The following command configures the Diameter authentication dictionary, *aaa-custom1*:

```
diameter authentication dictionary aaa-custom1
```

The following command configures the Diameter endpoint, *EAP1*:

```
diameter authentication endpoint EAP1
```

The following commands configure Diameter authentication options:

```
diameter authentication max-retries 4
diameter authentication max-transmissions 2
diameter authentication redirect-host-avp primary-then-secondary
diameter authentication server svc priority 1
diameter authentication request-timeout 10
```

diameter authentication drmp

This command enables or disables the inclusion of DRMP AVP in S6b communication, and to configure DRMP value based on AAR-Initial, AAR-Interim and STR message types.

Product

All products using Diameter S6b interface.

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

diameter authentication drmp [aar-initial *drmp_value* **[aar-interim** *drmp_value* **[str** *drmp_value* **]] | aar-initial** *drmp_value* **[str** *drmp_value* **[aar-interim** *drmp_value* **]] | aar-interim** *drmp_value* **[aar-initial** *drmp_value* **[str** *drmp_value* **]] | aar-interim** *drmp_value* **[str** *drmp_value* **[aar-initial** *drmp_value* **]] | str** *drmp_value* **[aar-interim** *drmp_value* **[aar-initial** *drmp_value* **]] | str** *drmp_value* **[aar-initial** *drmp_value* **[aar-interim** *drmp_value* **]]]**
no diameter authentication drmp

no

Disables encoding of DRMP AVP in S6b messages. The **no diameter authentication drmp** is the default configuration.

drmp

Specifies the settings of Diameter Routing Message Priority.

aar-initial

Includes the DRMP value in AAR-initial message. The default value is 10.

aar-interim

Includes the DRMP value in AAR-interim message. The default value is 10.

str

Includes the DRMP value in STR message. The default value is 10.

drmp_value

Specifies the DRMP value and must be an integer from 0 through 15. Zero (0) has the highest priority and 15 has the lowest. That is, lower the value, higher the priority.

Usage Guidelines

This CLI command will individually configure DRMP values for the AAR-initial, AAR-interim and STR messages. If message type priority is not specified in the CLI, default value (10) will be used. The last configured CLI line will override all values previously configured, irrespective of how many priorities are explicitly configured.

In case of configuring specific values for message types, each time the CLI is invoked, all the 3 values will be modified with the new values. If a value is not specified in CLI, it will be overwritten by default value, which is 10.

Example

The following command will include DRMP value *12* to AAR-initial, *8* to AAR-interim, and *6* to STR message:

```
diameter authentication drmp aar-initial 12 aar-interim 8 str 6
```

diameter authentication failure-handling

This command configures the failure handling for Diameter authentication requests and Diameter Extensible Authentication Protocol (EAP) requests.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aaa-group)#`

Syntax Description

diameter authentication failure-handling { authorization-request | eap-request | eap-termination-request } { request-timeout action { continue | retry-and-terminate | terminate } | result-code *start_result_code* **{ [to** *end_result_code* **] action { continue | retry-and-terminate | terminate } } }**
no diameter authentication failure-handling { authorization-request | eap-request | eap-termination-request } result-code *start_result_code* **[to** *end_result_code* **]**
default diameter authentication failure-handling { authorization-request | eap-request | eap-termination-request } request-timeout action

no

Disables Diameter authentication failure handling.

default

Configures the default Diameter authentication failure handling setting.

authorization-request

Specifies that failure handling must be performed on Diameter authorization request (AAR/AAA) messages.

eap-request

Specifies configuring failure handling for EAP requests.

eap-termination-request

Specifies configuring failure handling for EAP termination requests.

request-timeout action { continue | retry-and-terminate | terminate }

Specifies the action to be taken for failures:

- **continue**: Continues the session
- **retry-and-terminate**: First retries, if it fails then terminates the session

- **terminate**: Terminates the session

Important For any failure encountered, the "continue" option terminates the call as with the "terminate" option for all Diameter dictionaries except aaa-custom15 dictionary.

result-code *start_result_code* [to *end_result_code*] action { continue | retry-and-terminate | terminate }

start_result_code: Specifies the result code number, must be an integer from 1 through 65535.

to *end_result_code*: Specifies the upper limit of a range of result codes. **to** *end_result_code* must be greater than *start_result_code*.

action { continue | retry-and-terminate | terminate }: Specifies the action to be taken for failures:

- **continue**: Continues the session
- **retry-and-terminate**: First retries, if it fails then terminates
- **terminate**: Terminates the session

Important For any failure encountered, the "continue" option terminates the call as with the "terminate" option for all Diameter dictionaries except aaa-custom15 dictionary. This behavior is true in releases prior to 20. In 20 and later releases, the "continue" option is applicable for all S6b dictionaries including aaa-custom15 dictionary.

Usage Guidelines Use this command to configure error handling for Diameter EAP, EAP-termination, and authorization requests. Specific actions (continue, retry-and-terminate, or terminate) can be associated with each possible result-code. Ranges of result codes can be defined with the same action, or actions can be specific on a per-result code basis.

Example

The following commands configure result codes *5001, 5002, 5004,* and *5005* to use "action continue" and result code *5003* to use "action terminate":

```
diameter authentication failure-handling eap-request result-code 5001 to
 5005 action continue
diameter authentication failure-handling eap-request result-code 5003
action terminate
```

diameter authentication failure-handling-template

This command associates the failure-handling template with AAA group authentication for Diameter authentication requests and Diameter Extensible Authentication Protocol (EAP) requests.

Product ePDG

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
diameter authentication failure-handling-template template_name emps
no diameter authentication failure-handling-template
no diameter authentication failure-handling-template emps
```

no

Disassociates a failure handling template with the AAA group authentication.

failure-handling-template *template_name*

Associates a previously created failure handling template with the authentication application in the AAA group. *template_name* specifies the name for a pre-configured failure handling template. *template_name* must be an alphanumeric string of 1 through 63 characters. By default, the template is not associated in the AAA group.

For more information on failure handling template, refer to the **failure-handling-template** command in the *Global Configuration Mode Commands* chapter.

emps

Specifies the failure-handling behavior for eMPS Sessions applicable during S6B authorization and re-authorization.

Usage Guidelines

Use this command to associate a configured failure handling template with the AAA group authentication application. The failure handling template defines the action to be taken when the Diameter application encounters a failure supposing a result-code failure, Tx-expiry or response-timeout. The application will take the action given by the template. For more information on failure handling template configurations, refer to the *Diameter Failure Handling Template Configuration Mode Commands* chapter in this guide.

This CLI command is introduced to support Overload Control on Diameter interfaces such as Gx, S6b and SWm and also to prevent network overload and outages. Whenever there is an overload condition at the Diameter Servers or DRA and request times out, the clients (ePDG/P-GW) are typically unaware of the overload condition and attempt to send the message on an alternate connection with the Diameter server causing some more traffic in the network. In order to handle this overload condition effectively, a new vendor-specific Diameter Experimental Result-Code 5198 (DIAMETER_OVERLOAD_RETRY_NOT_ALLOWED_TO_ANY) is defined.

When the overloaded PCRF/DRA receives a message, it includes the result-code 5198 in the response message. On receiving the experimental result-code, call is terminated based on the failure-handling configuration. If failure-handling is configured as local-policy, then the call is continued with local-policy without retrying the secondary server. For more information on the Diameter Overload Control feature, refer to the *AAA Interface Administration and Reference* document.

When the **failure-handling-template** is configured and the **failure-handling** CLI is also enabled in the AAA Group configuration, the template is given the higher preference. When the Result-Code (5198) is received

in DEA/AAA request, the call is terminated without the Session Terminate Request (STR) for S6b and SWm interfaces.

If the association is not made to the template then failure handling behavior configured in the application with the **failure-handling** command will take its effect.

Example

The following command associates the failure handling template FH_1 with the Diameter authentication interface.

```
diameter authentication failure-handling-template FH_1
```

The following command configures the failure-handling template *TEST* for eMPS subscribers during S6B authorization/re-authorization failures:

```
diameter authentication failure-handling-template TEST emps
```

diameter authentication server-selection sent-by-epdg

Use this command to disable the feature of encoding the AAA-Server-Identifier information, provided by ePDG node, into the Destination-Host/Destination-Realm in the AAR request.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
[ no ] diameter authentication server-selection sent-by-epdg
```

no

Causes the P-GW to ignore the AAA-Server-Identifier information received from the ePDG node.

Usage Guidelines

This CLI command is applicable to Release 21.3.5 and higher.

Use this command to disable the encoding of ePDG provided AAA-Server-Identifier information in the AAR request.

This CLI command is applicable only to servers connected through a Diameter Routing Agent (DRA).

With the default configuration (or no explicit use of the this CLI command), there is no change in behavior. That is to say, the feature of encoding an ePDG provided AAA-Server-Identifier information into the Destination-Host/Destination-Realm in the AAR request cannot be disabled.

diameter authentication strip-leading-digit

This command enables or disables stripping of leading digit from User-Name AVP of non-authentication procedures like AAR and STR.

Product

ePDG

HSGW

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
[ no ] diameter authentication strip-leading-digit { user-name }
```

no

Disables the stripping of leading digit from User-Name AVP of non-authentication procedures

user-name

This keyword specifies to strip off the leading digit from User-Name AVP of non-authentication procedures. By default, this feature is disabled.

Usage Guidelines

As part of 2015 4G network upgrade release, no leading digit is included in the User-Name AVP of non-authentication procedures like AAR and STR. For backward compatibility, the 3GPP AAA server accepts User-Name with and without the leading digit.

This CLI command is used to control the stripping of leading digit in the User-Name AVP. This feature is applicable to all authentication and authorization interfaces like S6b, STa and SWm and not for accounting interfaces. This CLI command is applicable only for AAR and STR messages.

If the User-Name AVP is received in RAR (for SWm and STa), the same User-Name is included in the RAA message irrespective of the CLI option. For example, if the User-Name AVP is prefixed with 0 in RAR and the CLI option for stripping is enabled, then the User-Name AVP is sent in RAA with the leading "0".

Important This CLI command will not take effect for aaa-custom17 and aaa-custom19 dictionaries. This CLI is not applicable for response messages (RAA/ASA) sent by chassis.

Example

The following command strips off the leading digit in the User-Name AVP of non-authentication procedures.

```
diameter authentication strip-leading-digit user-name
```

diameter dictionary

This command is deprecated and is replaced by the **diameter accounting dictionary** and **diameter authentication dictionary** commands. See the diameter accounting, on page 19 and diameter authentication, on page 25 commands respectively.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

radius

This command configures basic RADIUS options.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aaa-group)#`

Syntax Description

```
radius { deadtime minutes | detect-dead-server { consecutive-failures
consecutive_failures_count | response-timeout response_timeout_duration } | dictionary
 dictionary | max-outstanding max_messages | max-retries max_retries |
max-transmissions max_transmissions | probe-message local-service-address
ipv4/ipv6_address | strip-domain { authentication-only | accounting-only } |
 timeout idle_seconds }
default radius { deadtime | detect-dead-server | dictionary |
max-outstanding | max-retries | max-transmissions | timeout }
no radius { detect-dead-server | max-transmissions | radius probe-message
 local-service-address | strip-domain }
```

no

Removes the specified configuration.

default

Configures default setting for the specified keyword.

dictionary *dictionary*

Specifies which dictionary to use. The following table describes the possible values for *dictionary*:

Dictionary	Description
custom*XX*	These are dictionaries that can be customized to fit your needs. Customization information can be attained by contacting your local service representative. *XX* is the integer value of the custom dictionary.
standard	This dictionary consists only of the attributes specified in RFC 2865, RFC 2866, and RFC 2869.
3gpp	This dictionary consists not only of all of the attributes in the standard dictionary, but also all of the attributes specified in 3GPP 32.015.
3gpp2	This dictionary consists not only of all of the attributes in the standard dictionary, but also all of the attributes specified in IS-835-A.
3gpp2-835	This dictionary consists not only of all of the attributes in the standard dictionary, but also all of the attributes specified in IS-835.
starent-vsa1	This dictionary consists not only of the 3GPP2 dictionary, but also includes Starent Networks vendor-specific attributes (VSAs) as well. The VSAs in this dictionary support a one-byte wide VSA Type field in order to support certain RADIUS applications. The one-byte limit allows support for only 256 VSAs (0 - 255). This is the default dictionary. **Important** In 12.0 and later releases, no new attributes can be added to the **starent-vsa1** dictionary. If there are any new attributes to be added, these can only be added to the **starent** dictionary. For more information, please contact your Cisco account representative.

Dictionary	Description
starent-vsa1-835	This dictionary consists not only of the 3gpp2-835 dictionary, but also includes Starent Networks vendor-specific attributes (VSAs) as well. The VSAs in this dictionary support a one-byte wide VSA Type field in order to support certain RADIUS applications. The one-byte limit allows support for only 256 VSAs (0 - 255). This is the default dictionary.
starent	This dictionary consists of all of the attributes in the starent-vsa1 dictionary and incorporates additional Starent Networks VSAs by using a two-byte VSA Type field. This dictionary is the master-set of all of the attributes in all of the dictionaries supported by the system.
starent-835	This dictionary consists of all of the attributes in the starent-vsa1-835 dictionary and incorporates additional Starent Networks VSAs by using a two-byte VSA Type field. This dictionary is the master-set of all of the attributes in all of the -835 dictionaries supported by the system.

deadtime *minutes*

Specifies the number of minutes to wait before changing the state of a RADIUS server from "Down" to "Active". *minutes* must be an integer from 0 through 65535.

Default: 10

Important This parameter is not applicable when **radius detect-dead-server keepalive** is configured. For keepalive approach **radius keepalive consecutive-response** is used instead of **radius deadtime** to determine when the server is marked as reachable. For further explanation refer to **radius keepalive consecutive-response** command's description.

Important This parameter should be set to allow enough time to remedy the issue that originally caused the server's state to be changed to "Down". After the deadtime timer expires, the system returns the server's state to "Active" regardless of whether or not the issue has been fixed.

Important For a complete explanation of RADIUS server states, if you are using StarOS 12.3 or an earlier release, refer to the *RADIUS Server State Behavior* appendix in the *AAA and GTPP Interface Administration and Reference*. If you are using StarOS 14.0 or a later release, refer to the *AAA Interface Administration and Reference*.

detect-dead-server { consecutive-failures *consecutive_failures_count* | keepalive | response-timeout *response_timeout_duration* }

consecutive-failures *consecutive_failures_count*: Specifies the number of consecutive failures, for any AAA Manager, before a server's state is changed from "Active" to "Down". *consecutive_failures_count* must be an integer from 1 through 1000. Default: 4.

keepalive: Enables the AAA server alive-dead detect mechanism based on sending keepalive authentication messages to all authentication servers. Default is disabled.

response-timeout *response_timeout_duration*: Specifies the number of seconds, for any AAA Manager, to wait for a response to any message before a server's state is changed from "Active" to "Down". *response_timeout_duration* must be an integer from 1 through 65535.

Important If both **consecutive-failures** and **response-timeout** are configured, then both parameters must be met before a server's state is changed to "Down".

Important The "Active" or "Down" state of a RADIUS server as defined by the system, is based on accessibility and connectivity. For example, if the server is functional but the system has placed it into a "Down" state, it could be the result of a connectivity problem. When a RADIUS server's state is changed to "Down", a trap is sent to the management station and the **deadtime** timer is started.

max-outstanding *max_messages*

Specifies the maximum number of outstanding messages a single AAA Manager instance will queue.

max_messages must be an integer from 1 through 4000.

Default: 256

max-retries *max_retries*

Specifies the maximum number of times communication with a AAA server will be attempted before it is marked as "Not Responding", and the detect dead server's consecutive failures count is incremented.

max_retries must be an integer from 0 through 65535.

Default: 5

max-transmissions *max_transmissions*

Sets the maximum number of re-transmissions for RADIUS authentication requests. This limit is used in conjunction with **max-retries** parameter for each server.

When failing to communicate with a RADIUS sever, the subscriber is failed once all of the configured RADIUS servers have been exhausted, or once the configured number of maximum transmissions is reached.

For example, if three servers are configured and if the configured max-retries is 3 and max-transmissions is 12, then the primary server is tried four times (once plus three retries), the secondary server is tried four times, and then a third server is tried four times. If there is a fourth server, it is not tried because the maximum number of transmissions (12) has been reached.

max_transmissions must be an integer from 1 through 65535.

Default: Disabled

probe-message local-service-address *ipv4/ipv6_address*

radius probe-message: Configures AVPs to be sent in RADIUS authentication probe messages.

local-service-address: Configures the service ip-address to be sent as an AVP in RADIUS authentication probe messages.

ipv4/ipv6_address: Specifies the IP address of the server.

ip_address must be specified in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation. A maximum of 128 RADIUS servers can be configured per context. This limit includes accounting and authentication servers.

strip-domain { authentication-only | accounting-only }

Specifies that the domain must be stripped from the user name prior to authentication or accounting.

By default, strip-domain configuration will be applied to both authentication and accounting messages, if configured.

When the argument **authentication-only** or **accounting-only** is present, **strip-domain** is applied only to the specified RADIUS message types.

timeout *idle_seconds*

Specifies the number of seconds to wait for a response from the RADIUS server before re-sending the messages.

idle_seconds must be an integer from 1 through 65535.

Default: 3

Usage Guidelines

Use this command to configure the basic RADIUS parameters according to the RADIUS server used for the context.

Example

The following command configures the RADIUS timeout parameter to *300* seconds.

```
radius timeout 300
```

radius accounting

This command configures the current context's RADIUS accounting parameters.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting { archive [ stop-only ] | deadtime minutes |
detect-dead-server { consecutive-failures consecutive_failures_count | keepalive
 | response-timeout response_timeout_duration } | fire-and-forget | interim
```

interval *interim_interval* **| max-outstanding** *max_messages* **| max-pdu-size** *octets* **| max-retries** *max_retries* **| max-transmissions** *max_transmissions* **| timeout** *idle_seconds* **}**
default radius accounting { deadtime | detect-dead-server | fire-and-forget | max-outstanding | max-pdu-size | max-retries | max-transmissions | timeout }
no radius accounting { archive | detect-dead-server | fire-and-forget | interim interval | max-transmissions }

no

Removes the specified configuration.

default

Configures the default setting for the specified keyword.

archive [stop-only]

Enables archiving of RADIUS accounting messages in the system after the accounting message has exhausted retries to all available RADIUS accounting servers. All RADIUS accounting messages generated by a session are serially delivered to the RADIUS accounting server. That is, previous RADIUS accounting messages from the same call must be delivered and acknowledged by the RADIUS accounting server before the next RADIUS accounting message is sent to the RADIUS accounting server.

stop-only specifies archiving of only STOP accounting messages.

Default: enabled

deadtime *minutes*

Specifies the number of minutes to wait before changing the state of a RADIUS server from "Down" to "Active".

minutes must be an integer from 0 through 65535.

Default: 10 minutes

Important This parameter is not applicable when **radius accounting detect-dead-server keepalive** is configured. For keepalive approach **radius accounting keepalive consecutive-response** is used instead of **radius accounting deadtime** to determine when the server is marked as reachable. For further explanation refer to **radius accounting keepalive consecutive-response** command's description.

Important This parameter should be set to allow enough time to remedy the issue that originally caused the server's state to be changed to "Down". After the deadtime timer expires, the system returns the server's state to "Active" regardless of whether or not the issue has been fixed.

Important For a complete explanation of RADIUS server states, if you are using StarOS 12.3 or an earlier release, refer to the *RADIUS Server State Behavior* appendix in the *AAA and GTPP Interface Administration and Reference*. If you are using StarOS 14.0 or a later release, refer to the *AAA Interface Administration and Reference*.

detect-dead-server { consecutive-failures *consecutive_failures_count* | keepalive | response-timeout *response_timeout_duration* }

consecutive-failures *consecutive_failures_count*: Specifies the number of consecutive failures, for any AAA Manager, before a server's state is changed from "Active" to "Down". *consecutive_failures_count* must be an integer from 1 through 1000. Default: 4

keepalive: Enables the AAA server alive-dead detect mechanism based on sending keepalive authentication messages to all authentication servers. Default: disabled

response-timeout *response_timeout_duration*: Specifies the number of seconds, for any AAA Manager, to wait for a response to any message before a server's state is changed from "Active" to "Down". *response_timeout_duration* must be an integer from 1 through 65535.

Important If both **consecutive-failures** and **response-timeout** are configured, then both parameters must be met before a server's state is changed to "Down".

Important The "Active" or "Down" state of a RADIUS server as defined by the system, is based on accessibility and connectivity. For example, if the server is functional but the system has placed it into a "Down" state, it could be the result of a connectivity problem. When a RADIUS server's state is changed to "Down", a trap is sent to the management station and the deadtime timer is started.

Important For a complete explanation of RADIUS server states, if you are using StarOS 12.3 or an earlier release, refer to the *RADIUS Server State Behavior* appendix in the *AAA and GTPP Interface Administration and Reference*. If you are using StarOS 14.0 or a later release, refer to the *AAA Interface Administration and Reference*.

fire-and-forget

Enables RADIUS Fire-and-Forget accounting for the AAA group.

Default: Disabled

The request sent to the RADIUS accounting server configured under the AAA group with this keyword configured will not expect a response from the server. If the request must be sent to more than one such type of server, the acct-algorithm first-n configuration in the AAA group can be used.

Important The Fire-and-Forget feature is supported on GGSN, HA, PDSN and P-GW.

Keepalive feature for server state detection is supported in conjunction since there is no waiting for responses. Archiving in such a AAA group is not supported. If the server is down, the request is sent to the next server in the group. If all the servers in the group are down, the request is deleted.

This CLI is independent of the APN or subscriber profile configuration **aaa secondary-group** *aaa_group_name*.

interim interval *interim_interval*

Specifies the time interval, in seconds, for sending accounting INTERIM-UPDATE records.

interim_interval must be an integer from 50 through 40000000.

Default: Disabled

Important If RADIUS is used as the accounting protocol for the GGSN product, other commands are used to trigger periodic accounting updates. However, these commands would cause RADIUS STOP/START packets to be sent as opposed to INTERIM-UPDATE packets. Also, note that accounting interim interval settings received from a RADIUS server take precedence over those configured on the system.

max-outstanding *max_messages*

Specifies the maximum number of outstanding messages a single AAA Manager instance will queue.

max_messages must be an integer from 1 through 4000.

Default: 256

max-pdu-size *octets*

Specifies the maximum sized packet data unit which can be accepted/generated, in bytes (octets).

octets must be an integer from 512 through 2048.

Default: 2048

max-retries *max_retries*

Specifies the maximum number of times communication with a AAA server will be attempted before it is marked as "Not Responding" and the detect dead server consecutive failures count is incremented.

max_retries must be an integer from 0 through 65535.

Default: 5

Once the maximum number of retries is reached this is considered a single failure for the consecutive failures count for detecting dead servers.

max-transmissions *max_transmissions*

Sets the maximum number of transmissions for a RADIUS accounting message before the message is declared as failed.

max_transmissions must be an integer from 1 through 65535.

Default: Disabled

timeout *timeout_duration*

Specifies the duration to wait for a response from a RADIUS server before retransmitting a request.

timeout_duration must be an integer from 1 through 65535.

Default: 3

Usage Guidelines

Use this command to configure RADIUS accounting options according to the RADIUS server used for the context.

Example

The following command configures the accounting timeout parameter to *16* seconds.

```
radius accounting timeout 16
```

radius accounting apn-to-be-included

This command specifies the APN name inclusion for RADIUS accounting.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting apn-to-be-included { gi | gn }
default radius accounting apn-to-be-included
```

default

Configures the default setting.

gi

Specifies the use of Gi APN name in RADIUS accounting request. Gi APN represents the APN that is finally selected as part of Virtual APN selection by GGSN/P-GW.

gn

Specifies the use of Gn APN name in RADIUS accounting request. Gn APN represents the APN that is sent during "Create Session Request" from MME/S-GW to P-GW.

Usage Guidelines

Use this command to specify the APN name to be included for RADIUS accounting.

Example

The following command configures the gn APN name to be included for RADIUS accounting:

```
radius accounting apn-to-be-included gn
```

radius accounting algorithm

This command specifies the fail-over/load-balancing algorithm to select the RADIUS accounting server(s) to which accounting data must be sent.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting algorithm { first-n n | first-server [ fallback ] |
round-robin }
default radius accounting algorithm
```

default

Configures the default setting.

Default: **first-server**

first-n *n*

Default: 1 (Disabled)

Specifies that the AGW must send accounting data to *n* (more than one) AAA accounting servers based on their priority. The full set of accounting data is sent to each of the *n* AAA servers. Response from any one of the servers would suffice to proceed with the call. On receiving an ACK from any one of the servers, all retries are stopped.

n is the number of AAA servers to which accounting data will be sent, and must be an integer from 2 through 128.

first-server[fallback]

Specifies that the context must send accounting data to the RADIUS accounting server with the highest configured priority. In the event that this server becomes unreachable, accounting data is sent to the accounting server with the next-highest configured priority. This is the default algorithm.

fallback: This algorithm is an extension of the existing "**first-server**" algorithm. This algorithm specifies that the context must send accounting data to the RADIUS server with the highest configured priority. When the

server is unreachable, accounting data is sent to the server with the next highest configured priority. If a higher priority server recovers back, the accounting requests of existing sessions and new sessions are sent to the newly recovered server.

This new algorithm behaves similar to "**first-server**" algorithm, i.e. the accounting data is sent to the highest priority RADIUS/mediation server at any point of time.

If the highest priority server is not reachable, accounting data is sent to the next highest priority server. The difference between "**first-server**" and "**first-server fallback**" is that, with the new algorithm, if a higher priority server recovers, all new RADIUS requests of existing sessions and new accounting sessions are sent to the newly available higher priority server. In the case of "**first-server**" algorithm, the accounting requests of existing sessions continued to be sent to the same server to which the previous accounting requests of those sessions were sent.

The following are the two scenarios during which the requests might be sent to lower priority servers even though a higher priority server is available:

- When **radius max-outstanding** command or **max-rate** is configured, there are chances that the generated requests might be queued and waiting to be sent when bandwidth is available. If a higher priority server recovers, the queued requests will not be switched to the newly available higher priority server.
- When a higher priority server becomes reachable, all existing requests, which are being retried to a lower priority server, will not be switched to the newly available higher priority RADIUS server.

round-robin

Specifies that the context must load balance sending accounting data among all of the defined RADIUS accounting servers. Accounting data is sent in a circular queue fashion on a per Session Manager task basis, where data is sent to the next available server and restarts at the beginning of the list of configured servers. The order of the list is based upon the configured relative priority of the servers.

In releases to prior to 17, for subscribers with IMSI containing hexadecimal characters the round robin algorithm fails causing the messages to be forwarded to a single RADIUS server all the time. This algorithm works only for decimal based IMSI addresses. In 17 and later releases, support is extended to hexadecimal based IMSI addresses. That is, IMSI based round robin would be done for subscribers with hexadecimal based IMSI addresses.

Usage Guidelines

Use this command to specify the algorithm to select the RADIUS accounting server(s) to which accounting data must be sent.

Example

The following command configures to use the round-robin algorithm for RADIUS accounting server selection:

```
radius accounting algorithm round-robin
```

radius accounting billing-version

This command configures billing-system version of RADIUS accounting servers.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius accounting billing-version *version*
default radius accounting billing-version

default

Configures the default setting.

Default: 0

version

Specifies the billing-system version, and must be an integer from 0 through 4294967295.

Usage Guidelines

Use this command to configure the billing-system version of RADIUS accounting servers.

Example

The following command configures the billing-system version of RADIUS accounting servers as *10*:

```
radius accounting billing-version 10
```

radius accounting gtp trigger-policy

This command configures the RADIUS accounting trigger policy for GTP messages.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius accounting gtp trigger-policy [standard | ggsn-preservation-mode]
default radius accounting gtp trigger-policy

default

Resets the RADIUS accounting trigger policy to standard behavior for GTP session.

standard

This keyword sets the RADIUS accounting trigger policy to standard behavior which is configured for GTP session for GGSN service.

ggsn-preservation-mode

This keyword sends RADIUS Accounting Start when the GTP message with private extension of preservation mode is received from SGSN.

Important This is a customer-specific keyword and needs customer-specific license to use this feature. For more information on GGSN preservation mode, refer to the *GGSN Service Configuration Mode Commands* chapter.

Usage Guidelines Use this command to set the trigger policy for the AAA accounting for a GTP session.

Example

The following command sets the RADIUS accounting trigger policy for GTP session to standard:

```
default radius accounting gtp trigger-policy
```

radius accounting ha policy

This command configures the RADIUS accounting policy for Home Agent (HA) sessions.

Product HA

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting ha policy { custom1-aaa-res-mgmt | session-start-stop
}
default radius accounting ha policy
```

default

Configures the default setting.

session-start-stop

Specifies sending Accounting Start when the Session is connected, and sending Accounting Stop when the session is disconnected. This is the default behavior.

custom1-aaa-res-mgmt

Accounting Start/Stop messages are generated to assist special resource management done by AAA servers. It is similar to the session-start-stop accounting policy, except for the following differences:

- Accounting Start is also generated during MIP session handoffs.
- No Accounting stop is generated when an existing session is overwritten and the new session continues to use the IP address assigned for the old session.
- Accounting Start is generated when a new call overwrites an existing session.

Usage Guidelines

Use this command to configure the AAA accounting behavior for an HA session.

Example

The following command configures the HA accounting policy to *custom1-aaa-res-mgmt*:

```
radius accounting ha policy custom1-aaa-res-mgmt
```

radius accounting interim

This command configures the volume of uplink and downlink volume octet counts that trigger RADIUS interim accounting, and configures the time period between the sending of interim accounting records.

Product

GGSN

PDSN

HA

HSGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius accounting interim { interval *interim_interval* **| volume { downlink** *bytes* **uplink** *bytes* **| total** *bytes* **| uplink** *bytes* **downlink** *bytes* **} }**
no radius accounting interim volume

no

Disables RADIUS interim accounting.

interval *interim_interval*

Specifies the time interval, in seconds, between sending interim accounting records. *interim_interval* must be an integer from 50 through 40000000.

volume { downlink *bytes* uplink *bytes* | total *bytes* | uplink *bytes* downlink *bytes* }

downlink *bytes* **uplink** *bytes*: Specifies the downlink to uplink volume limit, in bytes, for RADIUS Interim accounting. *bytes* must be an integer from 100000 through 4000000000.

total *bytes*: Specifies the total volume limit, in bytes, for RADIUS interim accounting. *bytes* must be an integer from 100000 through 4000000000.

uplink *bytes* **downlink** *bytes*: Specifies the uplink to downlink volume limit, in bytes, for RADIUS interim accounting. *bytes* must be an integer from 100000 through 4000000000.

Usage Guidelines

Use this command to trigger RADIUS interim accounting based on the volume of uplink and downlink bytes and/or to configure the time interval between the sending of interim accounting records.

Example

The following command triggers RADIUS interim accounting when the total volume of uplink and downlink bytes reaches *110000*:

```
radius accounting interim volume total 110000
```

The following command sets the interval between sending interim accounting records to 3 minutes (180 seconds):

```
radius accounting interim interval 180
```

radius accounting ip remote-address

This command configures IP remote address-based RADIUS accounting parameters.

Product

PDSN

HA

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
[ no ] radius accounting ip remote-address { collection | list list_id }
```

no

Removes the specified configuration.

collection

Enables collecting and reporting Remote-Address-Based accounting in RADIUS Accounting. This should be enabled in the AAA Context. It is disabled by default.

list *list_id*

Enters the Remote Address List Configuration mode. This mode configures a list of remote addresses that can be referenced by the subscriber's profile.

list_id must be an integer from 1 through 65535.

Usage Guidelines

This command is used as part of the Remote Address-based Accounting feature to both configure remote IP address lists and enable the collection of accounting data for the addresses in those lists on a per-subscriber basis.

Individual subscriber can be associated to remote IP address lists through the configuration/specification of an attribute in their local or RADIUS profile. (Refer to the **radius accounting** command in the Subscriber Configuration mode.) When configured/specified, accounting data is collected pertaining to the subscriber's communication with any of the remote addresses specified in the list.

Once this functionality is configured on the system and in the subscriber profiles, it must be enabled by executing this command with the collection keyword.

Example

The following command enables collecting and reporting Remote-Address-Based accounting in RADIUS Accounting:

```
radius accounting ip remote-address collection
```

radius accounting keepalive

This command configures the keepalive authentication parameters for the RADIUS accounting server.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius accounting keepalive { calling-station-id *id* **| consecutive-response** *consecutive_responses* **| framed-ip-address** *ipv4/ipv6_address***| interval** *seconds* **| retries** *number* **| timeout** *seconds* **| username** *user_name* **}**

```
default radius accounting keepalive { calling-station-id |
consecutive-response | interval | retries | timeout | username }
no radius accounting keepalive framed-ip-address
```

no

Removes the specified configuration.

default

Configures the default setting for the specified keyword.

calling-station-id *id*

Configures the Calling-Station-Id to be used for the keepalive authentication.

id must be an alphanumeric string of size 1 to 15 characters.

Default: 000000000000000

consecutive-response *consecutive_responses*

Configures the number of consecutive authentication response after which the server is marked as reachable.

consecutive_responses must be an integer from 1 through 10.

Default: 1

Important The keepalive request is tried every 0.5 seconds (non-configurable) to mark the server as up.

Important In this case (for keepalive approach) "radius accounting deadtime" parameter is not applicable.

framed-ip-address *ipv4/ipv6_address*

Configures the framed-ip-address to be used for the keepalive accounting.

ipv4/ipv6_address must be specified using IPv4 dotted-decimal notation or IPv6 colon-separated hexadecimal notation.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

interval *seconds*

Configures the time interval between the two keepalive access requests.

Default: 30 seconds

retries *number*

Configures the number of times the keepalive access request to be sent before marking the server as unreachable.

number must be an integer from 3 through 10.

Default: 3

timeout *timeout_duration*

Configures the time interval between each keepalive access request retries.

timeout_duration must be an integer from 1 through 30.

Default: 3 seconds

username *user_name*

Configures the user name to be used for authentication.

user_name must be an alphanumeric string of 1 through 127 characters.

Default: Test-Username

Usage Guidelines Use this command to configure the keepalive authentication parameters for the RADIUS accounting server.

Example

The following command sets the user name for RADIUS keepalive access requests to *Test-Username2*:

```
radius accounting keepalive username Test-Username2
```

The following command sets the number of RADIUS accounting keepalive retries to *4*.

```
radius accounting keepalive retries 4
```

radius accounting pdif trigger-policy

This command configures the policy for generating START/STOP pairs in overflow condition.

Product PDIF

Privilege Administrator, Security Administrator

Command Modes Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting pdif trigger-policy { standard | counter-rollover }
default radius accounting pdif trigger-policy
```

default

The default option configures the "standard" policy.

standard

Applies a policy as defined by the standards.

counter-rollover

If the counter-rollover option is enabled, the system generates a STOP/START pair before input/output data octet counts (or input/output data packet counts) become larger than (2^32 - 1) in value. This setting is used to guarantee that a 32-bit octet count in any STOP message has not wrapped to larger than 2^32 thus ensuring the accuracy of the count. The system may, at its discretion, send the STOP/START pair at any time, so long as it does so before the 32-bit counter has wrapped.

Usage Guidelines

Used to define the policy for dealing with overflow packet counts.

Example

Use the following example to set the default policy to *standard*.

```
default radius accounting pdif trigger-policy
```

radius accounting rp

This command configures the RADIUS accounting R-P originated call options.

Product

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius accounting rp { handoff-stop { immediate | wait-active-stop } |
tod minute hour | trigger-event { active-handoff | active-start-param-change
 | active-stop } | trigger-policy { airlink-usage [ counter-rollover ] |
 custom [ active-handoff | active-start-param-change | active-stop ] |
standard } | trigger-stop-start }
no radius accounting rp { tod minute hour | trigger-event { active-handoff
 | active-start-param-change | active-stop } | trigger-stop-start }
default radius accounting rp { handoff-stop | trigger-policy }
```

no

Removes the specified configuration.

default

Sets the default configuration for the specified keyword.

handoff-stop { immediate | wait-active-stop }

Specifies the behavior of generating accounting STOP when handoff occurs.

- **immediate**: Indicates that accounting STOP should be generated immediately on handoff, i.e. not to wait active-stop from the old PCF.
- **wait-active-stop**: Indicates that accounting STOP is generated only when active-stop received from the old PCF when handoff occurs.

Default: **wait-active-stop**

tod *minute hour*

Specifies the time of day a RADIUS event is to be generated for accounting. Up to four different times of the day may be specified through individual commands.

minute must be an integer from 0 through 59.

hour must be an integer from 0 through 23.

trigger-event { active-handoff | active-start-param-change | active-stop }

active-start-param-change: Enabled

active-stop: Disabled

Configures the events for which a RADIUS event is generated for accounting as one of the following:

- **active-handoff**: Disables a single R-P event (and therefore a RADIUS accounting event) when an Active PCF-to-PFC Handoff occurs. Instead, two R-P events occur (one for the Connection Setup, and the second for the Active-Start)
- **active-start-param-change**: Disables an R-P event (and therefore a RADIUS accounting event) when an Active-Start is received from the PCF and there has been a parameter change.
- **active-stop**: Disables an R-P event (and therefore a RADIUS accounting event) when an Active-Stop is received from the PCF.

Default: **active-handoff**: Disabled

Important This keyword has been obsoleted by the **trigger-policy** keyword. Note that if this command is used, if the context configuration is displayed, radius accounting rp configuration is represented in terms of the trigger-policy.

trigger-policy { airlink-usage [counter-rollover] | custom [active-handoff | active-start-param-change | active-stop] | standard }

Default: **airlink-usage**: Disabled

custom:

active-handoff = Disabled

active-start-param-change = Disabled

active-stop = Disabled

standard: Enabled

Configures the overall accounting policy for R-P sessions as one of the following:

- **airlink-usage [counter-rollover]**: Specifies the use of Airlink-Usage RADIUS accounting policy for R-P, which generates a start on Active-Starts, and a stop on Active-Stops.
- If the **counter-rollover** option is enabled, the system generates a STOP/START pair before input/output data octet counts (or input/output data packet counts) become larger than (2^32 - 1) in value. This setting is used to guarantee that a 32-bit octet count in any STOP message has not wrapped to larger than 2^32 thus ensuring the accuracy of the count. The system, may, at its discretion, send the STOP/START pair at any time, so long as it does so before the 32-bit counter has wrapped. Note that a STOP/START pair is never generated unless the subscriber RP session is in the Active state, since octet/packet counts are not accumulated when in the Dormant state.
- **custom**: Specifies the use of custom RADIUS accounting policy for R-P. The custom policy can consist of the following:
- **active-handoff**: Enables a single R-P event (and therefore a RADIUS accounting event) when an Active PCF-to-PFC Handoff occurs. Normally two R-P events will occur (one for the Connection Setup, and the second for the Active-Start)
- **active-start-param-change**: Enables an R-P event (and therefore a RADIUS accounting event) when an Active-Start is received from the PCF and there has been a parameter change.

Important Note that a custom trigger policy with only **active-start-param-change** enabled is identical to the **standard** trigger-policy.

- **active-stop**: Enables an R-P event (and therefore a RADIUS accounting event) when an Active-Stop is received from the PCF.

Important If the **radius accounting rp trigger-policy custom** command is executed without any of the optional keywords, all custom options are disabled.

- **standard**: Specifies the use of Standard RADIUS accounting policy for R-P in accordance with IS-835B.

trigger-stop-start

Specifies that a stop/start RADIUS accounting pair should be sent to the RADIUS server when an applicable R-P event occurs.

Usage Guidelines

Use this command to configure the events for which a RADIUS event is sent to the server when the accounting procedures vary between servers.

Example

The following command enables an R-P event (and therefore a RADIUS accounting event) when an Active-Stop is received from the PCF:

```
radius accounting rp trigger-event active-stop
```

The following command generates the STOP only when active-stop received from the old PCF when handoff occurs:

```
default radius accounting rp handoff-stop
```

radius accounting server

For accounting, this command configures the RADIUS accounting server(s) in the current context.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius [mediation-device] accounting server *ipv4/ipv6_address* **[encrypted] key** *value* **[acct-on { disable | enable }] [acct-off { disable | enable }] [admin-status { disable | enable }] [max** *max_messages* **] [max-rate** *max_value* **] [oldports] [port** *port_number* **] [priority** *priority* **] [type { mediation-device | standard }] [-noconfirm]**
no radius [mediation-device] accounting server *ipv4/ipv6_address* **[oldports | port** *port_number* **]**

no

Removes the server or server port(s) specified from the list of configured servers.

mediation-device

Enables mediation-device specific AAA transactions use to communicate with this RADIUS server.

Important If this option is not used, by default the system enables standard AAA transactions.

ipv4/ipv6_address

Specifies the IP address of the accounting server. *ip_address* must be specified using IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation. A maximum of 1600 RADIUS servers per context/system and 128 servers per server group can be configured. This limit includes accounting and authentication servers.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

Important The same RADIUS server IP address and port can be configured in multiple RADIUS server groups within a context.

port *port_number*

Specifies the port number to use for communications. *port_number* must be an integer from 0 through 65535. Default is 1813.

Important The same RADIUS server IP address and port can be configured in multiple RADIUS server groups within a context.

[encrypted] key *value*

Specifies the shared secret key used to authenticate the client to the servers. The **encrypted** keyword indicates the key specified is encrypted.

In 12.1 and earlier releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 256 characters with encryption.

In StarOS 12.2 and later releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 236 characters with encryption enabled.

The **encrypted** keyword is intended only for use by the chassis while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **key** keyword is the encrypted version of the plaint text key. Only the encrypted key is saved as part of the configuration file.

acct-on { disable | enable }

This keyword enables/disables sending of the Accounting-On message when a new RADIUS server is added to the configuration. By default, this keyword will be disabled.

When enabled, the Accounting-On message is sent when a new RADIUS server is added in the configuration. However, if for some reason the Accounting-On message cannot be sent at the time of server configuration (for example, if the interface is down), then the message is sent as soon as possible. Once the Accounting-On message is sent, if it is not responded to after the configured RADIUS accounting timeout, the message is

retried the configured number of RADIUS accounting retries. Once all retries have been exhausted, the system no longer attempts to send the Accounting-On message for this server.

In releases prior to 18.0, whenever a chassis boots up or when a new RADIUS accounting server or RADIUS mediation-device accounting server is configured with Acct-On configuration enabled, the state of the RADIUS server in all the AAA manager instances was initialized to "Waiting-for-response-to-Accounting-On". The Acct-On transmission and retries are processed by the Admin-AAAmgr.

When the Acct-On transaction is complete (i.e., when a response for Accounting-On message is received or when Accounting-On message is retried and timed-out), Admin-AAAmgr changes the state of the RADIUS accounting server to Active in all the AAA manager instances. During the period when the state of the server is in "Waiting-for-response-to-Accounting-On", any new RADIUS accounting messages which are generated as part of a new call will not be transmitted towards the RADIUS accounting server but it will be queued. Only when the state changes to Active, these queued up messages will be transmitted to the server.

During ICSR, if the interface of the radius nas-ip address is srp-activated, then in the standby chassis, the sockets for the nas-ip will not be created. The current behavior is that if the interface is srp-activated Accounting-On transaction will not happen at ICSR standby node and the state of the RADIUS server in all the AAAmgr instances will be shown as "Waiting-for-response-to-Accounting-On" till the standby node becomes Active.

In 18.0 and later releases, whenever the chassis boots up or when a new RADIUS accounting server or RADIUS mediation-device accounting server is configured with Acct-On configuration enabled, the state of the RADIUS server will be set to Active for all the non-Admin-AAAmgr instances and will be set to "Waiting-for-response-to-Accounting-On" for only Admin-AAAmgr instance. The Accounting-On transaction logic still holds good from Admin-AAAmgr perspective. However, when any new RADIUS accounting messages are generated even before the state changes to Active in Admin-AAAmgr, these newly generated RADIUS accounting messages will not be queued at the server level and will be transmitted to the RADIUS server immediately.

During ICSR, even if the interface of radius nas-ip address is srp-activated, the state of the RADIUS accounting server will be set to Active in all non-Admin-AAAmgr instances and will be set to "Waiting-for-response-to-Accounting-On" in Admin-AAAmgr instance.

acct-off { disable | enable }

Disables and enables the sending of the Accounting-Off message when a RADIUS server is removed from the configuration.

The Accounting-Off message is sent when a RADIUS server is removed from the configuration, or when there is an orderly shutdown. However, if for some reason the Accounting-On message cannot be sent at this time, it is never sent. The Accounting-Off message is sent only once, regardless of how many accounting retries are enabled.

Default: enable

max *max_messages*

Specifies the maximum number of outstanding messages that may be allowed to the server.

max_messages must be an integer from 0 through 4000.

Default: 0

max-rate *max_value*

Specifies the rate at which the accounting messages should be sent to the RADIUS server by a single AAA manager task.

max_value must be an integer from 0 through 1000.

Default: 0 (disabled)

oldports

Sets the UDP communication port to the out of date standardized default for RADIUS communications to 1646.

priority *priority*

Specifies the relative priority of this accounting server. The priority is used in server selection for determining which server to send accounting data to.

priority must be an integer from 1 through 1000, where 1 is the highest priority. When configuring two or more servers with the same priority you will be asked to confirm that you want to do this. If you use the **-noconfirm** option, you are not asked for confirmation and multiple servers could be assigned the same priority.

Default: 1000

type { mediation-device | standard }

mediation-device: Obsolete keyword.

Specifies the type of AAA transactions to use to communicate with this RADIUS server.

standard: Use standard AAA transactions.

Default: **standard**

admin-status { disable | enable }

Configures the admin-status for the RADIUS accounting server.

enable: Enables the RADIUS accounting server.

disable: Disables the RADIUS accounting server.

-noconfirm

Specifies that the command must execute without any prompts and confirmation from the user.

Usage Guidelines

Use this command to configure the RADIUS accounting servers with which the system must communicate for accounting.

You can configure up to 1600 RADIUS servers per context/system and 128 servers per server group. The servers can be configured as Accounting, Authentication, Charging servers, or any combination thereof.

Example

The following command sets the accounting server with mediation device transaction for AAA server *10.2.3.4*:

```
radius mediation-device accounting server 10.2.3.4 key sharedKey port
1024 max 127
```

radius algorithm

This command configures the RADIUS authentication server selection algorithm for the current context.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius algorithm { first-server | round-robin }
default radius algorithm
```

default

Configures the default setting.

Default: **first-server**

first-server

Authentication data is sent to the first available authentication server based upon the relative priority of each configured server.

round-robin

Authentication data is sent in a circular queue fashion on a per Session Manager task basis where data is sent to the next available authentication server and restarts at the beginning of the list of configured servers. The order of the list is based upon the configured relative priority of the servers.

Usage Guidelines

Use this command to configure the context's RADIUS authentication server selection algorithm to ensure proper load distribution amongst the available authentication servers.

Example

The following command configures to use the round-robin algorithm for RADIUS authentication server selection:

```
radius algorithm round-robin
```

radius allow

This command configures the system behavior for allowing subscriber sessions when RADIUS accounting and/or authentication is unavailable.

Product

All products used in CDMA deployments

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aaa-group)#`

Syntax Description

`[ no ] radius allow { authentication-down | accounting-down }`

no

Specifies that the specified option is to be disabled.

authentication-down

Allows sessions while authentication is not available (down).

Default: Disabled

accounting-down

Allows sessions while accounting is unavailable (down).

Default: Enabled

Usage Guidelines

Allow sessions during system troubles when the risk of IP address and/or subscriber spoofing is minimal. The denial of sessions may cause dissatisfaction with subscribers at the cost/expense of verification and/or accounting data.

Important Please note that this command is applicable ONLY to CDMA products. To configure this functionality in UMTS/LTE products (GGSN/P-GW/SAEGW), use the command **mediation-device delay-GTP-response** in APN Configuration mode.

Example

The following command configures the RADIUS server to allow the sessions while accounting is unavailable.

`radius allow accounting-down`

radius attribute

This command configures the system's RADIUS identification parameters.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius attribute { accounting *accounting_attribute* **| authentication** *authentication_attribute* **| nas-identifier** *nas_id* **| nas-ip-address address** *primary_ipv4/ipv6_address* **[backup** *secondary_ipv4/ipv6_address* **] [nexthop-forwarding-address** *nexthop_ipv4/ipv6_address* **] [mpls-label input** *in_label_value* **| output** *out_label_value1* **[** *out_label_value2* **] [vlan** *vlan_id* **]] }**
no radius attribute { accounting *accounting_attribute* **| authentication** *authentication_attribute* **| nas-identifier | nas-ip-address }**
default radius attribute { accounting | authentication | nas-identifier }

no

Removes or disables the specified configuration.

default

Configures the default setting(s).

accounting *accounting_attribute*

Enables RADIUS accounting attributes for the following options, provided they are supported in the configured RADIUS dictionary:

- **3gpp-cg-address**
- **3gpp-charging-characteristics**
- **3gpp-charging-id**
- **3gpp-ggsn-address**
- **3gpp-ggsn-mcc-mnc**
- **3gpp-gprs-qos-negotiated-profile**
- **3gpp-imeisv**
- **3gpp-imsi-mcc-mnc**
- **3gpp-ms-timezone**

- **3gpp-nsapi**
- **3gpp-pdp-type**
- **3gpp-rat-type**
- **3gpp-select-mode**
- **3gpp-session-stopindicator**
- **3gpp-sgsn-address**
- **3gpp-sgsn-mcc-mnc**
- **3gpp-user-location-info**
- **acct-authentic**
- **acct-delay-time**
- **acct-input-octets**
- **acct-input-packets**
- **acct-output-octets**
- **acct-output-packets**
- **acct-session-id**
- **acct-session-time**
- **acct-statustype**
- **called-station-id**
- **calling-station-id**
- **class**
- **event-timestamp**
- **framed-ip-address**
- **framed-ipv6-prefix**

  In Releases 19.4 and beyond, this attribute option will also include delegated-ipv6-prefix to support DHCPv6 Prefix Delegation via RADIUS server.
- **imsi**
- **nas-identifier**
- **nas-ip-address**
- **nas-port-id**
- **nas-port-type**
- **service-type**
- **username**

By default, all of the attributes are enabled except for nas-port-id attribute.

authentication *authentication_attribute*

Enables RADIUS authentication attributes for the following options, provided they are supported in the configured RADIUS dictionary:

- **3gpp-cg-address**
- **3gpp-charging-characteristics**
- **3gpp-ggsn-address**
- **3gpp-ggsn-mcc-mnc**
- **3gpp-gprs-qos-negotiated-profile**
- **3gpp-imeisv**
- **3gpp-imsi-mcc-mnc**
- **3gpp-ms-timezone**
- **3gpp-nsapi**
- **3gpp-pdp-type**
- **3gpp-rat-type**
- **3gpp-select-mode**
- **3gpp-sgsn-address**
- **3gpp-sgsn-mcc-mnc**
- **3gpp-user-location-info**
- **called-station-id**
- **calling-station-id**
- **chap-challenge**
- **framed-ipaddress**
- **framed-ipv6-prefix**
- **imsi**
- **nas-identifier**
- **nas-ip-address**
- **nas-port-id**
- **nas-port-type**
- **service-type**
- **username**

By default, all of the attributes are enabled except for nas-port-id attribute.

nas-identifier *nas_id*

Specifies the attribute name by which the system will be identified in Access-Request messages. *nas_id* must be a case-sensitive alphanumeric string of 1 through 32 characters.

nas-ip-address address *primary_ipv4/ipv6_address*

Specifies the AAA interface IP address(es) used to identify the system. Up to two addresses can be configured.

primary_ipv4/ipv6_address: The IP address of the primary interface to use in the current context. This must be specified using the IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In this release, a combination of IPv4 and IPv6 addresses is not supported.
- When a RADIUS server is configured in non-default AAA group without nas-ip, the NAS IP is taken from the default group. In this scenario, the IP address should be of the same transport type.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.
- It is recommended that the primary and secondary server IP addresses should be of the same transport type.

backup *secondary_ipv4/ipv6_address*

backup: The IP address of the secondary interface to use in the current context. This must be specified using IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In this release, a combination of IPv4 and IPv6 addresses is not supported.
- When a RADIUS server is configured in non-default AAA group without nas-ip, the NAS IP is taken from the default group. In this scenario, the IP address should be of the same transport type.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.
- It is recommended that the primary and secondary server IP addresses should be of the same transport type.

nexthop-forwarding-address *nexthop_ipv4/ipv6_address*

Configures next hop IP address for this NAS IP address. It optionally sets the RADIUS client to provide VLAN ID and nexthop forwarding address to system when running in single nexthop gateway mode.

nexthop_ipv4/ipv6_address must be specified using IPv4 dotted-decimal notation.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.

- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

Important To define more than one NAS IP address per context, in Global Configuration Mode use the **aaa large-configuration** command. If enabled, for a PDSN a maximum of 400 and for a GGSN a maximum of 800 NAS IP addresses/NAS identifiers (1 primary and 1 secondary per server group) can be configured per context.

mpls-label input *in_label_value* | output *out_label_value1* [*out_label_value2*]

Configures the traffic from the specified RADIUS client NAS IP address to use the specified MPLS labels.

- *in_label_value* is the MPLS label that will identify inbound traffic destined for the configured NAS IP address.
- *out_label_value1* and *out_label_value2* identify the MPLS labels to be added to packets sent from the specified NAS IP address.
- *out_label_value1* is the inner output label.
- *out_label_value2* is the outer output label.

MPLS label values must be an integer from 16 to 1048575.

vlan *vlan_id*

This optional keyword sets the RADIUS client to provide VLAN ID with nexthop forwarding address to system when running in single nexthop gateway mode.

vlan_id must be a pre-configured VLAN ID, and must be an integer from 1 through 4096. It is the VLAN ID to be provided to the system in RADIUS attributes.

This option is available only when nexthop-forwarding gateway is also configured with nexthop-forwarding-address *nexthop_address* keyword and **aaa-large configuration** is enabled at Global Configuration level.

Usage Guidelines

This is necessary for NetWare Access Server usage such as the system must be identified to the NAS.

The system supports the concept of the active NAS-IP-Address. The active NAS-IP-Address is defined as the current source IP address for RADIUS messages being used by the system. This is the content of the NAS-IP-Address attribute in each RADIUS message.

The system will always have exactly one active NAS-IP-Address. The active NAS-IP-Address will start as the primary NAS-IP-Address. However, the active NAS-IP-Address may switch from the primary to the backup, or the backup to the primary. The following events will occur when the active NAS-IP-Address is switched:

- All current in-process RADIUS accounting messages from the entire system are cancelled. The accounting message is re-sent, with retries preserved, using the new active NAS-IP-Address. Acct-Delay-Time, however, is updated to reflect the time that has occurred since the accounting event. The value of Event-Timestamp is preserved.
- All current in-process RADIUS authentication messages from the entire system are cancelled. The authentication message is re-sent, with retries preserved, using the new active NAS-IP-Address. The value of Event-Timestamp is preserved.

- All subsequent in-process RADIUS requests uses the new active NAS-IP-Address.

The system uses a revertive algorithm when transitioning active NAS IP addresses as described below:

- If the configured primary NAS-IP-Address transitions from UP to DOWN, and the backup NAS-IP-Address is UP, then the active NAS-IP-Address switches from the primary to the backup NAS-IP-Address.
- If the backup NAS-IP-Address is active, and the primary NAS-IP-Address transitions from DOWN to UP, then the active NAS-IP-Address switches from the backup to the primary NAS-IP-Address.

Example

The following command configures the RADIUS identification parameter, NAS IP address to *10.2.3.4*.

```
radius attribute nas-ip-address 10.2.3.4
```

radius authenticate

This command configures RADIUS authentication related parameters.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius authenticate { apn-to-be-included { gi | gn } | null-username }
default radius authenticate { apn-to-be-included | null-username }
no radius authenticate null-username
```

default

Configures the default setting.

no radius authenticate null-username

Disables sending an Access-Request message to the AAA server for user names (NAI) that are blank.

apn-to-be-included

Specifies the APN name to be included for RADIUS authentication.

gi: Specifies the usage of Gi APN name in RADIUS authentication request. Gi APN represents the APN received in the Create PDP Context request message from SGSN.

gn: Specifies the usage of Gn APN name in RADIUS authentication request. Gn APN represents the APN selected by the GGSN.

null-username

Specifies attempting RADIUS authentication even if the provided user name is NULL (empty).

Default: Enables authenticating, sending Access-Request messages to the AAA server, all user names, including NULL user names.

Usage Guidelines

Use this command to disable, or re-enable, sending Access-Request messages to the AAA server for user names (NAI) that are blank (NULL).

Example

The following command disables sending of Access-Request messages for user names (NAI) that are blank:

```
no radius authenticate null-username
```

The following command re-enables sending of Access-Request messages for user names (NAI) that are blank:

```
radius authenticate null-username
```

radius authenticator-validation

This command enables/disables the MD5 authentication of RADIUS user. MD5 authentication is enabled by default.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
[ default | no ] radius authenticator-validation
```

no

Disables MD5 authentication validation for an Access-Request message to the AAA server.

Usage Guidelines

Use this command to disable or re-enable, sending Access-Request messages to the AAA server for MD5 validation.

Example

The following command disables MD5 authentication validation for Access-Request messages for user names (NAI):

no radius authenticator-validation

The following command enables MD5 authentication validation for Access-Request messages for user names (NAI):

radius authenticator-validation

radius charging

This command configures basic RADIUS options for Active Charging Service (ACS).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aaa-group)#`

Syntax Description

radius charging { deadtime *dead_time* **| detect-dead-server { consecutive-failures** *consecutive_failures_count* **| response-timeout** *response_timeout_duration* **} | max-outstanding** *max_messages* **| max-retries** *max_retries* **| max-transmissions** *max_transmissions* **| timeout** *idle_seconds* **}**
default radius charging { deadtime | detect-dead-server | max-outstanding | max-retries | max-transmissions | timeout }
no radius charging { detect-dead-server | max-transmissions | timeout }

no

Removes the specified configuration.

default

Configures the default setting for the specified keyword.

deadtime *dead_time*

Specifies the number of minutes to wait before attempting to communicate with a server that has been marked as unreachable.

dead_time must be an integer from 0 through 65535.

Default: 10

detect-dead-server { consecutive-failures *consecutive_failures_count* | response-timeout *response_timeout_duration* }

consecutive-failures *consecutive_failures_count*: Specifies the number of consecutive failures, for each AAA Manager, before a server is marked as unreachable.

consecutive_failures_count must be an integer from 1 through 1000.

Default: 4

response-timeout *response_timeout_duration*: Specifies the number of seconds for each AAA Manager to wait for a response to any message before a server is detected as failed, or in a down state.

response_timeout_duration must be an integer from 1 through 65535.

max-outstanding *max_messages*

Specifies the maximum number of outstanding messages a single AAA Manager instance will queue.

max_messages must be an integer from 1 through 4000.

Default: 256

max-retries *max_retries*

Specifies the maximum number of times communication with a AAA server will be attempted before it is marked as unreachable, and the detect dead servers consecutive failures count is incremented.

max_retries must be an integer from 0 through 65535.

Default: 5

max-transmissions *max_transmissions*

Sets the maximum number of re-transmissions for RADIUS authentication requests. This limit is used in conjunction with the **max-retries** parameter for each server.

When failing to communicate with a RADIUS sever, the subscriber is failed once all of the configured RADIUS servers have been exhausted or once the configured number of maximum transmissions is reached.

For example, if three servers are configured and if the configured max-retries is 3 and max-transmissions is 12, then the primary server is tried four times (once plus three retries), the secondary server is tried four times, and then a third server is tried four times. If there is a fourth server, it is not tried because the maximum number of transmissions (12) has been reached.

max_transmissions must be an integer from 1 through 65535.

Default: Disabled

timeout *idle_seconds*

Specifies the number of seconds to wait for a response from the RADIUS server before re-sending the messages.

idle_seconds must be an integer from 1 through 65535.

Default: 3

Usage Guidelines

Use this command to manage the basic Charging Service RADIUS options according to the RADIUS server used for the context.

Example

The following command configures the AAA server to be marked as unreachable when the consecutive failure count exceeds *6*:

radius charging detect-dead-server consecutive-failures *6*

The following command sets the timeout value to *300* seconds to wait for a response from RADIUS server before resending the messages:

radius charging timeout 300

radius charging accounting algorithm

This command specifies the fail-over/load-balancing algorithm to be used for selecting RADIUS servers for charging services.

Product

PDSN

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

[context_name]host_name(config-aaa-group)#

Syntax Description

radius charging accounting algorithm { first-n *n* **| first-server | round-robin }**

first-n *n*

Specifies that the AGW must send accounting data to *n* (more than one) AAA servers based on their priority. Response from any one of the *n* AAA servers would suffice to proceed with the call. The full set of accounting data is sent to each of the *n* AAA servers.

n is the number of AAA servers to which accounting data will be sent, and must be an integer from 2 through 128.

Default: 1 (Disabled)

first-server

Specifies that the context must send accounting data to the RADIUS server with the highest configured priority. In the event that this server becomes unreachable, accounting data is sent to the server with the next-highest configured priority. This is the default algorithm.

round-robin

Specifies that the context must load balance sending accounting data among all of the defined RADIUS servers. Accounting data is sent in a circular queue fashion on a per Session Manager task basis, where data is sent to the next available server and restarts at the beginning of the list of configured servers. The order of the list is based upon the configured relative priority of the servers.

Usage Guidelines

Use this command to specify the accounting algorithm to use to select RADIUS servers for charging services configured in the current context.

Example

The following command configures to use the round-robin algorithm for RADIUS server selection:

```
radius charging accounting algorithm round-robin
```

radius charging accounting server

This command configures RADIUS charging accounting servers in the current context for ACS Prepaid Accounting.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius charging accounting server *ipv4/ipv6_address* **[encrypted] key** *value* **[max** *max_messages* **] [oldports] [port** *port_number* **] [priority** *priority* **] [admin-status { enable | disable }] [-noconfirm]**
no radius charging accounting server *ipv4/ipv6_address* **[oldports | port** *port_number* **]**

no

Removes the server or server port(s) specified from the list of configured servers.

ipv4/ipv6_address

Specifies the IP address of the accounting server. *ip_address* must be specified using IPv4 dotted-decimal notation or IPv6 colon-separated-hexadecimal notation. A maximum of 128 RADIUS servers can be configured per context. This limit includes accounting and authentication servers.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

[encrypted] key *value*

Specifies the shared secret key used to authenticate the client to the servers. The **encrypted** keyword indicates the key specified is encrypted.

In 12.1 and earlier releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 256 characters with encryption.

In StarOS 12.2 and later releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 236 characters with encryption enabled.

The **encrypted** keyword is intended only for use by the system while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **key** keyword is the encrypted version of the plaint text key. Only the encrypted key is saved as part of the configuration file.

max *max_messages*

Specifies the maximum number of outstanding messages that may be allowed to the server. *max_messages* must be an integer from 0 through 4000.

Default: 0

oldports

Sets the UDP communication port to the out of date standardized default for RADIUS communications to 1646.

port *port_number*

Specifies the port number to use for communication.

port_number must be an integer from 0 through 65535.

Default: 1813

priority *priority*

Specifies the relative priority of this accounting server. The priority is used in server selection for determining which server to send accounting data to. *priority* must be an integer from 1 through 1000, where 1 is the highest priority.

Default: 1000

admin-status { enable | disable }

Enables or disables the RADIUS authentication/accounting/charging server functionality and saves the status setting in the configuration file to re-establish the set status at reboot.

-noconfirm

Specifies that the command must execute without any prompts and confirmation from the user.

Usage Guidelines

This command is used to configure the RADIUS charging accounting server(s) with which the system is to communicate for ACS Prepaid Accounting requests.

Up to 128 AAA servers can be configured per context when the system is functioning as a PDSN and/or HA. Up to 16 servers are supported per context when the system is functioning as a GGSN.

Example

The following commands configure RADIUS charging accounting server with the IP address set to 10.1.2.3, port to 1024, priority to 10:

```
radius charging accounting server 10.1.2.3 key sharedKey212 port 1024 max
 127
radius charging accounting server 10.1.2.3 encrypted key scrambledKey234
 oldports priority 10
```

radius charging algorithm

This command specifies the RADIUS authentication server selection algorithm for ACS for the current context.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius charging algorithm { first-server | round-robin }
default radius charging algorithm
```

default

Configures the default setting.

Default: **first-server**

first-server

Accounting data is sent to the first available server based upon the relative priority of each configured server.

round-robin

Accounting data is sent in a circular queue fashion on a per Session Manager task basis where data is sent to the next available server and restarts at the beginning of the list of configured servers. The order of the list is based upon the configured relative priority of the servers.

Usage Guidelines

Use this command to configure the context's RADIUS server selection algorithm for ACS to ensure proper load distribution amongst the available servers.

Example

The following command configures to use the round-robin algorithm for RADIUS server selection:

```
radius algorithm round-robin
```

radius charging server

This command configures the RADIUS charging server(s) in the current context for ACS Prepaid Authentication.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius charging server ipv4/ipv6_address [ encrypted ] key value [ max
max_messages ] [ oldports ] [ port port_number ] [ priority priority ] [
admin-status { enable | disable } ] [ -noconfirm ]
no radius charging server ipv4/ipv6_address [ oldports | port port_number ]
```

no

Removes the server or server port(s) specified from the list of configured servers.

ipv4/ipv6_address

Specifies the IP address of the server. *ipv4/ipv6_address* must be specified using IPv4 dotted-decimal notation or IPv6 colon-separated hexadecimal notation. A maximum of 128 RADIUS servers can be configured per context. This limit includes accounting and authentication servers.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.

- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

[encrypted] key *value*

Specifies the shared secret key used to authenticate the client to the servers. The **encrypted** keyword indicates the key specified is encrypted.

In 12.1 and earlier releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 256 characters with encryption.

In StarOS 12.2 and later releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 236 characters with encryption enabled.

The **encrypted** keyword is intended only for use by the system while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **key** keyword is the encrypted version of the plain text key. Only the encrypted key is saved as part of the configuration file.

max *max_messages*

Specifies the maximum number of outstanding messages that may be allowed to the server. *max_messages* must be an integer from 0 through 4000.

Default: 256

oldports

Sets the UDP communication port to the old default for RADIUS communications to 1645.

port *port_number*

Specifies the port number to use for communications.

port_number must be an integer from 1 through 65535.

Default: 1812

priority *priority*

Specifies the relative priority of this accounting server. The priority is used in server selection for determining which server to send accounting data to.

priority must be an integer from 1 through 1000, where 1 is the highest priority.

Default: 1000

admin-status { enable | disable }

Enables or disables the RADIUS authentication, accounting, or charging server functionality and saves the status setting in the configuration file to re-establish the set status at reboot.

-noconfirm

Specifies that the command must execute without any prompts and confirmation from the user.

Usage Guidelines

This command is used to configure the RADIUS charging server(s) with which the system is to communicate for ACS Prepaid Authentication requests.

Up to 128 AAA servers can be configured per context when the system is functioning as a PDSN and/or HA. Up to 16 servers are supported per context when the system is functioning as a GGSN.

Example

The following commands configure RADIUS charging server with the IP address set to 10.2.3.4, port to 1024, priority to 10:

```
radius charging server 10.2.3.4 key sharedKey212 port 1024 max 127
radius charging server 10.2.3.4 encrypted key scrambledKey234 oldports
priority 10
```

radius ip vrf

This command associates the specific AAA group (NAS-IP) with a Virtual Routing and Forwarding (VRF) Context instance for BGP/MPLS, GRE, and IPSec Tunnel functionality which needs VRF support for RADIUS communication. By default the VRF is NULL, which means that AAA group is associated with global routing table.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius ip vrf vrf_name
no radius ip vrf
```

no

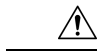
Disables the configured IP Virtual Routing and Forwarding (VRF) context instance and removes the association between the VRF context instance and the AAA group instance (NAS-IP).

By default this command is disabled, which means the NAS-IP being used is assumed a non-VRF IP and specific AAA group does not have any VRF association.

vrf_name

Specifies the name of a pre-configured VRF context instance.

vrf_name is the name of a pre-configured virtual routing and forwarding (VRF) context configured in Context configuration mode through **ip vrf** command.



Caution Any incorrect configuration, such as associating AAA group with wrong VRF instance or removing a VRF instance, will fail the RADIUS communication.

Usage Guidelines Use this command to associate/disassociate a pre-configured VRF context for a feature such as BGP/MPLS VPN or GRE, and IPSec tunneling which needs VRF support for RADIUS communication.

By default the VRF is NULL, which means that AAA group (NAS-IP) is associated with global routing table and NAS-IP being used is assumed a non-VRF IP.

This IP VRF feature can be applied to RADIUS communication, which associates the VRF with the AAA group. This command must be configured whenever a VRF IP is used as a NAS-IP in the AAA group or at the Context level for the "default" AAA group.

This is a required configuration as VRF IPs may be overlapping hence AAA needs to know which VRF the configured NAS-IP belongs to. By this support different VRF-based subscribers can communicate with different RADIUS servers using the same, overlapping NAS-IP address, if required across different AAA groups.

Example

The following command associates VRF context instance *ip_vrf1* with specific AAA group (NAS-IP):

```
radius ip vrf ip_vrf1
```

radius keepalive

This command configures the RADIUS keepalive authentication parameters.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius keepalive { calling-station-id id | consecutive-response number |
encrypted | interval seconds | password | retries number | timeout seconds |
username user_name | valid-response access-accept [ access-reject ] }
default radius keepalive { calling-station-id | consecutive-response |
interval | password | retries | timeout | username | valid-response }
```

default

Configures the default setting for the specified keyword.

calling-station-id *id*

Specifies the Calling-Station-Id to be used for the keepalive authentication.

id must be an alphanumeric string of size 1 to 15 characters.

Default: 000000000000000

consecutive-response *number*

Specifies the number of consecutive authentication responses after which the server is marked as reachable.

number must be an integer from 1 through 10.

Default: 1

Important The keepalive request is tried every 0.5 seconds (non-configurable) to mark the server as up.

Important In this case (for keepalive approach) "radius deadtime" parameter is not applicable.

encrypted password

Specifies encrypting the password.

In 12.1 and earlier releases, the *password* must be an alphanumeric string of 1 through 63 characters.

In StarOS 12.2 and later releases, *password* must be an alphanumeric string of 1 through 132 characters.

Default password: Test-Password

interval *seconds*

Specifies the time interval, in seconds, between two keepalive access requests.

Default: 30 seconds

password

Specifies the password to be used for authentication.

password must be an alphanumeric string of 1 through 63 characters.

Default password: Test-Password

retries *number*

Specifies the number of times the keepalive access request to be sent before marking the server as unreachable.

number must be an integer from 3 through 10.

Default: 3

timeout *timeout_duration*

Specifies the time interval between keepalive access request retries.

timeout_duration must be an integer from 1 through 30.

Default: 3 seconds

username *user_name*

Specifies the user name to be used for authentication.

user_name must be an alphanumeric string of 1 through 127 characters.

Default: Test-Username

valid-response access-accept [*access-reject*]

Specifies the valid response for the authentication request.

If *access-reject* is configured, then both access-accept and access-reject are considered as success for the keepalive authentication request.

If *access-reject* is not configured, then only access-accept is considered as success for the keepalive access request.

Default: **keepalive valid-response access-accept**

Usage Guidelines

Use this command to configure the keepalive authentication parameters for the RADIUS server.

Example

The following command configures the user name for RADIUS keepalive access requests to *Test-Username2*:

```
radius keepalive username Test-Username2
```

The following command configures the number of RADIUS keepalive retries to *4*:

```
radius keepalive retries 4
```

radius mediation-device

See the radius accounting server, on page 56 command.

radius probe-interval

This command configures the time interval between two RADIUS authentication probes.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius probe-interval *seconds*
default radius probe-interval

default

Configures the default setting.

seconds

Specifies the number of seconds to wait before sending another probe authentication request to a RADIUS server.

seconds must be an integer from 1 through 65535.

Default: 60

Usage Guidelines

Use this command for Interchassis Session Recovery (ICSR) support to set the duration between two authentication probes to the RADIUS server.

Example

The following command sets the RADIUS authentication probe interval to 30 seconds.

```
radius probe-interval 30
```

radius probe-max-retries

This command configures the number of retries for RADIUS authentication probe response.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius probe-max-retries *retries*
default radius probe-max-retries

default

Configures the default setting.

retries

Specifies the number of retries for RADIUS authentication probe response before the authentication is declared as failed.

retries must be an integer from 0 through 65535.

Default: 5

Usage Guidelines

Use this command with Interchassis Session Recovery (ICSR) to set the number of attempts to send RADIUS authentication probe without a response before the authentication is declared as failed.

Example

The following command configures the maximum number of retries to *6* seconds.

```
radius probe-max-retries 6
```

radius probe-timeout

This command configures the timeout duration for Interchassis Session Recovery (ICSR) to wait for a response for RADIUS authentication probes.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
radius probe-timeout idle_seconds
default radius probe-timeout
```

default

Configures the default setting.

idle_seconds

Specifies the number of seconds to wait for a response from the RADIUS server before re-sending the authentication probe.

idle_seconds must be an integer from 0 through 65535.

Default: 3

Usage Guidelines

Use this command to set the time duration for ICSR, to wait for a response before re-sending the RADIUS authentication probe to the RADIUS server.

Example

The following command sets the authentication probe timeout to *120* seconds:

```
radius probe-timeout 120
```

radius server

This command configures RADIUS authentication server(s) in the current context for authentication.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > **context** *context_name* > **aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

radius server *ipv4/ipv6_address* **[encrypted] key** *value* **[admin-status { disable | enable }] [max** *max_messages* **] [max-rate** *max_value* **] [oldports] [port** *port_number* **] [priority** *priority* **] [probe | no-probe] [probe-username** *user_name* **] [probe-password [encrypted] password** *password* **] [type { mediation-device | standard }] [-noconfirm]**
no radius server *ipv4/ipv6_address* **[oldports | port** *port_number* **]**

no

Removes the server or server port(s) specified from the list of configured servers.

ipv4/ipv6_address

Specifies the IP address of the server.

ipv4/ipv6_address: Must be specified using IPv4 dotted-decimal notation or IPv6 colon-separated hexadecimal notation. A maximum of 1600 RADIUS servers per context/system and 128 servers per Server group can be configured. This limit includes accounting and authentication servers.

Notes:

- The gateway supports only one type of transport within one AAA group. The AAA group should have the NAS IP and RADIUS servers of same transport type (IPv4 or IPv6). In Release 19, a combination of IPv4 and IPv6 addresses is not supported.
- The IPv6 Address Configuration support is available for GGSN, HA, PDSN and P-GW products only. If other products are used in conjunction with these supported products and shared the same AAA group, then the IPv6 address should not be configured.

Important The same RADIUS server IP address and port can be configured in multiple RADIUS server groups within a context.

port *port_number*

Specifies the port number of the server.

port_number: Specifies the port number to use for communications. *port_number* must be an integer from 1 through 65535.

Default: 1812.

Important The same RADIUS server IP address and port can be configured in multiple RADIUS server groups within a context.

[encrypted] key *value*

Specifies the shared secret key used to authenticate the client to the servers. The **encrypted** keyword indicates the key specified is encrypted.

In 12.1 and earlier releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 256 characters with encryption.

In StarOS 12.2 and later releases, the key *value* must be an alphanumeric string of 1 through 127 characters without encryption, and 1 through 236 characters with encryption enabled.

The **encrypted** keyword is intended only for use by the chassis while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **key** keyword is the encrypted version of the plain text key. Only the encrypted key is saved as part of the configuration file.

admin-status { disable | enable }

Enables or disables the RADIUS authentication, accounting, or charging server functionality and saves the status setting in the configuration file to re-establish the set status at reboot.

max *max_messages*

Specifies the maximum number of outstanding messages that may be allowed to the server.

max_messages must be an integer from 0 through 4000.

Default: 256

max-rate *max_value*

Specifies the rate at which the authentication messages should be sent to the RADIUS server by a single AAA manager task.

max_value must be an integer from 0 through 1000.

Default: 0 (disabled)

oldports

Sets the UDP communication port to the old default for RADIUS communications to 1645.

priority *priority*

Specifies the relative priority of this accounting server. The priority is used in server selection for determining which server to send accounting data to.

priority must be an integer from 1 through 1000, where 1 is the highest priority. When configuring two or more servers with the same priority you will be asked to confirm that you want to do this. If you use the **-noconfirm** option, you are not asked for confirmation and multiple servers could be assigned the same priority.

Default: 1000

probe

Enable probe messages to be sent to the specified RADIUS server.

no-probe

Disable probe messages from being sent to the specified RADIUS server. This is the default behavior.

probe-username *user_name*

The user name sent to the RADIUS server to authenticate probe messages. *user_name* must be an alphanumeric string of 1 through 127 characters.

probe-password [encrypted] password *password*

The password sent to the RADIUS server to authenticate probe messages.

encrypted: This keyword is intended only for use by the chassis while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **password** keyword is the encrypted version of the plain text password. Only the encrypted password is saved as part of the configuration file.

password *password*: Specifies the probe-user password for authentication. *password* must be an alphanumeric string of 1 through 63 characters.

type { mediation-device | standard }

Specifies the type of transactions the RADIUS server accepts.

mediation-device: Specifies mediation-device specific AAA transactions. This device is available if you purchased a transaction control services license. Contact your local Cisco representative for licensing information.

standard: Specifies standard AAA transactions. (Default)

-noconfirm

Specifies that the command must execute without any prompts and confirmation from the user.

Usage Guidelines

This command is used to configure the RADIUS authentication server(s) with which the system is to communicate for authentication.

You can configure up to 1600 RADIUS servers per context/system and 128 servers per Server group. The servers can be configured as accounting, authentication, charging servers, or any combination thereof.

Example

The following commands configure RADIUS server with the IP address set to 10.2.3.4, port to 1024, priority to 10:

```
radius server 10.2.3.4 key sharedKey212 port 1024 max 127
radius server 10.2.3.4 encrypted key scrambledKey234 oldports priority
10
```

radius trigger

This command enables specific RADIUS triggers.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > AAA Server Group Configuration

configure > context *context_name* **> aaa group** *group_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aaa-group)#
```

Syntax Description

```
[ no ] radius trigger { ms-timezone-change | qos-change | rai-change |
rat-change | serving-node-change | uli-change }
default radius trigger
```

no

Disables specified RADIUS trigger.

default

Configures the default setting.

Default: All RADIUS triggers are enabled.

ms-timezone-change

Specifies to enable RADIUS trigger for MS time zone change.

qos-change

Specifies to enable RADIUS trigger for Quality of Service change.

rai-change

Specifies to enable RADIUS trigger for Routing Area Information change.

rat-change

Specifies to enable RADIUS trigger for Radio Access Technology change.

serving-node-change

Specifies to enable RADIUS trigger for Serving Node change.

uli-change

Specifies to enable RADIUS trigger for User Location Information change.

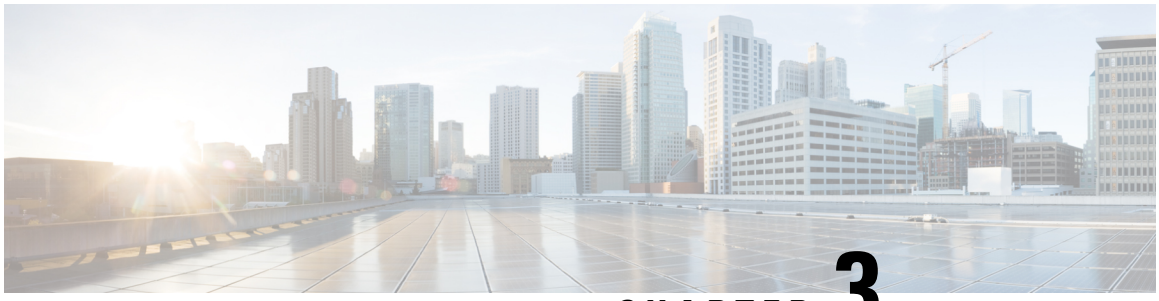
Usage Guidelines

Use this command to enable RADIUS triggers.

Example

The following command enables RADIUS trigger for RAT change:

```
radius trigger rat-change
```



CHAPTER 3

AAL2 Node Configuration Mode Commands

Important In Release 20 and later, HNBGW is not supported. Commands in this configuration mode must not be used in Release 20 and later. For more information, contact your Cisco account representative.

The AAL2 Node Configuration Mode is used to configure the ATM Adaptation Layer 2 nodes to manage the Access Link Control Application Part (ALCAP) on HNB-GW for IuCS-over-ATM support towards CS core network.

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration > AAL2 Node Configuration

configure > context *context_name* **> alcap-service** *service_name* **> aal2-node** *node_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aal2-node-node_name)#`

Important The AAL2 Node configured here will be used to bind with ATM port in PVC configuration sub-mode of ATM configuration mode for IuCS-over-ATM functionality.

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- aal2-path-id, on page 89
- end, on page 91
- exit, on page 91
- point-code, on page 91

aal2-path-id

This command set the AAL2 path identifier with AAL2 node and also used to block a particular AAL2 path.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration > AAL2 Node Configuration

configure > **context** *context_name* > **alcap-service** *service_name* > **aal2-node** *node_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-aal2-node-node_name)#`

Syntax Description **[no] aal2-path-id** *aal2_path_id* **[block]**

no

Removes the configured AAL2 path identifier from this AAL2 node configuration.

aal2_path_id

Specifies the AAL2 path identifier configured with adjacent AAL2 node(s). The AAL2 path id must be unique within an AAL2 node configuration. This value is used to identify a particular path towards an adjacent AAL2 node and is sent in ALCAP protocol messages to peer where path identification is required.

The *aal2_path_id* must be an integer between 1 through 4294967295.

Important This AAL2 path id *aal2_path_id* will be used to bind with ATM port in PVC configuration mode of ATM configuration mode.

block

This keyword block the AAL2 path configured with specific path identifier. When this keyword is executed ALCAP-BLO-REQUEST shall be sent to the adjacent AAL2 node.

To unblock an AAL2 path, the no keyword will be used for a locally blocked path by sending ALCAP-UNBLOCK-REQUEST to the adjacent AAL2 node.

Usage Guidelines Use this command to configure an AAL2 path between a pair of adjacent nodes, which is identified by a unique number called AAL2 path identifier. An AAL2 path provides 248 AAL2 channels wherein each AAL2 channel is used for one circuit switched call. The AAL2 channel range defined is 8 to 255.

This command can be used for blocking or unblocking an AAL2 path towards an adjacent AAL2 node.

Important The AAL2 path id configured here will be used to bind with ATM port in PVC configuration sub-mode of ATM configuration mode for IuCS-over-ATM functionality.

Example

Following command sets the AAL2 path identifier *2* in an AAL2 node configuration.

al2-path-id *2*

Following command unblocks the AAL2 path identifier *6* which was earlier blocked in an AAL2 node configuration.

no al2-path-id *6* **block**

end

Exits the current mode and returns to the Exec Mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Change the mode back to the Exec mode.

exit

Exits the current mode and returns to the previous mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Return to the previous mode.

point-code

This command configure the point code of adjacent AAL2 node in SS7 format address. This point code shall be filled in the destination point-code (dpc) field of MTP3 routing label. This is required if signaling transport network is based on MTP3-broadband (MTP3B).

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration > AAL2 Node Configuration

configure > **context** *context_name* > **alcap-service** *service_name* > **aal2-node** *node_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-aal2-node-node_name)#
```

Syntax Description

[no] point-code *point_code*

no

Removes the configured point code from this AAL2 node configuration.

point_code

Defines the point code to assign to adjacent AAL2 node in SS7 format.

point_code: value entered must adhere to the point code variant selected when the AAL2 node was defined:

- ITU Range 0.0.1 to 7.255.7
- ANSI Range 0.0.1 to 255.255.255
- TTC Range 0.0.1 to 15.31.255
- a string of 1 to 11 combined digits ad period.

Usage Guidelines

Use this command to configure configure the point code of adjacent AAL2 node in SS7 format address. This point code shall be filled in the destination point-code (dpc) field of MTP3 routing label. This is required if signaling transport network is based on MTP3-broadband (MTP3B).

A maximum of 16 point codes for adjacent AAL2 nodes can be configured in one ALCAP service.

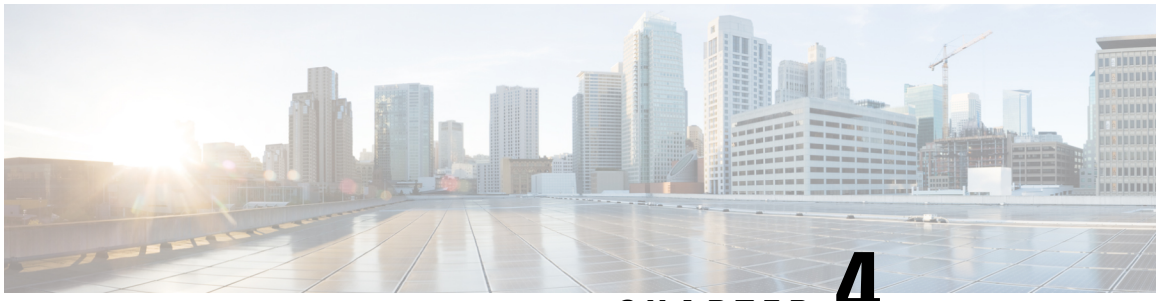
Example

The following command configures the point code *4.121.5* for adjacent AAL2 node.

point-code *4.121.5*

The following command removes the point code *4.121.15* from AAL2 node configuration.

no point-code *4.121.15*



CHAPTER 4

Access Policy Configuration Mode Commands

The Access Policy Configuration Mode is used to create and configure the access-policy.

Command Modes

Exec > Global Configuration > Access Policy Configuration

configure > access-policy *policy_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(access-policy-policy_name)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- do show, on page 93
- end, on page 94
- exit, on page 94
- precedence, on page 94

do show

Executes all **show** commands while in Configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

`do show`

Usage Guidelines

Use this command to run all Exec mode **show** commands while in Configuration mode. It is not necessary to exit the Config mode to run a **show** command.

The pipe character **|** is only available if the command is valid in the Exec mode.

Caution There are some Exec mode **show** commands which are too resource intensive to run from Config mode. These include: **do show support collection**, **do show support details**, **do show support record** and **do show support summary**. If there is a restriction on a specific **show** command, the following error message is displayed:

```
Failure: Cannot execute 'do show support' command from Config mode.
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

precedence

This command allows you to associate the access-profile, device type, and RAT type to the precedence in access-policy.

Product MME

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Access Policy Configuration

configure > access-policy *policy_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(access-policy-policy_name)#
```

Syntax Description

precedence *precedence_value* **access-profile** *profile_name* **{ device-type { low-power | mode-b } | rat-type { eutran | nbiot } }**
no precedence *precedence_value*

no

Removes the configured precedence value.

precedence *precedence_value*

Configures the order of access-profile precedence. *precedence_value* must be an integer from 1 to 16, where 1 has the highest precedence.

access-profile *profile_name*

Configures the access-profile to associate with the access-policy. *profile_name* must be an alphanumeric string of 1 through 64 characters.

device-type { low-power | mode-b }

Configures the IoT device type — Low power or CE Mode-B.

rat-type { eutran | nbiot }

Configures the RAT type — Evolved UTRAN or NB-IOT.

Usage Guidelines

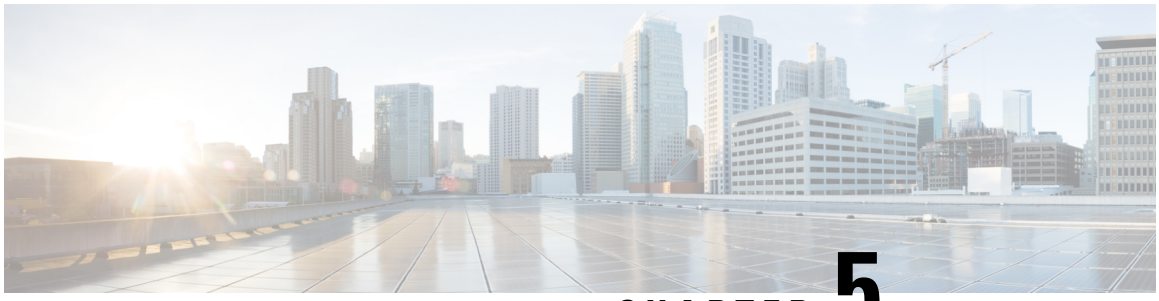
Use this command to associate the access-profile, device type, and RAT type to the precedence configured in access-policy.

One access-policy can have upto 16 entries of precedence along with access-profile, device type, and RAT type. If the precdence is lower, then the priority is higher.

Example

The following command configures the precedence value *2* with access-profile named *apr1* for *low-power* device type and *nbiot* RAT type:

```
precedence 2 access-profile apr1 device-type low-power rat-type nbiot
```



CHAPTER 5

Access Profile Configuration Mode Commands

The Access Profile Configuration Mode is used to create and configure the access-profile.

Command Modes

Exec > Global Configuration > Access Profile Configuration

configure > access-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(access-profile-profile_name)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- description, on page 97
- do show, on page 98
- end, on page 98
- exit, on page 99
- timeout, on page 99

description

Allows you to enter descriptive text for this configuration.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Access Profile Configuration

configure > access-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(access-profile-profile_name)#`

Syntax Description

description *text*
no description

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

do show

Executes all **show** commands while in Configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
do show
```

Usage Guidelines Use this command to run all Exec mode **show** commands while in Configuration mode. It is not necessary to exit the Config mode to run a **show** command.

The pipe character **|** is only available if the command is valid in the Exec mode.

Caution There are some Exec mode **show** commands which are too resource intensive to run from Config mode. These include: **do show support collection**, **do show support details**, **do show support record** and **do show support summary**. If there is a restriction on a specific **show** command, the following error message is displayed:

```
Failure: Cannot execute 'do show support' command from Config mode.
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

exit

Usage Guidelines

Use this command to return to the parent configuration mode.

timeout

This command allows you to configure the EMM timers, ESM timers, and Session Setup timers in access-profile.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Access Profile Configuration

configure > access-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(access-profile-`*`profile_name`*`)#`

Syntax Description

timeout { emm { t3422 | t3450 | t3460 | t3470 } *timeout_value* **| esm { t3485 | t3486 | t3489 | t3495 }** *timeout_value* **| session-setup** *setup_timer* **}**
remove timeout { emm | esm | session-setup }

remove

Removes the configuration from the access-profile.

emm { t3422 | t3450 | t3460 | t3470 } ***timeout_value***

Configures the EMM timers. The EMM timer configuration in access-profile will have higher precedence over the same timer configuration in mme-service.

- **t3422**: Timer for Retransmission of Detach Request.
- **t3450**: Timer for Retransmission of Attach Accept/TAU Accept.
- **t3460**: Timer for Retransmission of Auth Request/Security Mode.
- **t3470**: Timer for Retransmission of Identity Request.

timeout_value specifies the timeout value in seconds as an integer from 1 to 270.

esm { t3485 | t3486 | t3489 | t3495 } *timeout_value*

Configures the ESM timers. The ESM timer configuration in access-profile will have higher precedence over the same timer configuration in mme-service.

- **t3485**: Timer for Retransmission of Activate Default/Dedicated Bearer Request.
- **t3486**: Timer for Retransmission of Modify EPS Bearer Context Request.
- **t3489**: Timer for Retransmission of ESM Information Request.
- **t3495**: Timer for Retransmission of Deactivate EPS Bearer Request.

timeout_value specifies the timeout value in seconds as an integer from 1 to 270.

session-setup *setup_timer*

Configures the session setup timeout in seconds. The session setup timer configuration in access-profile will have higher precedence over the same timer configuration in mme-service.

setup_timer is an integer from 1 to 10000.

Usage Guidelines

Use this command to configure the EMM timers, ESM timers, and Session Setup timers in access-profile. The configuration in access-profile will have higher precedence over the same timer configuration in mme-service.

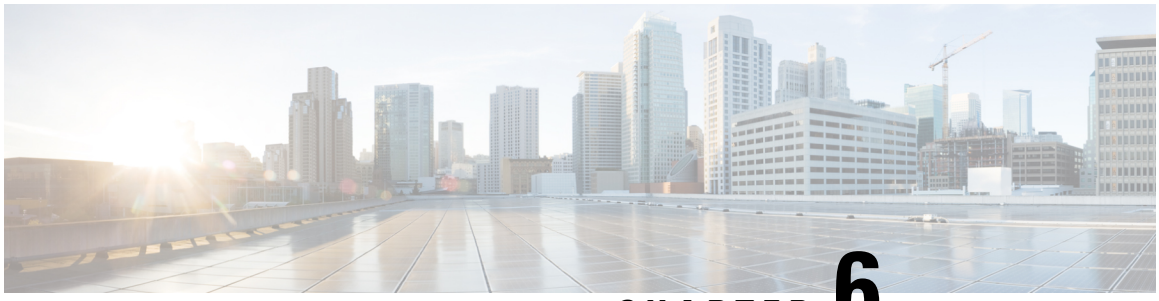
The device type and RAT type are not known while configuring the timer values. Hence, the valid range for these timers is defined such that it covers the maximum value for E-UTRAN and NB-IoT RAT as specified in 3GPP TS 24.301 Release 13.

The maximum timer value is 24+240 = 264 seconds for NB-IoT CE-mode. Hence, the maximum configurable value for timers is 270 seconds.

Example

The following command configures the *t3450* EMM timer with timeout value set to *100* seconds:

```
timeout emm t3450 100
```



CHAPTER 6

Accounting Policy Configuration Mode Commands

The Accounting Policy Configuration Mode is used to define the accounting method, mode, and event trigger responses for the accounting policy supporting the Rf (off-line charging) interface.

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- accounting-event-trigger, on page 102
- accounting-keys, on page 103
- accounting-level, on page 104
- accounting-mode, on page 106
- apn-name-to-be-included, on page 107
- attribute, on page 108
- cc, on page 109
- end, on page 111
- exit, on page 112
- max-containers, on page 112
- operator-string, on page 113
- rf, on page 114
- service-context-id, on page 115
- session, on page 116
- trigger-type, on page 117

accounting-event-trigger

Configures the response to specific event triggers for this policy. Multiple event instances can be configured.

Product

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
accounting-event-trigger { cgi-sai-change | ecgi-change |
flow-information-change | interim-timeout | location-change | rai-change
 | tai-change } action { interim | stop-start }
{ default | no } accounting-event-trigger { cgi-sai-change | ecgi-change
 | flow-information-change | interim-timeout | location-change | rai-change
 | tai-change }
```

default

Returns the command to its default setting of interim for the **action** keyword (for all events).

no

Removes the specified event trigger configuration from this policy.

cgi-sai-change

Specifies that the action is initiated upon indication of a Cell Global Identification-Service Area Identification (CGI-SAI) change.

ecgi-change

Specifies that the action is initiated upon indication of an E-UTRAN Cell Global Identifier (ECGI) change.

flow-information-change

Specifies that the action is initiated upon indication of a change in the flow information.

interim-timeout

Specifies that the action is initiated upon expiration of the interim interval.

location-change

Specifies that the action is initiated upon indication of a location change.

rai-change

Specifies that the action is initiated upon indication of an Routing Area Identifier (RAI) change.

tai-change

Specifies that the action is initiated upon indication of a Tracking Area Identity (TAI) change.

action { interim | stop-start }

Default: interim

Specifies the action initiated upon the occurrence of an event.

interim: Specifies that an interim ACR (Accounting Request) is sent.

stop-start: Specifies that a Stop-Start ACR is sent.

Usage Guidelines

Use this command to configure that action taken upon the occurrence of an accounting event trigger.

Example

The following command configures the policy to send a Stop-Start ACR upon indication of an interim timeout:

```
accounting-event-trigger interim-timeout action stop-start
```

accounting-keys

Aggregates the accounting information, using the configurable keys (QCI) along with default keys.

Product

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
accounting-keys qci
default accounting-keys
```

default

Aggregates the accounting information using QoS Class Identifier (QCI) as the additional key.

qci

Aggregates the accounting information using QCI as the additional key.

Usage Guidelines

Use this command to aggregate the accounting information using the configurable keys (QCI) along with default keys.

In Service Data Flow (SDF) level accounting, buckets are created and maintained using the Reporting-Level AVP value present in Gx message. The following are the accounting keys currently supported:

- Rating-group
- Rating-group and Service-Identifier
- Rating-group and QCI
- Rating-group, Service-Identifier, and QCI

Example

The following command aggregates the accounting information using QCI as the additional key:

```
accounting-keys qci
```

accounting-level

Configures the type of accounting performed by this profile.

Product

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
accounting-level { flow | pdn | pdn-qci | qci | sdf | subscriber }
default accounting-level
```

default

Returns the command to the default setting of subscriber-based accounting.

flow

Specifies that flow-based accounting is to be used for this accounting profile. Accounting Request (ACR) Start messages include an AVP with the following Evolved Packet System (EPS) information:

- PDN identifier
- QCI for which accounting is done
- Charging rule name for which accounting is being done
- AF charging identifier (included if PCRF has provided a charging identifier to correlate AF generated information)
- Flow description for the flows
- User Equipment information if available (ESN/MEID)
- Address of HSGW/S-GW
- Address of the P-GW (if available), one or more instances

pdn

Specifies that PDN-based accounting is to be used for this accounting profile. ACR Start messages include an AVP with the following EPS information:

- Addresses allocated to the UE in this PDN
- PDN identifier
- User Equipment information if available (ESN/MEID)
- Address of HSGW/S-GW
- Address of the P-GW (if available), one or more instances

pdn-qci

Specifies that PDN-QCI accounting is to be used for this accounting profile. ACR Start messages include an AVP with the following EPS information:

- Addresses allocated to the UE in this PDN
- PDN identifier
- QCI for which accounting is done
- User Equipment information if available (ESN/MEID)
- Address of HSGW/S-GW
- Address of the P-GW (if available), one or more instances

qci

Specifies that QCI-based accounting is to be used for this accounting profile. ACR Start messages include an AVP with the following EPS information:

- QCI for which accounting is done
- User Equipment information if available (ESN/MEID)
- Address of HSGW/S-GW
- Address of the P-GW (if available), one or more instances

sdf

Specifies that service data flow accounting is to be used for this accounting profile. ACR Start messages include an AVP with the following EPS information:

subscriber

Specifies that subscriber-based accounting is to be used for this accounting profile. ACR Start messages include an AVP with the following EPS information:

- User Equipment information if available (ESN/MEID)
- Address of HSGW/S-GW
- Address of the P-GW (if available), one or more instances

Usage Guidelines

Use this command to specify the type of accounting performed by this profile.

Example

The following command sets the accounting type for this profile to flow-based:

```
accounting-level flow
```

accounting-mode

Configures the accounting mode for this profile.

Product

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
accounting-mode normal
default accounting-mode
```

default

Returns the accounting mode for this profile to its default setting of "normal".

normal

Specifies that "normal" (start/interim/stop) accounting will be performed for this profile.

Usage Guidelines

Use this command to set the accounting mode for this profile.

apn-name-to-be-included

This command configures whether the virtual or real Access Point Name (APN) is sent in Rf accounting message.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
apn-name-to-be-included { gn | virtual } [ secondary-group { gn | virtual
 } ]
default apn-name-to-be-included
```

default

Configures this command with the default setting.

Default: **gn**

In release 21 and beyond, by default, the apn name to be included in Called-Station-ID AVP is Gn-APN for both primary and secondary Rf server groups. If the secondary group configuration is not available, the default behavior is to have Gn APN for secondary Rf group duplicate records.

apn-name-to-be-included

Configures the APN name to be included in the Rf messages for primary server group.

secondary-group { gn | virtual }

Configures the APN name to be included in the Rf messages for secondary server group.

gn

Sends the Gn APN name in the Rf accounting messages.

virtual

Sends the virtual APN name, if configured in the APN Configuration Mode, in the Rf accounting messages.

Usage Guidelines

Use this command to configure the APN name to be included in Rf accounting messages. Virtual APN name can be set to be sent in Rf accounting messages if it is configured in the APN Configuration Mode.

In Release 21, the **apn-name-to-be-included** CLI command is extended to enable actual APN (Gn-APN) or virtual APN (S6b returned virtual APN) name to be included in Called-Station-ID AVP in the secondary Rf accounting records (secondary server group) under policy accounting configuration. In releases prior to 21, policy accounting configuration supports sending the Gn-APN/S6b-VAPN in Called-Station-ID for primary Rf server. With the new **secondary-group { gn | virtual }** keyword, this functionality is extended for the secondary Rf server.

Example

The following command sets the virtual APN name to be sent in Rf accounting message:

```
apn-name-to-be-included virtual
```

attribute

This command configures the attributes to be reported in Rf accounting.

Product

P-GW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
[ default | no ] attribute csg
```

[default | no]

Specifies to disable reporting of attributes in Rf accounting.

csg

Specifies to enable reporting of Closed Subscriber Group (CSG) related IEs received during the initial attach (Create Session Request) for Rf accounting purpose.

Usage Guidelines

Use this command to enable or disable the reporting of attributes received during the initial attach (Create Session Request) for Rf billing purpose.

cc

Configures a charging characteristics (CC) profile, within the accounting profile configuration, for CDR generation.

Product

ePDG

GGSN

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

cc profile *index* **{ buckets** *num* **| interval** *seconds* **| sdf-interval** *seconds* **| sdf-volume { downlink** *octets* **{ uplink** *octets* **} | total** *octets* **| uplink** *octets* **{ downlink** *octets* **} } | serving-nodes** *num* **| tariff time1** *min hrs* **[time2** *min hrs*...**time4** *min hrs* **] | volume { downlink** *octets* **{ uplink** *octets* **} | total** *octets* **| uplink** *octets* **{ downlink** *octets* **} } }**
default cc profile *index*
no cc profile *index* **{ buckets | interval | sdf-interval | sdf-volume | serving-nodes | tariff | volume }**

default

Returns all profile features, for the specified profile index, to their default settings.

no

Returns the specified feature to its default setting.

profile *index*

Specifies a billing type to be applied to this profile. *index* must be one of the following:

1: Hot billing

2: Flat billing

4: Prepaid billing

8: Normal billing

buckets *num*

Default: 4

Specifies the number of container changes in the S-GW CDR due to QoS changes or tariff times. If an accounting policy is not configured, this value is 4. GTPP accounting will use the default value if the configured value is beyond 4.

In 12.1 and earlier releases, *num* must be an integer value from 1 through 4.

In release 12.2, *num* must be an integer value from 1 through 10.

In 12.3 and later releases, *num* must be an integer value from 1 through 20.

Important Please note that the maximum value for the CC profile buckets is extended to support up to 10 for Diameter Rf accounting only. However, in the case of GTPP accounting, this CLI command allows configuring only up to 4 buckets.

interval *seconds*

Default: disabled

Specifies a time interval for closing the charging record if the minimum volume thresholds are satisfied. *seconds* must be an integer value from 60 through 40000000.

sdf-interval *seconds*

Default: disabled

Specifies a time interval for closing the charging record for a specific flow if the minimum volume thresholds are satisfied. *seconds* must be an integer value from 60 through 40000000.

sdf-volume { downlink *octets* { uplink *octets* } | total *octets* | uplink *octets* { downlink *octets* } }

Specifies octet volume thresholds for the generation of interim CDRs for a specific flow.

downlink *octets*: Sets the threshold limit for the number of downlink octets that must be reached before the charging record for a specific flow is closed. *octets* must be an integer value from 100000 through 4000000000.

total *octets*: Sets the threshold limit for the total number of octets that must be reached before the charging record for a specific flow is closed. *octets* must be an integer value from 100000 through 4000000000.

uplink *octets*: Sets the threshold limit for the number of uplink octets that must be reached before the charging record for a specific flow is closed. *octets* must be an integer value from 100000 through 4000000000.

serving-nodes *num*

Default: 4

Specifies the number of serving node changes (inter-serving node switchovers) after which the interim CDR is generated. In P-GW and S-GW, a partial record needs to be generated whenever there is a serving node address list overflow. Serving node is added to the CDR list during handover scenarios. *num* must be an integer value from 1 through 15. If an accounting policy is not configured, this value is 4.

tariff time1 ***min hrs*** **[time2** ***min hrs...*****time4** ***min hrs*** **]**

Specifies time-of-day values used to determine when a container is closed in the charging records.

time1 *min hrs*: Specifies the first time-of-day value used to close the current container in the charging record. *min* must be an integer value from 0 through 59. *hrs* must be an integer value from 0 through 23.

time2 *min hrs***...time4** *minutes hours*: Specifies the second, third and fourth time-of-day values used to close containers in the charging record. *min* must be an integer value from 0 through 59. *hrs* must be an integer value from 0 through 23.

volume { downlink ***octets*** **{ uplink** ***octets*** **} | total** ***octets*** **| uplink** ***octets*** **{ downlink** ***octets*** **} }**

Specifies octet volume thresholds for the generation of interim CDRs.

downlink *octets*: Sets the threshold limit for the number of downlink octets that must be reached before the charging record is closed.

In 12.1 and earlier releases, the downlink *octets* must be an integer value from 100000 to 1345294336.

In 12.2 and later releases, the downlink *octets* must be an integer value from 100000 to 4000000000.

total *octets*: Sets the threshold limit for the total number of octets that must be reached before the charging record is closed.

In 12.1 and earlier releases, the total*octets* must be an integer value from 100000 to 400000000.

In 12.2 and later releases, the total *octets* must be an integer value from 100000 to 4000000000.

uplink *octets*: Sets the threshold limit for the number of uplink octets that must be reached before the charging record is closed.

In 12.1 and earlier releases, the uplink *octets* must be an integer value from 100000 to 400000000.

In 12.2 and later releases, the uplink *octets* must be an integer value from 100000 to 4000000000.

Usage Guidelines

Use this command to set charging characteristics that directly affect the CDR generation on the HSGW, P-GW, or S-GW.

Example

The following command creates a hot billing profile with a total octet volume threshold set to 500000:

```
cc profile 1 volume total 500000
```

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege Security Administrator, Administrator

Syntax Description **`end`**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **`exit`**

Usage Guidelines Use this command to return to the parent configuration mode.

max-containers

Control the number of containers in an ACR message.

Product GGSN

HSGW

P-GW

S-GW

SAEGW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-accounting-policy)#`

Syntax Description **`max-containers { `** *`containers`* **` | fill-buffer }`**
`default max-containers`

default

Cache containers until buffer is filled.

containers

System can send any value equal or less than the maximum number of containers selected. The number of containers that can be sent can be dynamically selected by the system, but it should not cross the limit of containers in any message.

containers must be in integer from 1 to 30.

fill-buffer

Cache containers until buffer is filled.

Usage Guidelines Use this command to control the number of containers before an interim ACR message is triggered.

Example

The following command sets a maximum of *20* containers in an ACR message:

```
max-containers 20
```

operator-string

Configures a text string to be included with accounting messages sent by this policy.

Product

HSGW

P-GW

S-GW

SAEGW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
operator-string string
no operator-string
```

no

Removes the operator string from this policy.

string

Specifies a text string that is included with accounting messages originating from this policy. *string* must be from 1 to 63 alphanumeric characters.

Usage Guidelines Use this command to create a text string to be included with accounting messages originating from this policy.

Example

The following command creates the text string *pgw_local* to be included with accounting messages originating from this policy:

```
operator-string pgw_local
```

rf

This command controls the reporting of subscriber traffic data for Rating Groups (RGs) based on the generation of Interim Record (IR).

Product

GGSN

HSGW

P-GW

S-GW

SAEGW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
rf report-all-active-rgs
{ default | no } rf report-all-active-rgs
```

default | no

The default behavior is to disable traffic data reporting in Service Data Container (SDC) for all active Rating Groups (RGs) whenever an interim is sent.

report-all-active-rgs

This keyword enables to report the traffic data in the SDC for all the active RGs whenever an IR is sent. By default, this feature is enabled.

Usage Guidelines There are several change conditions where a partial Service Data Container (SDC) is not cut for a particular RG but ACR-Interim is generated due to maximum change conditions. There are many triggers like time limit, volume limit, etc., that will lead to maximum change condition. Because of this some RGs SDC may not be generated for a longer period of time.

In releases prior to 18.0, when a Maximum Change Condition event was triggered, only those RGs that have hit one of the Change Conditions that require a caching of data as opposed to cutting an IR, used to have their

data in the generated IR. In 18.0 and later releases, when the Maximum Change Condition happens, the current Rf implementation is changed to make sure all RGs that have not been cached have a snapshot of their usage taken.

This CLI configuration will enable Rf to take a snapshot of all the active Rating Groups (RGs) whenever an Interim Record (IR) is generated. That means, the Rf will be enabled to report the subscriber traffic data in SDC whenever an IR is generated.

This feature is introduced mainly to ensure that the snapshot is available for all active RGs including the default bearer's RG so that all the traffic data is accounted during the billing cycle.

Example

The following command specifies to report the traffic data for all active RGs when an IR is sent:

```
rf report-all-active-rgs
```

service-context-id

Configures the value to be sent in the Service-Context-Id AVP, which defines the context in which Rf is used.

Product

GGSN

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

service-context-id *service_context_id*
default service-context-id

default

Configures this command with the default setting. Currently, the default value is encoded based on the dictionary wherever applicable; when not applicable, it is not encoded.

service_context_id

Specifies the service context as an alphanumeric string of 1 through 63 characters that can contain punctuation characters.

Usage Guidelines If Service-Context-Id is applicable and configured using this command, it will be sent in the AVP Service-Context-Id in the Rf ACR message.

Example

The following command specifies the value *version@customer.com* to be sent in the Service-Context-Id AVP in the Rf ACR message:

```
service-context-id version@customer.com
```

session

This command controls the behavior of whether to send or suppress the ACR-Interim records when the UE is idle.

Product P-GW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description **`[ default | no ] session idle-mode suppress-interim`**

default

The default behavior is to send accounting interim records even when the UE is in idle state and when there is no data to report.

no

Specifies to send the accounting interim records even when the UE is in idle state and when there is no data to report.

suppress-interim

Suppresses the ACR-I records when there is no data to report or the UE is in idle mode.

Usage Guidelines This CLI configuration is used to control sending of ACR-I records when the UE is in idle mode and when there is no data to report.

In a scenario where there is no data to report, upon configuring the CLI command "**session idle-mode suppress-interim**", a call is established, AII timer (or any other event for which an Interim needs to be generated) happens, and ACR-I will be suppressed.

When there is data to report, on configuring the CLI command "**session idle-mode suppress-interim**", a call is established, AII timer (or any other event for which an Interim needs to be generated) happens, and ACR-I will be sent out.

When there is data to report for the previous events, the following behavior is observed:

1. the CLI command "**session idle-mode suppress-interim**" is configured and a call is established.
2. QoS-Change happens (or any other event for which the container needs to be cached) happens, containers are cached.
3. AII timer (or any other event for which an Interim needs to be generated) happens, but there is no data to report with this event.
4. ACR-I will be sent with the previously cached containers (QoS-Change in this case).

Example

The following command suppresses sending of ACR-Interim message when the UE is idle or when there is no data to report:

```
session idle-mode suppress-interim
```

trigger-type

This command enables/disables the event triggers for Rf-Gy interaction.

Product

GGSN

HSGW

P-GW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Accounting Policy Configuration

configure > context *context_name* **> policy accounting** *policy_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-accounting-policy)#
```

Syntax Description

```
trigger-type { gy-sdf-time-limit { cache | immediate } | gy-sdf-unit-limit
 { cache | immediate } | gy-sdf-volume-limit { cache | immediate } } +
{ default | no } trigger-type
```

default

The default behavior is to disable all the configured event triggers. The interims will be dropped if the event triggers are received from Gy.

no

Specifies to disable all the configured event triggers. The interims will be dropped if the event triggers are received from Gy.

gy-sdf-time-limit { cache | immediate }

Enables the SDF time-limit trigger for Rf-Gy interaction.

cache: If this keyword option is configured then upon receipt of time-limit event trigger from Gy, the container record will be cached for reporting in a future transaction.

immediate: If this keyword option is configured then upon receipt of time-limit event trigger from Gy, Rf will send out an interim record immediately.

gy-sdf-unit-limit { cache | immediate }

Enables the SDF unit-limit trigger for Rf-Gy interaction in Assume Positive scenario. Upon configuration of the CLI command **trigger-type gy-sdf-unit-limit { cache | immediate }**, when the session gets terminated during assume-positive case, ACR-Stop is sent with the container-level change-condition as SERVICE-SPECIFIC-UNIT-LIMIT.

gy-sdf-volume-limit { cache | immediate }

Enables the SDF volume-limit trigger for Rf-Gy interaction.

cache: If this keyword option is configured then upon receipt of volume-limit event trigger from Gy, the container record will be cached for reporting in a future transaction.

immediate: If this keyword option is configured then upon receipt of volume-limit event trigger from Gy, Rf will send out an interim record immediately.

+

Indicates that more than one of the keywords can be entered in a single command.

Usage Guidelines

In Release 15.0 when time/volume quota on the Gy interface gets exhausted, Gy will trigger SERVICE_DATA_VOLUME/TIME_LIMIT. Release 16.0 and beyond, this behavior is CLI controlled.

This CLI configuration will either enable PCEF to send an ACR-Interim immediately or cache the container records for reporting in a future transaction. If there is no such configuration for that event-trigger, then the ACR-Interims will be dropped.

When the subscriber disconnects while in Assume Positive mode, then the CLI configuration enables the PCEF to send an ACR-Stop with PS-level change condition "Normal Release" and container level "Service Specific Unit Limit". The presence of the "Service Specific Unit Limit" change condition at the container level indicates to the OFCS that data has gone unreported on Gy. The change-condition at container level is only present if the keyword option **gy-sdf-unit-limit** is configured.

The gateway provides a configuration option to enable/disable the functionality at the ACR level to control which of the triggers are enabled – Service Specific Unit Limit, Service Data Volume Limit and Service Data Time Limit. The gateway provides configuration options to control the various Rf messages triggered for sync on this feature.

Gy Quota Update - Volume Limit - CLI options are:

- Disabled
- Enabled, container with SDF Volume limit queued and sent at next ACR trigger.
- Enabled, container with SDF Volume limit created and ACR sent immediately with PS info level of Volume Limit

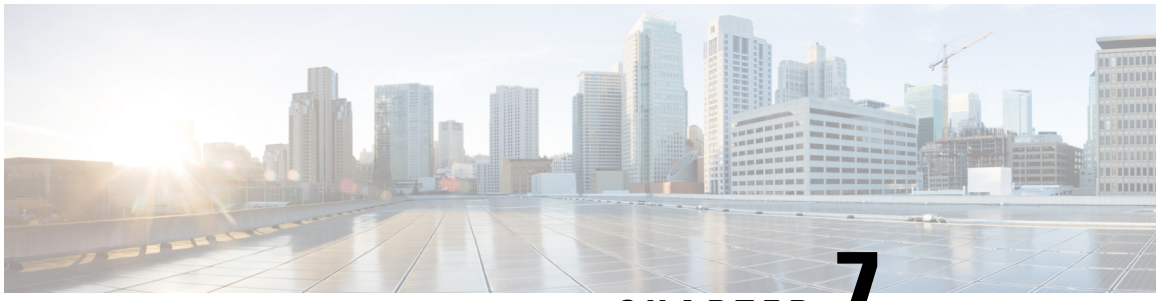
Gy Quota Update – Validity Timer Expires - CLI options are:

- Disabled
- Enabled, container with SDF Time Limit queued and sent at next ACR trigger.
- Enabled, container with SDF Time limit created and ACR sent immediately with PS info level of Time Limit

Example

The following command specifies to send ACR-Interim message immediately when the time quota on the Gy interface expires:

```
trigger-type gy-sdf-time-limit immediate
```



CHAPTER 7

ACL Configuration Mode Commands

The Access Control List Configuration Mode is used to create and manage IP-based, user access privileges.

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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- deny/permit (any), on page 124
- deny/permit (by host IP address), on page 126
- deny/permit (by source ICMP packets), on page 128
- deny/permit (by IP packets), on page 131
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- redirect css service (for uplink, by TCP/UDP packets), on page 210
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- redirect nexthop (any), on page 217
- redirect nexthop (by host IP address), on page 219
- redirect nexthop (by source ICMP packets), on page 221
- redirect nexthop (by IP packets), on page 225
- redirect nexthop (by TCP/UDP packets), on page 228

deny/permit (by source IP address masking)

Filters subscriber sessions based on the IP address mask sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
{ deny | permit } [ log ] source_address source_wildcard
after { deny | permit } [ log ] source_address source_wildcard
before { deny | permit } [ log ] source_address source_wildcard
no { deny | permit } [ log ] source_address source_wildcard
```

after

Indicates that all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates that all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: packets are not logged.

Indicates all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

source_address

The IP address(es) from which the packet originated. IP addresses must be entered in IPv4 dotted-decimal format.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

Usage Guidelines Define a rule when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of filtering rules as it does not require a rule for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines two rules with the second logging filtered packets:

```
permit 1.2.3.0 0.0.0.31
deny log 1.2.4.0 0.0.0.15
```

The following sets the insertion point before the first rule defined above:

```
before permit 1.2.3.0 0.0.0.31
```

The following command sets the insertion point after the second rule defined above:

```
after deny log 1.2.4.0 0.0.0.15
```

The following deletes the first rule defined above:

```
no permit 1.2.3.0 0.0.0.31
```

deny/permit (any)

Filters subscriber sessions based on any packet received. This command is also sets the access control list insertion point.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
{ deny | permit } [ log ] any
after { deny | permit } [ log ] any
before { deny | permit } [ log ] any
no { deny | permit } [ log ] any
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: Packets are not logged.

Indicates all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

any

Indicates all packets will match the filter regardless of source and/or destination.

Usage Guidelines

Define a catch all rule to place at the end of the list of rules.

Important

It is suggested that any rule which is added to be a catch all should also have the **log** option specified. The logged packets may be used to determine if the current list of rules is adequate or needs modification to ensure proper security.

The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following commands define two rules with the second logging filtered packets:

```
permit any
deny log any
```

The following sets the insertion point before the first rule defined above:

```
before permit any
```

The following command sets the insertion point after the second rule defined above:

```
after deny log any
```

The following deletes the first rule defined above:

```
no permit any
```

deny/permit (by host IP address)

Filters subscriber sessions based on the targeted host IP address sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
{ deny | permit } [ log ] host source_host_address
after { deny | permit } [ log ] host source_host_address
before { deny | permit } [ log ] host source_host_address
no { deny | permit } [ log ] host source_host_address
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: Packets are not logged.

Indicates that all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines

Define a rule when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rules to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following commands define two rules with the second logging filtered packets:

```
permit host 10.2.3.4
deny log host 10.2.3.5
```

The following sets the insertion point before the first rule defined above:

```
before permit host 10.2.3.4
```

The following command sets the insertion point after the second rule defined above:

```
after deny log host 10.2.3.5
```

The following deletes the first rule defined above:

```
no permit host 10.2.3.4
```

deny/permit (by source ICMP packets)

Filters subscriber sessions based on the internet control message protocol (ICMP) packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

{ deny | permit } [log] icmp { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [*icmp_type* [*icmp_code*]]

after { deny | permit } [log] icmp { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [*icmp_type* [*icmp_code*]]

before { deny | permit } [log] icmp { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [*icmp_type* [*icmp_code*]]

no { deny | permit } [log] icmp { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [*icmp_type* [*icmp_code*]]

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: packets are not logged.

Indicates all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

source_address

The IP address(es) from which the packet originated. IP addresses must be entered in IPv4 dotted-decimal format.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule to block ICMP packets which can be used for address resolution and possible be a security risk.

The IP filtering allows flexible controls for pairs of individual hosts or groups by IP masking which allows the filtering of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following commands define two rules with the second logging filtered packets:

```
permit icmp host 10.2.3.4 any 168
deny log icmp 10.2.3.0 0.0.0.31 host 10.2.4.16 168 11
```

The following sets the insertion point before the first rule defined above:

```
before permit icmp host 10.2.3.4 any 168
```

The following command sets the insertion point after the second rule defined above:

```
after deny log icmp 10.2.3.0 0.0.0.31 host 10.2.4.16 168 11
```

The following deletes the first rule defined above:

```
no permit icmp host 10.2.3.4 any 168
```

deny/permit (by IP packets)

Filters subscriber sessions based on the internet protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-acl)#`

Syntax Description

{ deny | permit } [log] ip { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [fragment] [protocol *num*]
after { deny | permit } [log] ip { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [fragment] [protocol *num*]
before { deny | permit } [log] ip { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [fragment] [protocol *num*]
no { deny | permit } [log] ip { *source_address source_wildcard* | any | host *source_host_address* } { *dest_address dest_wildcard* | any | host *dest_host_address* } [fragment] [protocol *num*]

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: Packets are not logged.

Indicates all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

fragment

Indicates packet filtering is to be applied to IP packet fragments only.

protocol *num*

Indicates that the packet filtering is to be applied to a specific protocol number.

num can be an integer ranging from 0 to 255.

Important This keyword is not applicable to a SPIO interface. Instead, you must specify the type of protocol packets for which you want to deny/permit processing on a SPIO. For example, **deny icmp**, **deny tcp**, or **deny udp**.

Usage Guidelines

Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following commands define two rules with the second logging filtered packets:

```
permit ip host 10.2.3.4 any fragment
deny log ip 10.2.3.0 0.0.0.31 host 10.2.4.16
```

The following sets the insertion point before the first rule defined above:

```
before permit ip host 10.2.3.4 any fragment
```

The following command sets the insertion point after the second rule defined above:

```
after deny log ip 10.2.3.0 0.0.0.31 host 10.2.4.16
```

The following deletes the first rule defined above:

```
no permit ip host 10.2.3.4 any fragment
```

deny/permit (by TCP/UDP packets)

Filters subscriber sessions based on the transmission control protocol/user datagram protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

{ deny | permit } [log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_port end_port*] }

after { deny | permit } [log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_port end_port*] }

before { deny | permit } [log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_port end_port*] }

no { deny | permit } [log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address*

} [eq *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_port end_port* **] }**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

deny | permit

Specifies the rule is either block (deny) or an allow (permit) filter.

- **deny**: Indicates the rule, when matched, drops the corresponding packets.
- **permit**: Indicates the rule, when matched, allows the corresponding packets.

log

Default: Packets are not logged.

Indicates all packets which match the filter are to be logged.

Important The logging option is not supported for ACLs applied on SPIO or local contexts.

tcp | udp

Specifies the filter is to be applied to IP based transmission control protocol or the user datagram protocol.

- **tcp**: Filter applies to TPC packets.

- **udp**: Filter applies to UDP packets.

source_address

The IP address(es) from which the packet originated. IP addresses must be entered in IPv4 dotted-decimal format.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be an integer from 0 through 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be an integer from 0 through 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

range *start_port end_port*

Specifies a range of ports to be matched.

start_port must be an integer from 0 through 65535, and must be less than the *end_port* value.

end_port must be an integer from 0 through 65535, and must be greater than the *start_port* value.

Important This option is supported in PDIF Release 8.3.

Usage Guidelines

Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following commands define four rules with the second and fourth rules logging filtered packets:

```
permit tcp host 10.2.3.4 any
deny log udp 10.2.3.0 0.0.0.31 host 10.2.4.16
permit tcp host 10.2.3.64 gt 1023 any
deny log udp 10.2.3.0 0.0.0.31 10.2.4.127 0.0.0.127
```

The following sets the insertion point before the first rule defined above:

```
before permit tcp host 10.2.3.4 any
```

The following command sets the insertion point after the second rule defined above:

```
after deny log udp 10.2.3.0 0.0.0.31 host 10.2.4.16
```

The following deletes the third rule defined above:

```
no permit tcp host 10.2.3.64 gt 1023 any
```

description

Allows you to enter descriptive text for this configuration.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

readdress server

Alters the destination address and port number in TCP or UDP packet headers to redirect packets to a different server.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

readdress server *redirect_address* **[port** *port_no* **] { tcp | udp } { { ***source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **] } { { ***dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq]** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **] }**

after readdress server *redirect_address* **[port** *port_no* **] { tcp | udp } { { ***source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **] } { { ***dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq]** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **] }**

before readdress server *redirect_address* **[port** *port_no* **] { tcp | udp } { { ***source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **] } { { ***dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq]** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **] }**

no readdress server *redirect_address* **[port** *port_no* **] { tcp | udp } { { ***source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **] } { { ***dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq]** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **] }**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

redirect_address

The IP address to which the IP packets are redirected. TCP or UDP packet headers are rewritten to contain the new destination address. This must be an IPv4 address specified in dotted-decimal notation.

port *port_no*

The number of the port at the redirect address where the packets are sent. TCP or UDP packet headers are rewritten to contain the new destination port number.

tcp | udp

Specifies the redirect is to be applied to the IP based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TCP packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be an integer from 0 through 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.

- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be an integer from 0 through 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be an integer 0 through 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be an integer 0 through 65535.

Usage Guidelines

Use this command to define a rule that redirects packets to a different destination address. The TCP and UDP packet headers are modified with the new destination address and destination port.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Prior to Release 8.3, for packets received from the packet data network destined for a subscriber's UE, the system applied logic to reset the source address of a packet to the original destination address of the input packet before applying the outbound access control list (ACL). In Release 8.3 and higher, the system reverses the order and applies the outbound ACL before resetting the source address. This change impacts all current readdress server rules in inbound IPv4 ACLs.

Important After Release 8.3, for every readdress server rule in an inbound IPv4 ACL, you must add a permit rule to an outbound ACL that explicitly permits packets from the readdress rule's redirect address and port number. If the permit rule is omitted, the system will reject all packets destined for the subscriber's UE from the readdress rule's redirect address and port number.

Example

The following command defines a rule that redirects packets to the server at 192.168.10.4, UDP packets coming from any host with a destination of any host are matched:

```
readdress server 192.168.10.4 udp any any
```

The following sets the insertion point before the rule defined above:

```
before readdress server 192.168.10.4 udp any any
```

The following command sets the insertion point after the first rule defined above:

```
after readdress server 192.168.10.4 udp any any
```

The following deletes the rule defined above:

```
no readdress server 192.168.10.4 udp any any
```

redirect context (by IP address masking)

Redirects subscriber sessions based on the IP address mask sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect context context_id [ log ] source_address source_wildcard
after redirect context context_id [ log ] source_address source_wildcard
before redirect context context_id [ log ] source_address source_wildcard
no redirect context context_id [ log ] source_address source_wildcard
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

Usage Guidelines Define a rule when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of redirect rules as it does not require a rule for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23 and the source IP and wildcard of 192.168.22.0 and 0.0.0.31:

```
redirect context 23 198.162.22.0 0.0.0.31
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 198.162.22.0 0.0.0.31
```

The following command sets the insertion point after the first rule defined above:

```
after redirect context 23 198.162.22.0 0.0.0.31
```

The following deletes the first rule defined above:

```
no redirect context 23 198.162.22.0 0.0.0.31
```

redirect context (any)

Redirects subscriber sessions based on any packet received. This command is also used to set the access control list insertion point.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect context context_id [ log ] any
after redirect context context_id [ log ] any
before redirect context context_id [ log ] any
no redirect context context_id [ log ] any
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

any

Indicates all packets will match the redirect regardless of source and/or destination.

Usage Guidelines

Define a catch all rule to place at the end of the list of rules to provide explicit handling of rules which do not fit any other criteria.

Important Any rule which is added as a catch all should also have the log option specified. The logged packets may be used to determine if the current list of rules is adequate or needs modification to ensure proper security.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23 and any source IP:

```
redirect context 23 any
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 any
```

The following command sets the insertion point after the first rule defined above:

```
after redirect context 23 any
```

The following deletes the first rule defined above:

```
no redirect context 23 any
```

redirect context (by host IP address)

Redirects subscriber sessions based on the targeted host IP address sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect context *context_id* **[log] host** *source_ipv4_address*
after redirect context *context_id* **[log] host** *source_ipv4_address*

before redirect context *context_id* **[log] host** *source_ipv4_address*
no redirect context *context_id* **[log] host** *source_ipv4_address*

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_ipv4_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines

Define a rule when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rules to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23 and a host IP address of 192.168.200.11:

```
redirect context 23 host 192.168.200.11
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 host 192.168.200.11
```

The following command sets the insertion point after first the rule defined above:

```
after redirect context 23 host 192.168.200.11
```

The following deletes the first rule defined above:

```
no redirect context 23 host 192.168.200.11
```

redirect context (by source ICMP packets)

Redirects subscriber sessions based on the internet control message protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect context context_id [ log ] icmp { source_address source_wildcard | any
| host source_host_address } { dest_address dest_wildcard | any | host dest_host_address
 } [ icmp_type [ icmp_code ] ]
after redirect context context_id [ log ] icmp { source_address source_wildcard
| any | host source_host_address } { dest_address dest_wildcard | any | host
dest_host_address } [ icmp_type [ icmp_code ] ]
before redirect context context_id [ log ] icmp { source_address source_wildcard
```

| any | host *source_host_address* **} { ***dest_address dest_wildcard* **| any | host** *dest_host_address* **} [** *icmp_type* **[** *icmp_code* **]]**
no redirect context *context_id* **[log] icmp {** *source_address source_wildcard* **| any | host** *source_host_address* **} {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [** *icmp_type* **[** *icmp_code* **]]**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule to block ICMP packets which can be used for address resolution and possibly be a security risk.

The IP redirecting allows flexible controls for pairs of individual hosts or groups by IP masking which allows the redirecting of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23, and ICMP packets coming from the host with the IP address 198.162.100.25:

```
redirect context 23 icmp host 192.168.100.25
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 icmp host 192.168.100.25
```

The following command sets the insertion point after the first rule defined above:

```
after redirect context 23 icmp host 192.168.100.25
```

The following deletes the first rule defined above:

```
no redirect context 23 icmp host 192.168.100.25
```

redirect context (by IP packets)

Redirects subscriber sessions based on the internet protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect context *context_id* **[log] ip {** *source_address source_wildcard* **| any | host** *source_host_address* **} {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
after redirect context *context_id* **[log] ip {** *source_address source_wildcard* **| any | host** *source_host_address* **} {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
before redirect context *context_id* **[log] ip {** *source_address source_wildcard* **| any | host** *source_host_address* **} {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
no redirect context *context_id* **[log] ip {** *source_address source_wildcard* **| any | host** *source_host_address* **} {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

fragment

Indicates packet redirection is to be applied to IP packet fragments only.

protocol *num*

Indicates that the packet filtering is to be applied to a specific protocol number.

num can be an integer ranging from 0 to 255.

Usage Guidelines

Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23, and IP packets coming from the host with the IP address 198.162.100.25, and fragmented packets for any destination are matched:

```
redirect context 23 ip host 198.162.100.25 any fragment
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 ip host 198.162.100.25 any fragment
```

The following command sets the insertion point after the first rule defined above:

```
after redirect context 23 ip host 198.162.100.25 any fragment
```

The following deletes the first rule defined above:

```
no redirect context 23 ip host 198.162.100.25 any fragment
```

redirect context (by TCP/UDP packets)

Redirects subscriber sessions based on the transmission control protocol/user datagram protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect context context_id [ log ] { tcp | udp } { { source_address
source_wildcard | any | host source_host_address } [ eq source_port | gt source_port
 | lt source_port | neq source_port ] } { { dest_address dest_wildcard | any | host
 dest_host_address } [ eq dest_port | gt dest_port | lt dest_port | neq dest_port ]
}
after redirect context context_id [ log ] { tcp | udp } { { source_address
source_wildcard | any | host source_host_address } [ eq source_port | gt source_port
 | lt source_port | neq source_port ] } { { dest_address dest_wildcard | any | host
 dest_host_address } [ eq dest_port | gt dest_port | lt dest_port | neq dest_port ]
}
before redirect context context_id [ log ] { tcp | udp } { { source_address
source_wildcard | any | host source_host_address } [ eq source_port | gt source_port
 | lt source_port | neq source_port ] } { { dest_address dest_wildcard | any | host
 dest_host_address } [ eq dest_port | gt dest_port | lt dest_port | neq dest_port ]
}
no redirect context context_id [ log ] { tcp | udp } { { source_address
source_wildcard | any | host source_host_address } [ eq source_port | gt source_port
```

```
 | lt source_port | neq source_port ] } { { dest_address dest_wildcard | any | host
 dest_host_address } [ eq dest_port | gt dest_port | lt dest_port | neq dest_port ]
}
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

tcp | udp

Specifies the redirect is to be applied to IP based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TPC packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be configured to an integer value from 0 to 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be an integer from 0 through 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

Usage Guidelines Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the context with the context ID of 23, and UDP packets coming from any host are matched:

```
redirect context 23 udp any
```

The following sets the insertion point before the rule defined above:

```
before redirect context 23 udp any
```

The following command sets the insertion point after the first rule defined above:

```
after redirect context 23 udp any
```

The following deletes the rule defined above:

```
no redirect context 23 udp any
```

redirect css delivery-sequence

This is a restricted command. In 9.0 and later releases, this command is obsoleted.

redirect css service (any)

Redirects subscriber sessions based on any packet received (Content Service Steering). This command is also used to set the access control list insertion point.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] any
after redirect css service service_name [ log ] any
before redirect css service service_name [ log ] any
no redirect css service service_name [ log ] any
```

after

Indicates all rule definitions defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definitions which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

any

Indicates all packets will match the redirect regardless of source and/or destination.

Usage Guidelines

Define a catch all rule definitions to place at the end of the list of rule definitions to provide explicit handling of rule definitions which do not fit any other criteria.

Important Any rule definition which is added to be a catch all should also have the **log** option specified. The logged packets may be used to determine if the current list of rule definitions is adequate or needs modification to ensure proper security.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1* and any source IP:

```
redirect css service chgsvc1 any
```

The following sets the insertion point before the rule definition above:

```
before redirect service chgsvc1 any
```

The following command sets the insertion point after the first rule definitions above:

```
after redirect service chgsvc1 any
```

The following deletes the first rule definition above:

```
no redirect service chgsvc1 any
```

redirect css service (by host IP address)

Redirecst subscriber sessions based on the targeted host IP address sent by the source to the mobile node or the network (Content Service Steering).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] host source_host_address
after redirect css service service_name [ log ] host source_host_address
before redirect css service service_name [ log ] host source_host_address
no redirect css service service_name [ log ] host source_host_address
```

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines Define a rule definition when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rule definitions to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1* and a host IP address of *192.168.200.11*:

```
redirect css service chgsvc1 host 192.168.200.11
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 host 192.168.200.11
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 host 192.168.200.11
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 host 192.168.200.11
```

redirect css service (by ICMP packets)

Redirects subscriber sessions based on the internet control message protocol packets sent by the source to the mobile node or the network (Content Service Steering).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] icmp { any | host source_host_address
 | source_address source_wildcard } { any | host dest_host_address | dest_address
dest_wildcard } [ icmp_type [ icmp_code ]
before redirect css service service_name [ log ] icmp { any | host
```

source_host_address **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
after redirect css service *service_name* **[log] icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
no redirect css service *service_name* **[log] icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.

- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule definition to block ICMP packets which can be used for address resolution and possibly be a security risk.

The IP redirecting allows flexible controls for pairs of individual hosts or groups by IP masking which allows the redirecting of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and ICMP packets coming from the host with the IP address *198.162.100.25*:

```
redirect css service chgsvc1 icmp host 192.168.200.11
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 icmp host 192.168.200.11
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 icmp host 192.168.200.11
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 icmp host 192.168.200.11
```

redirect css service (by IP packets)

Redirects subscriber sessions based on the internet protocol packets sent by the source to the mobile node or the network (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-acl)#`

Syntax Description

redirect css service *service_name* **[log] ip { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [fragment]**
after redirect css service *service_name* **[log] ip { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [fragment]**
before redirect css service *service_name* **[log] ip { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [fragment]**
no redirect css service *service_name* **[log] ip { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [fragment]**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition that exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

fragment

Indicates packet redirection is to be applied to IP packet fragments only.

Usage Guidelines

Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and IP packets coming from the host with the IP address *198.162.100.25*, and fragmented packets for any destination are matched:

redirect css service chgsvc1 ip host 192.168.100.25 any fragment

The following sets the insertion point before the rule definition above:

before redirect css service chgsvc1 ip host 192.168.100.25 any fragment

The following command sets the insertion point after the first rule definition above:

after redirect css service chgsvc1 ip host 192.168.100.25 any fragment

The following deletes the first rule definition above:

no redirect css service chgsvc1 ip host 192.168.100.25 any fragment

redirect css service (by source IP address masking)

Redirects subscriber sessions based on the IP address mask sent by the source to the mobile node or the network (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-acl)#`

Syntax Description

redirect css service *service_name* **[log]** *source_address source_wildcard*
after redirect css service *service_name* **[log]** *source_address source_wildcard*
before redirect css service *service_name* **[log]** *source_address source_wildcard*
no redirect css service *service_name* **[log]** *source_address source_wildcard*

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the filter are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

Usage Guidelines

Define a rule definition when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of filtering rule definitions as it does not require a rule definition for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines a rule definition to redirect packets to a charging service named *chgsvc1*:

```
redirect css service chgsvc1 10.2.3.0 0.0.0.31
```

redirect css service (by TCP/UDP packets)

Redirects subscriber sessions based on the transmission control protocol/user datagram protocol packets sent by the source to the mobile node or the network (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port* | range *start_source_port end_source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_dest_port end_dest_port*] }**
after redirect css service *service_name* **[log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port* | range *start_source_port end_source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_dest_port end_dest_port*] }**
before redirect css service *service_name* **[log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port* | range *start_source_port end_source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_dest_port end_dest_port*] }**
no redirect css service *service_name* **[log] { tcp | udp } { { *source_address source_wildcard* | any | host *source_host_address* } [eq *source_port* | gt *source_port* | lt *source_port* | neq *source_port* | range *start_source_port end_source_port*] } { { *dest_address dest_wildcard* | any | host *dest_host_address* } [eq *dest_port* | gt *dest_port* | lt *dest_port* | neq *dest_port* | range *start_dest_port end_dest_port*] }**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

tcp | udp

Specifies the redirect is to be applied to IP-based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TPC packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be configured to an integer value from 0 to 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

range *start_source_port end_source_port*

Specifies that all source TCP ports within a specific range are to be filtered.

start_source_port is the initial port in the range and *end_source_port* is the final port in the range.

Both *start_source_port* and *end_source_port* can be configured to an integer value from 0 to 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

range *start_dest_port end_dest_port*

Specifies that all destination TCP ports within a specific range are to be filtered.

start_dest_port is the initial port in the range and *end_dest_port* is the final port in the range.

Both *start_dest_port* and *end_dest_port* can be configured to an integer value from 0 to 65535.

Usage Guidelines

Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and UDP packets coming from any host are matched:

```
redirect css service chgsvc1 udp any
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 udp any
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 udp any
```

The following command deletes the rule definition above:

```
no redirect css service chgsvc1 udp any
```

redirect css service (for downlink, any)

Redirects subscriber sessions based on any packet received in the downlink (from the Mobile Node) direction (Content Service Steering). This command is also used to set the access control list insertion point.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] downlink any
after redirect css service service_name [ log ] downlink any
before redirect css service service_name [ log ] downlink any
no redirect css service service_name [ log ] downlink any
```

after

Indicates all rule definitions defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

any

Indicates all packets will match the redirect regardless of source and/or destination.

Usage Guidelines

Define a catch all rule definition to place at the end of the list of rule definitions to provide explicit handling of rule definitions which do not fit any other criteria.

Important Any rule definition which is added to be a catch all should also have the **log** option specified. The logged packets may be used to determine if the current list of rule definitions is adequate or needs modification to ensure proper security.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1* and any source IP:

```
redirect css service chgsvc1 downlink any
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 downlink any
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 downlink any
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 downlink any
```

redirect css service (for downlink, by host IP address)

Redirects subscriber sessions based on the targeted host IP address in the downlink (from the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] downlink host** *source_host_address*
before redirect css service *service_name* **[log] downlink host** *source_host_address*
after redirect css service *service_name* **[log] downlink host** *source_host_address*
no redirect css service *service_name* **[log] downlink host** *source_host_address*

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines

Define a rule definition when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rule definitions to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1and* a host IP address of *192.168.200.11*:

```
redirect css service chgsvc1 downlink host 192.168.200.11
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 downlink host 192.168.200.11
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 downlink host 192.168.200.11
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 downlink host 192.168.200.11
```

redirect css service (for downlink, by ICMP packets)

Redirects subscriber sessions based on the internet control message protocol packets in the downlink (from the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] downlink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
after redirect css service *service_name* **[log] downlink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
before redirect css service *service_name* **[log] downlink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
no redirect css service *service_name* **[log] downlink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule definition to block ICMP packets which can be used for address resolution and possibly be a security risk.

The IP redirecting allows flexible controls for pairs of individual hosts or groups by IP masking which allows the redirecting of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and ICMP packets coming in the downlink (from the Mobile Node) direction from the host with the IP address 192.168.100.25:

```
redirect css service chgsvc1 downlink icmp host 192.168.100.25
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 downlink icmp host 192.168.100.25
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 downlink icmp host 192.168.100.25
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 downlink icmp host 192.168.100.25
```

redirect css service (for downlink, by IP packets)

Redirects subscriber sessions based on the internet protocol packets in the downlink (from the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] downlink ip { any | host
source_host_address | source_address source_wildcard } { any | host dest_host_address
| dest_address dest_wildcard } [ fragment ]
after redirect css service service_name [ log ] downlink ip { any | host
source_host_address | source_address source_wildcard } { any | host dest_host_address
| dest_address dest_wildcard } [ fragment ]
before redirect css service service_name [ log ] downlink ip { any | host
source_host_address | source_address source_wildcard } { any | host dest_host_address
| dest_address dest_wildcard } [ fragment ]
no redirect css service service_name [ log ] downlink ip { any | host
source_host_address | source_address source_wildcard } { any | host dest_host_address
| dest_address dest_wildcard } [ fragment ]
```

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

fragment

Indicates packet redirection is to be applied to IP packet fragments only.

Usage Guidelines

Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and downlink IP packets coming from the host with the IP address *198.162.100.25*, and fragmented packets for any destination are matched:

```
redirect css service chgsvc1 downlink ip host 198.162.100.25 any fragment
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 downlink ip host 198.162.100.25 any
fragment
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 downlink ip host 198.162.100.25 any
fragment
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 downlink ip host 198.162.100.25 any
fragment
```

redirect css service (for downlink, by source IP address masking)

Redirects subscriber sessions based on the IP address mask sent by the source in the downlink (from the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] downlink** *source_address source_wildcard*
after redirect css service *service_name* **[log] downlink** *source_address source_wildcard*
before redirect css service *service_name* **[log] downlink** *source_address source_wildcard*
no redirect css service *service_name* **[log] downlink** *source_address source_wildcard*

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the filter are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

Usage Guidelines

Define a rule definition when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of filtering rule definitions as it does not require a rule definition for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines a rule definition to redirect packets to a charging service named *chgsvc1*:

```
redirect css service chgsvc1 downlink 10.2.3.0 0.0.0.31
```

redirect css service (for downlink, by TCP/UDP packets)

Redirects subscriber sessions to a charging service based on the transmission control protocol/user datagram protocol packets in the downlink (from the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] downlink { tcp | udp } { {** *source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **| range** *start_source_port end_source_port* **] } { {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_dest_port end_dest_port* **] }**

after redirect css service *service_name* **[log] downlink { tcp | udp } { {** *source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **| range** *start_source_port end_source_port* **] } { {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_dest_port end_dest_port* **] }**

before redirect css service *service_name* **[log] downlink { tcp | udp } { {** *source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **| range** *start_source_port end_source_port* **] } { {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_dest_port end_dest_port* **] }**

no redirect css service *service_name* **[log] downlink { tcp | udp } { {** *source_address source_wildcard* **| any | host** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **| range** *start_source_port end_source_port* **] } { {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_dest_port end_dest_port* **] }**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

downlink

Apply this rule definition only to packets in the downlink (from the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

tcp | udp

Specifies the redirect is to be applied to IP based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TPC packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be configured to an integer value from 0 to 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

range *start_source_port end_source_port*

Specifies that all source TCP ports within a specific range are to be filtered.

start_source_port is the initial port in the range and *end_source_port* is the final port in the range.

Both *start_source_port* and *end_source_port* can be configured to an integer value from 0 to 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

range *start_dest_port end_dest_port*

Specifies that all destination TCP ports within a specific range are to be filtered.

start_dest_port is the initial port in the range and *end_dest_port* is the final port in the range.

Both *start_dest_port* and *end_dest_port* can be configured to an integer value from 0 to 65535.

Usage Guidelines

Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and UDP packets coming from any host are matched:

```
redirect css service chgsvc1 downlink udp any
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 downlink udp any
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 downlink udp any
```

The following deletes the rule definition above:

```
no redirect css service chgsvc1 downlink udp any
```

redirect css service (for uplink, any)

Redirects subscriber sessions based on any packet received in the uplink (to the Mobile Node) direction (Content Service Steering). This command is also used to set the access control list insertion point.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] uplink any
after redirect css service service_name [ log ] uplink any
before redirect css service service_name [ log ] uplink any
no redirect css service service_name [ log ] uplink any
```

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

any

Indicates all packets will match the redirect regardless of source and/or destination.

Usage Guidelines

Define a catch all rule definition to place at the end of the list of rule definitions to provide explicit handling of rule definitions which do not fit any other criteria.

Important It is suggested that any rule definition which is added to be a catch all should also have the **log** option specified. The logged packets may be used to determine if the current list of rule definitions is adequate or needs modification to ensure proper security.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1* and any source IP:

```
redirect css service chgsvc1 uplink any
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 uplink any
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 uplink any
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 uplink any
```

redirect css service (for uplink, by host IP address)

Redirects subscriber sessions based on the targeted host IP address in the uplink (to the Mobile Node) direction (Content Service Steering).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] uplink host** *source_host_address*
after redirect css service *service_name* **[log] uplink host** *source_host_address*
before redirect css service *service_name* **[log] uplink host** *source_host_address*
no redirect css service *service_name* **[log] uplink host** *source_host_address*

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

after

Indicates all rule definitions defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines

Define a rule definition when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rule definitions to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service with the name *chgsvc1* and a host IP address of *192.168.200.11*:

```
redirect css service chgsvc1 uplink host 192.168.200.11
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 uplink host 192.168.200.11
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 uplink host 192.168.200.11
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 uplink host 192.168.200.11
```

redirect css service (for uplink, by ICMP packets)

Redirects subscriber sessions based on the internet control message protocol packets in the uplink (to the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] uplink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
after redirect css service *service_name* **[log] uplink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
before redirect css service *service_name* **[log] uplink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**
no redirect css service *service_name* **[log] uplink icmp { any | host** *source_host_address* **|** *source_address source_wildcard* **} { any | host** *dest_host_address* **|** *dest_address dest_wildcard* **} [** *icmp_type* **[** *icmp_code* **]**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule definition to block ICMP packets which can be used for address resolution and possibly be a security risk.

The IP redirecting allows flexible controls for pairs of individual hosts or groups by IP masking which allows the redirecting of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rule definitions are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and ICMP packets in the uplink (to the Mobile Node) direction from the host with the IP address *198.162.100.25*:

```
redirect css service chgsvc1 uplink icmp host 192.168.100.25
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 uplink icmp host 192.168.100.25
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 uplink icmp host 192.168.100.25
```

The following deletes the first rule definition above:

```
no redirect css service chgsvc1 uplink icmp host 192.168.100.25
```

redirect css service (for uplink, by IP packets)

Redirects subscriber sessions based on the internet protocol packets in the uplink (to the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect css service *service_name* **[log] uplink ip { any | host** *source_host_address* **| *source_address source_wildcard* } { any | host** *dest_host_address* **| *dest_address dest_wildcard* } [fragment]**
after redirect css service *service_name* **[log] uplink ip { any | host** *source_host_address* **| *source_address source_wildcard* } { any | host** *dest_host_address* **| *dest_address dest_wildcard* } [fragment]**
before redirect css service *service_name* **[log] uplink ip { any | host** *source_host_address* **| *source_address source_wildcard* } { any | host** *dest_host_address* **| *dest_address dest_wildcard* } [fragment]**
no redirect css service *service_name* **[log] uplink ip { any | host** *source_host_address* **| *source_address source_wildcard* } { any | host** *dest_host_address* **| *dest_address dest_wildcard* } [fragment]**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

Important If the options specified do not exactly match an existing rule definition, the insertion point does not change.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

fragment

Indicates packet redirection is to be applied to IP packet fragments only.

Usage Guidelines Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and uplink IP packets going to the host with the IP address *198.162.100.25*, and fragmented packets for any destination are matched:

```
redirect css service chgsvc1 uplink ip host 198.162.100.25 any fragment
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 uplink ip host 198.162.100.25 any
fragment
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 uplink ip host 198.162.100.25 any
fragment
```

The following command deletes the first rule definition above:

```
no redirect css service chgsvc1 uplink ip host 198.162.100.25 any fragment
```

redirect css service (for uplink, by source IP address masking)

Redirects subscriber sessions based on the IP address mask sent by the source in the uplink (to the Mobile Node) direction (Content Service Steering).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] uplink source_address source_wildcard
after redirect css service service_name [ log ] uplink source_address
source_wildcard
before redirect css service service_name [ log ] uplink source_address
source_wildcard
no redirect css service service_name [ log ] uplink source_address source_wildcard
```

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the filter are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Usage Guidelines

Define a rule definition when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of filtering rule definitions as it does not require a rule definition for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines a rule definition to redirect packets to a charging service named *chgsvc1*:

```
redirect css service chgsvc1 uplink 10.2.3.0 0.0.0.31
```

redirect css service (for uplink, by TCP/UDP packets)

Redirects subscriber sessions to a charging service based on the transmission control protocol/user datagram protocol packets in the uplink (to the Mobile Node) direction (Content Service Steering).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect css service service_name [ log ] uplink { tcp | udp } { {
source_address source_wildcard | any | source_host_address } [ eq source_port | gt
source_port | lt source_port | neq source_port | range start_source_port end_source_port
 ] } { { dest_address dest_wildcard | any | host dest_host_address } [ eq dest_port
 | gt dest_port | lt dest_port | neq dest_port | range start_dest_port end_dest_port
 ] }
after redirect css service service_name [ log ] uplink { tcp | udp } { {
source_address source_wildcard | any | source_host_address } [ eq source_port | gt
source_port | lt source_port | neq source_port | range start_source_port end_source_port
 ] } { { dest_address dest_wildcard | any | host dest_host_address } [ eq dest_port
 | gt dest_port | lt dest_port | neq dest_port | range start_dest_port end_dest_port
 ] }
before redirect css service service_name [ log ] uplink { tcp | udp } { {
source_address source_wildcard | any | source_host_address } [ eq source_port | gt
source_port | lt source_port | neq source_port | range start_source_port end_source_port
 ] } { { dest_address dest_wildcard | any | host dest_host_address } [ eq dest_port
 | gt dest_port | lt dest_port | neq dest_port | range start_dest_port end_dest_port
 ] }
```

no redirect css service *service_name* **[log] uplink { tcp | udp } { {** *source_address source_wildcard* **| any |** *source_host_address* **} [eq** *source_port* **| gt** *source_port* **| lt** *source_port* **| neq** *source_port* **| range** *start_source_port end_source_port* **] } { {** *dest_address dest_wildcard* **| any | host** *dest_host_address* **} [eq** *dest_port* **| gt** *dest_port* **| lt** *dest_port* **| neq** *dest_port* **| range** *start_dest_port end_dest_port* **] }**

after

Indicates all rule definitions subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule definition which matches the exact options specified such that new rule definitions will be added, in order, after the matching rule definition.

before

Indicates all rule definitions subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule definition which matches the exact options specified such that new rule definitions will be added, in order, before the matching rule definition.

no

Removes the rule definition which exactly matches the options specified.

css service *service_name*

The name of the active charging service to which packets are to be redirected. At the executive mode prompt, use the **show active-charging service all** command to display the names of all configured charging services.

service_name must be an alphanumeric string from 1 through 15 characters.

uplink

Apply this rule definition only to packets in the uplink (to the Mobile Node) direction.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

tcp | udp

Specifies the redirect is to be applied to IP based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TPC packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

any

Specifies that the rule definition applies to all packets.

host

Specifies that the rule definition applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be configured to an integer value from 0 to 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be configured to an integer value from 0 to 65535.

range *start_source_port end_source_port*

Specifies that all source TCP ports within a specific range are to be filtered.

start_source_port is the initial port in the range and *end_source_port* is the final port in the range.

Both *start_source_port* and *end_source_port* can be configured to an integer value from 0 to 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be configured to an integer value from 0 to 65535.

range *start_dest_port end_dest_port*

Specifies that all destination TCP ports within a specific range are to be filtered.

start_dest_port is the initial port in the range and *end_dest_port* is the final port in the range.

Both *start_dest_port* and *end_dest_port* can be configured to an integer value from 0 to 65535.

Usage Guidelines

Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Example

The following command defines a rule definition that redirects packets to the charging service named *chgsvc1*, and UDP packets coming from any host are matched:

```
redirect css service chgsvc1 uplink udp any
```

The following sets the insertion point before the rule definition above:

```
before redirect css service chgsvc1 uplink udp any
```

The following command sets the insertion point after the first rule definition above:

```
after redirect css service chgsvc1 uplink udp any
```

The following deletes the rule definition above:

```
no redirect css service chgsvc1 uplink udp any
```

redirect nexthop (by IP address masking)

Redirects subscriber sessions based on the IP address mask sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect nexthop nexthop_addr { context context_id | interface interface_name }
[ log ] source_address source_wildcard
after redirect nexthop nexthop_addr { context context_id | interface interface_name
 } [ log ] source_address source_wildcard
before redirect nexthop nexthop_addr { context context_id | interface
interface_name } [ log ] source_address source_wildcard
no redirect nexthop nexthop_addr { context context_id | interface interface_name
 } [ log ] source_address source_wildcard
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 to 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

Usage Guidelines

Define a rule when any packet from the IP addresses which fall into the group of addresses matching the IP address masking. This allows the reduction of redirect rules as it does not require a rule for each source and destination pair.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23 and the source IP and wildcard of 192.168.22.0 and 0.0.0.31:

```
redirect nexthop 192.168.10.4 context 23 198.162.22.0 0.0.0.31
```

The following sets the insertion point before the rule defined above:

```
before redirect nexthop 192.168.10.4 context 23 198.162.22.0 0.0.0.31
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 198.162.22.0 0.0.0.31
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 198.162.22.0 0.0.0.31
```

redirect nexthop (any)

Redirects subscriber sessions based on any packet received. This command is also used to set the access control list insertion point.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] any**
after redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] any**
before redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] any**
no redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] any**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 to 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

any

Indicates all packets will match the redirect regardless of source and/or destination.

Usage Guidelines

Define a catch all rule to place at the end of the list of rules to provide explicit handling of rules which do not fit any other criteria.

Important Any rule which is added to be a catch all should also have the **log** option specified. The logged packets may be used to determine if the current list of rules is adequate or needs modification to ensure proper security.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23 and any source IP:

```
redirect nexthop 192.168.10.4 context 23 any
```

The following sets the insertion point before the rule defined above:

```
before redirect nexthop 192.168.10.4 context 23 any
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 any
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 any
```

redirect nexthop (by host IP address)

Redirects subscriber sessions based on the targeted host IP address sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] host** *source_ipv4_address*
after redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] host** *source_ipv4_address*
before redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] host** *source_ipv4_address*
no redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] host** *source_ipv4_address*

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 to 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_ipv4_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

Usage Guidelines

Define a rule when a very specific remote host is to be blocked. In simplified networks where the access controls need only block a few hosts, this command allows the rules to be very clear and concise.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23 and a host IP address of 192.168.200.11:

```
redirect nexthop 192.168.10.4 context 23 host 192.168.200.11
```

The following sets the insertion point before the rule defined above:

```
before redirect nexthop 192.168.10.4 context 23 host 192.168.200.11
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 host 192.168.200.11
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 host 192.168.200.11
```

redirect nexthop (by source ICMP packets)

Redirects subscriber sessions based on the internet control message protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

```
redirect nexthop nexthop_addr { context context_id | interface interface_name }
[ log ] icmp { source_address source_wildcard | any | host source_host_address } {
 dest_address dest_wildcard | any | host dest_host_address } [ icmp_type [ icmp_code
] ]
after redirect nexthop nexthop_addr { context context_id | interface interface_name
 } [ log ] icmp { source_address source_wildcard | any | host source_host_address
} { dest_address dest_wildcard | any | host dest_host_address } [ icmp_type [ icmp_code
 ] ]
before redirect nexthop nexthop_addr { context context_id | interface
interface_name } [ log ] icmp { source_address source_wildcard | any | host
source_host_address } { dest_address dest_wildcard | any | host dest_host_address } [
 icmp_type [ icmp_code ] ]
no redirect nexthop nexthop_addr { context context_id | interface interface_name
 } [ log ] icmp { source_address source_wildcard | any | host source_host_address
} { dest_address dest_wildcard | any | host dest_host_address } [ icmp_type [ icmp_code
 ] ]
```

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 through 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

icmp_type

Specifies that all ICMP packets of a particular type are to be filtered. The type can be an integer value between 0 and 255.

icmp_code

Specifies that all ICMP packets of a particular code are to be filtered. The type can be an integer value between 0 and 255.

Usage Guidelines

Define a rule to block ICMP packets which can be used for address resolution and possible be a security risk.

The IP redirecting allows flexible controls for pairs of individual hosts or groups by IP masking which allows the redirecting of entire subnets if necessary.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23, and ICMP packets coming from the host with the IP address 198.162.100.25:

```
redirect nexthop 192.168.10.4 context 23 icmp host 192.168.100.25
```

The following sets the insertion point before the rule defined above:

```
before redirect nexthop 192.168.10.4 context 23 icmp host 192.168.100.25
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 icmp host 192.168.100.25
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 icmp host 192.168.100.25
```

redirect nexthop (by IP packets)

Redirects subscriber sessions based on the internet protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > context *context_name* **> ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] ip { source_address source_wildcard | any | host** *source_host_address* **} { dest_address dest_wildcard | any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
after redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] ip { source_address source_wildcard | any | host** *source_host_address* **} { dest_address dest_wildcard | any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
before redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] ip { source_address source_wildcard | any | host** *source_host_address* **} { dest_address dest_wildcard | any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**
no redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **} [log] ip { source_address source_wildcard | any | host** *source_host_address* **} { dest_address dest_wildcard | any | host** *dest_host_address* **} [fragment] [protocol** *num* **]**

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to be immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 through 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

fragment

Indicates packet redirection is to be applied to IP packet fragments only.

protocol *num*

Indicates that the packet filtering is to be applied to a specific protocol number.

num can be an integer ranging from 0 to 255.

Usage Guidelines

Block IP packets when the source and destination are of interest.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23, and IP packets coming from the host with the IP address 198.162.100.25, and fragmented packets for any destination are matched:

```
redirect nexthop 192.168.10.4 context 23 ip host 192.168.100.25 any
fragment
```

The following sets the insertion point before the rule defined above:

```
before redirect nexthop 192.168.10.4 context 23 ip host 192.168.100.25
any fragment
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 ip host 192.168.100.25 any
 fragment
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 ip host 192.168.100.25 any
fragment
```

redirect nexthop (by TCP/UDP packets)

Redirects subscriber sessions based on the transmission control protocol/user datagram protocol packets sent by the source to the mobile node or the network.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ACL Configuration

configure > **context** *context_name* > **ip access-list** *acl_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acl)#
```

Syntax Description

redirect nexthop *nexthop_addr* **{ context** *context_id* **| interface** *interface_name* **}** **[log] { tcp | udp } { {** *source_address source_wildcard* **| any | host**

source_host_address } [**eq** *source_port* | **gt** *source_port* | **lt** *source_port* | **neq** *source_port*] } { { *dest_address dest_wildcard* | **any** | **host** *dest_host_address* } [**eq** *dest_port* | **gt** *dest_port* | **lt** *dest_port* | **neq** *dest_port*] }
after redirect nexthop *nexthop_addr* { **context** *context_id* | **interface** *interface_name* } [**log**] { **tcp** | **udp** } { { *source_address source_wildcard* | **any** | **host** *source_host_address* } [**eq** *source_port* | **gt** *source_port* | **lt** *source_port* | **neq** *source_port*] } { { *dest_address dest_wildcard* | **any** | **host** *dest_host_address* } [**eq** *dest_port* | **gt** *dest_port* | **lt** *dest_port* | **neq** *dest_port*] }
before redirect nexthop *nexthop_addr* { **context** *context_id* | **interface** *interface_name* } [**log**] { **tcp** | **udp** } { { *source_address source_wildcard* | **any** | **host** *source_host_address* } [**eq** *source_port* | **gt** *source_port* | **lt** *source_port* | **neq** *source_port*] } { { *dest_address dest_wildcard* | **any** | **host** *dest_host_address* } [**eq** *dest_port* | **gt** *dest_port* | **lt** *dest_port* | **neq** *dest_port*] }
no redirect nexthop *nexthop_addr* { **context** *context_id* | **interface** *interface_name* } [**log**] { **tcp** | **udp** } { { *source_address source_wildcard* | **any** | **host** *source_host_address* } [**eq** *source_port* | **gt** *source_port* | **lt** *source_port* | **neq** *source_port*] } { { *dest_address dest_wildcard* | **any** | **host** *dest_host_address* } [**eq** *dest_port* | **gt** *dest_port* | **lt** *dest_port* | **neq** *dest_port*] }

after

Indicates all rules defined subsequent to this command are to be inserted after the command identified by the exact options listed.

This moves the insertion point to immediately after the rule which matches the exact options specified such that new rules will be added, in order, after the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

before

Indicates all rules defined subsequent to this command are to be inserted before the command identified by the exact options listed.

This moves the insertion point to be immediately before the rule which matches the exact options specified such that new rules will be added, in order, before the matching rule.

Important If the options specified do not exactly match an existing rule, the insertion point does not change.

no

Removes the rule which exactly matches the options specified.

nexthop *nexthop_addr*

The directly connected IP address to which the IP packets are forwarded.

context *context_id*

The context identification number of the context to which packets are redirected. At the executive mode prompt, use the **show context all** command to display context names and context IDs.

interface *interface_name*

The name of the logical interface to which the packets should be redirected. *interface_name* must be an alphanumeric string from 1 through 79 characters.

log

Default: packets are not logged.

Indicates all packets which match the redirect are to be logged.

tcp | udp

Specifies the redirect is to be applied to IP based transmission control protocol or the user datagram protocol.

- **tcp**: Redirect applies to TPC packets.
- **udp**: Redirect applies to UDP packets.

source_address

The IP address(es) from which the packet originated.

This option is used to filter all packets from a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this option. The range can then be configured using the *source_wildcard* parameter.

source_wildcard

This option is used in conjunction with the *source_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *source_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

any

Specifies that the rule applies to all packets.

host

Specifies that the rule applies to a specific host as determined by its IP address.

source_host_address

The IP address of the source host to filter against expressed in IPv4 dotted-decimal notation.

dest_host_address

The IP address of the destination host to filter against expressed in IPv4 dotted-decimal notation.

eq *source_port*

Specifies a single, specific source TCP port number to be filtered.

source_port must be an integer from 0 through 65535.

gt *source_port*

Specifies that all source TCP port numbers greater than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

lt *source_port*

Specifies that all source TCP port numbers less than the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

neq *source_port*

Specifies that all source TCP port numbers not equal to the one specified are to be filtered.

source_port must be an integer from 0 through 65535.

dest_address

The IP address(es) to which the packet is to be sent.

This option is used to filter all packets to a specific IP address or a group of IP addresses.

When specifying a group of addresses, the initial address is configured using this parameter. The range can then be configured using the *dest_wildcard* parameter.

dest_wildcard

This option is used in conjunction with the *dest_address* option to specify a group of addresses for which packets are to be filtered.

The mask must be entered as a complement:

- Zero-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be identical.
- One-bits in this parameter mean that the corresponding bits configured for the *dest_address* parameter must be ignored.

Important The mask must contain a contiguous set of one-bits from the least significant bit (LSB). Therefore, allowed masks are 0, 1, 3, 7, 15, 31, 63, 127, and 255. For example, acceptable wildcards are 0.0.0.3, 0.0.0.255, and 0.0.15.255. A wildcard of 0.0.7.15 is **not** acceptable since the one-bits are not contiguous.

eq *dest_port*

Specifies a single, specific destination TCP port number to be filtered.

dest_port must be an integer from 0 through 65535.

gt *dest_port*

Specifies that all destination TCP port numbers greater than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

lt *dest_port*

Specifies that all destination TCP port numbers less than the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

neq *dest_port*

Specifies that all destination TCP port numbers not equal to the one specified are to be filtered.

dest_port must be an integer from 0 through 65535.

Usage Guidelines

Block IP packets when the source and destination are of interest but for only a limited set of ports.

Important The maximum number of rules that can be configured per ACL varies depending on how the ACL is to be used. For more information, refer to the *Engineering Rules* appendix in the *System Administration Guide*.

Important Also note that "redirect" rules are ignored for ACLs applied to specific subscribers or all subscribers facilitated by a specific context.

Example

The following command defines a rule that redirects packets to the next hop host at 192.168.10.4, the context with the context ID of 23, and UDP packets coming from any host are matched:

```
redirect nexthop 192.168.10.4 context 23 udp any
```

The following sets the insertion point before the rule defined above:

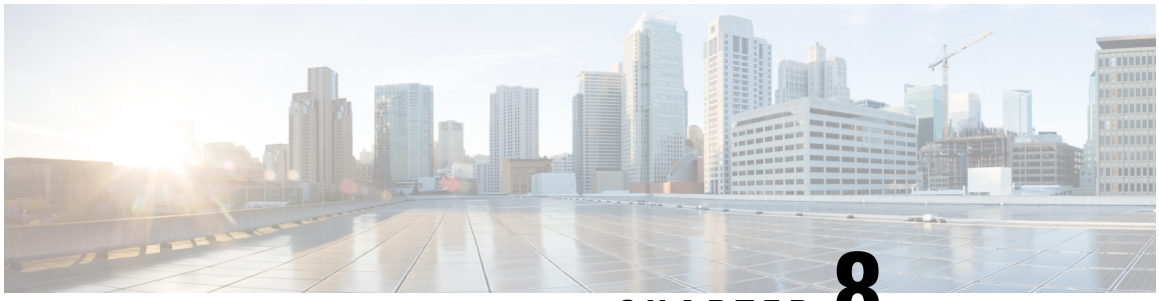
```
before redirect nexthop 192.168.10.4 context 23 udp any
```

The following command sets the insertion point after the first rule defined above:

```
after redirect nexthop 192.168.10.4 context 23 udp any
```

The following deletes the first rule defined above:

```
no redirect nexthop 192.168.10.4 context 23 udp any
```



CHAPTER 8

ACS Bandwidth Policy Configuration Mode Commands

The ACS Bandwidth Policy Configuration Mode is used to create and manage Active Charging Service (ACS) Bandwidth Policies.

Note In 12.3 and earlier releases, a maximum of 64 bandwidth policies can be configured.

In 14.0 and later releases, a maximum of 256 bandwidth policies can be configured.

Command Modes Exec > ACS Configuration > Bandwidth Policy Configuration

active-charging service *service_name* > **bandwidth-policy** *policy_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-bandwidth-policy)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 235
- exit, on page 236
- flow limit-for-bandwidth, on page 236
- group-id, on page 237

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

flow limit-for-bandwidth

This command allows you to configure the flow limit-for-bandwidth parameter for the current bandwidth policy.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Bandwidth Policy Configuration

active-charging service *service_name* **> bandwidth-policy** *policy_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bandwidth-policy)#
```

Syntax Description

flow limit-for-bandwidth id *bandwidth_id* **group-id** *group_id*
no flow limit-for-bandwidth id *bandwidth_id*

no

If previously configured, removes the specified flow limit-for-bandwidth configuration in the current bandwidth policy.

id *bandwidth_id*

Specifies ID for the current bandwidth policy.

bandwidth_id must be an integer from 1 through 65535.

group-id *group_id*

Specifies group ID for the current bandwidth policy.

group_id must be an integer from 1 through 65535.

Usage Guidelines Use this command to configure the flow limit-for-bandwidth configuration for a bandwidth policy.

Example

The following command configures the Flow Limit-for-Bandwidth configuration with bandwidth policy ID *test123* and group ID *123*:

```
flow limit-for-bandwidth id test123 group-id 123
```

group-id

This command allows you to configure the group ID for the current bandwidth policy.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Bandwidth Policy Configuration

active-charging service *service_name* **> bandwidth-policy** *policy_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bandwidth-policy)#
```

Syntax Description

```
group-id group_id direction { downlink | uplink } peak-data-rate peak_data_rate
 peak-burst-size peak_burst_size violate-action { discard |
lower-ip-precedence } [ committed-data-rate committed_data_rate
committed-burst-size committed_burst_size [ exceed-action { discard |
lower-ip-precedence } ] ]
{ default | no } group-id group_id direction { downlink | uplink }
```

default

Configures this command with default settings for the specified group ID.

no

If previously configured, removes the specified group ID configuration from the current bandwidth policy.

group_id

Specifies the group ID.

group_id must be an integer from 1 through 65535.

direction { downlink | uplink }

Specifies the direction for which bandwidth will be controlled.

peak-data-rate *peak_data_rate*

Specifies the peak data rate, in bits per second.

peak_data_rate must be an integer from 1 through 4294967295.

Default: 0

peak-burst-size *peak_burst_size*

Specifies the peak burst size, in bytes.

peak_burst_size must be an integer from 1 through 4294967295.

Default: 0

violate-action { discard | lower-ip-precedence }

Specifies the action to be taken if Peak Data Rate is surpassed.

- **discard**: Specifies to discard the packet
- **lower-ip-precedence**: Specifies to lower IP precedence of the packet

committed-data-rate *committed_data_rate*

Specifies the committed Data Rate, in bits per second. This can also be used to specify the Guaranteed Bit Rate (GBR) for Network Controlled QoS (NCQoS) without exceed-action.

committed_data_rate must be an integer from 1 through 4294967295.

Default: 0

committed-burst-size *committed_burst_size*

Specifies the committed burst size, in bytes.

committed_burst_size must be an integer from 1 through 4294967295.

Default: 0

exceed-action { discard | lower-ip-precedence }

Specifies the action to be taken if Committed Data Rate is surpassed.

- **discard**: Specifies to discard the packet.
- **lower-ip-precedence**: Specifies to lower IP precedence of the packet.

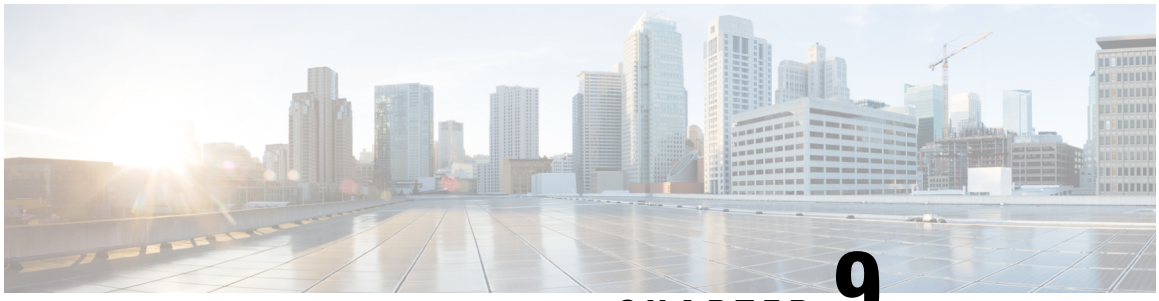
Usage Guidelines

Use this command to configure the Group ID for an bandwidth policy.

Example

The following command configures the group ID *111* to control bandwidth in the downlink direction specifying peak data rate of *10000* bits per second and peak burst size of *10000* bytes while specifying the action to be taken on violation as discard:

```
group-id 111 direction downlink peak-data-rate 10000 peak-burst-size 10000
 violate-action discard
```



CHAPTER 9

ACS Charging Action Configuration Mode Commands

The ACS Charging Action Configuration Mode is used to configure Active Charging Service (ACS) charging actions.

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- allocation-retention-priority , on page 240
- billing-action, on page 241
- cca charging credit, on page 244
- charge-units, on page 245
- charge-volume, on page 246
- content-filtering processing server-group, on page 249
- content-id, on page 250
- deactivate-predefined-rule, on page 251
- edns format, on page 251
- end, on page 253
- exit, on page 253
- flow action, on page 253
- flow idle-timeout, on page 260
- flow limit-for-bandwidth, on page 261
- flow limit-for-flow-type, on page 264
- flow tethering-detection, on page 265
- ip tos, on page 266
- ip vlan, on page 267
- nexthop-forwarding-address, on page 269

- pco-custom1, on page 269
- pco-custom2, on page 270
- pco-custom3, on page 271
- pco-custom4, on page 272
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- pco-custom8, on page 274
- pco-custom9, on page 275
- pco-custom10, on page 276
- product-offer-id-avp, on page 277
- qos-class-identifier, on page 277
- qos-renegotiate, on page 278
- retransmissions-counted, on page 279
- service-chain, on page 280
- service-detection, on page 281
- service-identifier, on page 282
- stripurl token, on page 283
- tft packet-filter, on page 284
- tft-notify-ue, on page 284
- throttle-suppress, on page 285
- tos, on page 286
- tpo profile, on page 287
- video bitrate, on page 287
- video cae-readdressing, on page 288
- video detailed-statistics, on page 289
- video optimization-preprocessing all, on page 290
- video optimization-preprocessing cae-readdressing, on page 291
- video pacing by-policing, on page 292
- xheader-insert, on page 293

allocation-retention-priority

This command allows you to configure the Allocation Retention Priority (ARP).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

allocation-retention-priority *priority* **[pci** *pci_value* **| pvi** *pvi_value* **]**
no allocation-retention-priority

no

If previously configured, disables ARP configuration in the current charging action.

priority

priority must be an integer from 1 through 15.

pci *pci_value*

Specifies the Pre-emption Capability Indicator (PCI).

pci_value must be integer 0 or 1.

Important If not explicitly enabled, then the default value of 1 will hold true.

pvi *pvi_value*

Specifies the Pre-emption Vulnerability Indicator (PVI).

pvi_value must be integer 0 or 1.

Important If not explicitly enabled, then the default value of 0 will hold true.

Usage Guidelines

This command configures the ARP, which indicates the priority of allocation and retention of the service data flow. The ARP resolves conflicts in demand for network resources. At the time of resource crunch, this parameter prioritizes allocation of resources during bearer establishment and modification. In a congestion situation, a lower ARP flow may be dropped to free up capacity. Once a service flow is successfully established, this parameter plays no role in quality of service (QoS) experienced by the flow.

Example

The following command sets the ARP to *10*:

```
allocation-retention-priority 10
```

billing-action

This command allows you to configure the billing action for packets that match specific rule definitions (ruledefs).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

In StarOS 12.2 and later releases:

billing-action { create-edrs { charging-edr *charging_edr_format_name* **| reporting-edr** *reporting_edr_format_name* **} + [wait-until-flow-ends] | egcdr | exclude-from-udrs | radius | rf } +**
no billing-action [create-edrs | egcdr | exclude-from-udrs | radius | rf] +

In StarOS 12.1 and earlier releases:

billing-action { edr *edr_format_name* **[wait-until-flow-ends] | egcdr | exclude-from-udrs | radius | rf } +**
no billing-action [edr | egcdr | exclude-from-udrs | radius | rf] +

no

If previously configured, disables the specified configuration in the current charging action.

edr *edr_format_name* [wait-until-flow-ends]

Important This option is available only in 12.1 and earlier releases. In 12.2 and later releases, it is deprecated and is replaced by the **create-edrs charging-edr** option.

Enables EDR billing for packets matching this charging action.

edr_format_name must be the name of an existing EDR format, and must be an alphanumeric string of 1 through 63 characters.

Important If the EDR format name specified here is not configured in the EDR Format Configuration Mode, or has been deleted, the system accepts it without applying any EDR format for the billing action in this ACS service.

If this option is configured, the system generates an EDR immediately when a packet is received and it matches a ruledef that is associated with this charging action. Other events configured for flow end-condition, flow action, termination, and/or session control also create the triggers for EDR generation.

wait-until-flow-ends: By default, the EDR is generated immediately after a ruledef hit results in this charging action. When this keyword is specified, no EDR is generated on a ruledef hit. When the flow ends, an attempt is made to generate an EDR with the format specified.

create-edrs { charging-edr *charging_edr_format_name* | reporting-edr *reporting_edr_format_name* } + [wait-until-flow-ends]

Important This option is available only in 12.2 and later releases.

Enables EDR billing for packets matching this charging action.

- **charging-edr** *charging_edr_format_name*: Specifies to generate charging EDR.

  charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

- **reporting-edr** *reporting_edr_format_name*: Specifies to generate reporting EDR.

  reporting_edr_format_name must be the name of a reporting EDR format, and must be an alphanumeric string of 1 through 63 characters.

If the above options are configured, the system generates an EDR immediately when a packet is received and it matches a ruledef that is associated with this charging action. Other events configured for flow end-condition, flow action, termination, and/or session control also creates the triggers for EDR generation.

- **wait-until-flow-ends**: By default, the EDR is generated immediately after a ruledef hit results in this charging action. When this keyword is specified, no EDR is generated on a ruledef hit. When the flow ends, an attempt is made to generate an EDR with the format specified.

egcdr

Enables eG-CDR billing for packets matching this charging action.

If this option is configured, the system generates an eG-CDR when the subscriber session ends or an interim trigger condition occurs. The interim triggers are configurable in the ACS Rulebase Configuration Mode. In addition, whenever there is an SGSN-to-SGSN handoff the system treats that as a trigger.

To generate an eG-CDR the **accounting-mode** command in the APN Configuration Mode must be configured with the "none" option.

The format of enhanced G-CDRs is controlled by the **inspector** CLI command in the Context Configuration Mode.

exclude-from-udrs

By default, statistics are accumulated on a per content ID basis for possible inclusion in UDRs. The **exclude-from-udrs** keyword causes the system to not include the packet's statistics in UDRs.

When this option is disabled, (the default setting) UDRs will be generated based on the UDR format specified in the rulebase.

Default: Disabled.

radius

Enables billing action as RADIUS Charging Data Records (CDRs) for packets matching this charging action, and the data packet statistics will be included in the postpaid RADIUS accounting.

Default: Disabled.

rf

Enables Rf accounting.

Rf accounting is applicable only for dynamic and predefined rules that are marked for it. Dynamic rules have a field offline-enabled to indicate this. To mark a predefined rule as offline-enabled, use this keyword and the **billing-records** CLI in the ACS Rulebase Configuration Mode.

Usage Guidelines

Use this command to enable an EDR, eG-CDR and/or RADIUS CDR type of billing for content matching this charging action.

Example

In 12.1 and earlier releases, the following command enables the EDR billing type with EDR format *charge1_format*:

```
billing-action edr charge1_format
```

In 12.2 and later releases, the following command is applied to both charging and reporting EDRs since the trigger for both the EDRs is the same:

```
billing-action create-edrs charging-edr charging_edrformat1 reporting-edr
 reporting_edrformat1 wait-until-flow-ends
```

cca charging credit

This command allows you to enable/disable Credit Control Application (CCA) and configure the RADIUS/Diameter prepaid charging behavior.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

cca charging credit [rating-group *coupon_id* **] [preemptively-request] { default | no } cca charging**

no

If previously configured, disables RADIUS/Diameter Prepaid Credit Control Charging in the current charging action.

default

Disables RADIUS/Diameter Prepaid Credit Control Charging.

credit

Specifies RADIUS/Diameter Prepaid Credit Control Charging Credit behavior.

preemptively-request

Specifies RADIUS/Diameter prepaid credit preemptively requested charging credit behavior. If this option is used, a quota is requested for the specific type of content during session initialization.

rating-group *coupon_id*

Specifies the coupon ID used in prepaid charging as rating-group which maps to the coupon ID for prepaid customer.

coupon_id must be an integer from 0 through 65535.

This option also assigns different content-types for the same charging action depending upon whether or not prepaid is enabled.

Important This rating-group overrides the content ID, if present in the same charging-action for the prepaid customer in Diameter Credit Control Application (DCCA). But only the content IDs will be used in eG-CDRs irrespective of the presence of rating-group in that charging action.

Usage Guidelines

Use this command to configure RADIUS/Diameter Prepaid Credit Control Charging behavior.

This command selects reservation based credit control. A CCR-Initial is used to reserve quota upon the first traffic, then a series of CCR-updates are issued as the traffic proceeds and quota dwindles. A CCR-Terminate is issued at the end of the session or at the end of the quota-hold-time.

Example

The following is an example of this command:

```
cca charging credit
```

charge-units

This command allows you to configure the charge units for RADIUS/DCCA charging calculation.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

charge-units *units*
{ default | no } charge-units

default

Configures this command with its default setting.

Default: 0; disables the counter, same as **no charge-units**

no

If previously configured, disables the charge-units configuration in the current charging action.

units

Specifies the service-specific fixed unit counter per content ID for RADIUS/DCCA charging.

units is the value set for charging unit, and must be an integer from 1 through 65535.

Usage Guidelines

This command configures the unit amount counters for charging calculation on per content ID basis for different protocols and packets regardless of packet direction (uplink or downlink).

Important For more information on content ID, refer to the **if-protocol** command in the *ACS Ruledef Configuration Mode Commands* chapter.

Example

The following command sets the charging unit to *1024*:

```
charge-units 1024
```

charge-volume

This command allows you to configure how the volume amount counter for eG-CDRs, UDRs, and DCCA charging are calculated.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

charge-volume { { dns | ftp-control | ftp-data | http | icmp | imap | ip | mms | pop3 | pptp | rtcp | rtp | rtsp | sdp | secure-http | sip | smtp | tcp | tftp | udp | wsp | wtp } { bytes | packet-length | packets } [

downlink | uplink] | constant *fixed_value* **}**
{ default | no } charge-volume

default

Configures this command with its default setting.

Default: **charge-volume ip bytes**

no

If previously configured, deletes the charge-volume configuration in the current charging action.

{ dns | ftp-control | ftp-data | http | icmp | imap | ip | mms | pop3 | pptp | rtcp | rtp | rtsp | sdp | secure-http | sip | smtp | tcp | tftp | udp | wsp | wtp }

Specifies the charge volume method for the specific rule definition.

- **dns**: Charge volume for DNS
- **ftp-control**: Charge volume for FTP-Control
- **ftp-data**: Charge volume for FTP-Data
- **http**: Charge volume for HTTP
- **icmp**: Charge volume for ICMP
- **imap**: Charge volume for Internet Message Access Protocol (IMAP)
- **ip**: Charge volume for IP
- **mms**: Charge volume for MMS
- **pop3**: Charge volume for POP3
- **pptp**: Charge volume for PPTP
- **rtcp**: Charge volume for RTCP
- **rtp**: Charge volume for RTP
- **rtsp**: Charge volume for RTSP
- **sdp**: Charge volume for SDP
- **secure-http**: Charge volume for secure-https
- **sip**: Charge volume for SIP
- **smtp**: Charge volume for SMTP
- **tcp**: Charge volume for TCP
- **tftp**: Charge volume for TFTP
- **udp**: Charge volume for UDP
- **wsp**: Charge volume for WSP
- **wtp**: Charge volume for WTP

bytes

Sets charge volume for bytes.

packet-length

Sets charge volume for packet length.

packets

Sets charge volume for packets.

constant *fixed_value*

This sets the fixed increment value for charging.

fixed_value is the value set for charging, and must be an integer from 0 through 65535.

If **constant** *3* is configured for every invocation of this Charging Action, the system adds 3 to the downlink/uplink volume counter, depending on the direction of packet.

Usage Guidelines

This command provides the method for charging volume calculation for different protocols and packets.

For information on supported protocols see the *ACS Ruledef Configuration Mode Commands* chapter.

If **charge-volume rtp packets** is configured, system computes volume amounts for different options for RTP as follows:

Volume	Description
Volume amount	Total (downlink and uplink) RTP packets
Volume amount uplink	Uplink RTP packets
Volume amount downlink	Downlink RTP packets
Volume amount uplink packets	Uplink RTP packets
Volume amount downlink packets	Downlink RTP packets
Volume amount uplink bytes	Uplink RTP bytes
Volume amount downlink bytes	Downlink RTP bytes

Important Whenever service counts volume, it counts all packets that the relevant analyzers accepted.

Important If a TCP packet is routed to the HTTP analyzer but there is no HTTP payload, then the TCP statistics will be updated but the HTTP statistics will not be updated (except for the "packets ignored by the HTTP analyzer" statistic).

Example

Following command sets the charging volume of downlink packets for RTP:

```
charge-volume rtp packets downlink
```

content-filtering processing server-group

This command allows you to enable/disable Category-based Content Filtering.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

```
content-filtering processing server-group
{ default | no } content-filtering processing
```

default

Configures this command with its default setting.

Default: Content filtering configured for the rulebase is attempted

no

Specifies to bypass content filtering.

This configuration should only be specified for charging actions that are performed when known safe sites are being accessed.

Usage Guidelines

Use this command to enable or disable Category-based Content Filtering in the charging action.

This command works as second-level filter to process the HTTP/WAP GET request with Internet Content Adaptation Protocol (ICAP) after ruledef matching. The first-level filtering is in the rulebase configuration. This CLI command is only effective when the **content-filtering mode server-group** command is configured in the rulebase.

Example

The following command enables content filtering in the current charging action:

```
content-filtering processing server-group
```

content-id

This command allows you to specify the content ID to use in the generated billing records, as well as the AVP used by the Credit Control Application, such as the "Rating-Group" AVP for use by the Diameter Credit Control Application (DCCA).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

content-id *content_id*
no content-id

no

Removes the content ID configuration from the charging action.

content_id

Specifies the content ID for credit control service.

In 12.1 and earlier releases *content_id* must be an integer from 1 through 65535.

In 12.2 and later releases, *content_id* must be an integer from 1 through 2147483647.

Usage Guidelines

This command specifies an optional content ID to use in the generated billing records. This identifier assists the carrier's billing post processing and also used by credit-control system to use independent quotas for different value of **content-id**.

If the specified ruledef uses the **if-protocol** command to select a value for content ID, then the *content_id* specified through this command is not used for billing record generation.

Important For more information on **content-id**, refer to the **if-protocol** command in the *ACS Ruledef Configuration Mode Commands* chapter.

Example

The following command sets the content ID in the current charging action to *23*:

```
content-id 23
```

deactivate-predefined-rule

This command allows you to remove or deactivate the matched predefined rule/Group of Ruledefs (activated by PCRF via Gx) that selected this action to ensure one time redirection for the subscriber.

Product

GGSN, P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

`[ default | no ] deactivate-predefined-rule`

default

Configures this command with its default setting.

Default: Disabled; same as **no deactivate-predefined-rule**

no

If previously enabled, disables the predefined rule in the current charging action.

Usage Guidelines

Use this command to ensure that the predefined rule/Group of Ruledefs gets deactivated after applying the charging-action when configured. By default, the configuration is disabled. Static rules are not deactivated by this command.

This feature is added in the ECSv2 to redirect traffic when quota for a user expires. When quota expires, PCRF will install a rule for the redirection. In the charging-action for this redirection rule, an action to disable the same rule will ensure one time redirection. A charging-rule-report will be sent to PCRF indicating the PCC Rule Status as INACTIVE for the deactivated rule. Rule-Failure-Code sent is RESOURCE_ALLOCATION_FAILURE.

The deactivation will apply only for predefined rules/Group of Ruledefs. If a static rule is associated with the charging-action, it will not be deactivated.

edns format

Important This is a licensed controlled feature. Contact your Cisco account representative for detailed information on specific licensing requirements.

This CLI command associates the device-id's with the security profiles to be applied. If any of the associated formats is not configured or the configured field value is not available for encoding, then the DNS request is sent unchanged and no EDNS translation is performed.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[no] edns format *edns_format_name* **{ security-profile** *profile_name* **{ encryption rc4md5 encrypted key** *key_string* **} }**

no

If previously configured, deletes the specified EDNS Format configuration.

edns-format

Enables EDNS format configuration.

format_name

Defines the name of EDNS field or EDNS format.

security-profile

Defines the security profile configuration in the EDNS to add mapping with the device-id.

security_profile_name

Defines the name of the security profile. This is a string of size 1 to 50.

encryption

Encrypts the EDNS header fields.

Important rc4md5 is hardcoded value as currently, encryption is not supported.

encryption-key

Designates use of encryption.

key

Defines key used to encrypt EDNS header fields. This is string of size 1 to 255.

Usage Guidelines Use this command to associate the device-id's with the security profiles to be applied. If any of the associated formats is not configured or the configured field value is not available for encoding, then the DNS request is sent unchanged and no EDNS translation is performed.

Example

The following command associates the device-id's with the security profiles to be applied.:

```
edns format f1 security-profile s1 encryption rc4md5 encrypted key k1
```

Note Since the rc4md5 encryption is not supported in the StarOS for the OpenDNS configuration, the encryption rc4md5 encrypted key parameter is not supported and does not have any functional behavior.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `end`

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `exit`

Usage Guidelines Use this command to return to the parent configuration mode.

flow action

This command allows you to specify the action to take on packets that match rule definitions.

Product All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

In StarOS 12.2 and later releases:

flow action { conditional user-agent end-token *end_token_name* **| discard [downlink | uplink] | random-drop interval** *interval_start* **to** *interval_end* **pkts-to-drop** *packet_min* **to** *packet_max* **| readdress [[server** *ipv4_address/ipv6_address* **[discard-on-failure] [dns-proxy-bypass]] [port** *port_number* **[discard-on-failure] [dns-proxy-bypass]] | server-list** *server_list_name* **[hierarchy][round-robin] [dns-proxy-bypass] [discard-on-failure]] | redirect-ocs-url | redirect-url** *redirect_url* **[[encryption { blowfish128 | blowfish64 }| { { aes128 | aes256 | aes-gcm-256 } [salt] } } [encrypted] key** *key* **] [clear-quota-retry-timer] [first-request-only [post-redirect { allow | discard | terminate }]]] | rulebase-change** *rulebase_name* **| terminate-flow | terminate-session | url-readdress server** *ipv4_address* **[port** *port_number* **] }**
no flow action

In StarOS 12.1 and earlier releases:

flow action { conditional user-agent end-token *end_token_name* **| discard [downlink | uplink] | random-drop interval** *interval_start* **to** *interval_end* **pkts-to-drop** *packet_min* **to** *packet_max* **| redirect-url** *redirect_url* **[clear-quota-retry-timer] | readdress [server** *ipv4_address/ipv6_address* **] [port** *port_number* **] | terminate-flow | terminate-session }**
no flow action

no

If previously configured, deletes the flow action configuration in the current charging action.

conditional user-agent end-token *end_token_name*

Specifies to conditionally redirect the HTTP packets matched to a configured user-agent to a specified URL. The user agent is configured using the **redirect user-agent** command in the ACS Configuration Mode.

end_token_name must be an alphanumeric string of 1 through 32 characters, and is configured with this command to end the redirection condition.

discard [downlink | uplink]

Specifies to discard the specified packets.

- **downlink**: Downlink packets
- **uplink**: Uplink packets

If **downlink** or **uplink** keyword is not specified, both downlink and uplink packets will be discarded.

random-drop interval *interval_start* to *interval_end* pkts-to-drop *packet_min* to *packet_max*

Specifies to drop a group of consecutive packets (**pkts-to-drop**) to be dropped in the specified time interval (**random-drop interval**). This will cause degradation in user experience. P2P VoIP would need more than one packet to be dropped, since that type of protocol is geared to handle occasional single packet drops.

- **random-drop interval** *interval_start* **to** *interval_end*: Specifies the random drop interval, in seconds, at which the voice packets will be dropped.

  interval_start and *interval_end* must be integers from 1 through 999.

- **pkts-to-drop** *packet_min* **to** *packet_max*: Specifies the number of voice packets to be dropped at a time in a flow when the packets have to be dropped.

  packet_min and *packet_max* must be integers from 1 through 100.

readdress [[server *ipv4_address/ipv6_address* [discard-on-failure] [dns-proxy-bypass]] [port *port_number* [discard-on-failure] [dns-proxy-bypass]] | server-list *server_list_name* [hierarchy][round-robin] [discard-on-failure] [dns-proxy-bypass]]

Specifies to readdress the location of the uplink packets for charging action.

- **server** *ipv4_address/Ipv6*: Specifies the re-address server's IPv4/IPv6 address.
- **port** *port_number*: Specifies the re-address server's port number.

  port_number must be an integer from 1 through 65535.

Important You can optionally keep the original destination address and just change the destination TCP/UDP port number.

- **server-list** *server_list_name*

Important This option is available only in StarOS 14.1 and later releases.

This keyword is license dependent. For more information please contact your Cisco account representative.

Specifies to readdress the packet flow to the DNS servers configured under the server list.

For more information about configuring the server list, see the *ACS Readdress Server List Configuration Mode* chapter.

- **hierarchy**

  Specifies the hierarchy approach to select the server list from the readdress server list.

- **round-robin**

  Specifies the round-robin approach to select the server list from the readdress server list. This is the default approach.

- **discard-on-failure**

Important This option is available only in StarOS 14.0 and later releases.

Specifies to discard the packets if readdressing fails due to duplicate key. If this keyword is not configured, no action is taken and the packets are allowed to pass.

If already configured, to revert the behavior, configure the **flow action readdress** command again without the **discard-on-failure** keyword.

- **dns-proxy-bypass**

Important This option is available only in StarOS 12.3 and later releases.

Specifies the DNS packets to bypass interception at the session manager when readdressing for flow occurs, and go through ECS-based DNS redirection. If this keyword is not configured, DNS redirection from ECS is disabled.

redirect-ocs-url

Important This option is available only in StarOS 12.3 and later releases.

Specifies to redirect to the URL provided by OCS only for post-processing dynamic rules.

redirect-url *redirect_url* [[encryption { blowfish128 | blowfish64 } | { { aes128 | aes256 | aes-gcm-256 }aes [salt] } } [encrypted] key *key*] [clear-quota-retry-timer] [first-request-only [post-redirect { allow | discard | terminate }]]]

Specifies to return a redirect response to the subscriber, and terminate the TCP connections (to the subscriber and server). The subscriber's Web browser should automatically send the original HTTP packet to the specified URL. Redirection is only possible for certain types of HTTP packets (for example, GET requests), which typically are only sent in the uplink direction. If the flow is not HTTP, the **redirect-url** option is ignored, that is the packet is forwarded normally, except for SIP. For SIP, a Contact header with the redirect information is inserted.

The redirect-url consists of the redirect url and may additionally include one or more dynamic fields. Earlier, the dynamic fields could be encrypted using 128 and 256 bit blowfish encryption. The new functionality provides the additional AES-CBC encryption ofthe dynamic fields as well.

- *redirect_url* specifies the redirect URL. *redirect_url* must be an alphanumeric string of 1 through 511 characters. It may include one or more dynamic fields (up to 16 may be specified). For example, *http://search.com/subtarg=#HTTP.URL#*.

  Dynamic fields must be enclosed in "#" (hash).

  Up to 16 dynamic fields out of the following 23 are allowed:

  - #BEARER.CALLED-STATION-ID#
  - #BEARER.CALLING-STATION-ID#

- #BEARER.NAS-IP-ADDRESS#
- #BEARER.USER-NAME#
- #BEARER.ACCT-SESSION-ID#
- #BEARER.CORRELATION-ID#
- #BEARER.RULEBASE#
- #BEARER.SERVED-BSA-ADDR#
- #BEARER.SERVICE-NAME#
- #BEARER.SUBSCRIBER-ID#
- #BEARER.MSISDN#
- #HTTP.URL#
- #HTTP.URI#
- #HTTP.HOST#
- #RTSP.URI#
- #WSP.URL#
- #CONTENT-ID-LABEL#
- #CONTENT-ID-LABEL-CAUSING-REDIRECTION#
- #BEARER.HWID#
- #BEARER.IMSI#
- #BEARER.IMEI#
- #BEARER.ESN#
- #BEARER.MEID#

Concatenated fields separated by ; (semi colon) can also be inserted. For example, #BEARER.IMSI;BEARER.IMEI#

- **encryption { blowfish128 | blowfish64 }** [| **{ { aes128 | aes256 | aes-gcm-256 } [salt] } }encrypted] key** *key*

Important This option is available only in StarOS 12.2 and later releases.

- **encryption**: Specifies to enable encryption for dynamic fields of the redirect URL.
  - **blowfish128**: Specifies to use Blowfish encryption with 128 bit key for encrypting the dynamic fields.
  - **blowfish64**: Specifies to use Blowfish encryption with 64 bit key for encrypting the dynamic fields.

- **aes128**: Specifies to use AES-CBC encryption with 128-bit key for encrypting the dynamic fields.
- **aes256**: Specifies to use AES-CBC encryption with 256 bit key for encrypting the dynamic fields.

Note For **aes128** and **aes256** CBC encryption, the iteration count used is 10 and the digest used is sha1. Both of these parameters are static fields used while encrypting and are not configurable by the user.

- **aes-gcm-256**: Use AES GCM with 256 bit key for encrypting the dynamic fields.

Note For **aes-gcm-256** encryption, the iteration count used is 14 and the digest used is sha384. Both of these parameters are static fields used while encrypting and are not configurable by the user.

- **salt**: Specifies to use salt with AES encryptions of the dynamic fields. Note: salt is not relevant for blowfish algorithms.

- **encrypted**: Specifies to encrypt the key.
- **key** *key*: Specifies the key to use for encryption of dynamic fields.

  key must be an alphanumeric string of 1 through 523 characters.

Note that encryption is supported only for the following fields:

- #BEARER.CALLING-STATION-ID#
- #BEARER.MSISDN#
- #BEARER.IMEI#
- #BEARER.MEID#
- #BEARER.IMSI#
- #BEARER.USERNAME#
- #BEARER.ESN#

Also, concatenated fields having any of the above will be encrypted.

%3furl= can be used as a delimiter between URL. As in http://search.com/subtarg/%3furl=#HTTP.URL# format.

- **clear-quota-retry-timer**: Specifies to reset Credit Control Application (CCA) Quota Retry Timer upon redirection.
- **first-request-only [post-redirect { allow | discard | terminate }]**

Important This option is available only in StarOS 12.3 and later releases.

- **first-request-only**: Specifies the url-redirection to be performed only once per session after the first web traffic has been detected.
- **post-redirect**: Specifies the action to be taken on subsequent flow packets that invoke this charging action after the first url-redirection has been performed for that session.

  The following are the different actions allowed on the flow packets:

  - **allow**: allows the packets subsequent to the first url-redirection to flow
  - **discard**: discards the packets subsequent to the first url-redirection
  - **terminate**: terminates the flow of packets on receiving packets subsequent to the first url-redirection

To disable this option if configured earlier, reuse the same **flow action redirect-url** *redirect_url* command without the **first-request-only** keyword.

Important Disabling the **first-request-only** keyword will not affect the existing subscriber calls.

rulebase-change *rulebase_name*

Specifies the rulebase to change to when the charging action is applied. The new rulebase will be applied to the next packet on the call, and applied only to the current PDN.

terminate-flow

Specifies to terminate the flow.

Terminates the TCP connection gracefully between the subscriber and external server and sends a TCP FIN to the subscriber and a TCP RST to the server. If the flow does not use TCP, this option simply discard the packets. This option is applicable only for flows that use TCP.

terminate-session

Specifies to terminate the session.

When a rule pointing to a charging action configured with the terminate-session keyword is hit, then the corresponding session will be terminated.

url-readdress server *ipv4_address* [port *port_number*]

Configures the URL server to re-address for the specified charging action.

- **server** *ipv4_address*: Specifies the re-address server's IPv4 address.
- **port** *port_number*: Specifies the re-address server's port number.

port_number must be an integer from 1 through 65535.

Usage Guidelines

Use this command to specify the action to take on packets, for example to discard, terminate, or redirect.

When a readdress server is configured for a charging action, the **show configuration** command will display the readdress related configuration only if server address is configured. The **show configuration verbose** command will display the readdress sever if configured, else will display "no flow action".

The redirect-url option can be used to redirect SIP requests as well. The following is a sample configuration:

```
configure
     active-charging service s1
          charging-action ca_sip_redir
               content-id 10
               flow action redirect-url sip:test@sip.org
               exit
          ruledef sip_req
               sip request packet = TRUE
               exit
          rulebase plan1
              action priority 08 ruledef sip_req charging-action ca_sip_redir

            /* other rules, routing rules for sip, etc */
               end
```

This would mean any SIP request that hits the *sip_req* ruledef, would get redirected to the url given in *ca_sip_redir*. This involves creating a redirection packet with the following response line and "Contact" header in the response.

SIP/2.0 302 Moved Temporarily

302 Moved Temporarily

Most of the header fields are copied directly from the request, so that the mandatory SIP headers are present. If content-length header was seen in the original message, it is replaced in the reply with "Content-Length: 0".

Example

The following command sets the flow action to terminate:

```
flow-action terminate-flow
```

The following command resets quota retry timer upon redirection of flow to HTTP URL *http://search.com/?url=#http://msn.com#*:

```
flow action redirect-url http://search.com/%3url=#http://msn.com#
clear-quota-retry-timer
```

flow idle-timeout

This command allows you to configure the maximum duration a flow can remain idle after which the system automatically terminates the flow.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

flow idle-timeout { *idle_timeout* **| flow-mapping** *flow_timeout* **}**
{ default | no } flow idle-timeout [flow-mapping]

no

Disables the idle-timeout configuration; sets the idle-timeout to 0 seconds.

default

Configures this command with its default setting.

Default: 300 seconds

idle-timeout *idle_timeout*

Specifies the maximum duration, in seconds, a flow can remain idle.

idle_timeout must be an integer from 0 through 86400.

flow-mapping *flow_timeout*

Specifies the maximum duration of flow-mapping timeout, in seconds.

flow_timeout must be an integer from 0 through 86400.

Usage Guidelines

Use this command to configure the maximum duration a flow can remain idle after which the system automatically terminates the flow.

Example

The following command configures the idle-timeout setting to *400* seconds:

```
flow idle-timeout 400
```

flow limit-for-bandwidth

For Session Control functionality this command allows you to enable/disable bandwidth limiting and configure the uplink and downlink bandwidth limits for subscriber.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

flow limit-for-bandwidth { { direction { downlink | uplink } peak-data-rate *bps* **peak-burst-size** *bytes* **violate-action { discard | lower-ip-precedence } [committed-data-rate** *bps* **committed-burst-size** *bytes* **[exceed-action { discard | lower-ip-precedence }]] } | { id** *id* **} }**
{ default | no } flow limit-for-bandwidth { direction { downlink | uplink } | id }

no

If previously configured, disables bandwidth control traffic policing for the specified direction for the current subscriber.

default

Configures this command with its default setting.

direction { downlink | uplink }

Specifies the direction of flow to apply bandwidth limit:

- **downlink**: Flow of data towards subscriber.
- **uplink**: Flow of data from subscriber.

peak-data-rate *bps*

Specifies the peak data-rate for the subscriber, in bps (bits per second).

bps must be an integer from 1 through 4294967295.

Default: 256000

peak burst-size *bytes*

The peak burst size allowed, in bytes.

bytes must be an integer from 1 through 4294967295.

Default: 3000

Important It is recommended that this parameter be configured to at least the greater of the following two values: 1) three times greater than packet MTU for the subscriber connection, OR 2) three seconds worth of token accumulation within the "bucket" for the configured peak-data-rate.

violate-action { discard | lower-ip-precedence }

Specifies the action to take on packets that exceed both the committed-data-rate and the peak-data-rate. The following actions are supported:

- **discard**: Discard the packet
- **lower-ip-precedence**: Transmit the packet after lowering the IP precedence

Default: **discard**

committed-data-rate *bps*

The committed data rate (guaranteed-data-rate) in bits per second (bps).

In releases prior to 15.0, the committed-data-rate based policing was not effected for non-GBR bearers even if it is configured in Charging Action configuration mode. In 15.0 and later releases, the committed-data-rate policing can be implemented for both GBR bearers and non-GBR bearers. If the customer does not want to implement the committed-data-rate policing for non-GBR bearers, then the **committed-data-rate** keyword should not configured with the **flow limit-for-bandwidth** command in Charging Action configuration mode.

bps must be an integer from 1 through 4294967295.

Default: 144000

committed-burst-size *bytes*

The committed burst size allowed, in bytes.

bytes must be an integer from 1 through 4294967295.

Default: 3000

exceed-action { discard | lower-ip-precedence }

The action to take on the packets that exceed the committed-data-rate but do not violate the peak-data-rate. The following actions are supported:

- **discard**: Discard the packet
- **lower-ip-precedence**: Transmit the packet after lowering the ip-precedence

If exceed-action is not configured, the packets are forwarded.

Default: **lower-ip-precedence**

id *id*

Important This option is available only in StarOS 8.1 and later releases.

Specifies the bandwidth limiting identifier.

id must be an integer from 1 through 65535.

This identifier enables traffic policing based on a separate identifier other than content ID. This identifier will always take priority over content ID. If this identifier is not configured, traffic policing will be based on the content ID.

Usage Guidelines

Use this command to limit the bandwidth a subscriber uses in the uplink and downlink directions under Session Control.

Important If the exceed/violate action is set to "lower-ip-precedence", the TOS value for the outer packet becomes "best effort" for packets that exceed/violate the traffic limits regardless of what the **ip user-datagram-tos copy** command is configured to. In addition, the **lower-ip-precedence** option may also override the **ip qos-dscp** command configuration. Therefore, it is recommended that command not be used when specifying this option.

More information on the QoS feature is available in the *QoS Management* appendix of the *System Administration Guide*.

Example

The following command sets an uplink peak data rate of *128000* bps and lowers the IP precedence when the committed-data-rate and the peak-data-rate are exceeded:

```
flow limit-for-bandwidth uplink peak-data-rate 128000 violate-action
lower-ip-precedence
```

The following command sets a downlink peak data rate of *256000* bps and discards the packets when the committed-data-rate and the peak-data-rate are exceeded:

```
flow limit-for-bandwidth downlink peak-data-rate 256000 violate-action
discard
```

flow limit-for-flow-type

Use this command to specify the maximum number of similar flows that match the charging action, and the action to take if the limit is reached.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

```
flow limit-for-flow-type limit over-limit-action { discard | redirect-url
 url | terminate-flow | terminate-session }
no flow limit-for-flow-type
```

no

If previously configured, deletes the flow limit-for-flow-type configuration in the current charging action.

limit

Specifies the maximum number of flows of a type exceeding which the specified over-limit-action triggers.

limit must be an integer from 1 through 4000000000.

over-limit-action { discard | redirect-url *url* | terminate-flow | terminate-session }

Specifies the action to take on exceeding *limit* for a flow type:

- **discard**: Discards the packets
- **redirect-url** *url* : Redirects the flow to the specified URL. *url* must be an alphanumeric string of 1 through 511 characters. For example, http://search.com.
- **terminate-flow**: Terminates the flow to which this packet belongs
- **terminate-session**: Terminates the session to which this packet belongs

Usage Guidelines

Use this command to specify the number of simultaneous flows (of a type) that a subscriber may have, and the action to take if the limit is reached.

All flows with the same content-id are considered to be the same type. This limit applies to the total of all flows for a subscriber connection (that is, an individual PDP context or individual A10 tunnel).

If the flow is not HTTP, the **redirect-url** option is ignored, that is the packet is forwarded normally. Refer to the **flow action** CLI command.

If the limit specified by the **flow limit-across-applications** command in the Rulebase Configuration Mode is also exceeded, action is taken for that over-limit condition rather than the action configured here.

Example

The following command terminates the flow if total number of flows of a type exceeds *1024*:

```
flow limit-for-flow-type 1024 over-limit-action terminate-flow
```

flow tethering-detection

This command allows required caching from DNS flows when the DNS-based tethering detection is configured.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[no] flow tethering-detection dns-based host-table caching

no

If previously configured, deletes the specified configuration in the current charging action.

dns-based

Enables DNS-based tethering options.

host-table

Enables DNS-based tethering host table operations.

caching

Enables DNS-based tethering host table caching.

Usage Guidelines

Use this command to allow required caching from DNS flows to be done when the DNS-based tethering detection is enabled and required.

ip tos

This command allows you to configure the IP Type of Service (ToS) octets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

ip tos { af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | be | ef | lower-bits *tos_value* **} [uplink | downlink]**
{ default | no } ip tos [uplink | downlink]

default

Configures this command with its default setting.

Default: IP ToS is not modified.

no

If previously configured, deletes the IP ToS configuration in the current charging action.

af *xx*

Specifies the use of an assured forwarding *xx* per hop behavior (PHB).

be

Specifies the use of best effort forwarding PHB.

ef

Specifies the use of expedited forwarding PHB.

lower-bits *tos_value*

Important In StarOS 8.1 and later releases, this option is "**lower-bits** *tos_value*". In StarOS 8.0, it is *tos_value*.

Specifies the least-significant 6 bits in the TOS byte with the specified numeric value.

tos_value must be an integer from 0 through 63.

downlink

Specifies the ToS only for downlink packets.

uplink

Specifies the ToS only for uplink packets.

Usage Guidelines

Use this command to specify the IP Type of Service (ToS) octets to use in the charging action. If one of the enumerated values is set, the DSCP bits which are the six most-significant bits in the TOS byte are marked. If the integer value is set, it will be written into the six least-significant bits of the TOS byte.

If **downlink** or **uplink** keywords are not specified, the command applies to both directions.

This command may be used multiple times. For example, the following sequence of commands will cause to set the ToS to af11 in the uplink direction, but not modify the ToS in the downlink direction:

```
ip tos af11
no ip tos downlink
```

Example

The following command sets the IP ToS to *be* with *downlink*:

```
ip tos be downlink
```

ip vlan

This command allows you to configure the VLAN identifier to be associated with the subscriber traffic in the destination context.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

ip vlan *vlan_id*
{ default | no } ip vlan

default

Configures this command with its default setting.

Default: Disable this IP VLAN configuration. Same as **no ip vlan** command.

no

If previously configured, deletes the IP VLAN configuration in the current charging action. Whatever value is configured for the VLAN tag in the subscriber configuration or IP pool configuration (or no VLAN tag if there is no configuration elsewhere) is used.

vlan_id

Specifies the VLAN ID.

vlan_id must be an integer from 1 through 4094.

Usage Guidelines

This command configures the subscriber VLAN ID which is used with the assigned address for the subscriber session to receive packets. If the IP pool from which the address is assigned is configured with a VLAN ID, then this subscriber configured VLAN ID overrides it.

Subscriber traffic can be routed to specific VLANs based on the configuration of their user profile. Using this functionality provides a mechanism for routing all traffic from a subscriber over the specified VLAN. All packets destined for the subscriber must also be sent using only IP addresses valid on the VLAN or they will be dropped.

Example

The following command sets the IP VLAN range to go up to *500*:

```
ip vlan 500
```

The following command sets the IP VLAN range back to default.

```
default ip vlan
```

nexthop-forwarding-address

This command allows you to configure the nexthop forwarding address.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

nexthop-forwarding-address *ipv4_address*
no nexthop-forwarding-address

no

If previously configured, deletes the nexthop-forwarding-address configuration in the current charging action.

ipv4_address

Specifies the nexthop-forwarding-address for the current charging action.

ipv4_address must be the nexthop forwarding address, and must be an IPv4 address.

Usage Guidelines

Use this command to configure the nexthop-forwarding-address for a charging action. When an uplink packet matches a rule and a charging action is applied to it this nexthop forwarding address is used.

There are different methods to configure a nexthop forwarding address, they are prioritized as follows:

- The nexthop forwarding address, if configured, in a redirect ACL is used
- Else, the nexthop address configured in the charging action is used
- Else, the nexthop address, if configured, in the IP pool is used

Example

The following command sets the nexthop forwarding address for the current charging action to *209.165.200.225*:

```
nexthop-forwarding-address 209.165.200.225
```

pco-custom1

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom1 *custom1_value*
{ no | default } pco-custom1

default

Configures custom1 with the default setting.

Default: 0

no

If previously configured, resets the pco-custom1 value to the default setting.

custom1_value

Specifies the PCO custom1 value.

custom1_value must be an integer from 0 through 255.

Usage Guidelines Use this command to configure the PCO custom1 value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom1 value to 5:

```
pco-custom1  5
```

pco-custom2

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom2 *custom2_value*

custom2_value

Specifies the PCO custom2 value.

custom2_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom2 value to 5:

```
pco-custom2  5
```

pco-custom3

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom3 *custom3_value*

custom3_value

Specifies the PCO custom3 value.

custom3_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom3 value to 6:

pco-custom3 6

pco-custom4

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-charging-action)#`

Syntax Description

pco-custom4 *custom4_value*

custom4_value

Specifies the PCO custom4 value.

custom4_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom4 value to 7:

pco-custom4 7

pco-custom5

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom5 *custom5_value*

custom5_value

Specifies the PCO custom5 value.

custom5_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom5 value to 8:

```
pco-custom5  8
```

pco-custom6

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom6 *custom6_value*

custom6_value

Specifies the PCO custom6 value.

custom6_value must be an integer from 0 through 255.

Usage Guidelines Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom6 value to 12.

```
pco-custom6  12
```

pco-custom7

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description **pco-custom7** *custom7_value*

custom7_value

Specifies the PCO custom7 value.

custom7_value must be an integer from 0 through 255.

Usage Guidelines Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom7 value to 13.

```
pco-custom7  13
```

pco-custom8

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom8 *custom8_value*

custom8_value

Specifies the PCO custom8 value.

custom8_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom8 value to 14.

```
pco-custom8  14
```

pco-custom9

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom9 *custom9_value*

custom9_value

Specifies the PCO custom9 value.

custom9_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom9 value to 15.

```
pco-custom9  15
```

pco-custom10

This command configures the Protocol Configuration Options (PCO) value that will be sent to all UEs, and relates to the PCO for UE Notification feature.

Product

- GGSN
- P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

pco-custom10 *custom10_value*

custom10_value

Specifies the PCO custom10 value.

custom10_value must be an integer from 0 through 255.

Usage Guidelines

Use this command to configure the PCO custom value to be sent to the MS GTP messages. To enable or disable sending customized PCO options, use the **pco-options** command in the APN Configuration Mode.

Example

The following command configures PCO custom10 value to 16.

```
pco-custom10  16
```

product-offer-id-avp

This command enables sending the "Product-Offer-ID" AVP with traffic identifier for Home Agent (HA)/Content Charging Gateway (CCG) instead of the "Rating-Group" AVP. This allows to identify and report application service traffic interval or volume.

Important This command is customer-specific. For more information please contact your Cisco account representative.

Product

HA

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

product-offer-id-avp

Usage Guidelines

Use this command to send the "Product-Offer-ID" AVP in Diameter message instead of the "Rating-Group" AVP for HA/CCG implementation. This implementation means that HA/CCG is deployed to work with both AAA server and OCS via Diameter Gy Online Charging Protocol for content based billing on both offline and online charging.

Important If there is no mapping label configured for a content-id with the **label content-id** command in Active Charging Service Configuration Mode, the rating group will be sent in Product-Offer-ID AVP as Label.

qos-class-identifier

This command allows you to configure the QoS Class Identifier (QCI).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

qos-class-identifier *qos_class_identifier*
no qos-class-identifier

no

If previously configured, deletes the QCI configuration in the current charging action.

qos_class_identifier

Specifies the QCI.

qos_class_identifier must be an integer from 1 through 9 or from 128 through 254 (Operator specific).

Usage Guidelines

Use this command to configure the QCI for a charging action.

Example

The following command configures the QCI as *3*:

qos-class-identifier 3

qos-renegotiate

This command allows you to configure the QoS traffic class for the Layer 7 QoS Renegotiation feature, enabling the triggering of QoS renegotiation from a rule.

Important This command is license dependent. For more information please contact your Cisco account representative.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

qos-renegotiate traffic-class { background | conversational | interactive *priority* **| streaming }**
no qos-renegotiate

no

If previously configured, deletes the qos-renegotiate traffic-class configuration in the current charging action.

background

Specifies the traffic class as Background, for traffic patterns in which the data transfer is not time-critical (for example e-mail exchange).

conversational

Specifies the traffic class as Conversational, for traffic patterns in which there is a constant flow of packets.

interactive *priority*

Specifies the traffic class as Interactive, for traffic patterns in which there is an intermittent flow of packets.

priority specifies the traffic handling priority, and must be an integer from 1 through 3.

streaming

Specifies the traffic class as Streaming, for traffic patterns in which there is a constant flow of data in one direction, either upstream or downstream.

Usage Guidelines

Use this command to configure the QoS traffic class for a charging action for the Layer 7 QoS Renegotiation feature, enabling triggering QoS renegotiation from an active-charging rule.

Layer 7 QoS Renegotiation is an extension of the Dynamic QoS Renegotiation feature. Upon matching a particular layer 7 rule, for example the access of a particular URL, the GGSN triggers the renegotiation of the PDP context.

Example

The following command sets the QoS traffic class in the charging action to streaming:

```
qos-renegotiate traffic-class streaming
```

retransmissions-counted

This command allows you to specify whether to count (for billing purposes) the number of packet retransmissions.

Product

Important In release 17.0, this command has been deprecated. This configuration is available at rulebase level as **[local]host_name(config-rule-base)# [no] retransmissions-counted.**

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[default | no] retransmissions-counted

default

Configures this command with its default setting.

Default: Disabled; same as **no retransmissions-counted**

no

If previously enabled, disables the retransmissions-counted configuration in the current charging action.

Usage Guidelines

Use this command to enable counting of the number of retransmissions.

If not enabled, retransmissions are automatically detected but discounted. The retransmissions will still be analyzed by the TCP analyzer (and higher layer analyzers), but the statistics (except for the count of retransmissions) will not be updated. Also, some higher layer analyzers (MMS, SIP, WSP, and WTP) can detect retransmissions when UDP is the transport layer.

Example

The following is an example of this command:

retransmissions-counted

service-chain

This command associates service-chain to the charging-action.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

service-chain*<service_chain_name>*
no service-chain

no

If previously configured, deletes the service-chain configuration in the current charging action.

service-chain

Associates service-chain with active-charging.

service_chain_name

Specifies service chain name

Usage Guidelines

Use this command to associate service chain name with active-charging.

Example

The following command associates service chain name with active-charging.

```
service-chain sc1
```

service-detection

The **service-detection session-update** command enables the support for users' QoS updation by PDSN/PCEF based on service start or stop.

Product

Important This command is customer specific. For more information contact your Cisco account representative.

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

```
service-detection session-update qos
no service-detection session-update
```

no

If previously configured, deletes the service-detection configuration in the current charging action.

service-detection

Detects start or end of service on PDSN

session-update

Updates the subscriber session

qos

Sets qos updation (upgrade/downgrade)

Usage Guidelines

Use this command to configure the service detection to enable the support for users' QoS updation by PDSN/PCEF based on service start or stop.

Example

The following command configures service detection for a subscriber session and sets the QoS updation.

```
service-detection session-update qos
```

service-identifier

This command allows you to configure the service identifier to use in the generated billing records, as well as the AVP used by the Credit Control Application, such as the "Service-Identifier" AVP for use by DCCA. This is a more general classifier than content-id.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

service-identifier *service_id*
no service-identifier

no

If previously configured, deletes the service ID configuration in the current charging action.

service_id

Specifies the service identifier.

In 12.1 and earlier releases *service_id* must be an integer from 1 through 65535.

In 12.2 and later releases, *service_id* must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to configure the service identifier to use in generated billing records, as well as the AVP used by the Credit Control Application, such as the "Service-Identifier" AVP for use by DCCA. This is a more general classifier than content-id.

Example

The following command configures the service identifier in the current charging action to *99*:

```
service-identifier 99
```

stripurl token

This command allows you to configure the token and value to be stripped from the HTTP URL.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

```
stripurl token token_name [ value token_value ]
no stripurl
```

no

If previously configured, disables the URL stripping configuration in the current charging action

token *token_name*

Specifies the name of the token to be stripped from the URL. The **stripurl token** command is case-sensitive. Hence if the token name does not match, then charging action will not be applied.

token_name must be an alphanumeric string of 1 through 127 characters.

value *token_value*

Specifies the value of the token to be stripped from the URL.

token_value must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to configure the token and value to be stripped from the HTTP URL.

Example

For the given URL: *http://www.videoserver.com?Name1=val1&Name2=val2&Name3=val3*, if the following CLI is used, this will strip parameter *Name2*and its optional value *val2* from the above URL and gives the following new URL: *http://www.videoserver.com?Name1=val1&Name3=val3*:

```
stripurl token Name2 value val2
```

tft packet-filter

This command allows you to specify the packet filter to use in TFTs sent to the MS.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[no] tft packet-filter *packet_filter_name*

no

If previously configured, removes the specified packet filter from the current charging action.

packet_filter_name

Specifies the packet filter to add/remove from the current charging action.

packet_filter_name must be the name of a packet filter, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the packet filter to be sent to the MS. Up to eight packet filters can be specified in a charging action.

Example

The following command configures the packet filter *filter23* to be sent to the MS:

```
tft packet-filter filter23
```

tft-notify-ue

This command allows you to to control whether TFT updates are sent to UE or not.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description **[no] tft-notify-ue**

no

If this option is configured, TFTs for that charging action are not sent to UE if certain trigger conditions are met.

Usage Guidelines Use this command to suppress the selected TFT updates from being sent to the UE. This helps to identify if the appropriate TFT defined in the charging action needs to be sent to the UE or not. This CLI command is supported for both default and dedicated bearers.

The ability to include TFTs in the initial session creation are also controlled through this command. This way, the operator can suppress any unwanted TFTs to the UE.

Releases prior to 15.0, all predefined rules charging actions are associated with TFTs and the system includes TFTs towards the UE for all scenarios. In some scenarios it results in creating duplicate TFTs. This CLI-based approach is developed to overcome this situation.

NOTE: The TFT updates are not sent to UE based on certain trigger conditions.

throttle-suppress

This command allows you to suppress bandwidth limiting at charging-action, bearer, and APN level.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description **throttle-suppress [timeout** *suppress_timeout* **]**
no throttle-suppress

no

If configured, bandwidth limiting will continue from the next flow onwards.

timeout *suppress_timeout*

Specifies the time for which bandwidth limiting is suppressed, in seconds.

suppress_timeout must be an integer from 10 through 300.

Default: 30 seconds

Usage Guidelines

Use this command to suppress bandwidth limiting (throttling) at charging-action, bearer, and APN level. When **throttle-suppress** is configured, the timeout will take the default value of 30 seconds and the flow will not be throttled for the next 30 seconds. When configured with the **timeout** keyword, bandwidth limiting is suppressed for the mentioned time.

Example

The following command suppresses the flow (PDP context) for the next 155 seconds when traffic hits the charging-action:

```
throttle-suppress timeout 155
```

tos

This command allows you to configure the Type of Service (ToS) octets.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

```
tos { af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41
 | af42 | af43 | be | ef | lower-bits tos_value } [ downlink | uplink ]
no tos [ downlink | uplink ]
```

no

Disables the ToS being used in the charging action.

af *xx*

Specifies the use of an assured forwarding *xx* Per Hop Behavior (PHB).

be

Specifies use of Best Effort forwarding PHB.

ef

Specifies use of Expedited Forwarding PHB.

lower-bits *tos_value*

Important In StarOS 8.1 and later releases, this option is "**lower-bits** *tos_value*". In StarOS 8.0 release, it is *tos_value*.

Sets the least-significant 6 bits in the ToS byte with the specified numeric value.

tos_value must be an integer from 0 through 63.

downlink

Specifies the ToS only for downlink packets.

uplink

Specifies the ToS only for uplink packets.

Usage Guidelines

Use this command to set the ToS octets used in the charging action. If one of the enumerated values is set, the Differentiated Services Code Point (DSCP) bits (the six most-significant bits (MSBs) in the ToS byte) are marked. If the integer value is set, it will be written into the six least-significant bits (LSBs) of the ToS byte.

Example

The following command sets the ToS to *be* for downlink packets:

```
tos be downlink
```

tpo profile

The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

video bitrate

This command allows you to specify the default target bit rate to use for the video pacing feature on the Mobile Video Gateway. This value is also used as the suggested maximum bit rate for the video optimization policy control feature.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[default | no] video bitrate *bit_rate* **[-noconfirm]**

default

Sets video bitrate to its default value.

no

Deletes the video bit rate if previously configured.

video bitrate *bit_rate*

Specifies the bit rate, in bits per second, at which the TCP video flow should be paced during video pacing. This value is also used as the suggested maximum bit rate for the video optimization policy control feature. For video pacing, this default bit rate is used on each video flow until the rate determination function calculates the optimal bit rate for pacing.

bit_rate must be an integer from 0 to 256000000.

Default: 0

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to specify the default bit rate to use for the video pacing feature, and the suggested maximum bit rate for the video optimization policy control feature.

Example

The following command sets the bit rate for the video flow at *300000* (300kbps):

```
video bitrate 300000
```

video cae-readdressing

This command allows you to enable CAE (Content Adaptation Engine) re-addressing, allowing video traffic to be fetched from the CAEs in the CAE group. The CAE is an optional component of the Mobile Videoscape.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product MVG

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description **[no] video cae-readdressing [xheader-format** *xheader_format_name* **]**

no

Disables CAE re-addressing if previously configured.

video cae-readdressing

Enables CAE re-addressing, allowing video traffic to be fetched from the CAEs in the CAE group.

xheader-format *xheader_format_name*

Specifies an HTTP x-header (Extension header) format for readdressing. When specified, the MVG inserts a destination IP address and TCP port number in a proprietary HTTP x-header in the HTTP request to the CAE. The CAE uses this information to connect to the OS (Origin Server) to retrieve selected video clips for adaptation.

xheader_format_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to enable CAE re-addressing on the Mobile Video Gateway.

Example

The following command enables CAE re-addressing:

```
video cae-readdressing xheader-format format_1
```

video detailed-statistics

This command allows you to enable the collection of detailed video statistics.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product MVG

Privilege Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-charging-action)#`

Syntax Description

`[ default | no ] video detailed-statistics [ -noconfirm ]`

default

Sets video detailed-statistics to its default value, which is the same as **[no]**.

no

Disables the video statistics feature if previously enabled.

video detailed-statistics

Enables the video statistics feature. When a flow matches a rule definition for video during DPI (Deep Packet Inspection), the video statistics feature begins collecting detailed statistics for the video flow.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to enable the video statistics feature.

Example

The following command enables the video statistics feature:

`video detailed-statistics`

video optimization-preprocessing all

This command allows you to enable CAE re-addressing by enabling the Active Charging Service (ACS) to re-address video requests to the CAEs in the CAE group.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

`[ no ] video optimization-preprocessing all`

no

Disables CAE re-addressing if currently enabled.

video optimization-preprocessing all

Enables CAE re-addressing by enabling the ACS to re-address video requests to the CAEs in the CAE group.

Usage Guidelines

Use this command to enable CAE re-addressing by enabling the ACS to re-address video requests to the CAEs in the CAE group.

Example

The following command enables CAE re-addressing:

`video optimization-preprocessing all`

video optimization-preprocessing cae-readdressing

This command allows you to enable CAE re-addressing by enabling the Active Charging Service (ACS) to re-address video requests to the CAEs in the CAE group.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

`[ no ] video optimization-preprocessing cae-readdressing`

no

Disables CAE re-addressing if currently enabled.

video optimization-preprocessing cae-readdressing

Enables CAE re-addressing by enabling the ACS to re-address video requests to the CAEs in the CAE group.

Usage Guidelines

Use this command to enable CAE re-addressing by enabling the ACS to re-address video requests to the CAEs in the CAE group.

Example

The following command enables CAE re-addressing:

```
video optimization-preprocessing cae-readdressing
```

video pacing by-policing

This command allows you to enable the video pacing feature.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* > **charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

[default | no] video pacing by-policing [initial-burst-duration *value* **| normal-burst-duration** *value* **][-noconfirm]**

default

Sets video pacing by-policing to its default value, which is the same as **[no]**.

no

Deletes the video pacing by-policing settings and disables video pacing if previously configured.

video pacing by-policing

Enables the video pacing feature. When enabled, video pacing is applied per TCP video flow. The command syntax **by-policing** enables pacing enforcement by the policing method, which is the available method for this software release.

initial-burst-duration *value*

Specifies the duration, in seconds, for the allowed initial burst of video content. Note that the initial burst is configured in terms of time, so that for video files with different encoding bit rates, the amount of bytes allowed without enforcing pacing gets adjusted accordingly. The amount of bytes allowed is calculated by (video encoding rate * initial-burst-duration).

value must be an integer between 1 and 30.

Default: 10 seconds

normal-burst-duration *value*

Specifies the duration, in seconds, for the allowed normal burst of video content after the initial burst is completed. Like the initial burst, the normal burst is also configured in terms of time, so that for video files with different encoding bit rates, the amount of bytes allowed without enforcing pacing gets adjusted accordingly. The amount of bytes allowed is calculated by (video encoding rate * normal-burst-duration).

value must be an integer between 1 and 30.

Default: 3 seconds

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to enable video pacing by policing.

Example

The following command enables video pacing by policing with an initial burst duration of 15 seconds and a normal burst duration of 3 seconds:

```
video pacing by-policing initial-burst-duration 15 normal-burst-duration
 3
```

xheader-insert

This command allows you to specify the extension-header (x-header) format whose fields have to be inserted in HTTP request packets and HTTP response packets.

Important This command is license dependent. For more information please contact your Cisco account representative.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Charging Action Configuration

active-charging service *service_name* **> charging-action** *charging_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-charging-action)#
```

Syntax Description

xheader-insert xheader-format *xheader_format_name* **[encryption { rc4md5 | aes-256-gcm-sha384 [salt] [encrypted] key** *key* **] [first-request-only] [msg-type { response-only | request-and-response }] [-noconfirm]**
no xheader-insert

}

no

Removes previously configured x-header format name.

xheader-format *xheader_format_name*

Enables x-header mode configuration, and specifies the x-header format whose fields are to be inserted in the packets.

xheader_format_name must be the name of an x-header format, and must be an alphanumeric string of 1 through 63 characters.

encryption rc4md5 [encrypted] key *key*

If the x-header format has any encrypted fields defined, specifies to use RC4MD5 encryption.

After configuring this option, the fields in xheader format having "encrypt" enabled will be encrypted as follows:

1. The MD5 hash of the configure key will be calculated.
2. This MD5 hash will be used as a key for RC4 encryption.
3. This encrypted value will be base64 encoded to get the final X-header value. The final inserted X-header will be X-alias: base64(RC4(MD5(key),MSISDN)).

In the default case, if encryption is not enabled as above, the plain text value of the xheader field will be inserted.

Note that if the value of the key is changed on the fly, it will take effect only in case of new calls. Also, if the per rulebase RSA encryption is also enabled in the same config, per charging-action RC4MD5 encryption will take precedence over it.

key specifies the key as an alphanumeric string of 8 through 15 characters.

encryption specifies use of encryption.

The *key* can be configured either as plain text or encrypted. However, in the output of the **show configuration** command it will always be displayed as encrypted. And, in the output of the **show configuration showsecrets** command it will be displayed as plain text.

encryption aes-256-gcm-sha384 [salt] [encrypted] key *key*

Use **aes-256-gcm-sha384** option to encrypt the x-header fields with AES-256-GCM algorithm and SHA384 to hash key in 384 bits.

Use the **[salt]** option for enhanced security. Use this additional option by generating new key each time the x-header is encrypted.

Use **key** option to enter the key that is used to encrypt and decrypt the x-header string. The key length for AES-256-GCM-SHA384 algorithm is 32 characters, which is equal to 256 bits.

first-request-only

Specifies x-header insertion only for the first HTTP request in the IP flow. If not configured, the default behavior is insertion for all requests.

msg-type { response-only | request-and-response }

Specifies the extension-header (x-header) format whose fields have to be inserted in HTTP Request and Response packets.

- **response-only**: X-header will be inserted in HTTP Response packets with specified x-header format.
- **request-and-response**: X-header will be inserted in both HTTP Request and Response packets with same x-header format.

-noconfirm

Specifies that the command must execute without any prompts and confirmation from the user.

Usage Guidelines

Use this command to enable x-header mode, and specify the x-header format name whose fields are to be inserted in HTTP GET and POST request packets and HTTP response packets.

Also, see the **xheader-format** command in the *ACS Configuration Mode Commands* and *ACS X-header Format Configuration Mode Commands* chapters.

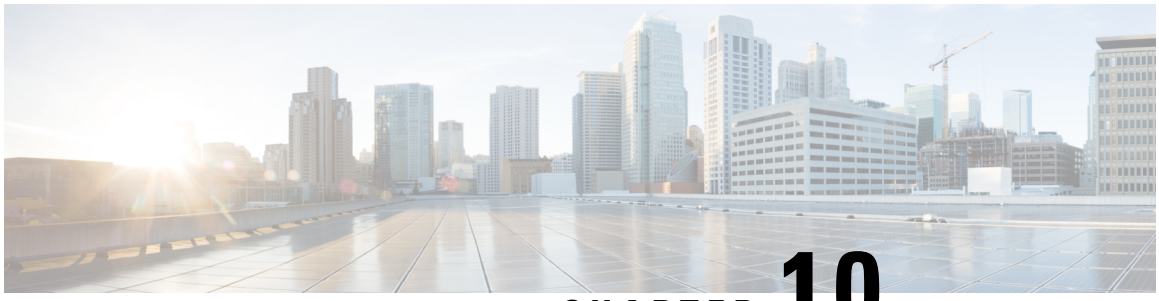
Example

The following command enables x-header mode, and specifies the x-header format name as *test12* for Request message:

```
xheader-insert xheader-format test12
```

The following command sets the x-header format name *format1* for both Request and Response messages:

```
xheader-insert xheader-format format1 msg-type request-and-response
```



CHAPTER 10

ACS Configuration Mode Commands

The ACS Configuration Mode is used to manage active charging service (ACS)/enhanced charging service (ECS) configurations. ACS provides flexible, differentiated, and detailed billing to subscribers through Layer 3 through Layer 7 packet inspection and the ability to integrate with back-end billing mediation systems.

Important In this release only one active charging service can be configured per system.

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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accelerate-flow

This command allows you to create/configure/delete Flow Aware Packet Acceleration (FAPA) feature.

Product

GGSN

P-GW

PDSN

S-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] accelerate-flow
```

no

If previously configured, disables the feature.

accelerate-flow

Enables and configures the FAPA feature.

Usage Guidelines

Use this command to create/configure/delete the FAPA feature.

Important Accelerated ECS Packet feature will be supported when TRM FastPath is enabled on the Rulebase.

Example

The following command enables the FAPA feature and enters the FAPA or accelerate-flow mode:

```
accelerate-flow
```

access-ruledef

This command allows you to create/configure/delete access rule definitions (ruledefs).

Important This command is available only in StarOS 8.1 and in StarOS 9.0 and later releases, and must be used to configure the Policy-based Stateful Firewall and NAT features.

Product

NAT

PSF

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

access-ruledef *access_ruledef_name* **[-noconfirm]**
no access-ruledef *access_ruledef_name*

no

If previously configured, deletes the specified access ruledef.

access_ruledef_name

Specifies the access ruledef to add/configure/delete.

access_ruledef_name must be the name of an access ruledef, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters. Each access ruledef must have a unique name.

If the named access ruledef does not exist, it is created, and the CLI mode changes to the Firewall-and-NAT Access Ruledef Configuration Mode wherein the ruledef can be configured.

If the named access ruledef already exists, the CLI mode changes to the Firewall-and-NAT Access Ruledef Configuration Mode for that access ruledef.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an access ruledef. A ruledef contains different conditions/criteria to permit, drop, or reject a packet/connection/traffic based on one or more parameters. The ruledef name must be unique within the service. Host pool, port map, IMSI pool, and access/firewall, routing, and charging ruledefs configured in the active charging service must all have unique names.

Important An access ruledef can be referenced by multiple Stateful Firewall rulebases.

Important Access ruledefs are different from ACS ruledefs.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-fw-ruledef)#

Also see the *Firewall-and-NAT Access Ruledef Configuration Mode Commands* chapter.

Example

The following command creates an access ruledef named *ruledef1*, and enters the Firewall-and-NAT Access Ruledef Configuration Mode:

```
access-ruledef ruledef1
```

bandwidth-policy

This command allows you to create/configure/delete bandwidth policies.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

bandwidth-policy *bandwidth_policy_name* **[-noconfirm]**
no bandwidth-policy *bandwidth_policy_name*

no

If previously configured, deletes the specified bandwidth policy from the active charging service.

bandwidth_policy_name

Specifies the bandwidth policy to add/configure/delete.

bandwidth_policy_name must be the name of a bandwidth policy, and must be an alphanumeric string of 1 through 63 characters. Each bandwidth policy must have a unique name.

If the named bandwidth policy does not exist, it is created, and the CLI mode changes to the ACS Bandwidth Policy Configuration Mode wherein the bandwidth policy can be configured.

If the named bandwidth policy already exists, the CLI mode changes to the ACS Bandwidth Policy Configuration Mode for that bandwidth policy.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a bandwidth policy.

In 12.3 and earlier releases, a maximum of 64 bandwidth policies can be configured.

In 14.0 and later releases, a maximum of 256 bandwidth policies can be configured.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-bandwidth-policy)#

Also see the *ACS Bandwidth Policy Configuration Mode Commands* chapter.

Example

The following command creates a bandwidth policy named *test73*, and enters the ACS Bandwidth Policy Configuration Mode:

```
bandwidth-policy test73
```

buffering-limit

This command allows you to configure packet buffering limits.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

buffering-limit { far-max-packets *far_max_packets* **| flow-max-packets** *flow_max_packets* **| subscriber-max-packets** *subscriber_max_packets* **}**
{ default | no } buffering-limit { far-max-packets | flow-max-packets | subscriber-max-packets }

default

Configure this command with the default setting.

no

Disable the buffering limit configuration.

far-max-packets *far_max_packets*

Specify the maximum number of packets that can be buffered per FAR.

far_max_packets must be an integer from 1 to 128.

Default value: 5 packets

flow-max-packets *flow_max_packets*

Specify the maximum number of packets that can be buffered per flow.

flow_max_packets must be an integer from 1 to 255.

subscriber-max-packets *subscriber_max_packets*

Specify the maximum number of packets that can be buffered per subscriber.

subscriber_max_packets must be an integer from 1 to 255.

Usage Guidelines

Use this command to configure the limits for buffering packets sent by a subscriber, while waiting for a response from the Diameter server. Packets need to be buffered for various reasons, such as, waiting for Credit Control Authorization or waiting for the result of a content filtering rating request.

Example

The following command sets the buffering limit per flow to *55* packets:

```
buffering-limit flow-max-packets 55
```

charging-action

This command allows you to create/configure/delete ACS charging actions.

Important A maximum of 2048 charging actions can be configured in the active charging service.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

`[ no ] charging-action` *`charging_action_name`* **`[ -noconfirm ]`**

no

If previously configured, deletes the specified charging action from the active charging service.

charging_action_name

Specifies the charging action to add/configure/delete.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters and can contain punctuation characters. Each charging action must have a unique name.

If the named charging action does not exist, it is created, and the CLI mode changes to the ACS Charging Action Configuration Mode wherein the charging action can be configured.

If the named charging action already exists, the CLI mode changes to the ACS Charging Action Configuration Mode for that charging action.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS charging action.

A charging action represents actions to be taken when a configured rule is matched. Actions could range from generating an accounting record (for example, an EDR) to dropping the IP packet, etc. The charging action will also determine the metering principle—whether to count retransmitted packets and which protocol field to use for billing (L3/L4/L7 etc).

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-charging-action)#

Also see the *ACS Charging Action Configuration Mode Commands* chapter.

Example

The following command creates a charging action named *action123* and changes to the ACS Charging Action Configuration Mode:

```
charging-action action123
```

check-point accounting

This command configures micro checkpoint syncup timer for ICSR and Session Recovery for Rf-Gy synchronization.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
check-point accounting sync-timer { icsr | sr } timer_value [ sr | icsr ]
timer_value
no check-point accounting sync-timer { icsr | sr }
```

no

If the micro checkpoint syncup timer is already configured, then the **no** variant will delete the configuration.

sr *timer_value*

Configures micro check-pointing timer for Session Recovery (SR). By default, the session recovery check-pointing will be done on 8 seconds.

timer_value: Time configured will be in multiples of 2 seconds. Note that the timer value less than 4 seconds and greater than 60 seconds will not be accepted.

icsr *timer_value*

Configures micro check-pointing timer for ICSR. By default, the ICSR check-pointing will be done on 18 seconds.

timer_value: Time configured will be in multiples of 2 seconds. Note that the timer value less than 4 seconds and greater than 60 seconds will not be accepted.

Usage Guidelines

Use this command to configure micro checkpoint syncup timer for ICSR and Session Recovery. Micro Checkpoint Sync-up timer is an internal timer utilized by Rf and Gy modules to check point corresponding billing information.

Releases prior to 17.0, micro checkpoint sync-up timer was hardcoded with a value of 18 seconds for ICSR and 8 seconds for Session Recovery (SR). In 17.0 and later releases, the micro checkpoint sync-up timer is made configurable with an expectation that it be set at a value as low as 4 seconds. The timer value is reduced to ensure the accurate billing information during the ICSR or SR switchover event.

This CLI is available at both active charging service level and rulebase level. If the timer value is configured at both service and rulebase level, then the service level value will be overridden with rulebase level values.

This feature provides the operator with the flexibility to provision timer for accurate billing information in case of session recovery or ICSR switchover. However, this is a performance impacting feature and the impact of the micro checkpoint sync timer reduction needs to be carefully considered by the operator before provisioning a lower value.

Example

The following command configures the micro checkpoint syncup timer for Session Recovery as *8* seconds:

```
check-point accounting sync-timer sr 8
```

content-filtering

Content Filtering Range, Trigger Action, Trigger Condition, edns static prefix, edns fields and edns tags under the active changing service. This option is disabled by default.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[default] content-filtering range range
          trigger-condition trigger_condition_name
             app-proto = dns
             external-content-filtering
```

default

By default, the content-filtering range is 1 to 4294967295. Any value in CF-Policy-ID AVP is considered for CF. It will not be shown by default and will be shown in verbose config. To restore default functionality, use the cli **default content-filtering range**

content-filtering

content-filtering range: Enter start number and end number for the **cf-policy-id**. *range_values* can be integers. For example, 1-4294967295.

If range parameter is set to 1-1000, any subscriber with a content filtering policy ID greater than or equal to 1 and lower than or equal to 1000 should use the standard content filtering functionality. And any subscriber profile with a content filter policy ID outside the range of 1-1000 can trigger the new EDNS0 functionality.

app-proto=dns

Avoids the IP readdressing of the non-DNS traffic. If this CLI is enabled with multiline-or cli, then all DNS traffic will be EDNS encoded.

external-content-filtering

Enables EDNS0 feature.When this flag is true along with the range criteria, EDNS0 feature is enabled. By default, this flag is disabled.

Usage Guidelines

Enter start number and end number for the **cf-policy-id**. *range_values* can be integers. For example, 1-4294967295.

If the content filter policy ID for any Subscriber profile is outside the range of 1 to 1000, use the following CF policy id range CLI commands to enable the new EDNS0 functionality.

Syntax Description

```
content-filtering
       category
       range
         content-filitering range range_start_number to range_end_number
         content-filtering range 1 to 1000
         [ default ] content-filtering
         [ no ] content-filtering
```

range

Specifies policy-id range for content filtering feature.

range

content-filtering range : Enter start number and end number for the content filtering *range_start_number* to *range_end_number* can be integers. For example, 1-4294967295.

no content-filitering range

When chassi comes up, the **no content-filitering range** CLI is displayed in verbose.

default

Configures the range between 1 to 4294967295. The CF-Policy-ID value that comes up in Gx event is considered for Content Filtering. You can view this range in both verbose and non- verbose mode.

content-filtering category match-method

This command allows you to specify the match method to look up URLs in the Category-based Content Filtering database.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
content-filtering category match-method { exact | generic }
default content-filtering category match-method
```

default

Configures this command with its default setting.

Default: **generic**

exact

Specifies the exact-match method, wherein URLs are rated only on exact match with URLs present in the Category-based Content Filtering database.

generic

Specifies the generic match method, wherein normalization, multi-lookups, and rollback algorithms are applied to URLs during look up. URLs are rated on generic match with URLs present in the Category-based Content Filtering database.

Usage Guidelines

Use this command to set the match method to look up URLs in the Category-based Content Filtering database.

Example

The following command sets the exact-match method to look up URLs in the Category-based Content Filtering database:

```
content-filtering category match-method exact
```

content-filtering category policy-id

This command allows you to create/configure/delete Content Filtering Category Policies for Category-based Content Filtering support.

Important A maximum of 64 Content Filtering Category Policies can be configured in the active charging service.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

content-filtering category policy-id *cf_policy_id* **[description [** *description_string* **]] [-noconfirm]**
no content-filtering category policy-id *cf_policy_id*

no

If previously configured, deletes the specified Content Filtering Category Policy from the active charging service.

cf_policy_id

Specifies the Content Filtering Category Policy ID to add/configure/delete.

cf_policy_id must be an integer from 1 through 4294967295.

If the specified policy ID does not exist, it is created and the CLI mode changes to the Content Filtering Policy Configuration Mode, wherein the policy can be configured.

If the specified policy ID already exists, the CLI mode changes to the Content Filtering Policy Configuration Mode for that policy.

description [*description_string*]

Specifies a description for the Content Filtering Category Policy.

description_string must be an alphanumeric string of 1 through 31 characters.

Note that both **description** and *description_string* are optional.

"**description** *description_string*" saves *description_string* as the new description.

"**description**" removes the previously specified description.

This description is displayed in the output of the "**show content-filtering category policy-id id** *id*" and "**show active-charging service name** *service_name*" commands.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a Content Filtering Category Policy.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-content-filtering-policy)#

Also see the *Content Filtering Policy Configuration Mode Commands* chapter.

Example

The following command creates a Content Filtering Policy with the ID *101*, and enters the Content Filtering Policy Configuration Mode:

```
content-filtering category policy-id 101
```

credit-control

This command allows you to enable/disable Prepaid Credit Control Configuration Mode.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] credit-control [ group cc_group_name ]
```

no

Disables the specified Prepaid Credit Control Application configuration.

group *cc_group_name*

Important This option is only available in StarOS 8.1 and later releases.

Specifies the credit control group to add/configure/delete.

cc_group_name must be the name of a credit control group, and must be an alphanumeric string of 1 through 63 characters. Each credit control group must have a unique name.

If the named credit control group does not exist, it is created, and the CLI mode changes to the Credit Control Configuration Mode, wherein the credit control group can be configured.

If the named credit control group already exists, the CLI mode changes to the Credit Control Configuration Mode for that credit control group.

Creating different credit control groups enables applying different credit control configurations (DCCA dictionary, failure-handling, session-failover, Diameter endpoint selection, etc.) to different subscribers on the same system.

Without credit control groups, only one credit control configuration is possible on a system. All the subscribers in the system will have to use the same configuration.

Important ICSR support for credit-control group is limited to a maximum of three bearers (one default and two dedicated bearers).

Usage Guidelines

Use this command to enable/disable Prepaid Credit Control Configuration for RADIUS/Diameter charging mode.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-dcca)#

Also see the *Credit Control Configuration Mode Commands* chapter.

Example

The following command enables prepaid credit control accounting to use RADIUS and/or Diameter interface mode.

```
credit-control
```

diameter credit-control

This command has been deprecated, and is replaced by the credit-control, on page 310 command.

edns

Important This is a licensed controlled feature. Contact your Cisco account representative for detailed information on specific licensing requirements.

This command allows you to configure EDNS format and fields. This configuration can be used whenever the DNS traffic needs to be converted to an EDNS request.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
edns
  security-profile  security_profile cf-policy-id-static-prefix
static_prefix_value
        fields fields_name
           [ default ] tag  number cf-policy-id  payload-length ( tcp | udp
 )
no edns
```

no

If previously configured, deletes the specified EDNS mode from the active charging service.

edns

This command allows you to configure EDNS format and fields.

security-profile

Specifies security profile is used to configure the 32 MS bit static value.

cf-policy-id-static-prefix *static_prefix_value*

Enter the integer value. The 32 bit static ID is used as MSB bytes in 64 bit device ID. If security-profile static prefix does not have any **cf-policy-id-prefix** defined, then device-id is encoded with only 32 bit **cf-policy-id**.

tag *val* cf-policy-id

This is a tag field to insert CF Policy ID in the EDNS0 Resource Record (RR) data.

payload-length (tcp | udp)

Specifies the RR UDP or TCP Payload-length value. You can enter the value ranging from 512 to 4096.

default tag

Resets the UDP or TCP payload-length field to an unconfigured default value of 1280.

Note If you enter a **default tag** *number* on a tag number that is not configured, the following error message is displayed:

Usage Guidelines

Use this command to configure EDNS format and fields.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-edns)#

Also see the *EDNS Configuration Mode Commands* chapter.

Example

The following command enables EDNS Configuration Mode:

edns

The following command disables EDNS Configuration Mode:

no edns

edr-format

This command allows you to create/configure/delete ACS Event Data Record (EDR) formats.

Important A maximum of 256 EDR plus UDR formats can be configured in the active charging service.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Using this command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
edr-format edr_format_name [ -noconfirm ]
no edr-format edr_format_name
        attribute attribute_name
        attribute attribute_name
```

no

If previously configured, deletes the specified EDR format from the active charging service.

edr_format_name

Specifies the EDR format to add, configure, and delete.

edr_format_name must be an alphanumeric string of 1 through 63 characters. Each EDR format must have a unique name.

If the specific EDR format does not exist, it is created, and the CLI mode changes to the EDR Format Configuration Mode wherein the EDR format can be configured.

If the named EDR format already exists, the CLI mode changes to the EDR Format Configuration Mode for that EDR format.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create, configure, and delete an EDR format.

Upon entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-edr)#

Also see the *EDR Format Configuration Mode Commands* chapter.

Example

The following command creates an EDR format named *edr_format1*, and enters the EDR Format Configuration Mode:

```
edr-format edr_format1
```

Example

The following example shows the warning message for **edr-format**:

```
no edr-format name
Are you sure? [  Yes | No ]  :  Yes
```

Note The previous warning message is displayed when you disable the following CLI commands in the active-charging service configuration:

- **ruledef**
- **rulebase**
- **charging-action**
- **packet-filter**
- **subscriber-base**
- **qos-group-of-ruledefs**
- **group-of-ruledefs**
- **trigger-condition**
- **trigger-action**
- **tcp-acceleration-init-params**
- **tcp-acceleration-profile**
- **subs-class**
- **readdress-server-list**
- **udr-format**
- **p2p-ads-group**
- **bandwidth-policy**

attribute *attribute_name*

Specifies the attribute to configure an EDR.

Usage Guidelines This command is used to create, configure, and delete the ACS Event Data Record (EDR) formats.

edr-ipproto-port-map

This command enables IP protocol and server port mapping for Event Data Records (EDR).

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[default | no] edr-ipproto-port-map

default

Configures this command with its default setting.

Default: Disabled

no

If previously enabled, disables the IP protocol and server port mapping for EDR.

Usage Guidelines

Use this command to enable IP protocol and server port mapping for EDR. As part of EDR generation, packets can be mapped based on IP header protocol and Transport Header Port. Generating statistics based on IP Protocol and Transport Port number is an added advantage for offline packet analysis.

edr-udr-flow-control

This command allows you to enable/disable flow control between Session Managers (SessMgrs) and the CDRMOD process.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

edr-udr-flow-control [unsent-queue-size *unsent_queue_size* **]**
{ default | no } edr-udr-flow-control

no

If previously enabled, disables the flow control configuration.

default

Configures this command with its default setting.

Default: Flow control is enabled; **unsent-queue-size**: 375

unsent-queue-size *unsent_queue_size*

Specifies the flow control unsent queue size at Session Manager (SessMgr) level.

unsent_queue_size must be an integer from 1 through 2500.

Usage Guidelines Use this command to enable Flow Control between SessMgr and the CDRMOD process, and configure the unsent queue size.

Example

The following command enable Flow Control between SessMgrs and the CDRMOD process, and configure the unsent queue size to *1000*:

```
edr-udr-flow-control unsent-queue-size 1000
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `end`

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `exit`

Usage Guidelines Use this command to return to the parent configuration mode.

fair-usage deact-margin

This command allows you to configure the deactivate margin for the Fair Usage feature.

Product

Important In release 17.0, this command has been deprecated.

ACS

ADC

CF

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

fair-usage deact-margin *deactivate_margin*
default fair-usage deact-margin

default

Configures this command with its default setting.

Default: 5 percent

deactivate_margin

Specifies that Fair Usage monitoring must be disabled when the instance-level credit usage goes *deactivate_margin* percentage below *usage_threshold*.

deactivate_margin is a percentage value, and must be an integer from 1 through 100.

Usage Guidelines

Use this command to configure when to disable the Fair Usage feature, which enables SessMgr instance-level load balancing for in-line service features, and resource usage control for subscribers. For additional information, refer to the feature description in the *Enhanced Charging Service Administration Guide*.

Example

The following command configures the deactivate margin to disable Fair Usage monitoring to 10% below the session resource usage threshold (65%):

fair-usage deact-margin 10

fair-usage tcp-proxy

This command allows you to configure the maximum number of flows for which TCP Proxy can be used per subscriber, and what portion of ECS memory should be reserved for TCP Proxy flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
fair-usage tcp-proxy { max-flows-per-subscriber max_flows_subscriber |
memory-share memory_share }
default fair-usage [ max-flows-per-subscriber | memory-share ]
```

default

Configures this command with its default setting.

max-flows-per-subscriber *max_flows_subscriber*

Specifies the maximum number of flows for which TCP Proxy can be used per subscriber.

This limit is per Session Manager.

max_flows_subscriber must be an integer from 1 through 1000.

Default: 5

memory-share *memory_share*

Specifies what portion of ECS memory should be reserved for TCP Proxy flows.

memory_share is a percentage value, and must be an integer from 1 through 100.

Default: 10%

Usage Guidelines

Use this command to configure the maximum number of flows for which TCP Proxy can be used for a subscriber, and what portion of ECS memory should be reserved for TCP Proxy flows.

Example

The following command configures 100 as the maximum number of flows for which TCP Proxy can be enabled for the subscriber:

```
fair-usage tcp-proxy max-flows-per-subscriber 100
```

fair-usage threshold-percent

This command allows you to configure the usage threshold to start Fair Usage monitoring.

Product

Important In release 17.0, this command has been deprecated.

ACS

ADC

CF

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

fair-usage threshold-percent *usage_threshold*
default fair-usage threshold-percent

default

Configures this command with its default setting.

Default: 50 percent

usage_threshold

Specifies the threshold to start Fair Usage monitoring. Until the credit usage hits this threshold, all session resource allocation is allowed. On crossing this threshold, any new resource allocation request is evaluated before being allowed or denied.

usage_threshold is a percentage value, and must be an integer from 1 through 100.

Usage Guidelines

Use this command to configure the threshold to enable the Fair Usage feature, which enables SessMgr instance-level load balancing for in-line service features, and resource usage control for subscribers. For additional information, refer to the feature description in the *Enhanced Charging Service Administration Guide*.

Example

The following command enables the Fair Usage feature, and configures the session resource usage threshold to start Fair Usage monitoring to 75%:

```
fair-usage threshold-percent 75
```

firewall dos-protection flooding

This command is configured to protect servers from mobile subscribers in the uplink direction.

Product

Important In StarOS 17.0 and later releases, the uplink flooding feature is not enabled in the ACS Configuration mode, and must be enabled in the Firewall-and-NAT Policy Configuration mode. Hence, this command is no longer supported and left in place for backward compatibility.

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
firewall dos-protection flooding { { icmp | tcp-syn | udp } protect-servers
 { all | host-pool hostpool_name } packet limit packet_limit |
inactivity-timeout timeout | uplink-sample-interval interval }
default firewall dos-protection flooding { icmp | tcp-syn | udp |
inactivity-timeout | uplink-sample-interval }
no firewall dos-protection flooding { icmp | tcp-syn | udp }
```

no

Disables Stateful Firewall protection for subscribers against the specified Denial of Service (DoS) attack(s).

default

Disables Stateful Firewall protection for subscribers against all DoS attacks.

flooding { icmp | tcp-syn | udp } protect-servers { all | host-pool *hostpool_name*

Enables protection against the specified flooding attack:

- **icmp**: Enables ICMP uplink flooding protection.
- **tcp-syn**: Enables TCP Syn uplink flooding protection.
- **udp**: Enables UDP uplink flooding protection.

all: Enables protection for all the servers.

host-pool *hostpool_name*: Specifies the name of the host pool. *hostpool_name* must be an alphanumeric string of 1 through 63 characters.

packet limit *packet_limit*

Specifies the maximum number of packets allowed during a sampling interval.

packet_limit must be an integer from 1 through 4294967295.

Default: 1000 packets per sampling interval for all protocols.

inactivity-timeout *inactivity_timeout*

Specifies the inactivity timeout period, in seconds. This allows flooding traffic if the destination is inactive for more than the configured period.

inactivity_timeout must be an integer from 1 through 4294967295.

Default: 300 seconds

uplink-sample-interval *interval*

Specifies the uplink sampling interval, in seconds. The maximum sampling-interval configurable is 60 seconds.

interval must be an integer from 1 through 60.

Default: 1 second

Usage Guidelines

Use this command to enable Stateful Firewall protection from different types of DoS attacks for all servers or for those servers mentioned in the host pool. This allows users to safeguard their own servers and other hosts.

DoS attacks are also detected in the downlink direction. The **firewall dos-protection** command must be configured in the FW-and-NAT Policy Configuration mode.

Example

The following command enables ICMP uplink protection for all servers with packet limit set to *10*:

```
firewall dos-protection flooding icmp protect-servers all packet limit
10
```

firewall dos-protection ip-sweep

This command is configured to detect Source IP-based flooding attacks in the uplink direction.

Product

Important In StarOS 17.0 and later releases, the IPsweep feature is not enabled in the ACS Configuration mode, and must be enabled in the Firewall-and-NAT Policy Configuration mode. Hence, this command is no longer supported and left in place for backward compatibility.

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
firewall dos-protection ip-sweep { icmp | tcp-syn | udp } protect-servers
 { all | host-pool hostpool_name } packet limit packet_limit |
downlink-server-limit server_limit | inactivity-timeout timeout |
sample-interval interval }
default firewall dos-protection ip-sweep { downlink-server-limit | icmp
| inactivity-timeout | sample-interval | tcp-syn | udp }
no firewall dos-protection ip-sweep { icmp | tcp-syn | udp }
```

default

Disables Stateful Firewall protection for subscribers against all DoS attacks.

no

Disables Stateful Firewall protection for subscribers against the specified Denial of Service (DoS) attack(s).

ip-sweep { icmp | tcp-syn | udp } protect-servers { all | host-pool *hostpool_name*

Enables protection against the specified flooding attack:

- **icmp**: Enables source IP-based flood attack detection for ICMP.
- **tcp-syn**: Enables source IP-based flood attack detection for TCP-SYN.
- **udp**: Enables source IP-based flood attack detection for UDP.

all: Enables protection for all the servers.

host-pool *hostpool_name*: Specifies the name of the host pool. *hostpool_name* must be an alphanumeric string of 1 through 63 characters.

packet limit *packet_limit*

Specifies the maximum number of packets allowed during a sampling interval for uplink and downlink.

packet_limit must be an integer from 1 through 4294967295.

Default: 1000 packets per sampling interval for all protocols.

downlink-server-limit *server_limit*

Specifies the number of internet hosts that can be blocked in the uplink and downlink direction.

server_limit must be an integer from 2 through 999.

Default: 100

inactivity-timeout *inactivity_timeout*

Specifies the inactivity timeout period for uplink and downlink, in seconds. This allows flooding traffic if the destination is inactive for more than the configured period.

inactivity_timeout must be an integer from 1 through 4294967295.

Default: 300 seconds

sample-interval *interval*

Specifies the IP Sweep sample interval, in seconds. The maximum sampling-interval configurable is 60 seconds.

interval must be an integer from 1 through 60.

Default: 1 second

Usage Guidelines

Use this command to enable or disable IP Sweep Protection in the uplink direction for mobile subscribers and internet hosts on a per protocol basis. The purpose of the Uplink IP Sweep protection is to check whether a particular source IP address is generating more flows per sample interval than is permitted. If so, the first packets that come after the maximum packet limit during the particular time interval will be dropped.

IP Sweep attacks are also detected in the downlink direction. The **firewall dos-protection ip-sweep** command must be configured in the FW-and-NAT Policy Configuration mode. The configuration values for packet limit and sampling interval are common for both uplink and downlink.

Example

The following command enables ICMP uplink protection for all servers with packet limit set to *30*:

```
firewall dos-protection ip-sweep icmp protect-servers all packet limit
30
```

firewall flooding

Description In StarOS 8.1 and later releases, for Rulebase-based Stateful Firewall this command is available in the ACS Rulebase Configuration Mode, and for Policy-based Stateful Firewall in the Firewall-and-NAT Policy Configuration Mode. In StarOS 8.3, this command is available in the ACS Rulebase Configuration Mode.

firewall flow-recovery

This command allows you to configure the Stateful Firewall's Flow Recovery feature.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
firewall flow-recovery { { downlink [ [ timeout timeout ] [ no-flow-creation
 ] + ] } | { uplink [ timeout timeout ] } }
{ default | no } firewall flow-recovery { downlink | uplink }
```

default

Configures this command with its default setting.

Default: Downlink and uplink flow recovery enabled, 300 seconds

no

Disables the flow recovery configuration.

downlink | uplink

Specifies the packets:

- **downlink**: Enables flow recovery for packets from the downlink direction.
- **uplink**: Enables flow recovery for packets from the uplink direction.

timeout *timeout*

Specifies the Stateful Firewall Flow Recovery Timeout setting, in seconds.

timeout must be an integer from 1 through 86400.

Default: 300 seconds

no-flow-creation

Specifies not to create data session/flow-related information for downlink-initiated packets (from the Internet to the subscriber) while the firewall downlink flow-recovery timer is running, but send to subscriber.

Usage Guidelines

Use this command to configure Stateful Firewall Flow Recovery feature.

Important NAT flows will not be recovered.

Example

The following command configures Stateful Firewall Flow Recovery for packets in downlink direction with a timeout setting of *600* seconds:

```
firewall flow-recovery downlink timeout 600
```

firewall icmp-destination-unreachable-message-threshold

Description In StarOS 8.1 and later releases, for Rulebase-based Stateful Firewall this command is available in the ACS Rulebase Configuration Mode, and for Policy-based Stateful Firewall in the Firewall-and-NAT Policy Configuration Mode. In StarOS 8.3, this command is available in the ACS Rulebase Configuration Mode.

firewall license

This command allows you to configure the license related parameters for Stateful Firewall.

Product PSF

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description **firewall license exceed-action { disable-feature | drop-call | ignore }**

exceed-action { disable-feature | drop-call | ignore }

Configures one of the following parameters when license is exceeded.

- **disable-feature**: Disables the service when license is exceeded.
- **drop-call**: Drops the call if call fails to get a Stateful Firewall license.
- **ignore**: Continues using the Stateful Firewall license even if license is exceeded. This is the default behavior.

Usage Guidelines Use this command to configure the license related parameters for Stateful Firewall when license is exceeded.

firewall max-ip-packet-size

Description In StarOS 8.1 and later releases, for Rulebase-based Stateful Firewall this command is available in the ACS Rulebase Configuration Mode, and for Policy-based Stateful Firewall in the Firewall-and-NAT Policy Configuration Mode. In StarOS 8.3, this command is available in the ACS Rulebase Configuration Mode.

firewall mime-flood

Description In StarOS 8.1 and later releases, for Rulebase-based Stateful Firewall this command is available in the ACS Rulebase Configuration Mode, and for Policy-based Stateful Firewall in the Firewall-and-NAT Policy Configuration Mode. In StarOS 8.3, this command is available in the ACS Rulebase Configuration Mode.

firewall nat-alg

This command enables/disables Network Address Translation (NAT) Application Level Gateways (ALGs).

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[default | no] firewall nat-alg { all | ftp | h323 | pptp | rtsp | sip } [ipv4-and-ipv6 | ipv4-only | ipv6-only]

default

Configures this command with the default setting for the specified parameter.

Default:

- **ftp**: Enabled
- **h323**: Enabled
- **pptp**: Disabled
- **rtsp**: Disabled
- **sip**: Disabled

no

Disables all/ or the specified NAT ALG configuration. When disabled, the ALG(s) will not do any payload translation for NATd calls.

all | ftp | h323 | pptp | rtsp | sip

Specifies the NAT ALG to enable/disable.

- **all**: Enables/disables all of the following NAT ALGs.
- **ftp**: Enables/disables File Transfer Protocol (FTP) NAT ALG.
- **h323**: Enables/disables H323 NAT ALG.
- **pptp**: Enables/disables Point-to-Point Tunneling Protocol (PPTP) NAT ALG.
- **rtsp**: Enables/disables Real Time Streaming Protocol (RTSP) ALG.
- **sip**: Enables/disables Session Initiation Protocol (SIP) NAT ALG.

ipv4-and-ipv6 | ipv4-only | ipv6-only

Specifies to enable/disable NAT44/NAT64 ALG.

- **ipv4-and-ipv6**: Enables both NAT44 and NAT64 ALGs.
- **ipv4-only**: Enables only NAT44 ALG.

- **ipv6-only**: Enables only NAT64 ALG.

Usage Guidelines Use this command to enable/disable NAT ALGs.

To enable NAT ALG processing, in addition to this configuration, ensure that the routing rule for that particular protocol is added in the rulebase.

Example

The following command enables FTP NAT ALG:

```
firewall nat-alg ftp
```

The following command disables FTP NAT ALG:

```
no firewall nat-alg ftp
```

The following command enables FTP NAT ALG, and disables H.323, PPTP, RTSP, and SIP NAT ALGs:

```
default firewall nat-alg all
```

firewall no-ruledef-matches

Description In StarOS 8.1 and later releases, this command is available in the ACS Rulebase Configuration Mode.

firewall port-scan

This command allows you to configure Stateful Firewall's Port Scan Detection algorithm.

Product PSF

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
firewall port-scan { connection-attempt-success-percentage { non-scanner
 | scanner } percentage | inactivity-timeout inactivity_timeout | protocol {
tcp | udp } response-timeout response_timeout | scanner-policy { block
inactivity-timeout inactivity_timeout | log-only } }
default firewall port-scan { connection-attempt-success- percentage {
non-scanner | scanner } | inactivity-timeout | protocol { tcp | udp }
response-timeout | scanner-policy }
```

default

Configures this command with its default setting.

connection-attempt-success-percentage { non-scanner | scanner } *percentage*

Specifies the connection attempt success percentage.

- **non-scanner**: Specifies the connection attempt success percentage for a non-scanner.

  percentage must be an integer from 60 through 99.

  Default: 70%

- **scanner**: Specifies the connection attempt success percentage for a scanner.

  percentage must be an integer from 1 through 40.

  Default: 30%

inactivity-timeout *inactivity_timeout*

Specifies the port scan inactivity timeout period, in seconds.

inactivity_timeout must be an integer from 60 through 1800.

Default: 300 seconds

protocol { tcp | udp } response-timeout *response_timeout*

Specifies transport protocol and response-timeout period.

- **tcp**: Specifies response timeout for TCP.

  response_timeout must be an integer from 1 through 30.

- **udp**: Specifies response timeout for UDP.

  response_timeout must be an integer from 1 through 60.

Default: 3 seconds

scanner-policy { block inactivity-timeout *inactivity_timeout* | log-only }

Specifies how to treat packets from a source address that has been detected as a scanner.

- **block inactivity-timeout** *inactivity_timeout*: Specifies blocking any subsequent traffic from the scanner. If the scanner is found to be inactive for the inactivity-timeout period, then the scanner is no longer blocked, and traffic is allowed.

  inactivity_timeout specifies the scanner inactivity timeout period, in seconds, and must be an integer from 1 through 4294967295.

- **log-only**: Specifies logging scanner information without blocking scanner traffic.

Default: **log-only**

Usage Guidelines

Use this command to configure the Stateful Firewall Port Scan Detection algorithm enabled by the **firewall dos-protection port-scan** CLI command.

This protection tracks all uplink source addresses, and the packets they initiate towards all subscribers that have this protection enabled.

Example

The following command configures the Stateful Firewall Port Scan inactivity timeout setting to *900* seconds:

```
firewall port-scan inactivity-timeout 900
```

firewall protect-servers

This command is configured to protect ISP servers from mobile space devices.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

firewall protect-servers { all | host-pool *hostpool_name* **} policy** *policy_name* **{ default | no } firewall protect-servers**

default

Configures this command with its default setting.

no

Disables protection of the servers.

all

Configured to protect all servers from attacking mobile nodes.

host-pool *hostpool_name*

Specifies the name of the host pool where all servers in that host pool need to protected.

hostpool_name must be an alphanumeric string of 1 through 63 characters.

policy *policy_name*

Specifies the Firewall-and-NAT policy to be applied to packets that are destined to the IPs mentioned in the host pool.

policy_name must be the name of a Firewall-and-NAT policy, and must be an alphanumeric string of 1 through 63 characters

Usage Guidelines

Use this command to protect all ISP servers or specific ISP servers from mobile space devices. All the uplink packets will be inspected, and the action will be taken based on the configuration in Firewall-and-NAT policy. Uplink protection can be enabled or disabled based on the server IP of the packet.

Example

The following command is configured to protect all servers within a Firewall-and-NAT policy named *test123*:

```
firewall protect-servers all policy test123
```

firewall ruledef

This command allows you to create/configure/delete Stateful Firewall ruledefs.

Important This command is available only in StarOS 8.1. This command must be used to configure the Rulebase-based Stateful Firewall and NAT features.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
firewall ruledef firewall_ruledef_name [ -noconfirm ]
no firewall ruledef firewall_ruledef_name
```

no

If previously configured, deletes the specified Stateful Firewall ruledef from the active charging service.

firewall_ruledef_name

Specifies the Stateful Firewall ruledef to add/configure/delete.

firewall_ruledef_name must be the name of a Stateful Firewall ruledef, and must be an alphanumeric string of 1 through 63 characters and can contain punctuation characters. Each ruledef must have a unique name.

If the named ruledef does not exist, it is created, and the CLI mode changes to the Firewall Ruledef Configuration Mode wherein the ruledef can be configured.

If the named Stateful Firewall ruledef already exists, the CLI mode changes to the Firewall Ruledef Configuration Mode for that ruledef.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a Stateful Firewall ruledef. A Stateful Firewall ruledef contains different conditions to permit, drop, or reject a packet/connection/traffic based on one or more parameters. The ruledef name must be unique within the active charging service. Host pool, port map, IMSI pool, and Stateful Firewall, routing, and charging ruledefs must have unique names.

A Stateful Firewall ruledef can be referenced by multiple Stateful Firewall rulebases.

Important The Stateful Firewall ruledefs are different from the ACS ruledefs.

Also see the *Firewall-and-NAT Access Ruledef Configuration Mode Commands* chapter.

Example

The following command creates a Stateful Firewall ruledef named *fw_ruledef1*, and enters the Firewall Ruledef Configuration Mode:

```
firewall ruledef fw_ruledef1
```

firewall tcp-syn-flood-intercept

Description In StarOS 8.1 and later releases, for Rulebase-based Stateful Firewall this command is available in the ACS Rulebase Configuration Mode, and for Policy-based Stateful Firewall in the Firewall-and-NAT Policy Configuration Mode. In StarOS 8.3, this command is available in the ACS Rulebase Configuration Mode.

firewall track-list

This command allows you to configure the maximum number of server IP addresses to be tracked that are involved in any kind of denial-of-service (DoS) attacks.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

firewall track-list attacking-servers *no_of_servers*
{ default | no } firewall track-list attacking-servers

default

Configures this command with its default setting.

Default: 10 servers

no

Important This command variant is available only in StarOS 8.3 and later releases.

If previously configured, deletes the configuration from the active charging service.

attacking-servers *no_of_servers*

Specifies the maximum number of servers to track.

no_of_servers must be an integer from 1 through 100.

Usage Guidelines

Use this command to configure the maximum number of server IP addresses to be tracked that are involved in any kind of DoS attacks.

Example

The following command configures the maximum number of server IP addresses to be tracked that are involved in any kind of DoS attacks to *20*:

```
firewall track-list attacking-servers 20
```

fw-and-nat action

This command allows you to create/configure/delete Firewall-and-NAT actions.

Important This command is available only in 11.0 and later releases. This command must be used to configure the Stateful Firewall and NAT Action.

Product

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
fw-and-nat action action_name [ -noconfirm ]
no fw-and-nat action action_name
```

no

If previously configured, deletes the specified Firewall-and-NAT action from the active charging service.

action_name

Specifies the Firewall-and-NAT action to add/configure/delete.

action_name must be the name of a Firewall-and-NAT action, and must be an alphanumeric string of 1 through 63 characters. Each Firewall-and-NAT action must have a unique name.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a Firewall-and-NAT action.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-fw-and-nat-action)#

Also see the *Firewall-and-NAT Action Configuration Mode Commands* chapter.

Example

The following command creates a Firewall-and-NAT action named *test1*, and changes to the Firewall-and-NAT Action Configuration Mode:

```
fw-and-nat action test1
```

fw-and-nat policy

This command allows you to create/configure/delete Firewall-and-NAT policies.

Important This command is available only in StarOS 8.1 and in StarOS 9.0 and later releases. This command must be used to configure the Policy-based Stateful Firewall and NAT features.

Product

PSF

NAT

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

fw-and-nat policy *policy_name* **[-noconfirm]**
no fw-and-nat policy *fw_nat_policy_name*

no

If previously configured, deletes the specified Firewall-and-NAT policy from the active charging service.

Important When a Firewall-and-NAT policy is deleted, for all subscribers using the policy, Stateful Firewall and NAT processing is disabled, also ACS sessions for the subscribers are dropped. In case of session recovery, the calls are recovered but with Stateful Firewall and NAT disabled.

fw_nat_policy_name

Specifies the Firewall-and-NAT policy to add/configure/delete.

fw_nat_policy_name must be the name of a Firewall-and-NAT policy, and must be an alphanumeric string of 1 through 63 characters. Each Firewall-and-NAT policy must have a unique name.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a Firewall-and-NAT policy.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-fw-and-nat-policy)#

Also see the *Firewall-and-NAT Policy Configuration Mode Commands* chapter.

Example

The following command creates a Firewall-and-NAT policy named *test321*, and changes to the Firewall-and-NAT Policy Configuration Mode:

```
fw-and-nat policy test321
```

group-of-objects

This command allows you to create/configure/delete an ACS group-of-objects.

Important This command is available only in StarOS 10.2 and later releases.

Important A maximum of 16 object groups can be configured in the active charging service. And a maximum of 128 objects can be configured within each object group.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

group-of-objects *objects_group_name* **[type string [-noconfirm]]**
no group-of-objects *objects_group_name*

no

If previously configured, deletes the specified group-of-objects from the active charging service.

objects_group_name

Specifies the group-of-objects to add/configure/delete.

objects_group_name must be the name of a group-of-objects, and must be an alphanumeric string of 1 through 63 characters. Each group-of-objects must have a unique name.

If the named group-of-objects does not exist, it is created, and the CLI mode changes to the ACS Group-of-Objects Configuration Mode wherein the group can be configured.

If the named group-of-objects already exists, the CLI mode changes to the ACS Group-of-Objects Configuration Mode for that group.

type

Specifies the data type for the group-of-objects.

Important "string" is the only data type supported in this release.

string

Specifies the data type as string.

When creating a group, specifying the data type is mandatory.

When modifying an existing group, specifying the data type is optional.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a group-of-objects.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-group-of-objects)#

Also see the *ACS Group-of-Objects Configuration Mode Commands* chapter.

Example

The following command creates a group-of-objects named *test4* with the data type string, and enters the ACS Group-of-Objects Configuration Mode:

```
group-of-objects test4 type string
```

group-of-prefixed-urls

This command allows you to create/configure/delete an ACS group-of-prefixed-URLs.

Important This command is customer specific. For more information contact your Cisco account representative.

Important A maximum of 64 group-of-prefixed-URL groups can be configured in the active charging service.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
group-of-prefixed-urls prefixed_urls_group_name [ -noconfirm ]
no group-of-prefixed-urls prefixed_urls_group_name
```

no

If previously configured, deletes the specified group-of-prefixed-urls from the active charging service.

prefixed_urls_group_name

Specifies the group-of-prefixed-urls to add/configure/delete.

prefixed_urls_group_name must be the name of a group-of-prefixed-urls, and must be an alphanumeric string of 1 through 63 characters. Each group-of-prefixed-urls must have a unique name.

If the named group-of-prefixed-urls does not exist, it is created, and the CLI mode changes to the ACS Group-of-Prefixed-URLs Configuration Mode wherein the group can be configured.

If the named group-of-prefixed-urls already exists, the CLI mode changes to the ACS Group-of-Prefixed-URLs Configuration Mode for that group.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a group-of-prefixed-URLs.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-grp-of-prefixed-urls)#

Also see the *ACS Group-of-Prefixed-URLs Configuration Mode Commands* chapter.

Example

The following command creates group-of-prefixed-urls named *test5*, and enters the ACS Group-of-Prefixed-URLs Configuration Mode:

```
group-of-prefixed-urls test5
```

group-of-ruledefs

This command allows you to create/configure/delete an ACS group-of-ruledefs.

Important A maximum of 512 ruledefs can be configured in one group-of-ruledefs in the active charging service. A maximum of 384 group-of-ruledefs can be configured.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
group-of-ruledefs ruledefs_group_name [ -noconfirm ]
no group-of-ruledefs ruledefs_group_name
```

no

If previously configured, deletes the specified group-of-ruledefs from the active charging service.

ruledefs_group_name

Specifies the group-of-ruledefs to add/configure/delete.

ruledefs_group_name must be unique within the active charging service, and must be an alphanumeric string of 1 through 63 characters. Each group-of-ruledefs must have a unique name.

If the named group-of-ruledefs does not exist, it is created, and the CLI mode changes to the ACS Group-of-Ruledefs Configuration Mode wherein the group can be configured.

If the named group-of-ruledefs already exists, the CLI mode changes to the ACS Group-of-Ruledefs Configuration Mode for that group.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a group-of-ruledefs.

A group-of-ruledefs is a collection of rule definitions to use in access policy creation.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-group-of-ruledefs)#

Also see the *ACS Group-of-Ruledefs Configuration Mode Commands* chapter.

Example

The following command creates a group-of-ruledefs named *group1*, and enters the ACS Group-of-Ruledefs Configuration Mode:

group-of-ruledefs group1

h323 time-to-live

This command allows you to configure the time period for which an endpoint's registration to an H.323 gatekeeper is valid.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

h323 time-to-live *timeout*
default h323 time-to-live

default

Configures this command with its default setting.

Default: 3600 seconds

timeout

Specifies the timeout setting, in seconds.

timeout must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to configure the time period for which an endpoint's registration to a gatekeeper is valid.

Example

The following command configures the time for an endpoint registration with a timeout setting of *5* seconds:

```
h323 time-to-live 5
```

h323 timeout

This command allows you to configure the timeout intervals for various H.323 requests.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
h323 timeout { admission admission_timeout | discovery discovery_timeout |
location location_timeout | registration registration_timeout | unregistration
unregistration_timeout }
default h323 timeout { admission | discovery | location | registration |
 unregistration }
```

default

Configures this command with the default setting for the specified parameters.

admission *admission_timeout*

Configures the timeout value for the admission request sent to the gatekeeper.

admission_timeout must be an integer from 1 through 20.

Default: 10 seconds

discovery *discovery_timeout*

Configures the timeout value for the gatekeeper request message sent to the Gatekeeper.

discovery_timeout must be an integer from 1 through 20.

Default: 10 seconds

location *location_timeout*

Configures the timeout value for the location request message sent to the Gatekeeper.

location_timeout must be an integer from 1 through 20.

Default: 10 seconds

registration *registration_timeout*

Configures the timeout value for the registration request message sent to the Gatekeeper.

registration_timeout must be an integer from 1 through 20.

Default: 6 seconds

unregistration *unregistration_timeout*

Configures the timeout value for the unregistration request message sent to the Gatekeeper.

unregistration_timeout must be an integer from 1 through 20.

Default: 3 seconds

Usage Guidelines

Use this command to configure the timeout interval for the various H.323 requests.

Example

The following command configures the admission request message with a timeout value of *15* seconds:

```
h323 timeout admission 15
```

h323 tpkt

This command allows you to configure the maximum size of Transport Protocol Data Unit Packets (TPKT) that the H.323 Application Layer Gateway (ALG) can handle.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

h323 tpkt *max_tpkt_size*
default h323 tpkt

default

Configures this command with its default setting.

Default: 2048 bytes

max_tpkt_size

Specifies the maximum TPKT size, in bytes.

max_tpkt_size must be an integer from 4 through 4096.

Usage Guidelines

Use this command to configure the maximum packet size for the H.323 ALG.

Example

The following command configures a maximum TPKT packet size of *100* bytes:

h323 tpkt 100

h323 version

This command allows you to configure the H.323 version number supported by an H.323 Application Layer Gateway (ALG).

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

h323 version *h323_version_number*
default h323 version

default

Configures this command with its default setting.

Default: 5

h323_version_number

Specifies the H.323 version number.

h323_version_number must be an integer from 1 through 7.

Usage Guidelines Use this command to configure the H.323 version number supported by the H.323 ALG.

Example

The following command configures the H.323 version as *1*:

```
h323 version 1
```

host-pool

This command allows you to create/configure/delete host pools.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
host-pool host_pool_name [ -noconfirm ]
no host-pool host_pool_name
```

no

If previously configured, deletes the specified host pool from the active charging service.

host_pool_name

Specifies the host pool to add/configure/delete.

host_pool_name must be the name of a host pool, and must be an alphanumeric string of 1 through 63 characters and can contain punctuation characters. Each host pool must have a unique name.

If the named host pool does not exist, it is created, and the CLI mode changes to the ACS Host Pool Configuration Mode wherein the host pool can be configured.

If the named host pool already exists, the CLI mode changes to the ACS Host Pool Configuration Mode for that host pool.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Syntax Description

```
extend-host-pool-limit host_pool_limit
no extend-host-pool-limit host_pool_limit
```

extend_host_pool_limit

Increases the number of host pools from 512 to 1024 and IP related configuration lines per host pool from 20 to 32.

no

Unconfigures or disables the feature. If the configured hostpools are more than 512 or configured entries in hostpool are more than 20 then error is displayed.

Note Remove the hostpools manually and then try to disable the feature.

Usage Guidelines Use this command to create/configure/delete ACS host pools.

A host pool is a collection of hosts and IP addresses to use in access policy creation. The host pool name must be unique with in the service. Host pool, port map, IMSI pool, and firewall, routing, and charging ruledefs must have unique names. A maximum of 512 host pools can be created. A maximum lines of 20 can be created inside the host pools.

Important Host pools configured in other ruledefs cannot be deleted.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-host-pool)#

Also see the *ACS Host Pool Configuration Mode Commands* chapter.

Example

The following command creates a host pool named *hostpool1*, and enters the ACS Host Pool Configuration Mode:

```
host-pool hostpool1
```

idle-timeout

This command allows you to configure the maximum duration a flow can remain idle for, after which the system automatically terminates the flow.

Product ACS

NAT

PSF

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
idle-timeout { alg-media | flow-mapping { tcp | udp } | icmp | tcp [
half-open ] | udp } idle_timeout
{ default | no } idle-timeout { alg-media | flow-mapping { tcp | udp } |
 icmp | tcp [ half-open ] | udp }
```

default

Configures this command with the default setting for the specified parameter.

Default:

- **alg-media**: 120 seconds
- **flow-mapping { tcp | udp }**: 300 seconds for TCP and 0 seconds for UDP
- **icmp**, **tcp**, **udp**: 300 seconds
- **tcp half-open**: 200 seconds

no

Disables the idle-timeout configuration for the specified flow.

alg-media

Configures the ALG media for the specified flow.

flow-mapping { tcp | udp }

The Flow Mapping timer is an extension to the existing flow idle-timeout in ACS. This flow mapping timeout applies only for NAT enabled calls and is supported only for TCP and UDP flows. The purpose of this timer is to hold the resources (NAT IP, NAT port, Private IP NPU flow) associated with a 5-tuple flow until Mapping timeout expiry.

If the Flow Mapping timer is disabled, then the Mapping timeout will not get triggered for UDP/TCP idle timed out flows. The resources such as NAT mapping will be released along with the 5-tuple flow.

icmp

Configures the ICMP protocol for the specified flow.

tcp [half-open]

Configures the TCP protocol for the specified flow.

Use the **half-open** keyword to configure timeout interval for half-open TCP flows.

udp

Configures the UDP protocol for the specified flow.

idle_timeout

Specifies the timeout duration, in seconds, and must be an integer from 0 through 86400.

For **alg-media** specifies the media inactivity timeout. The *idle_timeout* value gets applied on RTP and RTCP media flows that are created for SIP/H.323 calls. The timeout is applied only on those flows that actually match the RTP and RTCP media pinholes that are created by the SIP/H.323 ALG.

A value of 0 disables the idle-timeout setting.

Usage Guidelines

Use this command to configure the maximum duration a flow can remain idle, in seconds, after which the system automatically terminates the flow.

Setting the value to 0 will cause the idle-timeout setting to be disabled.

For flows other than TCP, UDP and ICMP, timeout value will always be 300 seconds (unless configured in the charging-action). Charging action's flow idle-timeout will have precedence over ACS idle-timeout. If charging action's flow idle-timeout is default, then flows will have the value configured in the active charging service.

Example

The following command configures the maximum duration a TCP flow can remain idle to *3000* seconds, after which the system automatically terminates the flow:

```
idle-timeout tcp 3000
```

imsi-pool

This command allows you to create/configure/delete International Mobile Subscriber Identity (IMSI) pools.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
imsi-pool imsi_pool_name [ -noconfirm ]
no imsi-pool imsi_pool_name
```

no

If previously configured, deletes the specified IMSI pool from the active charging service.

imsi_pool_name

Specifies the IMSI pool to add/configure/delete.

imsi_pool_name must be the name of an IMSI pool, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters. Each IMSI pool must have a unique name.

If the named IMSI pool does not exist, it is created, and the CLI mode changes to the ACS IMSI Pool Configuration Mode wherein the IMSI pool can be configured.

If the named IMSI pool already exists, the CLI mode changes to the ACS IMSI Pool Configuration Mode for that IMSI pool.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete pools of International Mobile Subscriber Identifier (IMSI) numbers having group of single or range of IMSI numbers to use in access policy creation. The IMSI pool name must be unique with in the service. Host pool, port map, IMSI pool, and firewall, routing, and charging ruledefs must have unique names. A maximum of 256 IMSI pools can be created.

Important IMSI pools configured in other ruledefs cannot be deleted.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-imsi-pool)#

Also see the *ACS IMSI Pool Configuration Mode Commands* chapter.

Example

The following command creates an IMSI pool named *imsipool1*, and enters the ACS IMSI Pool Configuration Mode:

```
imsi-pool imsipool1
```

ip dns-learnt-entries

This command allows you to configure how long to keep the snooped IPv4 addresses that were extracted from DNS responses.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
ip dns-learnt-entries timeout timeout_period
{ default | no } ip dns-learnt-entries timeout
```

default

Configures this command with the default DNS-learnt-entries timeout setting.

Default: 300 seconds

no

Specifies to always use the TTL value in the DNS response, and not the timeout configured with this command.

timeout_period

Specifies the DNS-learnt-entries timeout period, in seconds.

timeout_period must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to configure how long to keep the snooped IPv4 addresses that were extracted from DNS responses—for the TTL specified in the DNS response, or for the time period configured with this command, if greater.

The configurable timer will be at global ECS level and shared across all IP addresses. Internally, a five-minute (300 seconds, non configurable) timer will be started whenever DNS analyzer is enabled. On timeout of this timer, all the learnt IP addresses will be checked for TTL expiry and the expired entries will be flushed.

Example

The following command specifies to keep the snooped IPv4 addresses that were extracted from DNS responses for a time period of *900* seconds, or for the TTL value specified in the DNS response, whichever is greater:

```
ip dns-learnt-entries timeout 900
```

ip max-fragments

This command allows you to limit the maximum number of IPv4/IPv6 fragments per fragment chain.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

ip max-fragments *max_fragments*
default ip max-fragments

default

Configures this command with its default setting.

Default: 45

max_fragments

Specifies the maximum number of IPv4/IPv6 fragments per fragment chain.

max_fragments must be an integer from 1 through 300.

Usage Guidelines

Use this command to limit the maximum number of IPv4/IPv6 fragments.

Example

The following command limits the maximum number of IPv4/IPv6 fragments to *100*:

```
ip max-fragments 100
```

label content-id

This command allows you to specify a label (text string) to associate with a content ID for UDRs/EDRs/eG-CDRs.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
label content-id content_id text label_text
no label content-id content_id
```

no

If previously configured, deletes the specified label.

content-id *content_id*

Specifies the content ID to associate with the label.

content_id must be an integer from 1 through 65535.

text *label_text*

Specifies the label to associate with the specified content ID.

label_text must be an alphanumeric string of 1 through 64 characters.

Usage Guidelines

Use this command to create a text label to associate with a content ID.

A maximum of 2048 labels can be configured in the active charging service.

Example

The following command creates the label *test_charge1* to be associated with the content ID *1378*:

```
label content-id 1378 text test_charge1
```

load-db

This command allows you to load specified databases.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
load-db uidh wl-url-host-db
no load-db uidh
```

no

If configured, removes the database.

uidh

Configures the UIDH database.

wl-url-host-db

Loads URL Host database.

Usage Guidelines

Use this command to load and configure the UIDH database and URL Host database.

nat allocation-failure

This command allows you to configure the action to take when NAT IP/Port allocation fails.

Important This command is available only in StarOS 8.3 and later releases.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

nat allocation-failure send-icmp-dest-unreachable
{ default | no } nat allocation-failure

default

Configures this command with its default setting.

Default: Packets are dropped silently

no

If previously enabled, disables the NAT Allocation Failure configuration. Packets are dropped silently.

nat allocation-failure send-icmp-dest-unreachable

Specifies to send ICMP Destination Unreachable message when NAT IP/Port allocation fails.

Usage Guidelines

Use this command to configure the action to take when NAT IP/port allocation fails—to send or not to send an "ICMP destination unreachable message" when a NAT IP/port cannot be assigned to a flow in data path.

Example

The following command configures sending ICMP Destination Unreachable message when NAT IP/Port allocation fails:

```
nat allocation-failure send-icmp-dest-unreachable
```

nat allocation-in-progress

This command allows you to configure the action to take on packets when NAT IP/NPU allocation is in progress.

Important This command is available only in StarOS 8.3 and later releases.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
nat allocation-in-progress { buffer | drop }
default nat allocation-in-progress
```

default

Configures this command with its default setting.

Default: **buffer**

buffer | drop

Specifies the action to take on packets when NAT IP/NPU allocation is in progress:

- **buffer**: Buffers the packets.
- **drop**:Drops the packets.

Usage Guidelines

In On-demand NAT IP allocation (wherein NAT IP address is allocated to the subscriber when a packet is being sent), if no free NAT IP address is available, a NAT-IP Alloc Request is sent to the VPNMgr to get NAT-IP. During that time packets are dropped. This command enables buffering the packets received when IP Alloc Request is sent to VPNMgr.

Example

The following command specifies to buffer packets when NAT IP/NPU allocation is in progress:

```
nat allocation-in-progress buffer
```

nat ip downlink reassembly-timeout

This command configures the downlink IP reassembly timer.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ default ] nat ip downlink reassembly-timeout timeout
```

default

Configures this command with its default setting.

Default: 2000 milliseconds

timeout

The maximum duration for which IP packet fragments can be retained, in milliseconds.

timeout must be an integer from 1 through 30000.

Usage Guidelines

Use this command to configure the downlink IP reassembly timer by setting the duration for which IP packet fragments can be retained.

Example

The following command configures the duration for IP packet fragments with a timeout setting of *3000* seconds:

```
nat ip downlink reassembly-timeout 3000
```

nat tcp-2msl-timeout

This command allows you to configure the TCP 2MSL (Maximum Segment Lifetime) timeout value for NAT.

Important This command is available only in StarOS 8.3 and later releases.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

nat tcp-2msl-timeout *timeout*
default nat tcp-2msl-timeout

default

Configures this command with its default setting.

Default: 60 seconds

timeout

Specifies the TCP 2MSL timeout period, in seconds.

timeout must be an integer from 30 through 240.

Usage Guidelines Use this command to configure the TCP 2MSL timeout value for NAT.

Example

The following command configures the TCP 2MSL timeout for NAT to *120* seconds:

```
nat tcp-2msl-timeout 120
```

nat unsolicited-pkts

This command allows you to configure unsolicited packets.

Product

ACS

NAT

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
nat unsolicited-pkts { icmp-host-unreachable { max-rate packets_num } |
server-list { max-limit servers_num } }
[ default | no ] nat unsolicited-pkts { icmp-host-unreachable | server-list
 }
```

default

Configures this command with its default setting.

Default: Disabled

no

Configures this command with its default setting.

icmp-host-unreachable max-rate *packets_max*

Configures the maximum number of allowed ICMP response packets, in seconds.

packets_max must be an integer from 1 through 100.

server-list max-limit *servers_num*

Configures the maximum number of servers to be stored per Session Manager instance.

servers_num must be an integer from 2 through 50.

Usage Guidelines Use the following command to configure the number of allowed ICMP responses and the number of servers where most number of unsolicited packets are received.

Example

The following command configures the number of allowed ICMP responses per second to *10*:

nat unsolicited-pkts host-unreachable max-rate 10

The following command configures the number of servers to be stored as *20*:

nat unsolicited-pkts server-list max-limit 20

p2p-ads-group

This command configures the P2P Advertisement server and associated protocols/applications.

Product ADC

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description **`[ no ] p2p-ads-group`** *`ads_group_name`* **`[ -noconfirm ]`**

no

If previously configured, disables the configured correlation group.

ads_group_name

Specifies the name of the P2P Advertisement correlation group. *ads_group_name* must be an alphanumeric string of 1 through 63 characters.

[-noconfirm]

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines Use this command to configure the P2P Advertisement server and associated protocols/applications.

Important The maximum number of advertisement groups that can be configured is 100.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-p2p-ads)#

Also see the *P2P Advertisement Server Group Configuration Mode Commands* chapter.

Example

The following command specifies to configure the ad-server correlation group named **group1**:

```
p2p-ads-group group1
```

p2p-detection attribute

This command enables or disables the detection of SSL renegotiation flows.

Product

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] p2p-detection attribute { *attribute_list* **[** *sub_attribute_name sub_attribute_value* **] }**

no

If previously enabled, disables detection of SSL renegotiation flows.

attribute_list

List of configurable P2P detection attributes populated from the currently loaded P2P plugin.

Supported attribute: **ssl-renegotiation**

sub_attribute_name

List of configurable P2P detection sub-attributes related to the attribute selected from the attribute list. This list is populated from the currently loaded P2P plugin.

Supported sub-attributes if selected attribute is **ssl-renegotiation**:

- **max-entry-per-sessmgr**: Specifies maximum SSL Session IDs tracked per session manager.
- **id-reduce-factor**: Specifies by how much factor the SSL ID is stored in the SSL Session ID tracker table. Possible values are 1, 2, 4.

sub_attribute_value

Value of the selected sub-attribute. If sub-attribute is not specified, the default value set in the P2P plugin will be used.

The value for **max-entry-per-sessmgr** must be an integer from 1 through 65535. Default: 20000

Possible values for **id-reduce-factor** are 1,2,4. Default: 4

Usage Guidelines Use this command to enable or disable the detection of SSL renegotiation flows.

Example

The following command enables SSL renegotiation with SSL session IDs as **40000** and factor as **4**
:

```
p2p-detection attribute ssl-renegotiation max-entry-per-sessmgr 40000
id-reduce-factor 4
```

p2p-detection behavioral

This command enables or disables behavioral detection for unidentified traffic.

Product ADC

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description **[no] p2p-detection behavioral {** *behavioral_list* **| all }**

no

If previously configured, disables the behavioral configuration.

behavioral_list

Specifies the behavior to match. The behavioral list is the list of supported behavioral detection logic populated from the currently loaded ADC plugin.

behavioral_list must be one of the following:

- **all**: Enables all behavioral detection types supported by the ADC plugin
- **download**: Detects unknown flows which are data download using behavioral analysis
- **p2p**: Detects P2P and file sharing protocols using behavioral analysis
- **upload**: Detects unknown flows which are data upload using behavioral analysis
- **video**: Detects video flows using behavioral analysis
- **voip**: Detects VoIP (voice and video) protocols using behavioral analysis

Usage Guidelines Use this command to enable or disable behavioral detection for unidentified traffic. Behavioral VoIP is meant for zero day detection of VoIP traffic. Behavioral upload/download is similar to client-server upload/download using HTTP, FTP, SFTP, etc. It must also detect flows of non-standard ports which ECS cannot detect and falls under the client-server model. The behavioral feature is disabled by default.

Example

The following command specifies to configure behavioral VoIP:

```
p2p-detection behavioral voip
```

p2p-detection ecs-analysis

This command enables or disables ECS analysis for analyzers — FTP, HTPP, HTTPS, RTSP and SIP.

Product ADC

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] p2p-detection ecs-analysis { all | ftp | http | https | rtsp | sip
 }
```

no

If previously enabled, disables the configured analyzers.

all

ECS analysis for all analyzers — FTP, HTPP, RTSP and SIP.

ftp

ECS analysis for FTP analyzer.

http

ECS analysis for HTTP analyzer.

https

ECS analysis for HTTPS analyzer.

rtsp

ECS analysis for RTSP analyzer.

sip

ECS analysis for SIP analyzer.

Usage Guidelines

Use this command to enable or disable the interworking of analyzers — FTP, HTPP, RTSP and SIP. This feature is enabled by default if P2P protocols are enabled.

Example

The following command enables ECS analysis for the **ftp** analyzer:

```
p2p-detection ecs-analysis ftp
```

p2p-detection protocol

This command enables/disables the detection of all or specified peer-to-peer (P2P) protocols.

Product

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] p2p-detection protocol [ 120Sports | 8tracks | abcnetworks | abscbn
 | accuradio |actionvoip | actsync | adobeconnect | aenetworks | aimini
| all | amazoncloud | amazonmusic | amazonvideo | android_messageantsp2p
 | anyconnect | apple-push | apple-store | applejuice | applemaps | ares
 | armagettron | avi | badoo | baeblemusic | baidumovie | battlefld | bbm
 | beatport | betternet | bitcasa | bittorrent | bittorrent-sync |
blackberry-store | blackberry | blackdialer | blackplanet-radio | box |
btn | callofduty | cbssports | chikka | cisco-jabber | citrix | clubpenguin
 | clubbox | comodounite | crackle | crossfire | crunchyroll |
curiosity-stream | cyberghost | dashradio | danzwave | ddlink | deezer
didi | directconnect | directv | discord | dish-anywhere | disneymovies
| dns-tunneling | dofus | dramafever | dropbox | ebuddy | edonkey | epix
 | eros | espn | expressvpn | facebook | facetime | fandor | fasttrack |
 feidian | ficall | fiesta | filetopia | filmontv | fitradio | flash |
flickr | florensia | foursquare | fox-business | fox-news | fox-now |
fox-sports | foxsportsgo | freenet | friendster | fring | fubotv | funshion
 | fxnow | gaana | gadugadu | gamekit | gmail | gnutella | go90 | goober
 | googlemaps | google-music | google-push | google | googleplay |
googleplus | gotomeeting |gtalk | guildwars | halflife2 | hamachivpn |
hayu | hbogo | hbonow | hbonordic | heytell | hgtv | hike-messenger | hls
 | hotspotvpn | http | hulu | hyves | iax | icall | icecast | icloud |
idrive | igo | iheartradio | imesh | imessage | imgur | imo | implus |
instagram | iplayer | iptv | irc | isakmp | iskoot | itunes | jabber |
```

jap | jumblo | kakaotalk | kidoodle | kik-messenger | kiswe | klowdtv | kontiki | kugoo | kuro | linkedin | livestream | lync | magicjack | manolito | mapfactor | mapi | maplestory | meebo | meetic | mega | mgcp | mig33 | mlb | mojo | monkey3 | mozy | msn | msrp | mute | mxtp | mypeople | myspace | nateontalk | natgeotv | naverline | navigon | nbc-sports | nbc-tv | netflix | netmotion | newsy | nick | nimbuzz | nokia-store | nrktv | octoshape | odkmedia | odnoklassniki | off | ogg | ohiofm | oist | oovoo | opendrive | openft | openvpn | operamini | orb | oscar | outlook | paltalk | pando | pandora | path | pbs | pcanywhere | periscope | pinterest | playstation | plingm | poco | pokemon-go | popo | pplive | ppstream | ps3 | qello_concerts | qq | qqgame | qqlive | quake | quic | quicktime | radio-paradise | radiocom| rdp | rdt | redbulltv | regram | rfactor | rhapsody | rmstream | rodi | reddit | rynga | samsung-store | scydo | secondlife | shoutcast | showtime | silverlight | siri | skinny | skydrive | skype | slacker-radio | slingbox | slingtv | smartvoip | smashcast | smule |snapchat | softether | somafm | sopcast | soribada | soulseek | soundcloud | spark | spdy | spike| speedtest | splashfighter | spotify | ssdp | ssl | starz | stealthnet | steam | stun | sudaphone | svtplay | tagged | talkatone | tango | taxify | teamspeak | teamviewer | telegram | thunder | tinder | tidal | tmo-tv | tor | truecaller | truphone | tumblr | tunein-radio | tunnelvoice | turbovpn | tvants | tvland | tvuplayer | tv2sumotwitch | twitter | ufc | ultrabac | ultrasurf | univision | upc-phone | usenet | ustream | uusee | vchat | veohtv | vessel | vevo | viber | viki | vimeo | vine | voipdiscount | vopium | voxer | vpnmaster | vpnx | vtok | vtun | vudu | warcft3 | waze | webex | wechat | weibo | whatsapp | wii | willow | windows-azure | windows-store | winmx | winny | wmstream | wofkungfu | wofwarcraft | wuala | wwe | xbox | xdcc | xfinity | xing | yahoo | yahoomail | yogafree | youku | yiptv | yourfreetunnel | youtube | zattoo | zello +]

no

If previously enabled, disables the detection of the specific peer-to-peer protocol.

all

Specifies to detect all supported P2P protocols.

In 12.2 and earlier releases: Specifying **all** is the same as configuring each of the following protocols individually.

In 14.0 and later releases: Specifying **all** means all of the protocols supported by the currently loaded plugin.

120Sports

Specifies to detect 120Sports protocol.

8tracks

Specifies to detect 8tracks protocol.

abcnetworks

Specifies to detect Abcnetworks protocol.

abscbn

Specifies to detect ABSCBN protocol.

accuradio

Specifies to detect Accuradio protocol.

actionvoip

Specifies to detect ActionVoip protocol.

actsync

Specifies to detect ActiveSync protocol.

adobeconnect

Specifies to detect Adobe Connect protocol.

aenetworks

Specifies to detect AENetworks protocol.

aimini

Specifies to detect Aimini protocol.

amazoncloud

Specifies to detect AmazonCloud protocol.

amazonmusic

Specifies to detect Amazon Music protocol.

amazonvideo

Specifies to detect Amazon Video protocol.

android_messages

Specifies to detect Android Messages for Web P2P protocol.

antsp2p

Specifies to detect ANts P2P protocol.

anyconnect

Specifies to detect AnyConnect protocol.

apple-push

Specifies to detect Apple Push Notification protocol.

apple-store

Specifies to detect iPhone Appstore protocol.

applejuice

Specifies to detect Applejuice protocol.

applemaps

Specifies to detect Apple Maps protocol.

ares

Specifies to detect Ares Galaxy protocol.

armagettron

Specifies to detect Armagetron protocol.

avi

Specifies to detect AVI protocol.

badoo

Specifies to detect Badoo protocol.

baeblemusic

Specifies to detect Baeble Music protocol.

baidumovie

Specifies to detect Baidumovie protocol.

battlefld

Specifies to detect Battlefield protocol.

bbm

Specifies to detect BBM protocol.

beatport

Specifies to detect Beatport protocol.

betternet

Specifies to detect Betternet protocol.

bitcasa

Specifies to detect Bitcasa protocol.

bittorrent

Specifies to detect BitTorrent protocol.

bittorrent-sync

Specifies to detect BitTorrent Sync protocol.

blackberry-store

Specifies to detect Blackberry World protocol.

blackberry

Specifies to detect BlackBerry protocol.

blackdialer

Specifies to detect Blackdialer protocol.

blackplanet-radio

Specifies to detect BlackPlanet Radio protocol.

box

Specifies to detect BOX protocol.

btn

Specifies to detect BTN protocol.

callofduty

Specifies to detect Call of Duty protocol.

cbssports

Specifies to detect Cbs Sports protocol.

chikka

Specifies to detect Chikka protocol.

cisco-jabber

Specifies to detect Cisco Jabber protocol.

citrix

Specifies to detect Citrix Independent Computing Architecture (ICA) protocol.

clubbox

Specifies to detect Clubbox protocol.

clubpenguin

Specifies to detect Club Penguin protocol.

comodounite

Specifies to detect Comodo EasyVPN protocol.

cyberghost

Specifies to detect CyberGhost VPN protocol.

crackle

Specifies to detect Crackle protocol.

crossfire

Specifies to detect Crossfire protocol.

crunchyroll

Specifies to detect Crunchyroll protocol.

curiosity-stream

Specifies to detect CuriosityStream protocol.

dashradio

Specifies to detect Dashradio protocol.

danzwave

Specifies to detect Danzwave protocol.

ddlink

Specifies to detect DDLink protocol.

deezer

Specifies to detect Deezer protocol.

didi

Specifies to detect DiDi protocol.

directconnect

Specifies to detect Direct Connect protocol.

directv

Specifies to detect DirecTV protocol.

discord

Specifies to detect Discord protocol.

disneymovies

Specifies to detect Disney Movies protocol.

dish-anywhere

Specifies to detect Dish Anywhere protocol.

dns-tunneling

Specifies to detect DNS Tunneling protocol.

dofus

Specifies to detect DOFUS protocol.

dramafever

Specifies to detect DramaFever protocol.

dropbox

Specifies to detect Dropbox protocol.

ebuddy

Specifies to detect eBuddy protocol.

edonkey

Specifies to detect eDonkey protocol.

epix

Specifies to detect Epix protocol.

eros

Specifies to detect Eros Now protocol.

espn

Specifies to detect ESPN protocol.

expressvpn

Specifies to detect ExpressVPN protocol.

facebook

Specifies to detect Facebook protocol.

facetime

Specifies to detect FaceTime protocol.

fandor

Specifies to detect Fandor protocol.

fasttrack

Specifies to detect FastTrack protocol.

feidian

Specifies to detect Feidian protocol.

ficall

Specifies to detect Ficall protocol.

fiesta

Specifies to detect FIESTA protocol.

filetopia

Specifies to detect Filetopia protocol.

filmontv

Specifies to detect FilmOn TV protocol.

fitradio

Specifies to detect Fit Radio protocol.

flash

Specifies to detect Flash protocol.

flickr

Specifies to detect Flickr protocol.

flixea

Specifies to detect Flixea protocol.

florensia

Specifies to detect Florensia protocol.

foursquare

Specifies to detect Foursquare protocol.

fox-business

Specifies to detect Fox Business protocol.

fox-news

Specifies to detect Fox News protocol.

fox-now

Specifies to detect FoxNow protocol.

fox-sports

Specifies to detect Fox Sports protocol.

foxsportsgo

Specifies to detect Fox Sports Go protocol.

freenet

Specifies to detect Freenet protocol.

friendster

Specifies to detect Friendster protocol.

fring

Specifies to detect Fring SIP protocol.

fubotv

Specifies to detect fuboTV protocol.

funshion

Specifies to detect Funshion protocol.

fxnow

Specifies to detect FxNow protocol.

gaana

Specifies to detect Gaana protocol.

gadugadu

Specifies to detect Gadu-Gadu protocol.

gamekit

Specifies to detect GameKit protocol.

gmail

Specifies to detect Gmail protocol.

gnutella

Specifies to detect Gnutella protocol.

go90

Specifies to detect Go90 protocol.

goober

Specifies to detect Goober protocol.

googlemaps

Specifies to detect Google Maps protocol.

google-music

Specifies to detect Google Music protocol.

google-push

Specifies to detect Google Push Notification protocol.

google

Specifies to detect Google protocol.

googleplay

Specifies to detect GooglePlay protocol.

googleplus

Specifies to detect GooglePlus protocol.

gotomeeting

Specifies to detect Gotomeeting protocol.

gtalk

Specifies to detect Google Talk protocol.

guildwars

Specifies to detect GuildWars protocol.

halflife2

Specifies to detect Half-Life 2 protocol.

hamachivpn

Specifies to detect Hamachi VPN protocol.

hayu

Specifies to detect HAYU protocol.

hbogo

Specifies to detect HBO Go protocol.

hbonow

Specifies to detect HBO NOW protocol.

hbonordic

Specifies to detect HBO Nordic protocol.

heytell

Specifies to detect HeyTell protocol.

hgtv

Specifies to detect HGTV protocol.

hike-messenger

Specifies to detect Hike Messenger protocol.

hls

Specifies to detect HLS protocol.

hotspotvpn

Specifies to detect HotSpot VPN protocol.

http

Specifies to detect HTTP protocol.

hulu

Specifies to detect Hulu protocol.

hyves

Specifies to detect Hyves protocol.

iax

Specifies to detect Inter-Asterisk eXchange protocol.

icall

Specifies to detect iCall protocol.

icecast

Specifies to detect Icecast protocol.

icloud

Specifies to detect iCloud protocol.

idrive

Specifies to detect iDrive protocol.

igo

Specifies to detect IGO protocol.

iheartradio

Specifies to detect iHeartRadio protocol.

imesh

Specifies to detect iMesh protocol.

imessage

Specifies to detect iMessage protocol.

imgur

Specifies to detect Imgur protocol.

imo

Specifies to detect Imo.im instant messenger protocol.

implus

Specifies to detect IM+ protocol.

instagram

Specifies to detect Instagram protocol.

iplayer

Specifies to detect BBC iPlayer protocol.

iptv

Specifies to detect IPTV protocol.

irc

Specifies to detect Internet Relay Chat protocol.

isakmp

Specifies to detect Internet Security Association and Key Management Protocol.

iskoot

Specifies to detect iSkoot VoIP protocol.

itunes

Specifies to detect iTunes protocol.

jabber

Specifies to detect Jabber XMPP protocol.

jumblo

Specifies to detect Jumblo protocol.

jap

Specifies to detect Jap protocol.

kakaotalk

Specifies to detect Kakao Talk protocol.

kidoodle

Specifies to detect Kidoodle protocol.

kik-messenger

Specifies to detect Kik Messenger protocol.

kiswe

Specifies to detect Kiswe protocol.

klowdtv

Specifies to detect KlowdTV protocol.

kontiki

Specifies to detect Kontiki delivery protocol.

kugoo

Specifies to detect Kugoo protocol.

kuro

Specifies to detect Kuro protocol.

linkedin

Specifies to detect Linkedin protocol.

livestream

Specifies to detect Livestream protocol.

lync

Specifies to detect Microsoft Lync protocol.

magicjack

Specifies to detect MagicJack protocol.

manolito

Specifies to detect MANOLITO protocol.

mapfactor

Specifies to detect Mapfactor GPS Navigation protocol (Navigator Free, GPS Navigation).

mapi

Specifies to detect MAPI protocol.

maplestory

Specifies to detect MapleStory protocol.

meebo

Specifies to detect Meebo protocol.

meetic

Specifies to detect MEETIC protocol.

mega

Specifies to detect MEGA protocol.

mgcp

Specifies to detect Media Gateway Control Protocol.

mig33

Specifies to detect Mig33 protocol.

mlb

Specifies to detect MLB protocol.

mojo

Specifies to detect Mojo protocol.

monkey3

Specifies to detect Monkey3 protocol.

mozy

Specifies to detect Mozy protocol.

msn

Specifies to detect MSN Messenger protocol.

msrp

Specifies to detect MSRP protocol.

mute

Specifies to detect MUTE protocol.

mxtp

Specifies to detect My Mixtapez protocol.

mypeople

Specifies to detect My People protocol.

myspace

Specifies to detect MySpace protocol.

nateontalk

Specifies to detect NateOn Talk protocol.

natgeotv

Specifies to detect NatGeoTV protocol.

naverline

Specifies to detect Naver Line protocol.

navigon

Specifies to detect Navigon protocol.

nbc-sports

Specifies to detect NBC Sports protocol.

nbc-tv

Specifies to detect NBC TV protocol.

netflix

Specifies to detect Netflix protocol.

netmotion

Specifies to detect NetMotion Internet Mobility Protocol.

newsy

Specifies to detect Newsy protocol.

nick

Specifies to detect Nick and Noggin protocol.

nimbuzz

Specifies to detect Nimbuzz protocol.

nokia-store

Specifies to detect Nokia Ovi Store protocol.

nrktv

Specifies to detect NRK TV Store protocol.

odkmedia

Specifies to detect ODK Media protocol.

odnoklassniki

Specifies to detect Odnoklassniki protocol.

octoshape

Specifies to detect Octoshape protocol.

off

Specifies to detect Off-The-Record protocol.

ogg

Specifies to detect Ogg multimedia streaming protocol.

ohiofm

Specifies to detect Ohio FM streaming protocol.

oist

Specifies to detect Oist protocol.

oovoo

Specifies to detect ooVoo protocol.

opendrive

Specifies to detect Opendrive protocol.

openft

Specifies to detect OpenFT protocol.

openvpn

Specifies to detect OpenVPN protocol.

operamini

Specifies to detect Operamini protocol.

orb

Specifies to detect Internet Inter-ORB Protocol.

oscar

Specifies to detect Open System for CommunicAtion in Realtime protocol.

outlook

Specifies to detect Outlook protocol.

paltalk

Specifies to detect Paltalk protocol.

pando

Specifies to detect Pando protocol.

pandora

Specifies to detect Pandora protocol.

path

Specifies to detect Path protocol.

pbs

Specifies to detect PBS protocol.

pcanywhere

Specifies to detect PCAnywhere protocol.

periscope

Specifies to detect Periscope protocol.

pinterest

Specifies to detect Pinterest protocol.

playstation

Specifies to detect Playstation protocol.

plingm

Specifies to detect Plingm protocol.

poco

Specifies to detect Poco protocol.

pokemon-go

Specifies to detect Pokemon GO protocol.

popo

Specifies to detect Popo protocol.

pplive

Specifies to detect PPlive protocol.

ppstream

Specifies to detect PPstream protocol.

ps3

Specifies to detect PS3 protocol.

qello_concerts

Specifies to detect Qello Concerts instant messaging protocol.

qq

Specifies to detect Tencent QQ instant messaging protocol.

qqgame

Specifies to detect QQgame protocol.

qqlive

Specifies to detect QQlive protocol.

quake

Specifies to detect Quake network protocol.

quic

Specifies to detect QUIC protocol.

quicktime

Specifies to detect QuickTime protocol.

radiocom

Specifies to detect Radio.com protocol.

radio-paradise

Specifies to detect Radio Paradise protocol.

rdp

Specifies to detect Remote Desktop protocol.

rdt

Specifies to detect Real Data Transport (RDT) protocol.

redbulltv

Specifies to detect Red Bull TV protocol.

regram

Specifies to detect Regram protocol.

rfactor

Specifies to detect rFactor protocol.

rhapsody

Specifies to detect Rhapsody protocol.

rmstream

Specifies to detect RealMedia streaming protocol.

rodi

Specifies to detect Rodi protocol.

reddit

Specifies to detect Reddit protocol.

rynga

Specifies to detect Rynga protocol.

samsung-store

Specifies to detect Samsung App Store protocol.

scydo

Specifies to detect Scydo VoIP protocol.

secondlife

Specifies to detect Second Life protocol.

shalomworld

Specifies to detect Shalom World protocol.

shoutcast

Specifies to detect SHOUTcast protocol.

showtime

Specifies to detect Showtime protocol.

silverlight

Specifies to detect Silverlight protocol.

siri

Specifies to detect Apple Siri protocol.

skinny

Specifies to detect Skinny Call Control Protocol (SCCP).

skydrive

Specifies to detect Skydrive protocol.

skype

Specifies to detect Skype protocol.

slacker-radio

Specifies to detect Slacker Radio protocol.

slingbox

Specifies to detect Slingbox protocol.

slingtv

Specifies to detect Slingtv protocol.

smartvoip

Specifies to detect SmartVoip protocol.

smule

Specifies to detect Smule protocol.

snapchat

Specifies to detect SnapChat protocol.

softether

Specifies to detect Softether protocol.

somafm

Specifies to detect Soma FM protocol.

sopcast

Specifies to detect Sopcast streaming protocol.

soribada

Specifies to detect Soribada protocol.

soulseek

Specifies to detect Soulseek chat and file transfer protocol.

spark

Specifies to detect Spark protocol.

spdy

Specifies to detect SPDY protocol.

spike

Specifies to detect Spike protocol.

speedtest

Specifies to detect Speedtest protocol.

splashfighter

Specifies to detect SplashFighter protocol.

spotify

Specifies to detect Spotify music streaming protocol.

ssdp

Specifies to detect Simple Service Discovery Protocol.

ssl

Specifies to detect SSL Protocol.

starz

Specifies to detect Starz Play protocol.

stealthnet

Specifies to detect StealthNet RShare network protocol.

steam

Specifies to detect Steam file transfer protocol.

stun

Specifies to detect Session Traversal Utilities for NAT protocol.

subsplash

Specifies to detect Ligonier Ministries protocol.

sudaphone

Specifies to detect Sudaphone protocol.

svtplay

Specifies to detect SVTPlay protocol.

tagged

Specifies to detect Tagged protocol.

talkatone

Specifies to detect Talkatone protocol.

taxify

Specifies to detect Taxify protocol.

tango

Specifies to detect TAco Next Generation Objects hardware control system protocol.

teamspeak

Specifies to detect TeamSpeak VoIP gaming client protocol.

teamviewer

Specifies to detect TeamViewer remote control protocol.

telegram

Specifies to detect Telegram protocol.

thunder

Specifies to detect Thunder (Xunlei) download manager protocol.

tidal

Specifies to detect TIDAL protocol.

tinder

Specifies to detect Tinder protocol.

tmo-tv

Specifies to detect TMO TV protocol.

tor

Specifies to detect Tor hidden service (anonymizer) protocol.

truecaller

Specifies to detect Truecaller protocol.

truphone

Specifies to detect Truphone WiFi VoIP protocol.

tumblr

Specifies to detect Tumblr protocol.

tunein-radio

Specifies to detect TuneIn Radio protocol.

tunnelvoice

Specifies to detect Tunnel VoIP protocol.

turbovpn

Specifies to detect TurboVPN protocol.

tvants

Specifies to detect TVAnts protocol.

tvland

Specifies to detect TV Land protocol.

tvuplayer

Specifies to detect TVUPlayer protocol.

tv2sumo

Specifies to detect Tv2Sumo protocol.

twitch

Specifies to detect Twitch protocol.

twitter

Specifies to detect Twitter protocol.

ufc

Specifies to detect UFC and UFC Fight Pass protocols.

ultrabac

Specifies to detect UltraBac protocol.

ultrasurf

Specifies to detect UltraSurf protocol.

univision

Specifies to detect Univision Deportes protocol.

upc-phone

Specifies to detect UPC Phone protocol.

usenet

Specifies to detect Usenet Network News Transfer Protocol (NNTP) protocol.

ustream

Specifies to detect Ustream protocol.

uusee

Specifies to detect UUSee on-demand streaming protocol.

vchat

Specifies to detect VChat protocol.

veohtv

Specifies to detect VeohTV television via Internet protocol.

vessel

Specifies to detect Vessel protocol.

vevo

Specifies to detect Vevo protocol.

viber

Specifies to detect Viber VoIP protocol.

viki

Specifies to detect Viki protocol.

vimeo

Specifies to detect Vimeo protocol.

vine

Specifies to detect Vine protocol.

voipdiscount

Specifies to detect VoipDiscount protocol.

vopium

Specifies to detect Vopium protocol.

voxer

Specifies to detect Voxer Walkie Talkie protocol.

vpnmaster

Specifies to detect VPN Master protocol.

vpnx

Specifies to detect VPN-X cross-platform protocol.

vtok

Specifies to detect Vtok protocol.

vtun

Specifies to detect VTun (Virtual Tunnel) protocol.

vudu

Specifies to detect Vudu protocol.

warcft3

Specifies to detect Warcraft 3 game protocol.

waze

Specifies to detect Waze protocol.

webex

Specifies to detect Webex protocol.

wechat

Specifies to detect Wechat protocol.

weibo

Specifies to detect Weibo protocol.

whatsapp

Specifies to detect WhatsApp messaging protocol.

wii

Specifies to detect Wii Remote Bluetooth protocol.

windows-azure

Specifies to detect Windows Azure Cloud Services protocol.

windows-store

Specifies to detect Windows Phone App Store protocol.

winmx

Specifies to detect WinMX Peer Network Protocol (WPNP).

winny

Specifies to detect Winny anonymizing protocol.

wmstream

Specifies to detect Windows Media HTTP Streaming Protocol.

wofkungfu

Specifies to detect wofkungfu protocol.

wofwarcraft

Specifies to detect World of Warcraft gaming protocol.

wuala

Specifies to detect Wuala protocol.

wwe

Specifies to detect WWE protocol.

xbox

Specifies to detect Xbox protocol.

xdcc

Specifies to detect eXtended Direct Client-to-Client protocol.

xing

Specifies to detect Xing protocol.

xfinity

Specifies to detect Xfinity TV protocol.

yahoo

Specifies to detect Yahoo! Messenger protocol.

yahoomail

Specifies to detect Yahoo Mail protocol.

yiptv

Specifies to detect YipTV protocol.

yogafree

Specifies to detect Yogafree protocol.

youku

Specifies to detect Youku protocol.

yourfreetunnel

Specifies to detect your free Tunnel chat protocol.

youtube

Specifies to detect Youtube protocol.

zattoo

Specifies to detect Zattoo IPTV protocol.

zello

Specifies to detect Zello protocol.

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

Use this command to configure the detection of all or specific P2P protocol(s). Multiple keywords can be specified in a single command.

Example

The following command enables detection of all P2P protocols:

```
p2p-detection protocol all
```

p2p detection debug parameters

This command enables/disables the detection of all or specified peer-to-peer (P2P) debug parameters.

Product

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax

p2p-detection protocol debug-param protocol-param p2p_force_bailout_value *value* **snapchat_story_spotlight** *value*

p2p_force_bailout_value

Specifies that based on the number of packets configured, p2p analysis will be forced to bailout. p2p uses maxmium packets per flow for analysis.The values are:

- Default value is 300
- Minimum value allowed is 2
- Maximum value allowed is 300

Note It is recommended to use 300 as the maximum value. Lower values will have an impact on detection.

fb_insta_video_detection *value*

Enables or disables subtype (unknown,streaming-video) detection for TLS flows in Facebook and IInstagram, with multiplex multiple media types in a single TCP 5-tuple.

- If value is set to 1, enables video detection for Facebook and Instagram. The flows with certain SNI for Instagram/ and Facebook will permanently remain in slow path to detect the media types exchanged in the flow.
- If value is set to 0, disables video detection for Facebook and Instagram.The flow is marked based on the first subtype exchanged in the flow and offloaded.

The values are:

- Default value is 0, which indicates disabled.
- Allowed values 0 (disable) or 1 (enable)

voip_subtype_detection *value*

Enable this keyword to differentiate audio and video flows in a VOIP call from Facebook and Viber application.

- If the **voip_subtype_detection** configuration iis disabled, both audio and video is detected as audio.
- To retain the **voip_subtype_detection** keyword across reloads, enter the configuration in the boot configuration file.

Values: Disabled by default. The allowed range value is 0 or 1, where 0 indicates **disabled**.

snapchat_story_spotlight *value*

The P2P parameter **snapchat_story_spotlight** *value* is added with the existing **snapchat** protocool to classify snapchat stories and spotlight to streaming-video. *value* indicates that the snapchat stories are classified based on the following specified values:

- 0: The snapchat streaming video is disabled. By default, the snapchat_story_spotlight value is 0 and it is disabled.

  1: The snapchat streaming video is enabled with minimum number of p2p packet analysis. This is the recommended value.

2: The snapchat streaming video is enabled with more number of p2p packets.

packet-filter

This command allows you to create/configure/delete ACS packet filters.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

packet-filter *packet_filter_name* **[-noconfirm]**
no packet-filter *packet_filter_name*

no

If previously configured, deletes the specified packet filter from the active charging service.

packet_filter_name

Specifies the packet filter to add/configure/delete.

packet_filter_name must be the name of a packet filter, and must be an alphanumeric string of 1 through 63 characters. Each packet filter must have a unique name.

If the named packet filter does not exist, it is created, and the CLI mode changes to the ACS Packet Filter Configuration Mode wherein the packet filter can be configured.

If the named packet filter already exists, the CLI mode changes to the ACS Packet Filter Configuration Mode for that packet filter.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS packet filter.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-packet-filter)#

Also see the *ACS Packet Filter Configuration Mode Commands* chapter.

Example

The following command creates a packet filter named *filter3*, and enters the ACS Packet Filter Configuration Mode:

```
packet-filter filter3
```

passive-mode

This command allows you to configure the Active Charging Service to operate in passive mode, wherein ACS passively monitors copies of packets.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[default | no] passive-mode

no

If previously enabled, disables the passive mode configuration.

default

Configures this command with its default setting.

Default: Disabled

Usage Guidelines

Use this command to put the active charging service in/out of passive mode operation, wherein ACS passively monitors copies of packets.

Example

The following command puts the active charging service into passive mode operation:

passive-mode

pcp-service

Creates or deletes a Port Control Protocol (PCP) service.

Important This command is customer specific. Contact your Cisco account representative for more information.

Product

ACS

NAT

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] pcp-service *pcp_service_name* **[-noconfirm]**

no

If previously configured, deletes the specified PCP service.

pcp_service_name

Specifies the name of a PCP service.

pcp_service_name must be the name of a PCP service, and must be an alphanumeric string of 1 through 63 characters. A maximum of 5 PCP services can be configured in the active charging service.

If the named PCP service does not exist, it is created, and the CLI mode changes to the PCP Configuration Mode wherein the service can be configured. If the named PCP service already exists, the CLI mode changes to the PCP Configuration Mode.

-noconfirm

Specifies that the command must execute without any additional prompt and confirmation from the user.

Usage Guidelines

Use this command to create or delete a PCP service.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-pcp-service)#

Also see the *PCP Configuration Mode Commands* chapter.

Example

The following command creates a PCP service named *pcp1*, and changes to the PCP Configuration mode:

```
pcp-service pcp1
```

policy-control bearer-bw-limit

This command allows you to enable/disable per-bearer MBR policing—bandwidth limiting.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

{ default | no } policy-control bearer-bw-limit

default

Configures this command with its default setting.

Default: Enable; by default, per-bearer MBR policing is enabled.

no

Disables per-bearer MBR policing.

Usage Guidelines

This command allows you to enable/disable per-bearer bandwidth limiting based on bitrates received over Gx. Note that there are only two variants of this command, the default and no variants.

policy-control bind-default-bearer

For PCEF Bearer Binding in 3G and when BCM mode is UE only, this command allows you to enable/disable binding rules having QoS of default bearer to the default bearer and to not ignore/ignore other rules.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[default | no] policy-control bind-default-bearer

default

Configures this command with its default setting.

Default: Disables only binding those rules having QoS of default bearer to the default bearer and specifies to not ignore other rules. Rules having respective QoS will get attached to the relevant bearers. Also TFT updates towards the UE (access side) will not be suppressed.

no

The **no** keyword functionality is same as the default setting.

Usage Guidelines

This CLI command is used to bind all the PCC dynamic or predef rules received from PCRF (Bearer Control Mode (BCM) is UE_only) without QoS and ARP or with the same QoS and ARP as that of the default bearer, to the default bearer. This CLI is used for UE_Only mode.

In case no QoS is specified the rule gets attached to the default bearer. Also no TFT updates will be sent towards UE (access side). So only one default bearer will ever be created.

On receiving a PCC dynamic rule or predef rule from PCRF, having QoS/ARP other than the default bearer, then those rules are ignored and a response indicating that the rule could not be installed, is sent.

This CLI command will not work currently for dedicated bearers (secondary PDP contexts). Secondary bearers initiated by UE are not supported.

Releases prior to 12.2, when UE_Only BCM is received from PCRF, IMSA terminates the call for P-GW (GnGp setup). Release 12.2 onwards, the P-GW call is not terminated so as to be in compliance with 3GPP standard specification TS 29.212, but Traffic Flow Template (TFT) updates towards UE (access side) will be supported.

Important This CLI is applicable to all the rulebases in the chassis configuration. If the rulebase is changed to some other rulebase in the interim period or anytime later, this CLI will continue to apply to the current new rulebase too.

policy-control burst-size

This command allows you to configure the burst size for bandwidth limiting per dynamic-rule or per bearer.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

policy-control burst-size { auto-readjust [duration *duration* **] | bytes** *bytes* **}**
{ default | no } policy-control burst-size

default | no

Configures this command with its default setting.

Default: 65535 bytes

duration *duration*

Configures the burst size equal to <seconds> of traffic.

duration must be an integer from 1 through 20.

Default: In 12.1 and earlier releases, 10 seconds. In 12.2 and later releases, 5 seconds.

bytes *bytes*

Specifies the burst size, in bytes.

bytes must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to configure the burst size for bandwidth limiting per dynamic-rule or per bearer.

Example

The following command configures the burst size for bandwidth limiting per dynamic-rule or per bearer equal to 10 seconds of traffic:

```
policy-control burst-size auto-readjust
```

policy-control charging-action-override

This command has been removed from the ACS Configuration Mode, and replaced by the **charging-action-override** command in the ACS Rulebase Configuration Mode.

policy-control charging-rule-base-name

This command allows you to configure how the Charging-Rule-Base-Name AVP from PCRF is interpreted, either as ACS rulebase or ACS group-of-ruledefs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
policy-control charging-rule-base-name { active-charging-group-of-ruledefs
 | active-charging-rulebase [ ignore-when-removed ] [ use-first ]}
default policy-control charging-rule-base-name
no policy-control charging-rule-base-name active-charging-rulebase
use-first
```

default

Configures this command with its default setting(s).

Default:

- **charging-rule-base-name**: **active-charging-group-of-ruledefs**

- **use-first**: Disabled

no

If multiple Charging-Rule-Base-Name are received from the PCRF, specifies to select the last rulebase. This is the default behavior.

active-charging-group-of-ruledefs

Specifies interpreting Charging-Rule-Base-Name as ACS group-of-ruledefs.

active-charging-rulebase [ignore-when-removed][use-first]

Specifies interpreting Charging-Rule-Base-Name as ACS rulebase.

When Charging-Rule-Base-Name AVP is interpreted as ACS rulebase, if PCRF requests the removal of a Charging-Rule-Base-Name, which is the same as the rulebase used for that PDP context, the PDP context is terminated. This is because after removal of the rulebase, the PDP context will have no rulebase. This is the default behavior.

ignore-when-removed: Specifies to ignore PCRF request for removal of Charging-Rule-Base-Name, and take no action. If this keyword is not configured, the PDP context from which the rulebase is removed gets terminated.

use-first: If multiple Charging-Rule-Base-Name are received from the PCRF, since a call can only have one ACS rulebase applied, specifies to select the first rulebase. If previously enabled, to disable this configuration, use the **no policy-control charging-rule-base-name active-charging-rulebase use-first** command. If this keyword is not configured, by default, the last rulebase is selected.

For each call, this interpretation is decided at call setup, and will not be changed during the life of that call. Change will only apply to new calls coming up after the change.

Usage Guidelines

Use this command to configure interpretation of Charging-Rule-Base-Name AVP from PCRF either as ACS group-of-ruledefs or as ACS rulebase.

Example

The following command configures interpreting of Charging-Rule-Base-Name AVP as ACS rulebase:

```
policy-control charging-rule-base-name active-charging-rulebase
```

policy control def-bearer-qos-change

This command allows you to increase the buffer that is used for storing PCRF messages when the Default-Bearer-QoS change is in pending state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

policy-control def-bearer-qos-change pending-buffer-size *buffer_size*
no policy-control def-bearer-qos-change

no

Configures this command with its default setting.

Default: 2

def-bearer-qos-change

Sets the Default-Bearer-QoS change parameters.

pending-buffer-size *buffer_size*

Specifies the buffer size for storing the PCRF messages when Default-Bearer-QoS change is pending. The *buffer_size* is an integer ranging from 2 through 4.

Usage Guidelines

The minimum configured value is 2 and maximum is 4.

Default value should suffice for most of the use cases. Increased value should be used as per use case and memory usage should also be considered.

The CLI command takes effect for new calls.

policy-control dynamic-rule-limit

This command allows you to enable/disable per-dynamic-rule MBR policing—bandwidth limiting.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

{ default | no } policy-control dynamic-rule-limit

default

Configures this command with its default setting.

Default: Enable; by default, per-dynamic-rule MBR policing is enabled.

no

Disables per-dynamic-rule MBR policing.

Usage Guidelines This command allows you to enable/disable per-dynamic-rule bandwidth limiting based on bitrates received over Gx. Note that there are only two variants of this command, the default and no variants.

policy-control l7-dynamic-rules

This command allows you to enable/disable the L7 capabilities through Charging-Rule-Definition AVP received over Gx interface.

Product

Important This CLI command is license dependant. Contact your Cisco account representative for more information on the licensing requirements.

ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description **`[ default | no ] policy-control l7-dynamic-rules`**

default

Configures this command with its default setting.

Default: Disabled i.e. activation of L7 dynamic rules through Charging-Rule-Definition AVP will be disabled.

no

Disables the activation of L7 dynamic rules through Charging-Rule-Definition AVP if already activated.

Usage Guidelines This command allows you to enable/disable the L7 capabilities through Charging-Rule-Definition AVP received over Gx interface.

In releases prior to 20, only up to L4 dynamic rule provisioning and activation was supported by the gateway. In release 20, the dynamic rule is extended to support L7 capabilities. This is accomplished by introducing these two optional Diameter AVPs "L7-Application-Description" and "Rule-Condition-Action" as part of the grouped AVP "Charging-Rule-Definition".

When Out-of-Credit (OOC) trigger is sent from OCS to PCRF, L7 dynamic rule is sent from PCRF along with a condition and action which allow the subscriber to access specific URLs. The condition is the trigger when to apply the action. For example: If OOC (quota exhaustion condition) is sent from OCS, PCEF should

allow (action) all the packets matching that rule (rating-group) to pass through. Once the relocation of credit occurs the gateway reverts back the special treatment for these URLs.

This feature is configured in such a way that PCEF/PCRF is able to fully support L7 dynamic rules and thereby enabling dynamic routes to redirect L7 traffic.

Important This feature requires a valid license to be installed prior to configuring this feature. Contact your Cisco account representative for more information on the licensing requirements.

For more information on this feature, refer to the *ECS Administration Guide*.

policy-control report-rule-failure-once

This command enables or disables the feature which prevents the rule failure loop between PCRF and PCEF.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[default | no] policy-control report-rule-failure-once

default

Configures this command with its default setting.

Default: Disabled.

no

The **no** keyword functionality is same as the default setting.

Usage Guidelines

Use this command to send CCR-U only once for the same rule failure.

policy-control retransmissions-counted

This command allows you to enable/disable charging of retransmitted packets when they hit a dynamic rule.

Product

Important In release 17.0, this command has been deprecated. This configuration is available at rulebase level as **[local]host_name(config-rule-base)# [no] retransmissions-counted.**

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

`[ default | no ] policy-control retransmissions-counted`

default | no

Disables charging of retransmitted packets when they hit a dynamic rule.

Default: Disabled; no retransmissions counted.

Usage Guidelines

Use this command to enable/disable charging of retransmitted packets when they hit a dynamic rule.

Example

The following command enables retransmissions to be charged when they hit a dynamic rule:

`policy-control retransmissions-counted`

policy-control time-based-pcc-rule

This command allows you to configure the PCC rule with activation or deactivation time.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

`[ default | no ] policy-control time-based-pcc-rule install-on-activation-time remove-on-deactivation-time`

default | no

Configures the PCC rule with activation or deactivation time.

Default: Disabled.

Usage Guidelines

Use this command to configure a PCC rule with activation or deactivation time.

Example

The following command configures a PCC rule by installing the PCC rule only on activation time and removing the rule on deactivation time.

```
policy-control time-based-pcc-rule install-on-activation-time
remove-on-deactivation-time
```

policy-control token-replenishment-interval

This command configures token replenishment interval for MBR enforcement at the Active Charging Service level.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] policy-control token-replenishment-interval { 10ms [
multiplication-factor < 2..100 > ] }
```

no

Disables token replenishment interval at Active Charging Service level.

token-replenishment-interval

Configures token-replenishment-interval. The available values range from 10ms to 1000ms (1 sec).

multiplication-factor

Configures multiplication factor of 10 ms as token replenishment interval. Multiplication-factor is configurable only if token replenishment interval is 10 ms.

Usage Guidelines Use this command to configure token replenishment interval for MBR enforcement at the Active Charging Service level. By default, this CLI is disabled.

Example

The following commands generates peak-data-rate in Bytes of token every 1sec (1000ms).

```
policy-control token-replenishment-interval 10ms multiplication-factor
100
```

policy-control update-default-bearer

For PCEF Bearer Binding in 4G, this command allows you to enable/disable binding rules having QoS of default bearer to the default bearer and to not ignore/ignore other rules.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description **`[ default | no ] policy-control update-default-bearer`**

default

Configures this command with its default setting.

Disables only binding those rules having QoS of default bearer to the default bearer and specifies to not ignore other rules. Rules having respective QoS will get attached to the relevant bearers. Also TFT updates towards UE (access side) will not be suppressed.

no

Enables binding rules having QoS of default bearer to the default bearer and specifies to ignore other rules. In case no QoS is specified the rule gets attached to default bearer. Also TFT updates towards UE (access side) will be suppressed for default bearer. So only one default-bearer will ever be created.

Caution Upon executing this CLI command "**no policy-control update-default-bearer**", system crash is likely to occur if the TFT information is not added to the charging-action.

Usage Guidelines This CLI command is used to bind all the PCC dynamic or predef rules received from PCRF without QoS and ARP or with the same QoS and ARP as that of the default bearer, to the default bearer.

On receiving a PCC dynamic rule or predef rule from PCRF, having QoS/ARP other than the default bearer, then those rules are ignored and a response indicating that the rule could not be installed, is sent.

This CLI command will not work currently for dedicated bearers (secondary PDP contexts). Secondary bearers initiated by UE are not supported.

Releases prior to 12.2 TFT updates were sent towards the UE (access side) on all bearers. Release 12.2 onwards, TFT updates will be suppressed towards the UE (access side) for default bearer, if the CLI is enabled.

Important This CLI is applicable to all the rulebases in the chassis configuration. If the rulebase is changed to some other rulebase in the interim period or anytime later, this CLI will continue to apply to the current new rulebase too.

port-map

This command allows you to create/configure/delete port maps.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
port-map port_map_name [ -noconfirm ]
no port-map port_map_name
```

no

If previously configured, deletes the specified port map from the active charging service.

port_map_name

Specifies the port map to add/configure/delete.

port_map_name must be the name of a port map, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters. Each port map must have a unique name.

If the named port map does not exist, it is created, and the CLI mode changes to the ACS Port Map Configuration Mode wherein the port map can be configured.

If the named port map already exists, the CLI mode changes to the ACS Port Map Configuration Mode for that port map.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS port map.

The port map name must be unique with in the service. Host pool, port map, IMSI pool, and firewall, routing, and charging ruledefs must have unique names. A maximum of the 256 port maps can be created.

Important Port maps in use in other ruledefs cannot be deleted.

Also see the *ACS Port Map Configuration Mode Commands* chapter.

Example

The following command creates a port map named *portmap1*, and enters the ACS Port Map Configuration Mode:

```
port-map portmap1
```

qos-group-of-ruledefs

This command allows you to create/configure/delete a qos-group-of-ruledefs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

qos-group-of-ruledefs *qos_group_of_ruledefs_name* **[-noconfirm] [description** *description* **]**
no qos-group-of-ruledefs *qos_group_of_ruledefs_name*

no

If previously configured, deletes the specified qos-group-of-ruledefs from the active charging service.

qos_group_of_ruledefs_name

Specifies the qos-group-of-ruledefs to add/configure/delete.

qos_group_of_ruledefs_name must be the name of a qos-group-of-ruledefs, and must be an alphanumeric string of 1 through 63 characters. Each qos-group-of-ruledefs must have a unique name.

If the named qos-group-of-ruledefs does not exist, it is created, and the CLI mode changes to the ACS QoS-Group-of-Ruledefs Configuration Mode wherein the group can be configured.

If the named qos-group-of-ruledefs already exists, the CLI mode changes to the ACS QoS-Group-of-Ruledefs Configuration Mode for that group.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

description *description*

Specifies an optional description of the group, such as purpose of setting up the group, to be included in the configuration.

Usage Guidelines

Use this command to create/configure/delete a qos-group-of-ruledefs.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-qos-group-of-ruledefs)#

Also see the *ACS QoS-Group-of-Ruledefs Configuration Mode Commands* chapter.

Example

The following command creates a qos-group-of-ruledefs named *group1*, and enters the ACS QoS-Group-of-Ruledefs Configuration Mode:

qos-group-of-ruledefs group1

radio-congestion

This command allows you to create/configure/delete Radio Congestion policy.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

radio-congestion policy *policy_name* **[-noconfirm]**
no radio-congestion policy *policy_name*

no

If previously configured, deletes the specified Radio Congestion policy from the active charging service.

policy_name

Specifies the Radio Congestion policy to add/configure/delete.

policy_name must be an alphanumeric string of 1 through 63 characters.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a Radio Congestion policy.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-radio-congestion-policy)#

Also see the *Radio Congestion Policy Configuration Mode Commands* chapter.

Example

The following command creates a policy named *test123*, and changes to the Radio Congestion Policy Configuration Mode:

```
radio-congestion policy test123
```

readdress-server-list

This command allows you to create/delete server list for DNS redirection.

Important This command is license dependent. For more information please contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] readdress-server-list *server_list_name* **[-noconfirm]**

no

If previously configured, deletes the specified readdress server list from the active charging service.

server_list_name

Specifies the server list to add/configure/delete for DNS redirection.

server_list_name must be an alphanumeric string of 1 through 63 characters and can contain punctuation characters. Each server list must have a unique name.

If the named server list does not exist, it is created, and the CLI mode changes to the ACS Readdress Server List Configuration Mode wherein the servers can be configured.

If the named server list already exists, the CLI mode changes to the ACS Readdress Server List Configuration Mode for that server list.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/delete server list for DNS redirection.

To add the servers to the server list, see the **server** command in the *ACS Readdress Server List Configuration Mode* chapter.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-readdress-server-list)#

Also see the *ACS Readdress Server List Configuration Mode* chapter.

Example

The following command creates a charging action named *homeDNSserver* and changes to the ACS Readdress Server List Configuration Mode:

```
readdress-server-list homeDNSserver
```

redirect user-agent

This command allows you to specify the user agent for conditional redirection of traffic flows.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] redirect user-agent *user_agent_name*

no

If previously configured, deletes the specified user agent from the active charging service.

user_agent_name

Specifies the user agent to be used for redirecting traffic flow.

user_agent_name must be the name of a user agent, and must be an alphanumeric string of 1 through 32 characters.

A maximum of 16 user-agents can be configured in the active charging service.

Usage Guidelines

Use this command to redirect the traffic flow with conditions based on configured user-agent name. This user agent is used with **flow action** command in the ACS Charging Action Configuration Mode.

Example

The following command specifies the redirect user agent *user_rule1* for conditional redirection of traffic flow:

```
redirect user-agent user_rule1
```

rulebase

This command allows you to create/configure/delete ACS rulebases.

Important A maximum of 512 rulebases can be configured in the active charging service.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
rulebase rulebase_name [ -noconfirm ]
no rulebase rulebase_name
```

no

If previously configured, deletes the specified rulebase from the active charging service.

rulebase_name

Specifies the rulebase to add/configure/delete.

rulebase_name must be the name of an ACS rulebase, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters. Each rulebase must have a unique name.

If the named rulebase does not exist, it is created, and the CLI mode changes to the ACS Rulebase Configuration Mode wherein the rulebase can be configured.

If the named rulebase already exists, the CLI mode changes to the ACS Rulebase Configuration Mode for that rulebase.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS rulebase. A rulebase is a collection of protocol rules to match a flow and associated actions to be taken for matching flow.

The default rulebase is used when a subscriber/APN is not configured with a specific rulebase to use.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-rule-base)#

Also see the *ACS Rulebase Configuration Mode Commands* chapter.

Example

The following command creates a rulebase named *test1*, and enters the ACS Rulebase Configuration Mode:

```
rulebase test1
```

rulebase-list

This command allows you to create and delete ACS rulebase lists.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

rulebase-list *rulebase_list_name rulebase_name* **[** *rulebase_name* **+] strip server-ipv6** *prefix_length* **prefix-set** *prefix_set_name*
no rulebase-list *rulebase_list_name*

no

If previously configured, deletes the specified rulebase list from the active charging service.

rulebase_list_name

Specifies the rulebase list to add/modify/delete.

rulebase_list_name must be the name of an ACS rulebase list, and must be an alphanumeric string of 1 through 63 characters.

rulebase_name

Specifies the rulebase name(s) to add to the rulebase list.

Each rulebase list must contain a minimum of one rulebase name, and the cumulative length of all rulebase names must not exceed 256 bytes.

rulebase_name must be the name of an ACS rulebase, and each rulebase name must be an alphanumeric string of 1 through 63 characters.

strip_server ipv6 extracts IPv4 addtresses embedded in IPv6 addresses..

Prefix_Length uses the values 32,40,48,56,64 or 96.

prefix-set configures the active configuration for Well-known prefix and Network-specific prefix.

Usage Guidelines

Use this command to create or delete an ACS rulebase list. A rulebase list is a space-separated string of rulebase names supplied to the OCS, from which the OCS chooses the rulebase to use for the subscriber. The rulebase list to use for a subscriber is specified in the APN for the subscriber.

In 12.3 and earlier releases, a maximum of 20 rulebase lists can be configured.

In 14.0 and later releases, a maximum of 128 rulebase lists can be configured.

See the **active-charging rulebase-list** command in the *APN Configuration Mode Commands* chapter.

Example

The following command creates a rulebase list named *rblist*, and adds the rulebases named *rulebase1*, *rulebase3*, and *rulebase5* to it:

```
rulebase-list rblist rulebase1 rulebase3 rulebase5
```

The following command deletes the rulebase list named *rblist*:

```
no rulebase-list rblist
```

ruledef

This command allows you to create/configure/delete ACS rule definitions.

Important In releases prior to 21.1: A maximum of 2048 ruledefs can be configured in the active charging service.

In 21.1 and later releases: A maximum of 2500 ruledefs can be configured in the active charging service.

Product ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
ruledef ruledef_name [ -noconfirm ]
no ruledef ruledef_name
```

no

If previously configured, deletes the specified ruledef from the active charging service.

ruledef_name

Specifies the ruledef to add/configure/delete.

ruledef_name must be the name of an ACS ruledef, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters. Each ruledef must have a unique name. Host pool, port map, IMSI pool, and firewall, routing, and charging ruledefs must have unique names.

If the named ruledef does not exist, it is created, and the CLI mode changes to the ACS Ruledef Configuration Mode wherein the ruledef can be configured.

If the named ruledef already exists, the CLI mode changes to the ACS Ruledef Configuration Mode for that ruledef.

Important If there are any changes to ruledef and the Override Control/Inheritance feature is enabled, then execute the CLI command "update active-charging override-control rulebase-config". For more information on this command, see the *Command Line Interface Reference*.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS ruledef.

A ruledef represents a set of matching conditions across multiple L3 – L7 protocol based on protocol fields and state information. Each ruledef can be used across multiple rulebases within the active charging service.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-ruledef)#

Also see the *ACS Ruledef Configuration Mode Commands* chapter.

Example

The following command creates an ACS ruledef named *test1*, and enters the ACS Ruledef Configuration Mode:

```
ruledef test1
```

service-scheme

This command allows you to enable association of service-scheme based on trigger events.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

`[ no ] service-scheme` *`service_scheme_name`* **`[ -noconfirm ]`**

no

If previously configured, deletes the specified service scheme configuration from the active charging service.

service_scheme_name

Specifies the service scheme to add/configure/delete.

service_scheme_name must be a service scheme name, and must be an alphanumeric string of 1 through 63 characters.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a service-scheme and enable association of service-scheme based on trigger events.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-servscheme)#

Also see the *ACS Service Scheme Configuration Mode Commands* chapter.

Example

The following command creates a service scheme named *ss1* and changes to the ACS Service Scheme Configuration Mode:

```
service-scheme ss1
```

sip advanced

This command enables SIP ALG to maintain the same tag parameters (from and to tag) for Authorization or Proxy Authentication requests.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

`[ default | no ] sip advanced out-of-dialog-request retain-tag`

default

Configures this command with its default setting.

Default: Disabled

no

If previously enabled, disables the SIP ALG configuration.

Usage Guidelines

Use this command to enable SIP ALG to maintain the same tag parameters (from and to tag) while processing 4xx responses for Authorization or Proxy Authentication requests as described in section 8.1.3.5 of RFC 3261 (SIP: Session Initiation Protocol).

statistics-collection

This command allows to dynamically enable collection of VPP offload statistics, Charging, Firewall or Post-processing ruledef statistics.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

`statistics-collection { all | ruledef { all | charging | firewall | post-processing | vpp }`
`{ default | no } statistics-collection { vpp }`

default

Configures this command with its default setting. By default, statistics collection is disabled.

no

Disables dynamic statistics collection.

all

Specifies to collect all statistics.

ruledef

Specifies to collect ruledef statistics.

all | charging | firewall | post-processing

- **all**: Specifies to collect all ruledef statistics.
- **charging**: Specifies to collect charging ruledef statistics.
- **firewall**: Specifies to collect firewall ruledef statistics.
- **post-processing**: Specifies to collect post-processing ruledef statistics.

vpp

Configures VPP statistics collection. By default, this CLI is disabled.

Use the **no statistics-collection vpp** command to remove VPP statistics collection.

Usage Guidelines

Use this command to dynamically enable collection of ruledef statistics — Charging, Firewall or Post-processing. By default, the statistics will not be maintained. If the command is not configured, statistics collection will not be enabled and the following error message will be displayed in the **show active-charging sessions full** CLI — "statistics collection disabled; not collecting <*charging/firewall/postprocessing*> ruledef stats".

Example

The following command will collect firewall ruledef statistics:

```
statistics-collection ruledef firewall
```

The following command will collect vpp offload statistics:

```
statistics-collection vpp
```

subs-class

This command allows you to configure Active Charging Service subscriber class.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

`[ no ] subs-class` *`subs_class_name`* **`[ -noconfirm ]`**

no

If previously configured, deletes the specified configuration from the active charging service.

subs_class_name

Specifies the subscriber class to add/configure/delete.

subs_class_name must be an alphanumeric string of 1 through 63 characters.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a subscriber class.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-subsclass)#

Also see the *ACS Subscriber Class Configuration Mode Commands* chapter.

Example

The following command creates a subscriber class named *sc1* and changes to the ACS Subscriber Class Configuration Mode:

`subs-class sc1`

subscriber-base

This command allows you to configure Active Charging Service subscriber base.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description **`[ no ] subscriber-base`** *`subs_base_name`* **`[ -noconfirm ]`**

no

If previously configured, deletes the specified configuration from the active charging service.

subs_base_name

Specifies the subscriber base to add/configure/delete.

subs_base_name must be an alphanumeric string of 1 through 63 characters.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines Use this command to create/configure/delete a subscriber base. Only one subscriber-base configuration is currently allowed and it is recommended to use the subscriber base name as *default*.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-subscriber-base)#

Also see the *ACS Subscriber Base Configuration Mode Commands* chapter.

Example

The following command creates a subscriber base named *default* and changes to the ACS Subscriber Base Configuration Mode:

`subscriber-base default`

system-limit flow-chkpt-per-call

This command allows you to control the number of flows that can be checkpointed per call.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description **`system-limit flow-chkpt-per-call`** *`max_chkpt_flows`*
`default system-limit flow-chkpt-per-call`

default

Configures this command with its default setting.

Default value: 10

max_chkpt_flows

Specifies the maximum number of flows to be checkpointed per subscriber.

max_chkpt_flows must be an integer from 1 through 100.

Usage Guidelines

When this CLI command is configured, this sets the limit of flows per call to a value so that session level limits for recovered flows are not reached during initial calls or with subscribers having high number of flows.

The maximum number of flows that can be checkpointed per call are 100. A value of 0 indicates that there is no limit on the number of flows.

Example

The following command sets the number of flows to be checkpointed to *50*:

```
system-limit flow-chkpt-per-call 50
```

system-limit l4-flows

This command allows you to configure the system-wide Layer 4 flow limit.

Important This command is customer specific. For more information contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
system-limit l4-flows limit
{ default | no } system-limit l4-flows
```

default

Configures this command with its default setting.

Default: Disabled; same as **no system-limit l4-flows**

no

Disables the limit checking configuration.

limit

Specifies the Layer 4 flows limit.

limit must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to configure the system-wide limit for Layer 4 flows.

The System-wide L4 Flow Limiting feature provides the capability to limit the number of TCP and UDP flow over the system. This limiting can be applied to all subscribers attaching to the system and to all APNs. This feature is compatible with the existing per-subscriber limiting (configured using the flow limit-for-flow-type charging action). Both limiting can be active in the same time.

System-wide flow limiting is implemented by comparing the "Effective Flows" periodically (~ every 10 seconds) against the configurable "System-wide Flow Limit". Where "Effective Flows" is the number of active data sessions, each identified by the 5-tuple key. If the "Effective Flows" exceeds the "System-wide Flow Limit", the Resource Manager indicates it to the active charging service. When ACS is aware of the "System-wide Flow Limit" being reached, no more data sessions are setup. The packets are discarded. While processing a successive flow-usage update from active charging service a change in behavior is indicated to active charging service to start accepting data sessions. As this relies on periodic reporting there is an inherent delay in the detection of "exceeding/returning once exceeded" to the flow limit.

Example

The following command sets the system limit for L4 flows to *100*:

```
system-limit l4-flows 100
```

tcp-acceleration-profile

This command configures the TCP Acceleration profile for Inline TCP Optimization.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
tcp-acceleration-profile profile_name
no tcp-acceleration-profile
```

no

Disables the TCP Acceleration profile configuration.

Usage Guidelines

Use this command to configure a TCP Acceleration profile. Refer to *ACS TCP Acceleration Profile Configuration*mode for information on configuring the profile parameters.

tcp-acceleration

This command enables TCP Acceleration in the ACS Configuration mode.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] tcp-acceleration

no

Disables TCP Acceleration.

tcp-acceleration

Enables TCP Acceleration feature.

Usage Guidelines

Use this command to enable the TCP Acceleration feature.

tethering-database

This command allows you to enable/disable the Tethering Detection feature, and load the databases from the specified files into the service.

Important This command is available only if the *Smartphone Tethering Detection* license is enabled. Contact your Cisco account representative for more information.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

tethering-database [ipv6-os-signature *ipv6os_signature_db_file_name* **| os-signature** *os_signature_db_file_name* **| tac** *tac_db_file_name* **| ua-signature**

ua_signature_db_file_name **] +**
{ default | no } tethering-database

default

Configures this command with its default setting.

Default: Tethering Detection feature is disabled, and the database file names are reset to their default values.

no

Disables Tethering Detection.

ipv6-os-signature *ipv6os_signature_db_file_name*

Specifies the IPv6 OS Signature database file to load.

ipv6os_signature_db_file_name must be the name of the IPv6 OS Signature database file, and must be an alphanumeric string of 1 through 255 characters.

Default filename: **v6-os-db**

os-signature *os_signature_db_file_name*

Specifies the OS Signature database file to load.

os_signature_db_file_name must be the name of the OS Signature database file, and must be an alphanumeric string of 1 through 255 characters.

Default filename: **os-db**

tac *tac_db_file_name*

Specifies the TAC database file to load.

tac_db_file_name must be the name of a TAC database file, and must be an alphanumeric string of 1 through 255 characters.

Default filename: **tac-db**

ua-signature *ua_signature_db_file_name*

Specifies the User Agent (UA) Signature database file to load.

ua_signature_db_file_name must be the name of a UA Signature database file, and must be an alphanumeric string of 1 through 255 characters.

Default filename: **ua-db**

+

Indicates that more than one of the preceding option can be entered in a single command.

Usage Guidelines

Use this command to enable the Tethering Detection feature, and load the OS, TAC, and UA databases from the specified files into the service.

Tethering refers to the use of a smartphone as a USB dongle/modem to provide Internet connectivity to laptops/PDAs/tablets like iPad, using the smartphone's data plan. Typically many operators have in place an

eat-all-you-can-get data plan for smartphones, the usage of which is intended to be from the smartphone as a mobile device. However, some users use the low rate/unlimited usage of data plan to provide Internet connectivity to their laptops in places where normal Internet connection via broadband/WiFi might be more costly/not available/insecure.

Operators are interested in detecting such usage of a smartphone as a modem to better understand the usage across their networks and offer plans inline to that usage to their customers. They may also charge the tethered and non-tethered traffic separately.

After Tethering Detection has been enabled here (regardless, it must also be enabled within the rulebase), this CLI command may be used to change the databases with the specified databases.

The files are picked from the disk file system within the /databases directory. If a file name value is not configured, the default file names, *v6-os-db, os-db*, *tac-db*, and *ua-db*, are used.

For more information on the Tethering Detection feature, refer to the *Enhanced Charging Services Administration Guide*.

Example

The following command enables Tethering Detection and selects the UA Signature database file named *test*:

```
tethering-database ua-signature test
```

tethering-detection

This command allows you to enable tethering detection for TAC-db lookup, DNS-based lookup, and bypass tethering detection based on interface ID.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no] tethering-detection { bypass interface-id *ifid* **| dns-based nat64** *ipv6_network_prefix* **| tac-db }**
default tethering-detection

default

Configures this command with the default setting. DNS-based tethering detection is enabled by default.

no

If previously configured, disables the specified configuration for tethering detection.

bypass interface-id *ifid*

Specifies the IPv6 Interface ID from IPv6 address. When configured, all IPv6 flows having this interface ID in the source IP address will bypass IP-TTL and OS based tethering detection.

You can configure a maximum number of 10 interface IDs. If no interface IDs are present, then all the configured interface IDs will be removed.

By default, tethering detection bypass will be disabled.

ifid is a 64-bit unsigned integer from IPv6 address.

dns-based nat64 *ipv6_network_prefix*

Configure DNS-based lookup for tethering detection. The configured NAT64 prefixes are used to identify the IPv6 flows that will be considered for DNS-based tethering detection.

ipv6_network_prefix must be an IPv6 colon-separated-hexadecimal notation with subnet mask bit. IPv6 also supports :: notation.

tac-db

Enables TAC-db lookup for tethering detection. This is the default behavior.

Usage Guidelines

Use this command to enable TAC-db lookup for tethering detection, DNS-based lookup for tethering detection, or bypass tethering detection based on interface ID.

All the three options to enable tethering detection can be configured in a single line of CLI.

For more information on the Tethering Detection feature, refer to the *Enhanced Charging Services Administration Guide*.

Example

The following command enables TAC-db lookup for tethering detection:

```
tethering-detection tac-db
```

Example

The following command removes the specified *ifid1* and *ifidn* interface IDs:

```
no tethering-detection bypass interface-id ifid1 ifidn
```

timedef

This command allows you to create/configure/delete ACS Time Definitions (timedefs).

Important This command is available only in StarOS 8.1 and in StarOS 9.0 and later releases.

Important A maximum of 10 timedefs can be configured in the active charging service.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

timedef *timedef_name* **[-noconfirm]**
no timedef *timedef_name*

no

If previously configured, deletes the specified timedef from the active charging service.

timedef_name

Specifies the timedef to add/configure/delete.

timedef_name must be the name of a timedef, and must be an alphanumeric string of 1 through 63 characters. Each timedef must have a unique name.

If the named timedef does not exist, it is created, and the CLI mode changes to the ACS Timedef Configuration Mode wherein timeslots for the timedef can be configured.

If the named timedef already exists, the CLI mode changes to the ACS Timedef Configuration Mode for that timedef.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete ACS timedefs for the Time-of-Day Activation/Deactivation of Rules feature. Timedefs enable activation/deactivation of ruledefs/groups-of-ruledefs such that they are available for rule matching only when they are active.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-timedef)#

Also see the *ACS Timedef Configuration Mode Commands* chapter.

Example

The following command creates a timedef named *test1*, and enters the ACS Timedef Configuration Mode:

timedef test1

tpo policy

The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

tpo profile

The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

trigger-action

This command allows you to configure ACS trigger actions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
[ no ] trigger-action trigger_action_name [ -noconfirm ]
        edns-format format_name [ security-profile ] profile_name
        flow action readdress server-list  server_list_name  [ hierarchy ] [
 round-robin ][ discard-on-failure ]
```

no

If previously configured, deletes the specified trigger action from the active charging service.

trigger_action_name

Specifies the trigger action to add/configure/delete.

trigger_action_name must be the name of a trigger action, and must be an alphanumeric string of 1 through 63 characters.

If the named trigger action does not exist, it is created, and the CLI mode changes to the ACS Trigger Action Configuration Mode.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

edns-format*edns_format*

Specifies the EDNS format when EDNS is applied.

security-profile*profile_name*

Specifies the security profile configuration in the EDNS to add mapping with the Device-id. This is an optional keyword.

flow action readdress server-list

flow action readdress server-list *server_list_name* **[hierarchy] [round-robin][discard-on-failure]**: Specifies IP readdressing to readdress the packets to the configured server Ips. This CLI in trigger action supports only server list configuration. It does not support single server IP or port configuration like charging action.

Usage Guidelines

Use this command to create/configure/delete an ACS trigger action.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-trig-action)#

Also see the *ACS Trigger Action Configuration Mode Commands* chapter.

Example

The following command creates a trigger action named *ta1* and changes to the ACS Trigger Action Configuration Mode:

```
trigger-action ta1
```

trigger-condition

This command allows you to configure ACS trigger conditions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

[no]trigger-condition *trigger_condn_name* **[-noconfirm]**

no

If previously configured, deletes the specified trigger condition from the active charging service.

trigger_condn_name

Specifies the trigger condition to add/configure/delete.

trigger_condn_name must be an alphanumeric string of 1 through 63 characters.

If the named trigger condition does not exist, it is created, and the CLI mode changes to the ACS Trigger Condition Configuration Mode.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an ACS trigger condition.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-trig-condn)#

Also see the *ACS Trigger Condition Configuration Mode Commands* chapter.

Example

The following command creates a trigger condition named *tc1* and changes to the ACS Trigger Condition Configuration Mode:

trigger-condition tc1

udr-format

This command allows you to create/configure/delete a User Data Record (UDR) format.

Important A maximum of 256 UDR plus EDR formats can be configured in the active charging service.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs)#`

Syntax Description

udr-format *udr_format_name* **[-noconfirm]**
no udr-format *udr_format_name*

no

If previously configured, deletes the specified UDR format from the active charging service.

udr_format_name

Specifies the UDR format to add/configure/delete.

udr_format_name must be the name of a UDR format, and must be an alphanumeric string of 1 through 63 characters. Each UDR format must have a unique name.

If the named UDR format does not exist, it is created, and the CLI mode changes to the UDR Format Configuration Mode wherein the UDR format can be configured.

If the named UDR format already exists, the CLI mode changes to the UDR Format Configuration Mode for that UDR format.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete a UDR format in the active charging service.

On entering this command, the CLI prompt changes to:

[*context_name*]*hostname*(config-acs-udr)#

Also see the *UDR Format Configuration Mode Commands* chapter.

Example

The following command creates an UDR format named *udr_fromat1* and changes to the UDR Format Configuration Mode:

```
udr-format udr_format1
```

xheader-format

This command allows you to create/configure/delete ACS extension-header (x-header) format specifications.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration

active-charging service *service_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs)#
```

Syntax Description

```
xheader-format xheader_format_name [ -noconfirm ]
no xheader-format xheader_format_name
```

no

If previously configured, deletes the specified x-header format from the active charging service.

xheader_format_name

Specifies the x-header format to add/configure/delete.

xheader_format_name must be the name of an xheader format, and must be an alphanumeric string of 1 through 63 characters. Each x-header format must have a unique name.

If the named x-header format does not exist, it is created, and the CLI mode changes to the ACS X-header Format Configuration Mode wherein the x-header format can be configured.

If the named x-header format already exists, the CLI mode changes to the ACS X-header Format Configuration Mode for that x-header format.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to create/configure/delete an x-header format specification in the active charging service.

On entering this command, the CLI prompt changes to:

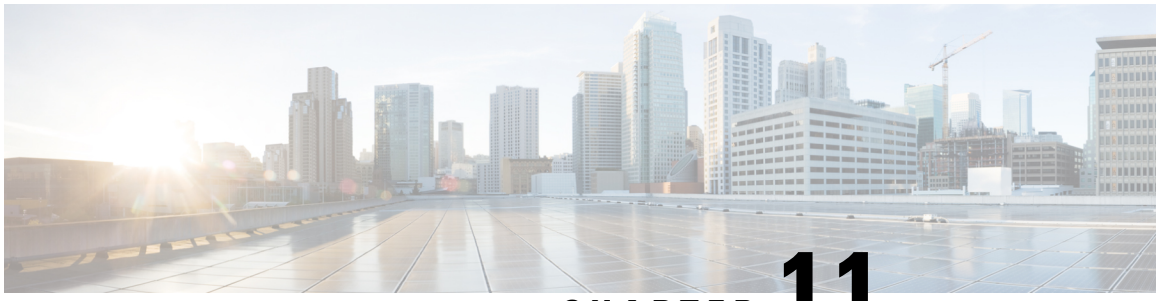
[*context_name*]*hostname*(config-acs-xheader)#

An x-header may be specified in a charging action to be inserted into HTTP GET and POST request packets. See **xheader-insert** CLI command in the *ACS Charging Action Configuration Mode Commands* chapter. Also see the *ACS X-header Format Configuration Mode Commands* chapter.

Example

The following command creates an x-header format named *test*, and enters the ACS X-header Format Configuration Mode:

```
xheader-format test
```



CHAPTER 11

ACS Group-of-Objects Configuration Mode Commands

The ACS Group-of-Objects Configuration Mode is used to configure groups of Active Charging Service (ACS) objects.

Important This configuration mode is available only in 10.2 and later releases.

Command Modes

Exec > ACS Configuration > ACS Group-of-Objects Configuration

active-charging service *service_name* **> group-of-objects** *object_name* **[type string]**

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-objects)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 427
- exit, on page 428
- member-object, on page 428

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

member-object

This command allows you to add or remove objects from the current group-of-objects.

Important A maximum of 128 objects can be added to a group-of-objects.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Group-of-Objects Configuration

active-charging service *service_name* **> group-of-objects** *object_name* **[type string]**

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-objects)#
```

Syntax Description

```
[ no ] member-object object
```

no

If previously added, removes the specified member object from the current group-of-objects.

object

Specifies the member object to add to or remove from the current group-of-objects.

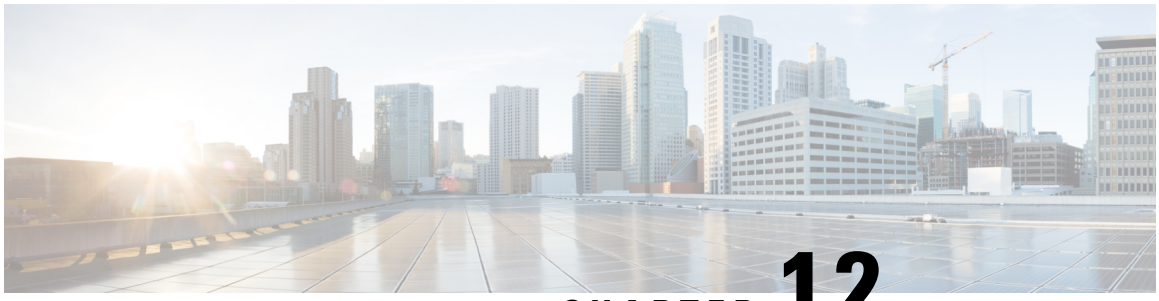
object must be an alpha and/or numeric string of 1 through 63 characters.

Usage Guidelines Use this command to add or remove member objects from a group-of-objects.

Example

The following command adds the object *test* to the current group-of-objects:

```
member-object test
```



CHAPTER 12

ACS Group-of-Prefixed-URLs Configuration Mode Commands

Important This configuration mode is customer specific. For more information, contact your Cisco account representative.

Command Modes

The ACS Group-of-Prefixed-URLs Configuration Mode is used to create and configure groups of prefixed URLs.

Exec > ACS Configuration > ACS Group-of-Prefixed-URLs Configuration

active-charging service *service_name* **> group-of-prefixed-urls** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-grp-of-prefixed-urls)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 429
- exit, on page 430
- prefixed-url, on page 430

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `end`

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

prefixed-url

This command allows you to add or remove URLs from the current group of prefixed URLs.

Important A maximum of 10 URLs can be added per group.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Group-of-Prefixed-URLs Configuration

active-charging service *service_name* **> group-of-prefixed-urls** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-grp-of-prefixed-urls)#
```

Syntax Description

```
[ no ] prefixed-url url
```

no

If added previously, removes the specified URL from the current group of prefixed URLs.

url

Specifies the URL to add/remove.

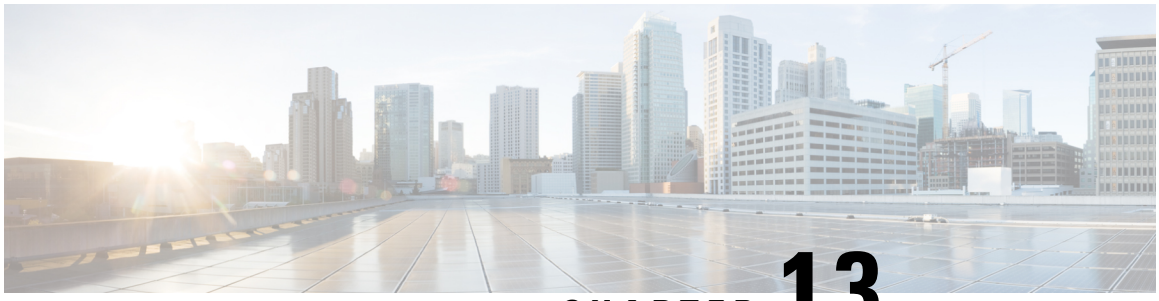
url must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to add or remove URLs to be filtered from the group of prefixed URLs.

Example

The following command adds the URL *http://abc.net* to the current group of prefixed URLs:

```
prefixed-url http://abc.net
```



CHAPTER 13

ACS Group-of-Ruledefs Configuration Mode Commands

The ACS Group-of-Ruledefs Configuration Mode is used to configure groups of rule definitions (ruledefs).

Important A maximum of 384 group-of-ruledefs can be configured.

Command Modes

Exec > ACS Configuration > ACS Group-of-Ruledefs Configuration

active-charging service *service_name* > **group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-ruledefs)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- add-ruledef, on page 431
- dynamic-command, on page 432
- end, on page 433
- exit, on page 434
- group-of-ruledefs-application, on page 434

add-ruledef

This command allows you to add or remove ruledefs from a group-of-ruledefs.

Important A maximum of 384 ruledefs can be added to a group-of-ruledefs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Group-of-Ruledefs Configuration

active-charging service *service_name* **> group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-ruledefs)#
```

Syntax Description

add-ruledef priority *ruledef_priority* **ruledef** *ruledef_name*
no add-ruledef priority *ruledef_priority*

no

If previously configured, specifies that the ruledef associated with the specified priority number be removed from the current group-of-ruledefs.

priority *ruledef_priority*

Specifies priority of the ruledef in the current group-of-ruledefs.

ruledef_priority must be unique in the group-of-ruledefs, and must be an integer from 1 through 10000.

ruledef *ruledef_name*

Specifies name of the ruledef to add to the current group-of-ruledefs.

ruledef_name must be the name of an ACS ruledef, and must be an alpha and/or numeric string of 1 through 63 characters.

Usage Guidelines

Use this command to add/remove ruledefs from a group-of-ruledefs.

A group-of-ruledefs can contain optimizable ruledefs. Whether a group is optimized or not is decided on whether all the ruledefs in the group-of-ruledefs can be optimized, and if the group is included in a rulebase that has optimization turned on, then the group will be optimized.

When a new ruledef is added, it is checked if it is included in any group-of-ruledefs, and whether it needs to be optimized, etc.

Warning Deletion or addition of the same rule name and/or priority must be done with some amount of time lag.

Example

The following command adds the ruledef *ruledef23* to the current group-of-ruledefs, and assigns it a priority of *3*:

```
add-ruledef priority 3 ruledef ruledef23
```

dynamic-command

This command allows you to add or remove dynamic commands from a group-of-ruledefs.

Product

ACS

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Group-of-Ruledefs Configuration

active-charging service *service_name* **> group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-ruledefs)#
```

Syntax Description

dynamic-command content-filtering category policy-id *policy_id*
no dynamic-command content-filtering category policy-id

no

Specifies to remove dynamic command configuration from the current group-of-ruledefs.

content-filtering category policy-id *policy_id*

Specifies the dynamic command for Content Filtering Category Policy ID configuration.

policy_id must be a Content Filtering Category Policy ID, and must be an integer from 1 through 4294967295.

Usage Guidelines

Use this command to add a dynamic command to a group-of-ruledefs, which will be executed when a dynamic protocol specifies that group-of-ruledefs (via the Rulebase-Name AVP).

Important This release supports only one command option, which is **dynamic-command content-filtering category policy-id** *policy_id*

Example

The following command configures a dynamic command for Content Filtering Category Policy ID configuration using the policy ID *100*:

```
dynamic-command content-filtering category policy-id 100
```

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

group-of-ruledefs-application

This command allows you to specify the purpose of setting up a group-of-ruledefs as either charging, post-processing, or for other purposes.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Group-of-Ruledefs Configuration

active-charging service *service_name* **> group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-group-of-ruledefs)#
```

Syntax Description

```
group-of-ruledefs-application { charging | content-filtering | gx-alias
| post-processing | tpo }
no group-of-ruledefs-application
```

no

If previously configured, deletes the group-of-ruledefs-application configuration from the current group-of-ruledefs.

charging

Specifies that the current group-of-ruledefs is for charging purposes.

content-filtering

Specifies that the current group-of-ruledefs is for content-filtering purposes.

gx-alias

Specifies that the current group-of-ruledefs is for Gx-alias purposes.

post-processing

Specifies that the current group-of-ruledefs is for post-processing purposes, that is, for use by the **post-processing** CLI command or automatic name-matching to the Diameter Filter-Id AVPs.

tpo

Important The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

Usage Guidelines

Use this command to specify the purpose of setting up a group-of-ruledefs. If not specified, by default the rule-application type will be charging.

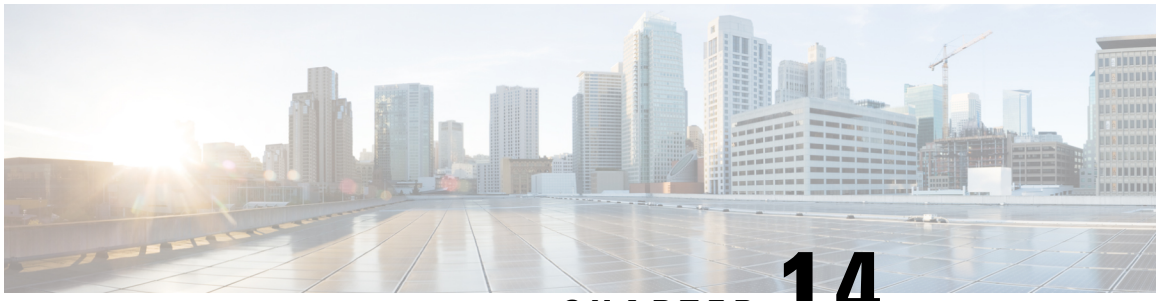
If the group-of-ruledefs-application is configured for content-filtering, no ruledef can be added to it. Similarly, if configured explicitly for charging or post-processing, a content-filtering policy cannot be configured in it.

The group-of-ruledefs may be dynamically selected by Diameter, as described by the **policy-control charging-rulebase-name** command in the Active Charging Service Configuration Mode. If so selected, the priority field of the add-ruledef instances within the group-of-ruledefs are ignored, and all of the rules named by the ruledef keyword that are also configured with the same name in the **action** command are selected.

Example

The following command configures the current group-of-ruledefs as for post-processing purposes:

```
group-of-ruledefs-application post-processing
```



CHAPTER 14

ACS Host Pool Configuration Mode Commands

The ACS Host Pool Configuration Mode is used to define a pool of host addresses within the ACS Configuration Mode. The host pool facilitates to create rules to handle the packets coming from or going to a group of hosts within an access policy.

Command Modes

Exec > ACS Configuration > ACS Host Pool Configuration

active-charging service *service_name* **> host-pool** *host_pool_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-host-pool)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 437
- exit, on page 437
- ip, on page 438

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

ip

This command allows you to add/remove an individual or a range of host IPv4/IPv6 address(es) from the current host pool.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Host Pool Configuration

active-charging service *service_name* **> host-pool** *host_pool_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-host-pool)#
```

Syntax Description **[no] ip {** *ipv4/ipv6_address* **|** *ipv4/ipv6_address/maskbit* **| range** *start_ipv4/ipv6_address* **to** *end_ipv4/ipv6_address* **}**

no

If added previously, removes the specified IPv4/IPv6 address(es) from the current host pool.

ipv4/ipv6_address

Specifies an IPv4/IPv6 address to add to the current host pool.

ipv4/ipv6_address must be an IPv4/IPv6 address.

ipv4/ipv6_address/maskbit

Specifies an IPv4/IPv6 address/mask bits combination to add to the current host pool.

ipv4/ipv6_address must be an IPv4/IPv6 address.

maskbit must be the number of bits in the subnet mask, and must be a numeric value.

range *start_ipv4/ipv6_address* to *end_ipv4/ipv6_address*

Specifies a range of IPv4/IPv6 addresses to add to the current host pool.

start_ipv4/ipv6_address specifies the starting IPv4/IPv6 address of the range, and must be less than *end_ipv4/v6_address*.

end_ipv4/v6_address specifies the ending IPv4/IPv6 address of the range, and must be greater than *start_ipv4/ipv6_address*.

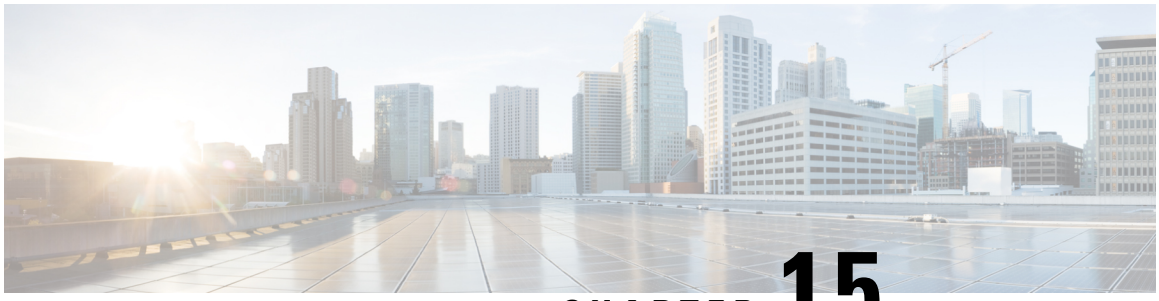
Usage Guidelines

Use this command to add an individual or a range of IPv4/IPv6 addresses to a host pool. Up to 20 sets of IPv4/IPv6 addresses can be configured in each host pool.

Example

The following command adds all IPv4 addresses from *10.2.3.4* through *10.4.5.6* to the current host pool:

```
ip range 10.2.3.4 to 10.4.5.6
```



CHAPTER 15

ACS IMSI Pool Configuration Mode Commands

The ACS IMSI Pool Configuration Mode is used to define a pool of subscriber International Mobile Station Identifier (IMSI) numbers within the ACS Configuration Mode. IMSI pool configuration facilitates creation of rules to handle the packets coming from or going to a group of subscriber of IMSI numbers within an access policy.

Command Modes

Exec > ACS Configuration > ACS IMSI Pool Configuration

active-charging service *service_name* **> imsi-pool** *imsi_pool_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-imsi-pool)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 441
- exit, on page 442
- imsi, on page 442

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

imsi

This command allows you to add/remove an individual or a range of subscriber IMSI numbers from the current IMSI pool.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS IMSI Pool Configuration

active-charging service *service_name* **> imsi-pool** *imsi_pool_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-imsi-pool)#
```

Syntax Description

```
[ no ] imsi { imsi_number | range start_imsi to end_imsi }
```

no

If added previously, removes the specified subscriber IMSI number(s) from the current IMSI pool.

imsi_number

Specifies an IMSI number to add to the current IMSI pool.

imsi_number must be an IMSI number, and must be a sequence of hexadecimal digits between 1 and 15.

start_imsi* to *end_imsi

Specifies a range of IMSI numbers to add to the current IMSI pool.

start_imsi specifies the starting IMSI number of the range and must be less than *end_imsi*.

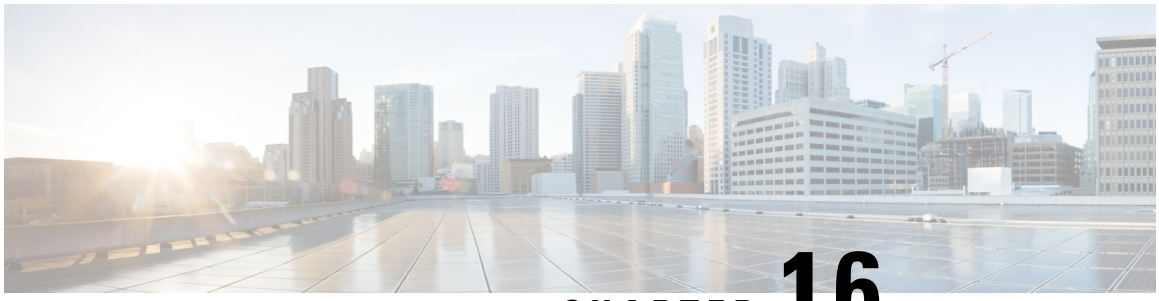
end_imsi specifies the ending IMSI number of the range and must be greater than *start_imsi*.

Usage Guidelines Use this command to add an individual or range of subscriber IMSI numbers to an IMSI pool. Up to 10 sets of IMSI numbers can be configured in each IMSI pool.

Example

The following command adds IMSI numbers from *310150987654321* to *310150987656879* to the current IMSI pool:

```
imsi range 310150987654321 to 310150987656879
```



CHAPTER 16

ACS Packet Filter Configuration Mode Commands

The ACS Packet Filter Configuration Mode is used to create and configure Active Charging Service (ACS) packet filters.

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* **> packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- direction, on page 445
- end, on page 446
- exit, on page 446
- ip local-port, on page 447
- ip protocol, on page 448
- ip remote-address, on page 449
- ip remote-port, on page 450
- ip tos-traffic-class, on page 451
- priority, on page 452

direction

This command allows you to specify the direction in which the current packet filter will be applied.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* **> packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

```
direction { bi-directional | downlink | uplink }
default direction
```

default

Configures this command with its default setting.

Default: **bi-directional**

bi-directional

Specifies that the packet filter has to be applied in both uplink and downlink directions.

downlink

Specifies that the packet filter has to be applied only in the downlink direction.

uplink

Specifies that the packet filter has to be applied only in the uplink direction.

Usage Guidelines

Use this command to specify the direction in which the packet filter has to be applied.

Example

The following command specifies that the packet filter must be applied in the downlink direction:

```
direction downlink
```

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege Security Administrator, Administrator

Syntax Description `exit`

Usage Guidelines Use this command to return to the parent configuration mode.

ip local-port

This command allows you to configure the IP 5-tuple local port(s) for the current packet filter.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* > **packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-packet-filter)#`

Syntax Description

```
ip local-port { = port_number | range start_port_number to end_port_number }
no ip local-port
```

no

If previously configured, deletes the ip local-port configuration from the current packet filter.

port_number

Specifies the port number of the transport protocol.

port_number must be the port number, and must be an integer from 1 through 65535.

range *start_port_number* to *end_port_number*

Specifies a range of port numbers.

start_port_number and *end_port_number* must be integers from 1 through 65535.

end_port_number must be greater than *start_port_number*.

Usage Guidelines Use this command to configure the IP local port(s) for a packet filter.

Example

The following command configures the IP local port as *456*:

```
ip local-port 456
```

ip protocol

This command allows you to configure the IP protocol(s) for the current packet filter.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* > **packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

In StarOS 9.0 and later releases:

```
ip protocol = protocol_number
no ip protocol
```

In StarOS 8.2 and earlier releases:

```
ip protocol { = protocol_number | range start_protocol_number to end_protocol_number
 }
no ip protocol
```

no

If previously configured, deletes the IP protocol configuration from the current packet filter.

protocol_number

Specifies the transport protocol field in the IP header.

protocol_number must be the numerical value of the protocol, and must be an integer from 1 through 255.

range *start_protocol_number* to *end_protocol_number*

Important In StarOS 9.0 and later releases this option is deprecated.

Specifies a range of protocol assignment numbers.

start_protocol_number and *end_protocol_number* must be integers from 1 through 255.

end_protocol_number must be greater than *start_protocol_number*.

Usage Guidelines

Use this command to configure the protocol(s) for a packet filter.

Example

The following command configures the protocol assignment number *300*:

```
ip protocol = 300
```

ip remote-address

This command allows you to configure the IP remote address(es) for the current packet filter.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* > **packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

In StarOS 9.0 and later releases:

```
ip remote-address = { ipv4/ipv6_address | ipv4/ipv6_address/mask }
no ip remote-address
```

In StarOS 8.2 and earlier releases:

```
ip remote-address { = { ipv4/ipv6_address | ipv4/ipv6_address/mask } | range {
start_ipv4/ipv6_address | start_ipv4/ipv6_address/mask } to { end_ipv4/ipv6_address |
end_ipv4/ipv6_address/mask } }
no ip remote-address
```

no

If previously configured, deletes the IP remote-address configuration from the current packet filter.

ip remote-address = { *ipv4/ipv6_address* | *ipv4/ipv6_address/mask* }

ipv4/ipv6_address specifies the IPv4/IPv6 address.

ipv4/ipv6_address/mask specifies the IPv4/IPv6 address and the number of subnet bits representing the subnet mask in shorthand.

ip remote-address range { *start_ipv4/ipv6_address* | *start_ipv4/ipv6_address/mask* } to { *end_ipv4/ipv6_address* | *end_ipv4/ipv6_address/mask* }

Important In StarOS 9.0 and later releases this keyword has been deprecated.

range specifies a range of IPv4/IPv6 addresses.

start_ipv4/ipv6_address and *end_ipv4/ipv6_address* specify, for the range, the starting and ending IPv4/IPv6 addresses.*end_ipv4/ipv6_address* must be greater than *start_ipv4/ipv6_address*.

start_ipv4/ipv6_address/mask and *end_ipv4/ipv6_address/mask* specify, for the range, the starting and ending IPv4/IPv6 address, and the number of subnet bits representing the subnet mask in shorthand. *end_ipv4/ipv6_address/mask* must be greater than *start_ipv4/ipv6_address/mask*.

Usage Guidelines Use this command to configure the remote address(es) for a packet filter.

Example

The following command configures the IP remote address as *10.2.3.4/24*:

```
ip remote-address = 10.2.3.4/24
```

ip remote-port

This command allows you to configure the IP remote port(s) for the current packet filter.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* **> packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

```
ip remote-port { = port_number | range start_port_number to end_port_number }
no ip remote-port
```

no

If previously configured, deletes the ip remote-port configuration from the current packet filter.

port_number

Specifies the port number of the transport protocol.

port_number must be the port number, and must be an integer from 1 through 65535.

range *start_port_number* to *end_port_number*

Specifies a range of port numbers.

start_port_number and *end_port_number* must be integers from 1 through 65535.

end_port_number must be greater than *start_port_number*.

Usage Guidelines Use this command to configure the IP remote port(s) for a packet filter.

Example

The following command configures the IP remote port as *789*:

```
ip remote-port = 789
```

ip tos-traffic-class

This command allows you to configure Type of Service (TOS)/Traffic class under charging action in the Packet filter mode.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* **> packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

[no] ip tos-traffic-class = { *type-of-service* | *traffic class* } **mask** { = *mask-value*}

no

If previously configured, deletes the TOS/Traffic class under charging action.

tos-traffic-class = { *type-of-service* | *traffic class* }

Specifies the TOS/Traffic Class" value that is used to filter the traffic. Enter an integer, ranging from 0 to 255.

mask {*mask-value*}

Specifies the type-of-service or traffic-class mask field. Enter an integer, ranging from 0 to 255.

Usage Guidelines

Use this command to configure TOS/Traffic class in Packet filter and the corresponding value to be sent in the Create Bearer and Update Bearer request.

If this CLI is not configured, by default TOS/Traffic class AVP is not included for Predefined rules in CBR/UBR messages.

The default behavior can also be configured with below command:

```
no ip  tos-traffic-class
```

While installing the Predefined rules for a bearer, TOS/Traffic class information can also be included such that the TOS value can be used to filter the traffic.

Note Operator should configure TOS along with mask and there are no default values for TOS value and mask.

Example

The following command configures TOS/Traffic class for the Predefined rules.

```
ip tos-traffic-class = 32 mask = 255
```

priority

This command allows you to configure the current packet filter's priority.

Product

Important This command is deprecated in certain 9.0 releases and in 10.0 and later releases. The precedence values of packet filters (those from both dynamic and predefined rules) are assigned by the PCEF based on an internal process.

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Packet Filter Configuration

active-charging service *service_name* **> packet-filter** *packet_filter_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-packet-filter)#
```

Syntax Description

```
priority priority
no priority
```

no

If previously configured, deletes the priority configuration in the current packet filter.

priority

Specifies this packet filter's priority

priority must be an integer from 0 through 255.

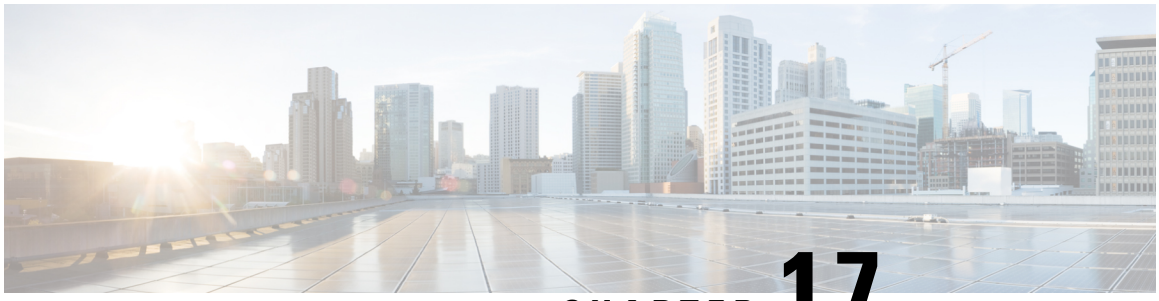
Usage Guidelines

Use this command to configure the packet filter's priority. The priority must be configured for the packet filter to be used in a TFT. Packets are compared against packet filters in a prioritized fashion, with 0 being the highest priority. Without this setting, this filter will not be used.

Example

The following command configures the packet filter's priority as *3*:

```
priority 3
```



CHAPTER 17

ACS Port Map Configuration Mode Commands

The ACS Port Map Configuration Mode is used to define an application-port mapping in the ACS Configuration Mode. The application-port map associates a range of TCP/UDP ports to a specific application/protocol within a rule definition (ruledef).

Command Modes

Exec > ACS Configuration > ACS Port Map Configuration

active-charging service *service_name* **> port-map** *port_map_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-port-map)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 455
- exit, on page 455
- port, on page 456

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

port

Adds or removes an individual or a range of TCP/UDP port numbers associated with an application or protocol from the current port map.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Port Map Configuration

active-charging service *service_name* **> port-map** *port_map_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-port-map)#
```

Syntax Description **[no] port {** *port_number* **| range** *start_port_number* **to** *end_port_number* **}**

no

If added previously, removes the specified TCP/UDP port numbers from the current port map.

port_number

Specifies a TCP/UDP port number to add to the current port map.

port_number is expressed an integer from 1 through 65535.

range *start_port_number* to *end_port_number*

Specifies a range of port numbers to add to the current port map.

start_port_number specifies the starting port number of the range, it must be an integer from 1 through 65535, and must be less than *end_port_number*.

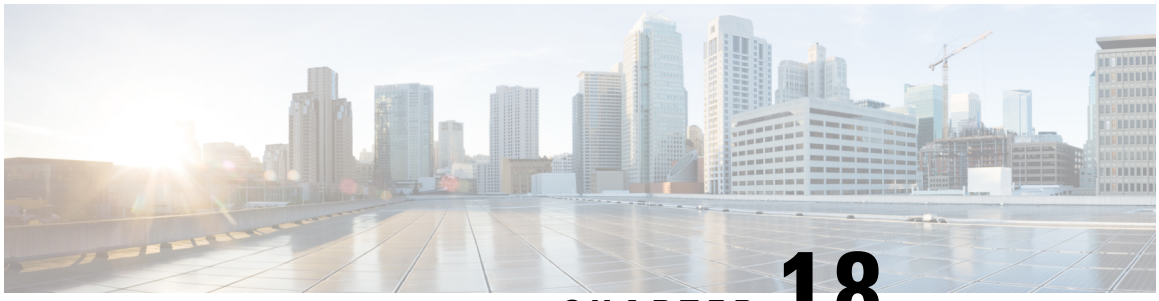
end_port_number specifies the ending port number of the range, it must be an integer from 1 through 65535, and must be greater than *start_port_number*.

Usage Guidelines Use this command to add an individual or a range of TCP/UDP port numbers to a port map. Up to 10 sets of ports can be configured in each port map.

Example

The following command adds all TCP/UDP port numbers from *3112* through *5000* to the port map:

```
port range 3112 to 5000
```



CHAPTER 18

ACS QoS-Group-of-Ruledefs Configuration Mode Commands

The ACS QoS-Group-of-Ruledefs Configuration Mode is used to configure groups of rule definitions (ruledefs).

Command Modes

Exec > ACS Configuration > QoS-Group-of-Ruledefs Configuration

active-charging service *service_name* > **qos-group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-qos-group-of-ruledefs)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- add-group-of-ruledef, on page 459
- add-ruledef, on page 460
- end, on page 461
- exit, on page 461

add-group-of-ruledef

This command allows you to add or remove groups-of-ruledefs from a qos-group-of-ruledefs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > QoS-Group-of-Ruledefs Configuration

active-charging service *service_name* > **qos-group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-qos-group-of-ruledefs)#`

Syntax Description

`[ no ] add-group-of-ruledef` *`group_of_ruledef_name`*

no

If added previously, removes the specified group-of-ruledef from the current qos-group-of-ruledefs.

group_of_ruledef_name

Specifies name of the group-of-ruledef to add/remove from the current qos-group-of-ruledefs.

group_of_ruledef_name must be the name of an ACS group-of- ruledef, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to add/remove a group-of-ruledefs from a qos-group-of-ruledefs.

Example

The following command adds the group-of-ruledef named *grpruledef1* to the current qos-group-of-ruledefs:

```
add-group-of-ruledef grpruledef1
```

add-ruledef

This command allows you to add or remove ruledefs from a qos-group-of-ruledefs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > QoS-Group-of-Ruledefs Configuration

active-charging service *service_name* **> qos-group-of-ruledefs** *group_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-qos-group-of-ruledefs)#
```

Syntax Description

[no] add-ruledef *ruledef_name*

no

If added previously, removes the specified ruledef from the current qos-group-of-ruledefs.

ruledef_name

Specifies name of the ruledef to add/remove from the current qos-group-of-ruledefs.

ruledef_name must be the name of an ACS ruledef, and must be an alpha and/or numeric string of 1 through 63 characters.

Usage Guidelines

Use this command to add/remove ruledefs from a qos-group-of-ruledefs.

Warning Deletion or addition of the same rule name must be done with some amount of time lag.

Example

The following command adds the ruledef *ruledef23* to the current qos-group-of-ruledefs:

```
add-ruledef ruledef23
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

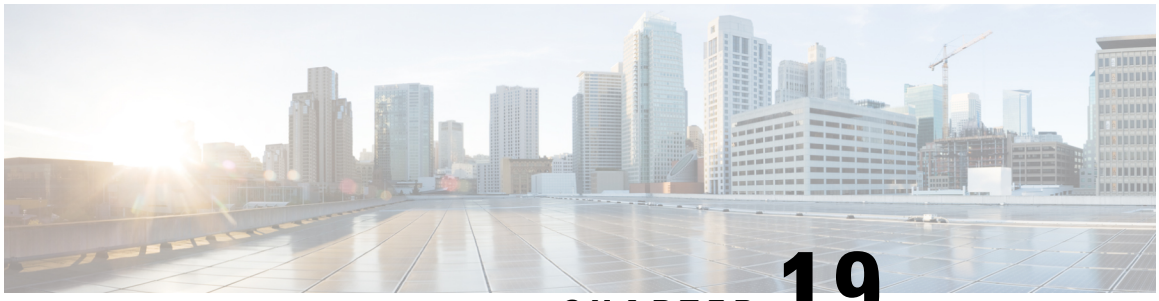
Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

exit



CHAPTER 19

ACS Readdress Server List Configuration Mode

The ACS Readdress Server List Configuration Mode is used to add, configure, and delete servers to the server list for DNS redirection.

Command Modes

Exec > ACS Configuration > Readdress Server List Configuration

active-charging service *service_name* **> readdress-server-list** *server_list_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-readdress-server-list)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- consecutive-failures, on page 463
- end, on page 464
- exit, on page 464
- reactivation-time, on page 465
- response-timeout, on page 466
- server, on page 467

consecutive-failures

This command allows you to configure the consecutive number of times a server can be unreachable after which the system marks the server as inactive.

Important This command is license dependent. For more information contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Readdress Server List Configuration

active-charging service *service_name* > **readdress-server-list** *server_list_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-readdress-server-list)#
```

Syntax Description

```
consecutive-failures consecutive_failures
default consecutive-failures
```

default

Configures this command with its default setting.

Default: 5

consecutive_failures

Specifies the consecutive number of times a server can be unreachable after which the system marks the server as inactive.

consecutive_failures must be an integer from 1 through 10.

Important If not explicitly configured, the default value of 5 will be used.

Usage Guidelines Use this command to configure the consecutive number of response failures, after which a server is marked as inactive.

Example

The following command configures the number of consecutive server response failures to *4*:

```
consecutive-failures 4
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

reactivation-time

This command allows you to configure the time duration (in seconds) after which the status of a previously inactive server is rechecked.

Important This command is license dependent. For more information contact your Cisco account representative.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Readdress Server List Configuration

active-charging service *service_name* > **readdress-server-list** *server_list_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-readdress-server-list)#
```

Syntax Description

reactivation-time *reactivation_time*
default reactivation-time

default

Configures this command with its default setting.

Default: 300 seconds

reactivation_time

Specifies the time duration after which the status of the inactive server is rechecked.

reactivation_time must be an integer from 1 through 1800.

Important If not explicitly configured, the default value of 300 seconds will be used.

Usage Guidelines Use this command to configure the time duration (in seconds) after which the status of a previously inactive server is rechecked.

Example

The following command configures the reactivation time to *180* seconds:

```
reactivation-time 180
```

response-timeout

This command allows you to configure the time duration for which the system will wait for a response from the server before marking it unreachable.

Important This command is license dependent. For more information contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Readdress Server List Configuration

active-charging service *service_name* > **readdress-server-list** *server_list_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-readdress-server-list)#
```

Syntax Description

response-timeout *response_timeout*
default response-timeout

default

Configures this command with its default setting.

Default: 1000 milliseconds

response_timeout

Specifies the time duration (in milliseconds) for which the system will wait for a response from the server before marking it unreachable.

response_timeout must be an integer from 1 through 10000.

Important If not explicitly configured, the default value of 1000 milliseconds will be used.

Usage Guidelines

Use this command to configure the time duration (in milliseconds) for which the system will wait for a response from the server before marking it unreachable.

Example

The following command sets the server response timeout to *4500* milliseconds:

```
response-timeout 4500
```

server

This command allows you to configure the DNS server(s) to which flow will be readdressed.

Important This command is license dependent. Contact your Cisco account representative for more information.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Readdress Server List Configuration

active-charging service *service_name* **> readdress-server-list** *server_list_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-readdress-server-list)#
```

Syntax Description

```
server [ ipv4_address | ipv6_address ]  [ port port_number ]
no server [ ipv4_address | ipv6_address ]
```

no

If previously configured, disables the specified server configuration.

ipv4_address | ipv6_address

Specifies the IP address of the DNS server.

ipv4_address must be expressed in IPv4 dotted-decimal notation format.

ipv6_address must be expressed in IPv6 colon-separated-hexadecimal notation.

port *port_number*

Specifies the TCP port of the DNS server.

port_number must be an integer from 1 through 65535.

Usage Guidelines

Use this command to configure the DNS server(s) to which the flow will be readdressed based on the contents of the Fully Qualified Domain Name (FQDN).

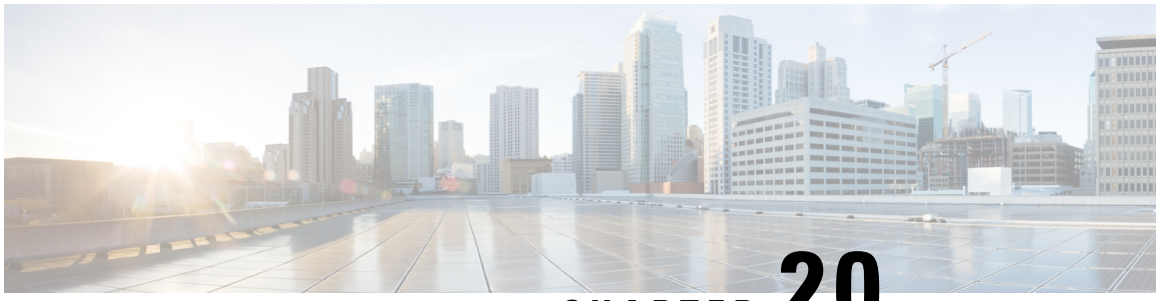
Example

The following commands configure the DNS servers for packet flow to *192.168.12.101*, *192.168.12.102*, and *2607:f0d0:1002:51::4/64*:

```
server 192.168.12.101
server 192.168.12.102
server 2607:f0d0:1002:51::4/64
```

The following command removes the DNS server configuration for *192.168.12.101* that was configured above:

```
no server 192.168.12.101
```



CHAPTER 20

ACS Ruledef Configuration Mode Commands

Important In 14.1 and earlier releases, up to 10 rule expressions can be configured in one ruledef. In 15.0 and later releases, up to 32 rule expressions can be configured in one ruledef.

Command Modes

The ACS Ruledef Configuration Mode is used to create and manage rule expressions in individual rule definitions (ruledefs).

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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bearer 3gpp apn

This command allows you to define rule expressions to match Access Point Name (APN) of the bearer flow.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] bearer 3gpp apn [ case-sensitive ]` *`operator apn_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

apn_name

Specifies name of the APN to match.

apn_name must be an alphanumeric string of 1 through 62 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match an APN in the bearer flow.

Example

The following command defines a rule expression to match user traffic based on APN named *apn12*:

```
bearer 3gpp = apn12
```

bearer 3gpp imsi

This command allows you to define rule expressions to match International Mobile Station Identification (IMSI) number in the bearer flow.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] bearer 3gpp imsi { *operator imsi* **| { !range | range } imsi-pool** *imsi_pool_name* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

imsi

Specifies the IMSI number to match.

!range | range

!range | range: Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

imsi-pool *imsi_pool_name*

Specifies the IMSI pool.

imsi_pool_name must be the name of an IMSI pool, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to define rule expressions to match an IMSI.

Example

The following command defines a rule expression to analyze user traffic for the IMSI number *9198838330912*:

```
bearer 3gpp imsi = 9198838330912
```

bearer 3gpp rat-type

This command allows you to define rule expressions to match Radio Access Technology (RAT) in the bearer flow.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

`[ no ] bearer 3gpp rat-type` *`operator rat_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

rat_type

Specifies the RAT type to match.

rat_type must be one of the following:

- **geran**: GSM EDGE Radio Access Network type
- **utran**: UMTS Terrestrial Radio Access Network type
- **wlan**: Wireless LAN type

Usage Guidelines

Use this command to define rule expressions to match a RAT type.

Example

The following command defines a rule expression to match user traffic based on RAT type **wlan**:

```
bearer 3gpp rat-type = wlan
```

bearer 3gpp sgsn-address

This command allows you to define rule expressions to match SGSN address associated in the bearer flow.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] bearer 3gpp sgsn-address *operator ipv4/ipv6_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ipv4/ipv6_address

Specifies the SGSN IP address to match.

ipv4/ipv6_address must be in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Usage Guidelines

Use this command to define rule expressions to match IP address of an SGSN node. This command replaces the **bearer sgsn-address** command.

Example

The following command defines a rule expression to analyze user traffic for an SGSN node with IP address *209.165.200.225*:

```
bearer 3gpp sgsn-address = 209.165.200.225
```

bearer 3gpp2 bsid

This command allows you to define rule expressions to match Base Station Identifier (BSID) associated with the bearer.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] bearer 3gpp2 bsid [case-sensitive] [use-group-of-objects] *operator string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

use-group-of-objects

Specifies using a group-of-objects as a qualifier to match this rule.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

string

Specifies the name of a group-of-objects to match.

If the **use-group-of-objects** keyword is not included in the command, *string* specifies name of the matching 3GPP2 service Base Station ID (BSID) in bearer flow.

If the **use-group-of-objects** keyword is included in the command, *string* must be the name of the group-of-objects to use. In this case, it is checked if the rule is satisfied for either one or none of the objects in the group-of-objects depending upon the operator used. For example, if the *operator* is **contains**, the expression would be true if any of the objects in the specified object group is contained in the BSID. If the *operator* is **!contains**, then the expression would be true if none of the objects in the object group is contained in the BSID.

string must be an alphanumeric string of 1 through 16 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match a 3GPP2 Base Station Identifier (BSID).

Example

The following command defines a rule expression to analyze user traffic for 3GPP2 BSID named *bs001_xyz*:

```
bearer 3gpp2 bsid = bs001_xyz
```

bearer 3gpp2 service-option

This command allows you to define rule expressions to match 3GPP2 service with service options associated with the bearer.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] bearer 3gpp2 service-option *operator service_option_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

service_option_code

Specifies the 3GPP2 service option code to match.

service_option_code must be an integer from 0 through 1000.

Usage Guidelines

Use this command to define rule expressions to match a 3GPP2 service's service option code.

Example

The following command defines a rule expression to analyze user traffic for a 3GPP2 service's service option matching *1034*:

```
bearer 3gpp2 service-option = 1034
```

bearer apn

This command allows you to define rule expressions to match the APN used for the subscriber session.

Important In 8.1 and later releases, this command is deprecated and is replaced by the bearer 3gpp apn command.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] bearer apn [ case-sensitive ]` *`operator apn_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

apn_name

Specifies the APN to match.

apn_name must be the name of an APN, and must be an alphanumeric string of 1 through 62 characters and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match APN used for subscriber session.

Example

The following command defines a rule expression to match user traffic based on APN name *apn12*:

```
bearer apn = apn12
```

bearer imsi

This command allows you to define rule expressions to match IMSI number of the subscriber.

Important In 8.1 and later releases, this command is deprecated and is replaced by the bearer 3gpp imsi command.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] bearer imsi { *operator imsi* | { !range | range } imsi-pool** *imsi_pool_name* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

imsi

Specifies the IMSI number to match.

!range | range

Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

imsi-pool *imsi_pool_name*

Specifies an IMSI pool.

imsi_pool_name must be the name of an IMSI pool, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match IMSI number of subscriber.

Example

The following command defines a rule expression to match user traffic based on IMSI number *9198838330912*:

```
bearer imsi = 9198838330912
```

bearer rat-type

This command allows you to define rule expressions to match Radio Access Technology (RAT) in the bearer flow.

Important In 8.1 and later releases, this command is deprecated and is replaced by the command.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] bearer rat-type *operator rat_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

rat_type

Specifies the RAT type to match.

rat_type must be one of the following:

- **geran**: GSM EDGE Radio Access Network type
- **utran**: UMTS Terrestrial Radio Access Network type
- **wlan**: Wireless LAN type

Usage Guidelines Use this command to define rule expressions to match a RAT type.

Example

The following command defines a rule expression to match user traffic based on RAT type **wlan**:

```
bearer rat-type = wlan
```

bearer sgsn-address

This command allows you to define rule expressions to match IP address of the SGSN (in acting as GGSN) / P-GW (if acting as S-GW) in the bearer flow.

Important In 8.1 and later releases, this command is deprecated and is replaced by the command.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] bearer sgsn-address** *operator ipv4/ipv6_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ipv4/ipv6_address

Specifies the SGSN IP address to match.

ipv4/ipv6_address must be in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Usage Guidelines Use this command to define rule expressions to match IP address of the SGSN (in acting as GGSN) / P-GW (if acting as S-GW).

Example

The following command defines a rule expression to match user traffic based on SGSN node IP address *10.1.1.1*:

```
bearer sgsn-address = 10.1.1.1
```

bearer traffic-group

This command allows you to define rule expressions to match traffic group number associated with the subscriber session.

Important This functionality is available only if the Content Access Control license has been installed on the chassis.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] bearer traffic-group** *operator group_number*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

group_number

Specifies the traffic group number to match.

group_number must be an integer from 1 through 255.

Usage Guidelines

Use this command to define rule expressions to match traffic group of the subscriber session. See the **fa-ha-spi** command in the *HA Service Configuration Mode Commands* chapter for more information.

Example

The following command defines a rule expression to analyze all traffic groups assigned a value greater or equal to *23*:

```
bearer traffic-group >= 23
```

cca quota-state

Specifies the quota state of a subscriber for prepaid credit control service. In release 12.0 and later, this command should be used as a post-processing rule. For more information on post-processing policy command, refer to the *ACS Rulebase Configuration Mode Commands* chapter in this guide.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] cca quota-state *operator* **{ limit-reached | lower-bandwidth }**

no

Disables the configured credit control quota state.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

limit-reached

This state matches an affirmative end-of-quota indication for the current ruledef from the prepay server.

lower-bandwidth

This state matches the lower-bandwidth quota state of a rating group.

Usage Guidelines

This command supports URL redirection and creates a rule for subscriber prepaid quota state as exhausted or not exhausted.

If a subscriber has exhausted the quota but has not exhausted the qualified period, a different charging-action can be applied via the **cca quota-state** command.

Example

The following command defines a rule expression to match user traffic based on the Credit-Control Application (CCA) quota state **limit-reached**:

```
cca quota-state = limit-reached
```

cca redirect-indicator

This command allows you to define rule expressions to match redirect-indicator state of the Credit Control Application. In release 12.0 and later, this command should be used as a post-processing rule. For more information on post-processing policy command, refer to *ACS Rulebase Configuration Mode Commands* chapter in this reference.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] cca redirect-indicator` *`operator redirect_indicator`*

no

Disables the configured CCA redirect-indicator in the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

redirect_indicator

Specifies the redirect indicator for the AVP used for redirection of the URL in the RADIUS dictionary for prepaid service. It must be an integer from 0 through 4294967295.

Important For the RADIUS server configured with different values to return for this AVP, the ACS requires ruledefs to match the different values for system to associate with charging actions that have different redirect URLs configured.

Usage Guidelines

This command is used to configure an AVP to be used from a dictionary that defines the AVP for the redirect-indicator.

For example, a RADIUS dictionary specifies the 3gpp2-release-indicator to be used for the redirect indicator when RADIUS is used as the Credit-Control Application. In this case, the value for 3gpp2-release-indicator that is returned by the RADIUS prepaid server for a quota request for a given content ID is retained by system and associated with the flow.

Example

The following command defines a rule expression to match redirect indicator *1234* for the URL Redirect AVP:

```
cca redirect-indicator = 1234
```

copy-packet-to-log

This command allows you to print every packet that hits the current ruledef to a log statement.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] copy-packet-to-log**

no

Disables the copy-packet-to-log feature.

copy-packet-to-log

Specifies to print packets hitting the current ruledef to a log.

Usage Guidelines Use this command to print every packet that hits a ruledef to a log statement. This facilitates debugging.

description

Allows you to enter descriptive text for this configuration.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

dns answer-name

This command allows you to define rule expressions to match answer name in the answer section of DNS response messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] dns answer-name [ case-sensitive ]` *`operator value`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

value

Specifies the value to match.

value must be an alphanumeric string of 1 through 255 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match an answer name from the answer section of DNS response messages.

The answer section of a DNS response may contain more than one answer. A maximum of seven answers from the response packet are parsed. For the equality expressions (=, contains, starts-with, ends-with) a match is sought from any of the answers in the packet (up to the first seven answers). For the inequality expressions (!=, !contains, !starts-with, !ends-with), a non-match is sought from all answers (up to the first seven answers).

Example

The following command defines a rule expression to match user traffic for answer name *test*:

```
dns answer-name = test
```

dns any-match

This command allows you to define rule expressions to match all DNS packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] dns any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define an any-match rule expression to match all DNS packets.

Example

The following command defines an any-match rule expression to match all DNS packets:

```
dns any-match = TRUE
```

dns previous-state

This command allows you to define rule expressions to match previous state of the DNS FSM.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] dns previous-state *operator dns_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

dns_previous_state

Specifies the previous state to match.

dns_previous_state must be one of the following:

- **dns-timeout**
- **init**
- **req-sent**
- **resp-error**
- **resp-success**

Usage Guidelines

Use this command to define rule expressions to match previous state of DNS FSM.

Example

The following command defines a rule expression to match the DNS FSM previous state **req-sent**:

```
dns previous-state = req-sent
```

dns query-name

This command allows you to define rule expressions to match query name in DNS request messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] dns query-name [ case-sensitive ]` *`operator query_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

query_name

Specifies the query name to match.

query_name must be an alphanumeric string of 1 through 255 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match query name in DNS request messages.

Example

The following command defines a rule expression to match DNS query name *test*:

```
dns query-name = test
```

dns query-type

This command allows you to define rule expressions to match the query type in the DNS request messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] dns query-type *operator query_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **=**: Specifies that the query-name must be equal to the one specified.
- **!=**: Specifies that the query-name must not be equal to the one specified.

query_type

Specifies the query type to match.

The following *query_type* are supported:

- A
- CNAME

- NS
- PTR
- SRV
- AAA
- TXT
- ANY
- NULL

Usage Guidelines

Use this command to define rule expressions to match the query type in the DNS request messages.

When enabled, the **dns query-type** CLI supports the following behavior:

- DNS request with only one query is supported.
- DNS response with multiple answers is supported. Query-type corresponding to all the answers is stored and matched to the highest priority ruledef.
- For DNS response with multiple answers, unsupported query-type (mentioned previously) is skipped and parsing continues for remaining answers.
- For 'TXT' and 'NULL' query types, minimal parsing occurs like only a DNS record is created and query-type is stored. 'Answer-name' is not extracted and hence the corresponding EDR field is not populated.
- For NULL query types, response is not parsed and matching is based on the same ruledef as a Request.

This CLI is disabled by default.

Example

The following command defines a rule expression to match the DNS query type *txt*:

```
dns query-type = txt
```

dns return-code

This command allows you to define rule expressions to match response code in DNS response messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] dns return-code *operator return_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

return_code

Specifies the response code to match.

return_code must be one of the following:

- **format-error**
- **name-error**
- **no-error**
- **not-implemented**
- **refused**
- **server-failure**

Usage Guidelines

Use this command to define rule expressions to match response code in DNS response messages.

Example

The following command defines a rule expression to match a DNS response code **refused**:

```
dns return-code = refused
```

dns state

This command allows you to define rule expressions to match current state of DNS FSM.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] dns state *operator dns_current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

dns_current_state

Specifies the current state to match.

dns_current_state must be one of the following:

- **dns-timeout**
- **init**
- **req-sent**
- **resp-error**
- **resp-success**

Usage Guidelines

Use this command to define rule expressions to match DNS FSM current state.

Example

The following command defines a rule expression to match DNS FSM current state of **req-sent**:

```
dns state = req-sent
```

dns tid

This command allows you to define rule expressions to match Transaction Identifier (TID) field in DNS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] dns tid *operator tid_value*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

tid_value

Specifies the DNS transaction identifier to match.

tid_value must be an integer from 1 through 65535.

Usage Guidelines

Use this command to define rule expressions to match a TID field of DNS messages.

Example

The following command defines a rule expression to match DNS TID field value of *test*:

```
dns tid = test
```

email

This command allows you to define rule expressions to match generic e-mail message parameters. These expressions will be applicable for IMAP, MMS, POP3, and SMTP protocols.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] email { cc | content { class | type } | from | size | subject | to } [case-sensitive] *operator value*

no

If previously configured, deletes the specified rule expression from the current ruledef.

cc

Specifies to match the "cc" field of standard e-mail message.

content { class | type }

Specifies to match the "content-type" or "content-class" field of standard e-mail message.

from

Specifies to match the "from" field of standard e-mail message.

subject

Specifies to match the "subject" field of standard e-mail message.

to

Specifies to match the "to" field of standard e-mail message.

size

Specifies to match with the total size of e-mail message specified in bytes.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following except for **size**:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with

- **starts-with**: Starts with

operator must be one of the following for **size**:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

value

Specifies the value to match.

value must be an alphanumeric string and can contain punctuation characters.

- **cc**: A string of 1 through 512 characters
- **content**: A string of 1 through 128 characters
- **from**: A string of 1 through 64 characters
- **size**: A range of bytes from 1 through 4000000000 bytes
- **subject**: A string of 1 through 128 characters
- **to**: A string of 1 through 512 characters

Usage Guidelines Use this command to define rule expressions to match different fields/parameters within standard e-mail messages.

Example

The following command defines a rule expression to analyze user traffic for the occurrence of *triangle* in the "cc" field of e-mail messages:

```
email cc contains triangle@xyz.com
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

exit

Usage Guidelines

Use this command to return to the parent configuration mode.

file-transfer any-match

This command allows you to define rule expressions to match all file-transfer packets. This expression applies to file transfers that use the FTP or HTTP protocols.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] file-transfer any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**

- **TRUE**

Usage Guidelines Use this command to define rule expressions to match all file-transfer packets. This expression applies to file transfers that use the FTP or HTTP protocols.

Example

The following command defines a rule expression to match all file-transfer packets:

```
file-transfer any-match = TRUE
```

file-transfer chunk-number

This command allows you to define rule expressions to match the total number of chunks in an HTTP file as determined by the File Transfer analyzer.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] file-transfer chunk-number** *operator chunks_number*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

chunks_number

Specifies the number of chunks to match.

chunks_number must be an integer from 1 through 65535.

Usage Guidelines Use this command to define rule expressions to match the total number of chunks in an HTTP file as determined by the File Transfer analyzer.

Example

The following command defines a rule expression to match *150* number of chunks:

```
file-transfer chunk-number = 150
```

file-transfer current-chunk-length

This command allows you to define rule expressions to match the length of an HTTP chunk currently in the File Transfer analyzer.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] file-transfer current-chunk-length`** *`operator current_chunk_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

current_chunk_length

Specifies the current chunk length value (in bytes) to match.

current_chunk_length must be an integer from 1 through 40000000.

Usage Guidelines Use this command to define rule expressions to match the length of an HTTP chunk currently in the File Transfer analyzer.

Example

The following command defines a rule expression to match length of current HTTP chunk as *1500000* bytes:

```
file-transfer current-chunk-length = 1500000
```

file-transfer declared-chunk-length

This command allows you to define rule expressions to match the declared length of an HTTP chunk currently in the File Transfer analyzer.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] file-transfer declared-chunk-length` *`operator declared_chunk_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

declared_chunk_length

Specifies the declared chunk length value (in bytes) to match.

declared_chunk_length must be an integer from 1 through 40000000.

Usage Guidelines

Use this command to define rule expressions to match the declared length of an HTTP chunk currently in the File Transfer analyzer.

Example

The following command defines a rule expression to match declared length of the current HTTP chunk as *2500000* bytes:

```
file-transfer declared-chunk-length = 2500000
```

file-transfer declared-file-size

This command allows you to define rule expressions to match the declared file size by the File Transfer analyzer decoding the FTP handshake.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] file-transfer declared-file-size` *`operator declared_file_size`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

declared_file_size

Specifies the declared file size (in bytes) to match.

declared_file_size must be an integer from 1 through 40000000.

Usage Guidelines

Use this command to define rule expressions to match the declared file size by the File Transfer analyzer decoding the FTP handshake.

Example

The following command defines a rule expression to match declared file size as *2500000* bytes:

```
file-transfer declared-file-size = 2500000
```

file-transfer filename

This command allows you to define rule expressions to match file name.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] file-transfer filename [ case-sensitive ]` *`operator file_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

file_name

Specifies the file name to match.

file_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match file name in file-transfer.

Example

The following command defines a rule expression to match file name containing *star1*:

```
file-transfer filename contains star1
```

file-transfer previous-state

This command allows you to define rule expressions to match previous state of File Transfer FSM.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] file-transfer previous-state *operator file_transfer_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

file_transfer_previous_state

Specifies the previous state to match.

file_transfer_previous_state must be one of the following:

- **init**: Specifies previous state as initialization.
- **request-sent**: Specifies previous state as request sent.

- **transfer-error**: Specifies previous state as transfer error.
- **transfer-ok**: Specifies previous state as transfer ok.

Usage Guidelines Use this command to define rule expressions to match previous state of File Transfer FSM.

Example

The following command defines a rule expression to match previous state of **init**:

```
file-transfer previous-state = init
```

file-transfer state

This command allows you to define rule expressions to match the current state of File Transfer FSM.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] file-transfer state** *operator file_transfer_current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

file_transfer_current_state

Specifies the current state to match.

file_transfer_current_state must be one of the following

- **init**: Specifies current state as initialization.
- **request-sent**: Specifies current state as request sent.

- **transfer-error**: Specifies current state as transfer error.
- **transfer-ok**: Specifies current state as transfer ok.

Usage Guidelines

Use this command to define rule expressions to match current state of File Transfer FSM.

The following table describes details of File Transfer FSM states with event:

Event	init	request-sent	transfer-ok	transfer-er
FTP "RETR" command or HTTP "GET" request received with chunk encoding	request-sent	Discarded	Discarded	Discarded
HTTP 2xx response received	transfer-ok	Discarded	Discarded	Discarded
HTTP 4xx or HTTP 5xx response received	transfer-error	Discarded	Discarded	Discarded
FTP reply received with reply status as file-transfer complete/successful	Discarded	transfer-ok	Discarded	Discarded
FTP reply received with reply status as file-transfer unsuccessful	Discarded	transfer-error	Discarded	Discarded

Example

The following command defines a rule expression to match file-transfer current state of **init**:

```
file-transfer state = init
```

file-transfer transferred-file-size

This command allows you to define rule expressions to match the size of a file that has been transferred so far, as detected by the File Transfer analyzer.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] file-transfer transferred-file-size *operator transferred_file_size*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

transferred_file_size

Specifies the transferred file size (in bytes) to match.

transferred_file_size must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match the size of the file that has been transferred so far, as detected by the File Transfer analyzer.

Example

The following command defines a rule expression to match file transferred size of *2500* bytes:

```
file-transfer transferred-file-size = 2500
```

ftp any-match

This command allows you to define rule expressions to match all FTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define a rule expression to match all FTP packets.

Example

The following command defines a rule expression to match all FTP packets:

```
ftp any-match = TRUE
```

ftp client-ip-address

This command allows you to define rule expressions to match IP address of the FTP client.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp client-ip-address *operator ipv4/ipv6_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals

- =: Equals
- >=: Greater than or equals

ipipv4/ipv6_address

Specifies the FTP client IP address to match.

ipv4/ipv6_address must be in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Usage Guidelines

Use this command to define rule expressions to match an FTP client IP address, which will be either the IP source address or the IP destination address, depending on the direction.

Example

The following command defines a rule expression to match client IP address *209.165.200.225*:

```
ftp client-ip-address = 209.165.200.225
```

ftp client-port

This command allows you to define rule expressions to match port number of the FTP client.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp client-port *operator port_number*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

port_number

Specifies the client port number to match.

port_number must be an integer from 1 through 65535.

Usage Guidelines

Use this command to define rule expressions to match port number of the FTP client, which will be either the TCP source port or the TCP destination port, depending on the direction.

Example

The following command defines a rule expression to match FTP client port number *10*:

```
ftp client-port = 10
```

ftp command args

This command allows you to define rule expressions to match arguments within an FTP command.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ftp command args [ case-sensitive ]` *`operator argument`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with

- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the argument to match.

argument must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines Use this command to define rule expressions to match arguments within an FTP command.

Example

The following command defines a rule expression to match argument *ascii* within an FTP command:

```
ftp command args = ascii
```

ftp command id

This command allows you to define rule expressions to match FTP command ID.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] ftp command id** *operator command_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals

- >=: Greater than or equals

command_id

Specifies the command identifier to match.

In 8.3 and earlier releases, *command_id* must be an integer from 0 through 15.

In 9.0 and later releases, *command_id* must be an integer from 0 through 18.

Usage Guidelines

Use this command to define rule expressions to match FTP command ID.

Example

The following command defines a rule expression to match the FTP command ID *10*:

```
ftp command id = 10
```

ftp command name

This command allows you to define rule expressions to match FTP command name.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp command name *operator command_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

command_name

Specifies the command name to match.

command_name must be one of the following:

- **abor**: Abort command
- **cwd**: Current working directory command
- **eprt**: eprt command
- **epsv**: epsv command
- **list**: List command
- **mode**: Transfer mode command
- **pass**: Password command
- **pasv**: Passive command
- **port**: Port command
- **quit**: Quit command
- **rest**: Restore command
- **retr**: Retry command
- **stor**: Store command
- **stru**: File structure command
- **syst**: System command
- **type**: Type command
- **user**: User command

Usage Guidelines Use this command to define rule expressions to match FTP command name.

Example

The following command defines a rule expression to match FTP command name **list**:

```
ftp command name = list
```

ftp connection-type

This command allows you to define rule expressions to match FTP connection type.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ftp connection-type` *`operator connection_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

connection_type

Specifies the connection type to match.

connection_type must be one of the following:

- **0**: Unknown
- **1**: Control connection
- **2**: Data connection

Usage Guidelines

Use this command to define rule expressions to match an FTP connection type.

Example

The following command defines a rule expression to match FTP connection type **1**:

```
ftp connection-type = 1
```

ftp data-any-match

This command allows you to define rule expressions to match all FTP data packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp data-any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all FTP data packets.

Example

The following command defines a rule expression to match all FTP data packets:

```
ftp data-any-match = TRUE
```

ftp filename

This command allows you to define rule expressions to match FTP file name.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ftp filename [ case-sensitive ]` *`operator file_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

file_name

Specifies the file name to match.

file_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match an FTP file name.

Example

The following command defines a rule expression to match a file named *testtransfer*:

```
ftp filename = testtransfer
```

ftp pdu-length

This command allows you to define rule expressions to match the length of a current FTP packet.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp pdu-length *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the FTP PDU length (in bytes) to match.

pdu_length must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match the length of a current FTP packet, that is, FTP PDU length (FTP header + FTP payload).

Example

The following command defines a rule expression to match an FTP PDU length of *9647* bytes:

```
ftp pdu-length = 9647
```

ftp pdu-type

This command allows you to define rule expressions to match FTP Protocol Data Unit (PDU) type.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ftp pdu-type` *operator pdu_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_type

Specifies the PDU type to match.

pdu_type must be one of the following:

- **0**: Unknown
- **1**: Command
- **2**: Reply

Usage Guidelines

Use this command to define rule expressions to match a PDU type of FTP packet.

Example

The following command defines a rule expression to match FTP PDU type **1**:

```
ftp pdu-type = 1
```

ftp previous-state

This command allows you to define rule expressions to match previous state of FTP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp previous-state *operator ftp_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ftp_previous_state

Specifies the previous state to match.

ftp_previous_state must be one of the following:

- **command-sent**
- **init**
- **response-error**
- **response-ok**

Usage Guidelines

Use this command to define rule expressions to match a previous state of FTP session.

Example

The following command defines a rule expression to match previous FTP state **init**:

```
ftp previous-state = init
```

ftp reply code

This command allows you to define rule expressions to match FTP reply code.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp reply code *operator reply_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the FTP reply code to match.

reply_code must be an integer from 100 through 599.

Usage Guidelines

Use this command to define rule expressions to match an FTP reply code.

Example

The following command defines a rule expression to match FTP reply code *150*:

```
ftp reply code = 150
```

ftp server-ip-address

This command allows you to define rule expressions to match FTP server IP address.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] ftp server-ip-address`** *`operator ipv4/ipv6_address`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

ipv4/ipv6_address

Specifies IP address of the server to match

ipv4/ipv6_address must be in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

Usage Guidelines Use this command to define rule expressions to match an FTP server IP address, which will be either the IP source address or the IP destination address, depending on the direction.

Example

The following command defines a rule expression to match the FTP server IP address *209.165.200.225*:

```
ftp server-ip-address = 209.165.200.225
```

ftp server-port

This command allows you to define rule expressions to match FTP server port number.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] ftp server-port`** *`operator port`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port

Specifies the FTP server port number to match.

port must be an integer from 1 through 65535.

Usage Guidelines

Use this command to define rule expressions to match an FTP server port number, which will be either the TCP source port or the TCP destination port, depending on the direction.

Example

The following command defines a rule expression to analyze user traffic for FTP server port *21*:

```
ftp server-port = 21
```

ftp session-length

This command allows you to define rule expressions to match the total number of bytes sent on an FTP control connection.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp session-length *operator session_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the FTP session length (in bytes) to match.

session_length must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match the total number of bytes sent on an FTP control connection.

Example

The following command defines a rule expression to match FTP session length of *40000* bytes:

```
ftp session-length = 40000
```

ftp state

This command allows you to define rule expressions to match the current state of an FTP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp state *operator ftp_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ftp_state

Specifies the FTP state to match.

ftp_state must be one of the following:

- **close**: FTP transmissions that are in closed state.
- **command-sent**: FTP transmissions that are in command-sent state.
- **response-error**: FTP transmissions that are in response-error state.
- **response-ok**: FTP transmissions that are in response-ok state.

Usage Guidelines

Use this command to define rule expressions to match the current state of an FTP session.

Example

The following command defines a rule expression to match FTP current state **close**:

```
ftp state = close
```

ftp url

This command allows you to define rule expressions to match the FTP URL/path of a file being transferred.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ftp url [case-sensitive] *operator url*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

url

Specifies the URL to match.

url must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines Use this command to define rule expressions to match the FTP URL/path of a file being transferred.

Example

The following command defines a rule expression to match the URL *ftp://rfc.ietf.org/rfc/rfc1738.txt*:

```
ftp url = ftp://rfc.ietf.org/rfc/rfc1738.txt
```

ftp user

This command allows you to define rule expressions to match the user name FTP command packet.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] ftp user [case-sensitive]** *operator ftp_user*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

ftp_user

Specifies the FTP user name to match.

ftp_user must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match a user name FTP command.

Example

The following command defines a rule expression to match FTP user name *user1*:

```
ftp user = user1
```

http accept

This command allows you to define rule expressions to match content types that are acceptable for the response.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http accept [case-sensitive] *operator accept_field*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **starts-with**: Starts with

accept_field

Specifies the ACCEPT field present in the HTTP header to be matched.

accept_field must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match content types in the HTTP header that are acceptable for the response.

Example

The following command defines a rule expression to match content that contains *cisco* in HTTP ACCEPT field:

```
http accept contains cisco
```

http any-match

This command allows you to define rule expressions to match all HTTP and HTTPS Connect Method packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all HTTP packets.

Example

The following command defines a rule expression to match all HTTP packets:

```
http any-match = TRUE
```

http attribute-in-data

This command allows you to define rule expressions to match any arbitrary attribute in the payload following the HTTP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

`[ no ] http attribute-in-data` *`attribute`* **`[ case-sensitive ]`** *`operator value`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

attribute

attribute must be an alphanumeric string of 1 through 31 characters.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

value

Specifies the value as an alphanumeric string of 1 through 127 characters.

Usage Guidelines Use this command to define rule expressions to match arbitrary attribute in the payload following the HTTP headers.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

http attribute-in-url

This command allows you to define rule expressions to match arbitrary attribute in the combined Host+URI HTTP headers.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] http attribute-in-url`** *`attribute`* **`[ case-sensitive ]`** *`operator value`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

attribute

attribute must be an alphanumeric string of 1 through 31 characters.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with

- **starts-with**: Starts with

value

Specifies the value as an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to configure rule expression to match an arbitrary attribute in the combined Host+URI HTTP headers.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

http content disposition

This command allows you to define rule expressions to match optional content-disposition field of HTTP entity header.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http content disposition [ case-sensitive ]` *`operator content_disposition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals

- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_disposition

This field offers a mechanism for the sender to transmit presentational information to the recipient, allowing each component of a message to be tagged with an indication of its desired presentation semantics.

content_disposition must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match optional content-disposition field of HTTP entity header. This feature supports RFC 2616 for HTTP and RFC 1806 for Content Disposition.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match content disposition *successful*:

```
http content disposition = successful
```

http content length

This command allows you to define rule expressions to match the value in HTTP Content-Length entity-header field.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http content length` *`operator content_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

content_length

Specifies the HTTP body length (in bytes) to match.

content_length must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match value in HTTP Content-Length entity-header field.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match value of *10000* bytes in HTTP Content-Length entity-header field:

```
http content length = 10000
```

http content range

This command allows you to define rule expressions for CAE re-addressing to verify if the HTTP Response has content-range header or not.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

ACS

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

```
[ no ] http content range = TRUE
```

no

If previously configured, deletes the specified rule expression from the current ruledef.

Usage Guidelines

Use this command to define rule expressions for CAE re-addressing to verify if the HTTP Response has content-range header or not. This header is useful in detecting HTTP video requests when using ECS DPI ruledefs based on HTTP headers/URI.

http content type

This command allows you to define rule expressions to match value in HTTP Content-Type entity-header field.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http content type [ case-sensitive ]` *`operator content_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the content type to match.

content_type must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match value in HTTP Content-Type entity-header field.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match *abc100* in HTTP Content-Type entity-header field:

```
http content type = abc100
```

http cookie

This command allows you to define rule expressions to match strings in the HTTP cookie header.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http cookie [case-sensitive] *operator cookie_string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain

- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **starts-with**: Starts with

cookie_string

Specifies the string to match in the HTTP cookie header.

cookie_string must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match strings in an HTTP cookie header.

The cookie match ruleline can be combined with other rulelines having different match criteria. Multiple line cookie header strings can be combined together using a comma (,) separator.

Important The HTTP parser can parse up to a maximum of 4096 bytes in the cookie header. In the case of multiple line cookie headers, the maximum of 4096 bytes includes the total size of all cookie header values, and the separators added to combine them.

Example

The following command defines a rule expression to match the HTTP cookie header with the string *tollfree*:

```
http cookie = tollfree
```

http domain

This command allows you to define rule expressions to match the domain portion of URIs in HTTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http domain [case-sensitive] *operator domain*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

domain

Specifies the domain to match.

domain must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the domain portion of URIs in HTTP packets.

From the URL, after http:// (if present) is removed, everything until the first "/" is the domain.

Example

The following command defines a rule expression to match user traffic based on domain name *testdomain*:

```
http domain = testdomain
```

http error

This command allows you to define rule expressions to match for errors in HTTP packets (for example, invalid HTTP header) and errors in the HTTP analyzer FSM (Finite State Machine) while parsing HTTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http error` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match for errors in HTTP packets and other errors in HTTP analyzer FSM while parsing HTTP packets. For example, FSM error, invalid header field values, ACS memory and buffer limit, packet related errors, and so on.

ACS supports pipelining of up to 32 HTTP requests on the same TCP connection. Pipeline overflow requests are not analyzed. Such overflow requests are treated as HTTP error. The billing system, based on this information, decides to charge or not charge, or refund the subscriber accordingly.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match user traffic based on HTTP error status of **TRUE**:

`http error = TRUE`

http first-request-packet

This command allows you to define rule expressions to match the GET or POST request, if it is the first HTTP request for the subscriber's session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http first-request-packet *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match the GET or POST request, if it is the first HTTP request for the subscriber's session.

This expression can be connected with a charging action, so the subscriber is redirected to a splash page for the first Web access attempted.

Example

The following command defines a rule expression to match first-request-packet:

```
http first-request-packet = TRUE
```

http header-length

This command allows you to define rule expressions to match HTTP header length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http header-length *operator header_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

header_length

Specifies the HTTP header length (in bytes) to match.

header_length must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match the length of an HTTP header.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match an HTTP header length of *8000*:

```
http header-length = 8000
```

http host

This command allows you to define rule expressions to match value in HTTP Host request-header field.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http host [case-sensitive] *operator host_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

host_name

Specifies the host name to match.

host_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match value in HTTP Host request-header field.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 4: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?)
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character

Regex Character	Description
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match *host1* in HTTP Host request-header field:

```
http host = host1
```

The following command defines a regex rule expression to match either of the following values in the HTTP Host request-header field: host1, host23w01.

```
http host regex "host1|host23w01"
```

http payload-length

This command allows you to define rule expressions to match HTTP payload length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http payload-length *operator payload_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

payload_length

Specifies the HTTP payload (data) length (in bytes) to match.

payload_length must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match HTTP payload (data) length (pdu-length - header-length).

Example

The following command defines a rule expression to match HTTP payload length of *100000* bytes:

```
http payload-length = 100000
```

http pdu-length

This command allows you to define rule expressions to match the total length of a single HTTP packet.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http pdu-length *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the HTTP PDU length (in bytes) to match.

pdu_length must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match the total length of a single HTTP packet. This will also match packets with partial HTTP message (due to fragmentation).

Example

The following command defines a rule expression to match an HTTP PDU length of *10000* bytes:

```
http pdu-length = 10000
```

http previous-state

This command allows you to define rule expressions to match previous state of HTTP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http previous-state *operator http_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

http_previous_state

Specifies the previous state to match.

http_previous_state must be one of the following:

- **init**: Initialized state
- **response-error**: Response error state
- **response-ok**: Response ok state
- **waiting-for-response**: Waiting for response state

Usage Guidelines Use this command to define rule expressions to match a previous state of HTTP sessions.

Example

The following command defines a rule expression to match HTTP previous state **response-ok**:

```
http previous-state = response-ok
```

http referer

This command allows you to define rule expressions to match the value in the HTTP Referer request-header field.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] http referer [case-sensitive]** *operator referer_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **regex**: Regular expression
- **starts-with**: Starts with

referer_name

Specifies the HTTP referer name to match.

referer_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match value in HTTP Referer request-header field.

This feature allows an operator to collect or track all URLs visited during a particular subscriber session. These URLs include the entire string of visited URLs, including all referral links. This information is output in an Event Data Record (EDR) format to support reporting or billing functions.

For example, if a subscriber begins a mobile web session and clicks on the "Sports" link from the home deck, and then selects ESPN and moves to an advertiser link, the operator can capture all URLs for that entire session. During this period ACS collects the URLs for a particular subscriber session; collection can be limited by time duration or number of URLs visited.

ACS generates EDRs that contain HTTP URL and the HTTP referer fields along with other fields.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 5: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +

Regex Character	Description
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".

Regex Character	Description
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match the HTTP referer *cricket.espn.com*:

```
http referer = cricket.espn.com
```

http reply code

This command allows you to define rule expressions to match status code associated with HTTP response packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http reply code *operator reply_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the HTTP reply code to match.

reply_code must be an integer from 100 through 599.

Usage Guidelines Use this command to define rule expressions to match status code associated with HTTP response codes.

Example

The following command defines a rule expression to match HTTP response code *204*:

```
http reply code = 204
```

http reply payload

This command allows you to define rule expressions to enable video detection using HTTP payload content.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product ACS

MVG

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

```
[ no ] http reply payload type = video
```

no

If previously configured, deletes the specified rule expression from the current ruledef.

Usage Guidelines Use this command to enable inspection for video in HTTP Response payload. Request payloads will not be inspected.

http request method

This command allows you to define rule expressions to match HTTP request method.

Product ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http request method *operator request_method*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

request_method

Specifies the HTTP request method to match.

request_method must be one of the following:

- **connect**
- **delete**
- **get**
- **head**
- **options**
- **post**
- **put**
- **trace**

Usage Guidelines

Use this command to define rule expressions to match an HTTP request method.

Example

The following command defines a rule expression to match user traffic based on HTTP request method **connect**:

```
http request method = connect
```

http session-length

This command allows you to define rule expressions to match HTTP session length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http session-length` *`operator session_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the HTTP total session length (in bytes) to match.

session_length must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match a total HTTP session length.

Example

The following command defines a rule expression to match an HTTP session length of *200000*:

```
http session-length = 200000
```

http state

This command allows you to define rule expressions to match current state of an HTTP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http state` *`operator current_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state of HTTP session to match.

current_state must be one of the following:

- **close**: Closed state
- **response-error**: Response error state
- **response-ok**: Response ok state
- **waiting-for-response**: Waiting for response state

Usage Guidelines

Use this command to define rule expressions to match a current state of an HTTP session.

Example

The following command defines a rule expression to match current state **close**:

```
http state = close
```

http-tls

This command allows you to define the configuration with 256 entries in a single pool. The entries can be a mix of URL and Server Name Indication (SNI) values. The system-wide limit of URL-SNI pools is 384 entries.

Product

CUPS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

http-tls url-sni-pool *pool_name*

Usage Guidelines

Use this command to define a list of URLs or SNIs for the **url-sni-pool** configuration. The system uses a pool of URLs or SNIs as an L7 filter within a ruledef. A ruledef can contain a combination of hostpool, portmap, and url-sni pool match. The system matches the url-sni-pool configuration along with the other rule lines criteria without occupying any of the 32 existing rule lines.

http transaction-length

This command allows you to define rule expressions to match HTTP transaction length (combined length of one HTTP GET Request message and its associated response messages).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http transaction-length { *operator transaction_length* **| { { range | !range }** *range_from* **to** *range_to* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

transaction_length

Specifies the HTTP transaction length (in bytes) to match.

transaction_length must be an integer from 1 through 4000000000.

{ range | !range } ***range_from*** **to** ***range_to***

Enables or disables the range criteria for length of transaction.

- **range**: Enables the range criteria for HTTP transaction length.
- **!range**: Disables the range criteria for HTTP transaction length.
- *range_from*: Specifies the start of range (in bytes) for HTTP transaction length.
- *range_to*: Specifies the end of range (in bytes) for HTTP transaction length.

Usage Guidelines Use this command to define rule expressions to match an HTTP transaction length [one HTTP GET Request message + associated response message(s)] in bytes.

Example

The following command defines a rule expression to match an HTTP transaction length of *10200* bytes:

```
http transaction-length = 10200
```

http transfer-encoding

This command allows you to define rule expressions to match the value in HTTP Transfer-Encoding general-header field.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] http transfer-encoding [ case-sensitive ]` *`operator transfer_encoding`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

transfer_encoding

Specifies the HTTP transfer encoding to match.

transfer_encoding must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the value in HTTP Transfer-Encoding general-header field.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match the value *chunked* in HTTP Transfer-Encoding general-header field:

```
http transfer-encoding = chunked
```

http uri

This command allows you to define rule expressions to match HTTP URI.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http uri [case-sensitive] *operator uri*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

uri

Specifies the HTTP URI to match.

uri must be an alphanumeric string of 1 through 127 characters, and can contain punctuation characters, and excludes the "host" portion.

Usage Guidelines

Use this command to define rule expressions to match an HTTP URI, excluding the host portion.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 6: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".

Regex Character	Description
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match the HTTP URI string *http://www.somehost.com*:

```
http uri = http://www.somehost.com
```

The following command defines a regex rule expression to match either of the following or similar values in the HTTP URI string: http://server19.com/search?form=zip, http://server20.com/search?form=pdf

```
http uri regex
"(http://|http://www).server[0-2][0-9].com/search?form=(pdf|zip)"
```

http url

This command allows you to define rule expressions to match HTTP URL.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http url [case-sensitive] *operator url*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

url

Specifies the HTTP URL to match.

url must be an alphanumeric string of 1 through 127 characters. that allows punctuation characters and includes "host + URI" for HTTP PDUs.

For example, in case of the URL "http://www.google.fr/", the host is "http://www.google.fr", and the URI is "/":

```
Hypertext Transfer Protocol
  GET / HTTP/1.1\r\n
    Request Method: GET
    Request URI: /
    Request Version: HTTP/1.1
  Accept: */*\r\n
  Accept-Language: fr\r\n
  Accept-Encoding: gzip, deflate\r\n
  User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1)\r\n
  Host: www.google.fr\r\n
  Connection: Keep-Alive\r\n
  \r\n
```

Usage Guidelines

Use this command to define rule expressions to match HTTP URL.

Important When rule lines are added or modified, the entire trie is recreated and it mallocs memory for every URL present in the configuration. This leads to huge memory allocation that gets freed once the trie is created.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *ECS Administration Guide*.

Table 7: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".

Regex Character	Description
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match the HTTP URL *http://rfc.ietf.org/rfc/rfc1738.txt*:

```
http url = http://rfc.ietf.org/rfc/rfc1738.txt
```

The following command defines a regex rule expression to match either of the following or similar values in the HTTP URL string: http://yahoo.com, http://www.yahoo.co.in, http://yahoo.com/news.

```
http url regex "(http://|http://www).yahoo.(co.in|com)*"
```

http user-agent

This command allows you to define rule expressions to match the User-Agent request-header field of HTTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http user-agent [case-sensitive] *operator user_agent*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **starts-with**: Starts with

user_agent

Specifies the HTTP user agent value to match.

user_agent must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match value in HTTP user-agent header field.

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match *xyz.123* in HTTP user-agent header field:

```
http user-agent = xyz.123
```

http version

This command allows you to define rule expressions to match version information in HTTP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http version [case-sensitive] *operator http_version*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **starts-with**: Starts with

http_version

Specifies this HTTP version value to match.

http_version must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match HTTP version.

Example

The following command defines a rule expression to match HTTP version *http4.2*:

```
http version = http4.2
```

http x-header

This command allows you to define rule expressions to match specified field within extension-headers (x-headers).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] http x-header *field_name* **[case-sensitive]** *operator string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

field_name

field_name must be an alphanumeric string of 1 through 31 characters.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!present**: Not present
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **present**: Present
- **starts-with**: Starts with

string

Specifies the HTTP x-header value to match.

string must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match specified fields within x-headers. The extension-header can be any header field not specified in RFCs.

All x-header fields must begin with "x-".

In 14.0 and later releases, the ECS HTTP analyzer supports both CRLF and LF as valid terminators for HTTP header fields.

Example

The following command defines a rule expression to match the extension-header *test_field* for the value *test_string*:

```
http x-header test_field = test_string
```

icmp any-match

This command allows you to define rule expressions to match all ICMP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] icmp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match all ICMP packets.

Example

The following command defines a rule expression to match all ICMP packets:

```
icmp any-match = TRUE
```

icmp code

This command allows you to define rule expressions to match value in the Code field of ICMP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] icmp code** *operator code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

code

Specifies the ICMP code to match.

code must be an integer from 0 through 255.

Usage Guidelines Use this command to define rule expressions to match a code field of ICMP packets.

Example

The following command defines a rule expression to match ICMP code *11*:

```
icmp code = 11
```

icmp type

This command allows you to define rule expressions to match value in Type field of ICMP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] icmp type` *operator type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

type

Specifies the ICMP type to match.

type must be an integer from 0 through 255. For example, 0 for Echo Reply, 3 for Destination Unreachable, and 5 for Redirect.

Usage Guidelines

Use this command to define rule expressions to match a type field of ICMP packets.

Example

The following command defines a rule expression to match user traffic based on ICMP type *3*:

```
icmp type = 3
```

icmpv6 any-match

This command allows you to define rule expressions to match all ICMPv6 packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] icmpv6 any-match` *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all ICMPv6 packets.

Example

The following command defines a rule expression to match all ICMPv6 packets:

```
icmpv6 any-match = TRUE
```

icmpv6 code

This command allows you to define rule expressions to match value in Code field of ICMPv6 packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] icmpv6 code` *`operator code`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

code

Specifies the ICMPv6 code to match.

code must be an integer from 0 through 255.

Usage Guidelines

Use this command to define rule expressions to match a code field of ICMPv6 packets.

Example

The following command defines a rule expression to match ICMPv6 code *134*:

```
icmpv6 code = 134
```

icmpv6 type

This command allows you to define rule expressions to match type field of ICMPv6 packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] icmpv6 type` *`operator type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

type

Specifies the ICMPv6 type to match.

type must be an integer from 0 through 255. For example, 129 for Echo Reply, 3 for Time Exceeded, and 137 for Redirect Message.

Usage Guidelines

Use this command to define rule expressions to match type field of ICMPv6 packets.

Example

The following command defines a rule expression to match ICMPv6 type *133*:

```
icmpv6 type = 133
```

if-protocol

This command allows you to associate different content IDs with the same ruledef, depending on the protocol being used.

Product

Important In StarOS 18.0 and later releases, this command has been deprecated.

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-ruledef)#`

Syntax Description

```
if-protocol { http | wsp-connection-less | wsp-connection-oriented }
content-id content_id
no if-protocol { http | wsp-connection-less | wsp-connection-oriented }
```

no

If previously configured, deletes the specified rule expression from the current ruledef.

http

Specifies HTTP protocol.

This is the same as the rule expression **http any-match = true**.

wsp-connection-less

Specifies WSP connection-less protocol.

This is the same as requiring "**wsp any-match = true**" but "**wtp any-match = false**" (that is, connection-less WAP1.x).

wsp-connection-oriented

Specifies WSP connection-oriented protocol.

This is the same as the combined rule expression "**wsp any-match = true**" and "**wtp any-match = true**" (that is, connection-oriented WAP1.x).

content-id *content_id*

Specifies the content ID for the specified protocol.

In 12.1 and earlier releases, *content_id* must be an integer from 1 through 65535.

In 12.2 and later releases, *content_id* must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to associate different content IDs with the same ruledef, depending on the protocol being used.

This command is only effective for charging ruledefs. See the command for information on how to configure charging ruledefs.

If a particular ruledef should have three different values for content-id, depending on whether the traffic is connection-oriented WAP1.x, connection-less WAP1.x, or WAP2.0, within the ruledef we should have configuration similar to the following:

if-protocol wsp-connection-oriented content-id *1*

if-protocol wsp-connection-less content-id *2*

if-protocol http content-id *3*

Presumably, the ruledef would have another configurable like "**www url contains** *foo*", which would cause it to use different content IDs when "foo" was accessed, depending upon the protocol being used.

Example

The following command associates HTTP protocol and a content ID of *23*:

```
if-protocol http content-id 23
```

imap any-match

This command allows you to define rule expressions to match all IMAP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all IMAP packets.

Example

The following command defines a rule expression to match all IMAP packets:

```
imap any-match = TRUE
```

imap cc

This command allows you to define rule expressions to match recipient address in the Carbon Copy (cc) field of e-mails in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap cc [ case-sensitive ]` *`operator cc_address`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

cc_address

Specifies the e-mail "cc" address/name to match.

cc_address must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match recipient address in the "cc" field of e-mails in IMAP messages.

Example

The following command defines a rule expression to match recipient address *triangle@xyz.com* in the "cc" field of e-mails in IMAP messages:

```
imap cc contains triangle@xyz.com
```

imap command

This command allows you to define rule expressions to match embedded IMAP commands in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap command *operator command*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

command

Specifies the command to match.

command must be one of the following:

- **append**
- **authenticate**
- **capability**
- **check**
- **close**
- **copy**
- **create**
- **delete**
- **examine**
- **expunge**
- **fetch**
- **list**
- **login**
- **logout**
- **lsub**
- **noop**
- **rename**
- **search**
- **select**
- **starttls**
- **status**
- **store**
- **subscribe**

- **uid-copy**
- **uid-fetch**
- **uid-search**
- **uid-store**
- **unsubscribe**

Usage Guidelines Use this command to define rule expressions to match an embedded command in the IMAP message.

Example

The following command defines a rule expression to match **close** command in IMAP messages:

```
imap command = close
```

imap content class

This command allows you to define rule expressions to match the content-class field of e-mails in IMAP messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] imap content class [ case-sensitive ]`** *`operator content_class`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain

- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_class

Specifies the content class to match.

content_class must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match the content-class field of e-mails in IMAP messages.

Example

The following command defines a rule expression to analyze user traffic matching content class *javax.mail.internet.MimeMultipart* in the content-class field of e-mails in IMAP messages:

```
imap content class contains javax.mail.internet.MimeMultipart
```

imap content type

This command allows you to define rule expressions to match the content-type field of e-mails in IMAP messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] imap content type [case-sensitive]** *operator content_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the content type field to match.

content_type must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the content-type field of e-mails in IMAP messages.

Example

The following command defines a rule expression to analyze user traffic matching content type *TEXT/plain; charset=iso-8859-1* in the content-type field of e-mails in IMAP messages:

```
imap content type contains TEXT/plain; charset=iso-8859-1
```

imap date

This command allows you to define rule expressions to match the Date field of e-mails in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap date [case-sensitive] *operator date*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

date

Specifies the date to match.

date must be an alphanumeric string of 1 through 127 characters that may include punctuation marks and spaces as shown in the example below.

Usage Guidelines

Use this command to define rule expressions to match the date field of e-mails in IMAP messages.

Example

The following command defines a rule expression to analyze user traffic matching date *Fri, 20 Jan 2012 11:00:00 -0600* in the "date" field of e-mails in IMAP messages:

```
imap date contains Fri, 21 Jan 2012 11:00:00 -0600
```

imap final-reply

This command allows you to define rule expressions to match final-reply value for the last IMAP final-reply message.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

[no] imap final-reply *operator final_reply*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

final_reply

Specifies the "final-reply" condition to match.

final_reply must be one of the following:

- **bad**: Final reply is invalid or bad.
- **no**: There is no final reply.
- **ok**: Final reply is valid.

Usage Guidelines

Use this command to define rule expressions to match a final-reply value for the last IMAP final-reply message.

Example

The following command defines a rule expression to analyze user traffic matching the final-reply condition **bad** in the last IMAP final-reply message:

```
imap final-reply = bad
```

imap from

This command allows you to define rule expressions to match the from field of e-mails in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap from [case-sensitive] *operator from_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

from_address

Specifies the "from" address/value to match.

from_address must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the from field of e-mails in IMAP messages.

Example

The following command defines a rule expression to analyze user traffic matching *triangle* in the "from" field of e-mails in the IMAP messages:

```
imap from contains triangle
```

imap mail-size

This command allows you to define rule expressions to match IMAP e-mail users that have e-mails of a specified size in their mailboxes.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap mail-size` *operator mail_size*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

mail_size

Specifies the total size of mail, in bytes, to match.

mail_size must be an integer from 0 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to discover the number of IMAP e-mail users that have e-mails of a specified size in their mailboxes.

Example

The following command defines a rule expression to match users with e-mail size less than or equal to *23400* bytes:

```
imap mail-size <= 23400
```

imap mailbox-size

This command allows you to define rule expressions to match IMAP e-mail user having a specified number of messages in their mailboxes.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap mailbox-size` *operator number_of_email*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

number_of_email

Specifies the total number of e-mail messages in mailbox of an IMAP user to match.

number_of_email must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match the number of IMAP e-mail users having a specified number of messages in their mailboxes.

Example

The following command defines a rule expression to match e-mail users having less than or equal to *1024* e-mail messages in their mailboxes:

```
imap mailbox-size <= 1024
```

imap message-type

This command allows you to define rule expressions to match the type of IMAP packet.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap message-type` *`operator message_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

message_type

Specifies the IMAP packet message-type to match.

message_type must be one of the following:

- **command-continuation-reply**: Message with command-continuation-reply type.
- **final-reply**: Message is of final reply type.
- **request**: There is of request type.
- **untagged-reply**: Message of reply type, but without any tag.

Usage Guidelines

Use this command to define rule expressions to match the IMAP message type.

Example

The following command defines a rule expression to match IMAP sessions with message type **request**:

```
imap message-type = request
```

imap previous-state

This command allows you to define rule expressions to match the previous state of IMAP request sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap previous-state *operator imap_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

imap_previous_state

Specifies the previous state to match.

imap_previous_state must be one of the following:

- **init**: Message in initialization state.
- **request-sent**: Message in request-sent state.

Usage Guidelines

Use this command to define rule expressions to match previous state of IMAP request session.

Example

The following command defines a rule expression to match IMAP sessions with previous state **init**:

```
imap previous-state = init
```

imap session-length

This command allows you to define rule expressions to match the total length of an IMAP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap session-length *operator session_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the total length of IMAP session (in bytes) to match.

session_length must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match the total length of IMAP sessions.

The session length is calculated by adding together the IP payloads (that is, starting after the IP header) of all relevant IMAP session packets.

Example

The following command defines a rule expression to match IMAP sessions with length less than or equal to *4000* bytes:

```
imap session-length <= 4000
```

imap session-previous-state

This command allows you to define rule expressions to match the previous state of an IMAP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap session-previous-state` *`operator imap_session_previous_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

imap_session_previous_state

Specifies the previous state of IMAP session to match.

imap_session_previous_state must be one of the following:

- **authenticated**: Session authenticated
- **connected**: Session connected
- **init**: Session initialized
- **mailbox-selected**: Mailbox selected

Usage Guidelines

Use this command to define rule expressions to match the previous state of IMAP sessions.

Example

The following command defines a rule expression to match IMAP sessions with previous state **init**:

```
imap session-previous-state = init
```

imap session-state

This command allows you to define rule expressions to match the current state of IMAP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap session-state *operator session_current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

session_current_state

Specifies the current state to match.

session_current_state must be one of the following:

- **authenticated**: Session authenticating.
- **connected**: Session connecting.
- **logout**: Session logged out.
- **mailbox-selected**: Mailbox selecting.

Usage Guidelines

Use this command to define rule expressions to match the current state of IMAP sessions.

Example

The following command defines a rule expression to match IMAP sessions with current state **connected**:

```
imap session-state = connected
```

imap state

This command allows you to define rule expressions to match the current state of IMAP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies current state of IMAP session to match.

current_state must be one of the following:

- **request-sent**: Request message sent
- **response-fail**: Request response failed
- **response-ok**: Request response is good

Usage Guidelines

Use this command to define rule expressions to match the current state of IMAP session.

Example

The following command defines a rule expression to match IMAP sessions with current state **response-fail**:

```
imap state = response-fail
```

imap subject

This command allows you to define rule expressions to match the subject field of e-mails in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] imap subject [ case-sensitive ]` *`operator subject`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

subject

Specifies the "subject" to match.

subject must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters and space as shown in the example below.

Usage Guidelines

Use this command to define rule expressions to match "subject" field of e-mail in IMAP message.

Example

The following command defines rule expression to match occurrence of the string *My test* in the "subject" field of e-mails in IMAP message:

```
imap subject contains My test
```

imap to

This command allows you to define rule expressions to match the "to" field of e-mails in IMAP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] imap to [case-sensitive] *operator to*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

to

Specifies the "to" field value to match.

to must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match "to" field of e-mails in IMAP messages.

Example

The following command defines a rule expression to analyze user traffic matching the occurrence *xyz.com* in the "to" field of e-mails in the IMAP message:

```
imap to contains xyz.com
```

ip any-match

This command allows you to define rule expressions to match all IPv4/IPv6 packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**

- **TRUE**

Usage Guidelines Use this command to define rule expressions to match IPv4/IPv6 packets.

Example

The following command defines a rule expression to match IPv4/IPv6 packets:

```
ip any-match = TRUE
```

ip dscp

This command enables you to configure a ruledef with the DSCP value and match it with the DSCP value in the incoming IP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] ip dscp {** *operator* **}** *ipv4_tos_value | ipv6_tc_value* **[mask** *mask_value* **]**

no

If previously configured, removes the specified DSCP value and the mask from the configuration.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ipv4_tos_value | ipv6_tc_value

Specifies the DSCP value to match with the incoming IP packets.

The *ipv4_tos_value* or *ipv6_tc_value* must be an integer from 0 through 63.

mask *mask_value*

Specifies the mask for the number of bits in the DSCP value to be considered for matching.

mask_value must be an integer from 0 through 63. The default mask value is 63.

Usage Guidelines Use this command to check if the DSCP value in the IPv4 ToS or IPv6 TC field of incoming IP packet matches with configured ToS/TC value.

Example

The following command will match all incoming packets which has DSCP value 20:

```
ip dscp = 20 mask 31
```

ip downlink

This command allows you to define rule expressions to match downlink (network to subscriber) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] ip downlink** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match downlink (to subscriber) IP packets.

Example

The following command defines a rule expression to match IP packet in downlink direction:

```
ip downlink = TRUE
```

ip dst-address

This command allows you to define rule expressions to match IP destination address field within IP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ip dst-address { `*`operator`*** **` { `***`ipv4/ipv6_address`*** **` | `***`ipv4/ipv6_address/mask`*** **` | address-group `***`ipv6_address`*** **` } | { !range | range } host-pool `***`host_pool_name`*** **` }`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

operator: Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

ipv4/ipv6_address

Specifies the IP address of the destination node for outgoing traffic. *ipv4/ipv6_address* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

ipv4/ipv6_address/mask

Specifies the IP address of the destination node for outgoing traffic. *ipv4/ipv6_address/mask* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation with subnet mask bit. The mask bit is a numeric value which corresponding to the number of bits in the subnet mask.

address-group *ipv6_address*

Important The **address-group** keyword can be configured only after the = operator. The wildcard support has not been provided for IPv4 addresses.

Specifies a group of IPv6 addresses configured with wildcard input and/or specialized range input. Multiple wildcard characters can be accepted as input and only one 2 byte range input will be accepted. Both wildcard character input and 2 byte range input can be configured together within a given IPv6 address.

In the example — *2607:7700:*:[2020-3040]::ce1d:b083/128*, * is a wildcard input and [2020-3040] is a 2 byte specialized range input.

{ !range | range } host-pool *host_pool_name*

!range | range: Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

host-pool *host_pool_name*: Specifies the name of the host pool. *host_pool_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to define rule expressions to match the IP destination address field within IP headers.

Example

The following command defines a rule expression to match user traffic based on the IPv4 destination address *209.165.200.225*:

```
ip dst-address = 209.165.200.225
```

The following command defines a rule expression to match user traffic based on the given destination IPv6 address where * is the wildcard input and *[2020-3040]* is the 2 byte specialized range input:

```
ip dst-address = 2607:7700:*:[2020-3040]::ce1d:b083/128
```

ip error

This command allows you to define rule expressions to match user traffic for invalid IP packets and other errors, for example IP header error, while parsing IP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip error *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match invalid IP packets and any other errors while parsing IP packets.

Example

The following command defines a rule expression to match user traffic for invalid IP packets and other errors:

```
ip error = TRUE
```

ip protocol

This command allows you to define rule expressions to match the protocol field in IP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip protocol *operator* **{** *protocol_assignment_no* **|** *protocol* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals—available only in 8.1 and later releases
- **=**: Equals
- **>=**: Greater than or equals—available only in 8.1 and later releases

protocol_assignment_no

Specifies the protocol by assignment number.

protocol_assignment_no must be an integer from 0 through 255.

For example, 1 for ICMP, 6 for TCP, and 17 for UDP.

protocol

Specifies the protocol by name.

protocol must be one of the following:

- **ah**
- **esp**
- **gre**
- **icmp**
- **icmpv6**
- **tcp**
- **udp**

Usage Guidelines

Use this command to define rule expressions to match protocol field in IP packet headers.

Example

The following command defines a rule expression to match protocol assignment number *1*:

```
ip protocol = 1
```

ip server-domain-name

This command allows you to define rule expressions to match host names (domain names).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ip server-domain-name` *operator domain_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

domain_name

Specifies the domain name to match.

domain_name must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match full or partial host names (domain names).

The rule will be matched for the learnt IP addresses resolved from DNS queries to the specified domain names. DNS responses for the specified domain names will be snooped and the learnt IP addresses stored.

Besides being used for standard rule matching, this command also enables the DNS Snooping feature if the rulebase references any ruledefs with this configuration. The DNS protocol analyzer must also be enabled in the rulebase.

Example

The following command defines a rule expression to match domain name values containing *star*:

```
ip server-domain-name contains star
```

ip server-ip-address

This command allows you to define rule expressions to match the IP address of the destination end of the connection.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip server-ip-address { *operator* { *ipv4/ipv6_address* | *ipv4/ipv6_address/mask* | address-group *ipv6_address* } | { !range | range } host-pool *host_pool_name* }

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

operator: Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

ipv4/ipv6_address

Specifies the server IP address. For uplink packets (subscriber to network), this field matches the destination IP address in the IP header. For downlink packets (network to subscriber), this field matches the source IP address in the IP header.*ipv4/ipv6_address* must be an IP address in IPv4 dotted-decimal notation or IPv6 colon-separated-hexadecimal notation.

ipv4/ipv6_address/mask

Specifies the server IP address with subnet mask bit. For uplink packets (subscriber to network), this field matches the destination IP address in the IP header. For downlink packets (network to subscriber), this field matches the source IP address in the IP header. *ipv4/ipv6_address/mask* must be an IP address in IPv4

dotted-decimal notation or IPv6 colon-separated-hexadecimal notation with subnet mask bit. The mask bit is a numeric value which is the number of bits in the subnet mask.

address-group *ipv6_address*

Important The **address-group** keyword can be configured only after the = operator. The wildcard support has not been provided for IPv4 addresses.

Specifies a group of IPv6 addresses configured with wildcard input and/or specialized range input. Multiple wildcard characters can be accepted as input and only one 2 byte range input will be accepted. Both wildcard character input and 2 byte range input can be configured together within a given IPv6 address.

In the example — *2607:7700:*:[2020-3040]::ce1d:b083/128*, * is a wildcard input and [2020-3040] is a 2 byte specialized range input.

{ !range | range } host-pool *host_pool_name*

!range | range: Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

host-pool *host_pool_name*: Specifies name of the host pool. *host_pool_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match the IP address of the destination end of the connection.

For uplink packets, this field matches the destination IP address in the IP header. For downlink packets, this field matches the source IP address in the IP header.

Example

The following command defines a rule expression to match user traffic based on IPv4 server address *209.165.200.234*:

```
ip server-ip-address = 209.165.200.234
```

The following command defines a rule expression to match user traffic based on the given destination IPv6 address where * is the wildcard input and *[2020-3040]* is the 2 byte specialized range input:

```
ip server-ip-address = 2607:7700:*:[2020-3040]::ce1d:b083/128
```

ip src-address

This command allows you to define rule expressions to match the source IP address field within IP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip src-address { *operator* **{** *ipv4/ipv6_address* **|** *ipv4/ipv6_address/mask* **| address-group** *ipv6_address* **} | { !range | range } host-pool** *host_pool_name* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

operator: Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

ipv4/ipv6_address

Specifies IP address of the source node for incoming traffic. *ipv4/ipv6_address* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

ipv4/ipv6_address/mask

Specifies the IP address of the source node for incoming traffic with subnet mask bit. *ipv4/ipv6_address/mask* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation with subnet mask bit. The mask bit is a numeric value which corresponds to the number of bits in the subnet mask.

address-group *ipv6_address*

Important The **address-group** keyword can be configured only after the = operator. The wildcard support has not been provided for IPv4 addresses.

Specifies a group of IPv6 addresses configured with wildcard input and/or specialized range input. Multiple wildcard characters can be accepted as input and only one 2 byte range input will be accepted. Both wildcard character input and 2 byte range input can be configured together within a given IPv6 address.

In the example — *2607:7700:*:[2020-3040]::ce1d:b083/128*, * is a wildcard input and [2020-3040] is a 2 byte specialized range input.

{ !range | range } host-pool *host_pool_name*

!range | range: Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

host-pool *host_pool_name*: Specifies name of the host pool. *host_pool_name* must be a string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match IP source address field within IP header.

Example

The following command defines a rule expression to match user traffic based on IPv4 source address *209.165.200.225*:

```
ip src-address = 209.165.200.225
```

The following command defines a rule expression to match user traffic based on the given source IPv6 address where * is the wildcard input and *[2020-3040]* is the 2 byte specialized range input:

```
ip src-address = 2607:7700:*:[2020-3040]::ce1d:b083/128
```

ip subscriber-ip-address

This command allows you to define rule expressions to match the IP address of the subscriber, which will be either the source or destination address depending on the direction.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip subscriber-ip-address { *operator* { *ipv4/ipv6_address* | *ipv4/ipv6_address/mask* | address-group *ipv6_address* } | { !range | range } host-pool *host_pool_name* }

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

operator: Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

ipv4/ipv6_address

Specifies the subscriber IP address. Depending on the direction of packet this IP address will be either the IP source address or the IP destination address. *ipv4/ipv6_address* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

ipv4/ipv6_address/mask

Specifies the subscriber IP address with subnet mask bit. Depending on the direction of packet this IP address will either be the IP source address or the IP destination address. *ipv4/ipv6_address/mask* must be an IP address in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation with subnet mask bit. The mask bit is a numeric value which corresponds to the number of bits in the subnet mask.

address-group *ipv6_address*

Important The **address-group** keyword can be configured only after the = operator. The wildcard support has not been provided for IPv4 addresses.

Specifies a group of IPv6 addresses configured with wildcard input and/or specialized range input. Multiple wildcard characters can be accepted as input and only one 2 byte range input will be accepted. Both wildcard character input and 2 byte range input can be configured together within a given IPv6 address.

In the example — *2607:7700:*:[2020-3040]::ce1d:b083/128*, * is a wildcard input and [2020-3040] is a 2 byte specialized range input.

{ !range | range } host-pool *host_pool_name*

!range | range: Specifies the range criteria:

- **!range**: Not in the range of
- **range**: In the range of

host-pool *host_pool_name*: Specifies the name of the host pool. *host_pool_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match the IP address of the subscriber, which will be either the source or destination address depending on the direction.

Example

The following command defines a rule expression to match user traffic based on subscriber IPv4 address *209.165.200.225*:

ip subscriber-ip-address = 209.165.200.225

The following command defines a rule expression to match user traffic based on the given subscriber IPv6 address where * is the wildcard input and *[2020-3040]* is the 2 byte specialized range input:

ip subscriber-ip-address = 2607:7700:*:[2020-3040]::ce1d:b083/128

ip total-length

This command allows you to define rule expressions to match the total length field in IP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-ruledef)#`

Syntax Description

[no] ip total-length *operator total_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

total_length

Specifies the total length of the IP packet (including payload) to match.

total_length must be an integer from 0 through 4096.

Usage Guidelines

Use this command to define rule expressions to match the total length field in IP headers.

Example

The following command defines a rule expression to match user traffic based on IP total length of *2000* bytes:

```
ip total-length = 2000
```

ip uplink

This command allows you to define rule expressions to match uplink (subscriber to network) IP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] ip uplink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match uplink (subscriber to network) IP packets.

Example

The following command defines a rule expression to match uplink packets:

```
ip uplink = TRUE
```

ip version

This command allows you to define rule expressions to match the version number in IP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] ip version` *operator ip_version*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be = (equals).

ip_version

Specifies the IP version to match.

ip_version must be one of the following:

- **ipv4**
- **ipv6**

Usage Guidelines

Use this command to define rule expressions to match version number in IP header.

Example

The following command defines a rule expression to match user traffic for the IP version **ipv6**:

```
ip version = ipv6
```

mms any-match

This command allows you to define rule expressions to match all Multimedia Messenging Service (MMS) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all MMS packets.

Example

The following command defines a rule expression to match all MMS packets:

```
mms any-match = TRUE
```

mms bcc

This command allows you to define rule expressions to match recipient addresses in the bcc field of MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms bcc [ case-sensitive ]` *`operator bcc_address`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

bcc_address

Specifies the "bcc" address/value to match.

bcc_address must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines Use this command to define rule expressions to match recipient address in the "bcc" field of MMS messages.

Example

The following command defines a rule expression to match recipient address containing *test1* in "bcc" field of MMS messages:

```
mms bcc contains test1
```

mms cc

This command allows you to define rule expressions to match recipient addresses in the cc field of MMS messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms cc [case-sensitive]** *operator cc_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with

- **starts-with**: Starts with

cc_address

Specifies the "cc" address/value to match.

cc_address must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match recipient addresses in "cc" field of MMS messages.

Example

The following command defines a rule expression to match recipient address containing *test1* in the "cc" field of MMS messages:

```
mms cc contains test1
```

mms content location

This command allows you to define rule expressions to match the content-location field of MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms content location [ case-sensitive ]` *`operator string`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain

- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

string

Specifies the value to match.

string must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines Use this command to define rule expressions to match the content-location field of MMS messages.

Example

The following command defines a rule expression to match *test1* in content-location field of MMS messages:

```
mms content location contains test1
```

mms content type

This command allows you to define rule expressions to match the content-type field of MMS messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms content type [case-sensitive]** *operator content_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the MMS content type to match.

content_type must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match content-type field of MMS messages.

Example

The following command defines a rule expression to match *image* in content-type field of MMS messages:

```
mms content type contains image
```

mms downlink

This command allows you to define rule expressions to match downlink (network to subscriber) MMS packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms downlink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the downlink (from the Mobile Node direction) status to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match downlink MMS packets.

Example

The following command defines a rule expression to match all downlink MMS packets:

```
mms downlink = TRUE
```

mms from

This command allows you to define rule expressions to match the "from" field in MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms from [case-sensitive] *operator from_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

from_address

Specifies the "from" address/value to match.

from_address must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match the "from" field of MMS messages.

Example

The following command defines a rule expression to match *test1* in the "from" field of MMS messages:

```
mms from contains test1
```

mms message-id

This command allows you to define rule expressions to match the message ID field of MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms message-id [ case-sensitive ]` *`operator message_id`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

message_id

Specifies the MMS message ID to match.

message_id must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the "message ID" field of MMS messages.

Example

The following command defines a rule expression to match *test1* in the "message ID" field of MMS messages:

```
mms message-id contains test1
```

mms pdu-type

This command allows you to define rule expressions to match Protocol Data Unit (PDU) type in the current MMS packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms pdu-type *operator pdu_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pdu_type

Specifies the MMS PDU type to match.

pdu_type must be one of the following:

- **mms-pdu-type-m-acknowledge-ind**
- **mms-pdu-type-m-delivery-ind**
- **mms-pdu-type-m-http-get**
- **mms-pdu-type-m-notification-ind**
- **mms-pdu-type-m-notify-rsp-ind**
- **mms-pdu-type-m-retrieve-conf**
- **mms-pdu-type-m-send-conf**
- **mms-pdu-type-m-send-request**
- **mms-pdu-type-m-wsp-get**
- **mms-pdu-type-response**: This option is deprecated. Use the **mms_pdu_type_m_retrieve_conf** option instead.

Usage Guidelines

Use this command to define rule expressions to match the PDU type in the current MMS packet.

Example

The following command defines a rule expression to match PDU type **mms-pdu-type-m-http-get** in the current MMS packet:

```
mms pdu-type = mms-pdu-type-m-http-get
```

mms previous-state

This command allows you to define rule expressions to match the previous state of MMS sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms previous-state *operator mss_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

mms_previous_state

Specifies the previous state to match.

mms_previous_state must be one of the following:

- **delayed-ack-pending**: This option is deprecated, use **retrieve-conf-received**.
- **delayed-m-notify-rsp-sent**: This option is deprecated, use **notify-rsp-sent**.
- **delayed-retrieval-pending**: This option is deprecated, use **retrieval-pending**.
- **immediate-retrieval-pending**: This option is deprecated, use **retrieval-pending**.
- **init**

- **m-send-conf-rcvd**: This option is deprecated, use **send-success**.
- **m-send-req-sent**
- **notification-ind-rcvd**
- **notify-rsp-sent**
- **retrieval-pending**
- **retrieve-conf-received**
- **send-success**

Usage Guidelines Use this command to define rule expressions to match the previous state of MMS sessions.

Example

The following command defines a rule expression to match user traffic based on MMS previous state of **retrieval-pending**:

```
mms previous-state = retrieval-pending
```

mms response status

This command allows you to define rule expressions to match the response status code of MMS messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms response status** *operator status_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

status_code

Specifies the status code to match.

status_code must be an integer from 128 through 136.

Usage Guidelines Use this command to define rule expressions to match response status code of MMS messages.

Example

The following command defines a rule expression to match user traffic based on MMS response status code *129*:

```
mms response status = 129
```

mms state

This command allows you to define rule expressions to match the current state of MMS sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms state** *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies current state of MMS session to match.

current_state must be one of the following:

- **delayed-ack-pending**: This option is deprecated, use **retrieve-conf-received**.

- **delayed-m-notify-rsp-sent**: This option is deprecated, use **notify-rsp-sent**.
- **delayed-retrieval-pending**: This option is deprecated, use **retrieval-pending**.
- **delivery-failed**
- **delivery-success**
- **immediate-retrieval-pending**: This option is deprecated, use **retrieval-pending**.
- **m-send-conf-rcvd**: This option is deprecated, use **send-success**.
- **m-send-req-sent**
- **notification-ind-rcvd**
- **notify-rsp-sent**
- **retrieval-failed**
- **retrieval-pending**
- **retrieval-success**
- **retrieve-conf-received**
- **send-success**

Usage Guidelines Use this command to define rule expressions to match the current state of MMS session.

Example

The following command defines a rule expression to match user traffic based on the current state of MMS session as **retrieval-failed**:

```
mms state = retrieval-failed
```

mms status

This command allows you to define rule expressions to match the current status of MMS sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms status** *operator status*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

status

Specifies the MMS status to match.

status must be an integer from 128 through 132.

Usage Guidelines Use this command to define rule expressions to match current status of MMS sessions.

Example

The following command defines a rule expression to match user traffic based on MMS current status *130*:

```
mms status = 130
```

mms subject

This command allows you to define rule expressions to match the "subject" field of MMS messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] mms subject [case-sensitive]** *operator subject_string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

subject_string

Specifies the value to match.

subject_string must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match "subject" field of MMS messages.

Example

The following command defines a rule expression to match *test1* in the "subject" field of MMS messages:

```
mms subject contains test1
```

mms tid

This command allows you to define rule expressions to match the "Transaction Identifier" (TID) field of MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms tid [ case-sensitive ]` *`operator transaction_id`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

transaction_id

Specifies the MMS TID to match.

transaction_id must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match TID field of MMS messages.

Example

The following command defines a rule expression to match *test* in TID field of MMS messages:

```
mms tid = test
```

mms to

This command allows you to define rule expressions to match the "to" field of MMS messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms to [case-sensitive] *operator to_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

to_address

Specifies the "to" address/name to match.

to_address must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match "to" field of MMS messages.

Example

The following command defines a rule expression to match user traffic based on *test* in "to" field of MMS messages:

```
mms to = test
```

mms uplink

This command allows you to define rule expressions to match uplink (subscriber to network) MMS packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] mms uplink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the uplink (from the Mobile Node direction) status to match.

condition must one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match uplink MMS packets.

Example

The following command defines a rule expression to match uplink MMS packets:

```
mms uplink = TRUE
```

mms version

This command allows you to define rule expressions to match the MMS version in MMS packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] mms version` *`operator version`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

version

Specifies the MMS version to match.

version must be an integer from 1 through 65535.

Important MMS protocol analyzer supports decoding of only MMS version 1.0.

Usage Guidelines

Use this command to define rule expressions to match MMS version in MMS packets.

Example

The following command defines a rule expression to match MMS version *1.0* in MMS packets:

```
mms version = 1
```

multi-line-or all-lines

This command applies the OR operator to all lines in the current ruledef.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] multi-line-or all-lines`

no

If previously configured, deletes this configuration in the current ruledef.

multi-line-or all-lines

Applies the OR operator to all lines in the current ruledef.

Usage Guidelines

When a ruledef is evaluated, if the **multi-line-or all-lines** command is configured, the logical OR operator is applied to all the rule expressions in the ruledef to decide if the ruledef matches or not. If the **multi-line-or all-lines** command is not configured, the logical AND operator is applied to all the rule expressions.

The intent of this command is to allow a single ruledef to specify multiple URL expressions. Otherwise, multiple ruledefs need to be created, each with one URL expression. When this CLI command is used, each expression in the ruledef impacts the total number of ruledefs allowed. So from a "maximum number of possible ruledefs" perspective, it makes no difference whether there are N ruledefs with one expression each, or one ruledef with N expressions.

p2p any-match

This command allows you to define rule expressions to match all Peer-to-Peer (P2P) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] p2p any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **TRUE**: The rule matches any P2P traffic.
- **FALSE**: The rule does not match any P2P traffic.

Usage Guidelines

Use this command to define rule expressions to match all P2P packets.

Example

The following command defines a rule expression to match all P2P packets:

```
p2p any-match = TRUE
```

p2p app-identifier

This command allows you to configure application identifiers populated from the plugin and mark the matching flows to a custom-defined protocol (CDP) name.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] p2p app-identifier { quic-sni *operator quic_sni_string* **| tls-cname** *operator tls_cname_string* **| tls-sni** *operator tls_sni_string* **}**

no

If previously configured, deletes the specified configuration from the current ruledef.

quic-sni *operator quic_sni_string*

Specifies the QUIC Server Name Indication (SNI) field value.

operator specifies how to match and must be one of the following:

- **!=**: Does not equal
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

quic_sni_string specifies the QUIC server name and must be an alphanumeric string of 1 through 127 characters.

tls-cname *operator tls_cname_string*

Specifies the common name in the Server Hello message of TLS.

SSL renegotiation is supported for the flows that are marked using "tls-cname" rules. This feature is available only if the plugin is loaded with 20.2 or later builds.

operator specifies how to match and must be one of the following:

- **!=**: Does not equal
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

tls_cname_string specifies the common name and must be an alphanumeric string of 1 through 127 characters.

tls-sni *operator tls_sni_string*

Specifies the TLS/SSL Server Name Indication (SNI) field.

operator specifies how to match and must be one of the following:

- **!=**: Does not equal
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

tls_sni_string specifies the TLS/SSL server name and must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to configure application identifiers populated from the plugin and mark the matching flows to a custom-defined protocol (CDP) name.

The SNI ruledef supports multi-line-or all-lines or default multi-line-and rule lines. The rule lines configured with "!=" operator will not be optimized.

Important The QUIC SNI Detection feature requires the latest ADC Plugin to be loaded from the adc_v2.x stream along with StarOS changes. The default plugin does not support this feature. Contact your Cisco account representative for more information.

Example

The following command configures the QUIC SNI app-identifier that is set to *fb.com*:

```
p2p app-identifier quic-sni = fb.com
```

p2p behavioral

This command allows you to define rule expressions to match behavioral detection type — P2P, Video, VoIP, Behavioral Upload or Behavioral Download.

Product

ACS, ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] p2p behavioral *operator behavioral_list*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals

behavioral_list

Specifies the behavior to match. The behavioral list is the list of supported behavioral detection logic populated from the currently loaded ADC plugin.

behavioral_list must be one of the following:

- **download**: Detects unknown flows which are data download using behavioral analysis
- **p2p**: Detects P2P/file sharing protocols using behavioral analysis
- **upload**: Detects unknown flows which are data upload using behavioral analysis
- **video**: Detects video flows using behavioral analysis
- **voip**: Detects VoIP (voice and video) protocols using behavioral analysis

Usage Guidelines

Use this command to define rule expressions to detect behavioral protocols. Behavioral P2P and behavioral VoIP are meant for zero day detection of P2P/file sharing protocols and VoIP traffic respectively. Behavioral upload/download is similar to client-server upload/download using HTTP, FTP, SFTP, etc. It must also detect flows of non-standard ports which ECS cannot detect and falls under the client-server model. This feature is disabled by default and meant only for statistical purposes (not for charging purposes). For detection purposes use the **p2p-detection behavioral** command in the ACS Configuration Mode.

Example

The following command specifies to configure behavioral VoIP:

```
p2p behavioral = voip
```

p2p protocol

This command allows you to define rule expressions to match P2P protocol. This command must be used for charging purposes. It must not be used for detection purposes.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] p2p protocol *operator protocol*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be = (equals).

protocol

Specifies the protocol to match.

protocol must be one of the following:

- **120Sports**
- **8tracks**
- **abcnetworks**
- **abscbn**
- **accuradio**
- **actionvoip**
- **actsync**
- **adobeconnect**
- **aenetworks**
- **aimini**
- **amazoncloud**
- **amazonmusic**
- **amazonvideo**
- **android_messages**
- **antsp2p**
- **anyconnect**
- **apple-push**
- **apple-store**
- **applejuice**
- **applemaps**
- **ares**
- **armagettron**
- **avi**
- **badoo**
- **baeblemusic**
- **baidumovie**

- **battlefld**
- **bbm**
- **beatport**
- **betternet**
- **bitcasa**
- **bittorrent**
- **bittorrent-sync**
- **blackberry-store**
- **blackberry**
- **blackdialer**
- **blackplanet-radio**
- **box**
- **btn**
- **callofduty**
- **cbssports**
- **chikka**
- **cisco-jabber**
- **citrix**
- **clubbox**
- **clubpenguin**
- **comodounite**
- **crackle**
- **crossfire**
- **crunchyroll**
- **curiosity-stream**
- **cyberghost**
- **danzwave**
- **dashradio**
- **ddlink**
- **deezer**
- **didi**
- **directconnect**

- **directv**
- **discord**
- **disneymovies**
- **dish-anywhere**
- **dns-tunneling**
- **dofus**
- **dramafever**
- **dropbox**
- **ebuddy**
- **edonkey**
- **epix**
- **eros**
- **espn**
- **expressvpn**
- **facebook**
- **facetime**

Important The **facetime** protocol is available only in 9.0 and in 11.0 and later releases.

- **fandor**
- **fasttrack**
- **feidian**
- **ficall**
- **fiesta**
- **filetopia**
- **filmontv**
- **fitradio**
- **flash**
- **flickr**
- **flixea**
- **florensia**
- **foursquare**

- **fox-business**
- **fox-news**
- **fox-now**
- **fox-sports**
- **foxsportsgo**
- **freenet**
- **friendster**
- **fring**
- **fubotv**
- **funshion**
- **fxnow**
- **gaana**
- **gadugadu**
- **gamekit**

Important The **gamekit** protocol is available only in 9.0 and in 11.0 and later releases.

- **gmail**
- **gnutella**
- **go90**
- **goober**
- **google-music**
- **google-push**
- **google**
- **googleplay**
- **googleplus**
- **gotomeeting**
- **gtalk**
- **guildwars**
- **halflife2**
- **hamachivpn**
- **hayu**

- **hbogo**
- **hbonow**
- **hbonordic**
- **heytell**
- **hgtv**
- **hike-messenger**
- **hls**
- **hotspotvpn**
- **http**
- **hulu**
- **hyves**
- **iax**
- **icall**
- **icecast**
- **icloud**
- **idrive**
- **igo**
- **iheartradio**
- **imesh**
- **imessage**
- **imgur**
- **imo**
- **implus**
- **instagram**
- **iplayer**
- **iptv**
- **irc**
- **isakmp**
- **iskoot**
- **itunes**
- **jabber**
- **jap**

- **jumblo**
- **kakaotalk**
- **kidoodle**
- **kik-messenger**
- **kiswe**
- **klowdtv**
- **kontiki**
- **kugoo**
- **kuro**
- **linkedin**
- **livestream**
- **lync**
- **magicjack**
- **manolito**
- **mapfactor**
- **mapi**
- **maplestory**
- **meebo**
- **meetic**
- **mega**
- **mgcp**
- **mig33**
- **mlb**
- **mojo**
- **monkey3**
- **mozy**
- **msn**
- **msrp**
- **mute**
- **mypeople**
- **myspace**
- **nateontalk**

- **natgeotv**
- **naverline**
- **navigon**
- **nbc-sports**
- **nbc-tv**
- **netflix**
- **netmotion**
- **newsy**
- **nick**
- **nimbuzz**
- **nokia-store**
- **nrktv**
- **octoshape**
- **odkmedia**
- **odnoklassniki**
- **off**
- **ogg**
- **oist**
- **oovoo**
- **opendrive**
- **openft**
- **openvpn**
- **operamini**
- **orb**
- **oscar**
- **outlook**
- **paltalk**
- **pando**
- **pandora**
- **path**
- **pbs**
- **pcanywhere**

- **periscope**
- **pinterest**
- **playstation**
- **plingm**
- **poco**
- **pokemon-go**
- **popo**
- **pplive**
- **ppstream**
- **ps3**
- **qello_concerts**
- **qq**
- **qqgame**
- **qqlive**
- **quake**
- **quic**
- **quicktime**
- **radio-paradise**
- **rdp**
- **rdt**
- **redbulltv**
- **regram**
- **rfactor**
- **rhapsody**
- **rmstream**
- **reddit**
- **rodi**
- **rynga**
- **samsung-store**
- **scydo**
- **secondlife**
- **shalomworld**

- **shoutcast**
- **showtime**
- **silverlight**
- **siri**
- **skinny**
- **skydrive**
- **skype**
- **slacker-radio**
- **slingbox**
- **slingtv**
- **smartvoip**
- **smashcast**
- **smule**
- **snapchat**
- **softether**
- **sopcast**
- **soribada**
- **soulseek**
- **soundcloud**
- **subsplash**
- **spark**
- **spdy**
- **speedtest**
- **splashfighter**
- **spotify**
- **ssdp**
- **ssl**
- **starz**
- **stealthnet**
- **steam**
- **stun**
- **sudaphone**

- **svtplay**
- **tagged**
- **talkatone**
- **tango**
- **taxify**
- **teamspeak**
- **teamviewer**
- **telegram**
- **thunder**
- **tidal**
- **tinder**
- **tmo-tv**
- **tor**
- **truecaller**
- **truphone**
- **tumblr**
- **tunein-radio**
- **tunnelvoice**
- **turbovpn**
- **tvants**
- **tvland**
- **tvuplayer**
- **tv2sumo**
- **twitter**
- **twitch**
- **ultrabac**
- **ultrasurf**
- **univision**
- **ufc**
- **upc-phone**
- **usenet**
- **ustream**

- **uusee**
- **vchat**
- **veohtv**
- **vessel**
- **vevo**
- **viber**
- **viki**
- **vimeo**
- **vine**
- **voipdiscount**
- **vopium**
- **voxer**
- **vpnmaster**
- **vpnx**
- **vtok**
- **vtun**
- **vudu**
- **warcft3**
- **waze**
- **webex**
- **wechat**
- **weibo**
- **whatsapp**
- **wii**
- **windows-azure**
- **windows-store**
- **winmx**
- **winny**
- **willow**
- **wmstream**
- **wofkungfu**
- **wofwarcraft**

- **wuala**
- **wwe**
- **xbox**
- **xdcc**
- **xfinity**
- **xing**
- **yahoo**
- **yahoomail**
- **yiptv**
- **yogafree**
- **youku**
- **yourfreetunnel**
- **youtube**
- **zattoo**
- **zello**

Usage Guidelines Use this command to define rule expressions to detect P2P protocols for charging purposes. For detection purposes use the **p2p-detection protocol** command in the ACS Configuration Mode.

Example

The following command specifies to detect orb protocol for charging purposes:

```
p2p protocol = orb
```

p2p protocol-group

This command allows you to define rule expressions to match ADC application/protocol group.

Product ACS, ADC

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] p2p protocol-group** *operator group_list*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals

group_list

Specifies the ADC application/protocol group to match.

group_list must be one of the following:

- **anonymous-access**: Anonymous internet access protocols mainly used for illegal purposes.
- **business**: Applications/Protocols used for business purposes.
- **communicator**: Applications/Protocols used mainly for messaging which includes IM, IM based file transfer, VoIP or video chats.
- **cloud**: Applications/Protocols for cloud service.
- **e-mail**: Applications/Protocols used for electronic mail.
- **e-news**: Applications/Protocols used for internet news and magazine reading.
- **e-store**: Applications/Protocols used for electronic stores.
- **internet-privacy**: Applications/Protocols used for file transfers.
- **filesharing**: Applications/Protocols used for gaming.
- **gaming**: Standard protocols used in internet.
- **p2p-filesharing**: Applications/Protocols used for creating a virtual network over internet mainly for business purposes.
- **p2p-anon-filesharing**: Peer to Peer application/protocols used for anonymous filesharing.
- **remote-control**: Peer to Peer application/protocols used for filesharing.
- **social-nw-game**: Application/Protocols used for remote management.
- **social-nw-generic**: Application/Protocols used for social networking games.
- **social-nw-videoconf**: Application/Protocols used for social networking.
- **standard**: Application/Protocols used for social network video conference.
- **streaming**: Application/Protocols used for streaming audio and video.
- **untagged**: Default group for protocols not otherwise classified.

Usage Guidelines Use this command to define rule expressions to match ADC protocol group. The list of P2P applications/protocols is populated from the currently loaded P2P plugin.

Example

The following command specifies to detect the **gaming** protocol group:

```
p2p protocol-group = gaming
```

p2p set-app-proto

This command allows you to configure the custom-defined protocol (CDP) name.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] p2p set-app-proto** *cdp_name_string*

no

If previously configured, deletes the specified configuration from the current ruledef.

cdp_name_string

Specifies the name of the custom defined protocol (CDP) for TLS/SSL flows, QUIC flows or any app-identifier matching the ruledef. *cdp_name_string* must be an alphanumeric string of 1 through 19 characters.

Usage Guidelines Use this command to set the CDP name. If the flow/packet matches the rule, the CDP name specified in the ruledef will be taken and the flow will be marked as CDP. If no CDP is configured in the rule, then the flow will be treated as TLS/SSL or QUIC flow.

Important The QUIC SNI Detection feature requires the latest ADC Plugin to be loaded from the adc_v2.x stream along with StarOS changes. The default plugin does not support this feature. Contact your Cisco account representative for more information.

Example

The following command configures the custom-defined application protocol name set to *facebook*:

```
p2p set-app-proto facebook
```

p2p traffic-type

This command allows you to define rule expressions to match the traffic type.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] p2p traffic-type` *`operator traffic_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

traffic_type

Specifies the traffic type to match.

In 11.0 and later releases, *traffic_type* must be one of the following:

- **ads**
- **audio**
- **file-transfer**
- **im**
- **streaming-video**
- **unclassified**
- **video**
- **voipout**

In 10.0 and earlier releases, the supported *traffic_type* was **voice**.

Usage Guidelines Use this command to configure the system to detect voice or non-voice P2P traffic. When the detection of a protocol is enabled then the detection of sub-type is enabled by default.

Example

The following command configures the system to detect video traffic:

```
p2p traffic-type = video
```

pop3 any-match

This command allows you to define rule expressions to match all Post Office Protocol 3 (POP3) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pop3 any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match all POP3 packets.

Example

The following command defines a rule expression to match all POP3 packets:

```
pop3 any-match = TRUE
```

pop3 command args

This command allows you to define rule expressions to match POP3 command arguments.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] pop3 command args [ case-sensitive ]` *`operator argument`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the command argument to match.

argument must be an alphanumeric string of 1 through 40 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match POP3 command argument.

Example

The following command defines a rule expression to match POP3 command argument *test*:

```
pop3 command args = test
```

pop3 command id

This command allows you to define rule expressions to match POP3 command ID.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] pop3 command id *operator command_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

command_id

Specifies the command ID to match.

command_id must be an integer from 1 through 12.

Usage Guidelines Use this command to define rule expressions to match a POP3 command ID.

Example

The following command defines a rule expression to match POP3 command ID *8*:

```
pop3 command id = 8
```

pop3 command name

This command allows you to define rule expressions to match command sent within a POP3 packet.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] pop3 command name`** *`operator command_name`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

command_name

Specifies the command name to match.

command_name must be one of the following:

- **apop**
- **dele**
- **list**
- **noop**
- **pass**

- **quit**
- **retr**
- **reset**
- **stat**
- **top**
- **uidl**
- **user**

Usage Guidelines Use this command to define rule expressions to match commands sent within POP3 packets.

Example

The following command defines a rule expression to match the **list** command sent in POP3 packets:

```
pop3 command name = list
```

pop3 mail-size

This command allows you to define rule expressions to match POP3 mail size.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pop3 mail-size {** *operator mail_size* **| { range | !range }** *range_from* **to** *range_to* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals

- =: Equals
- >=: Greater than or equals

{ range | !range } ***range_from*** **to** ***range_to***

Enables or disables the range criteria.

- **range**: Enables the range criteria.
- **!range**: Disables the range criteria.
- *range_from*: Specifies start of the range.

  range_from must be an integer from 1 through 4000000000.
- *range_to*: Specifies the end range.

  range_to must be an integer from 1 through 4000000000, and must be greater than *range_from*.

mail_size

Specifies the mail size to match.

mail_size must be an integer from 1 through 4000000000.

Usage Guidelines

Use this command to define rule expressions to match POP3 mail size.

Example

The following command defines a rule expression to match POP3 mail size of *40000*:

```
pop3 mail-size = 40000
```

pop3 pdu-length

This command allows you to define rule expressions to match the Protocol Data Unit (PDU) length of POP3 packets equal to the POP3 header plus POP3 payload.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] pop3 pdu-length { *operator pdu_length* **| { { range | !range }** *range_from* **to** *range_to* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

{ range | !range } ***range_from*** **to** ***range_to***

Enables or disables the range criteria.

- **range**: Enables the range criteria.
- **!range**: Disables the range criteria.
- *range_from*: Specifies the start of range as an integer from 0 through 65535.
- *range_to*: Specifies the end range. *range_to* must be an integer from 0 through 65535, and must be greater than *range_from*.

pdu_length

Specifies the POP3 PDU length to match.

pdu_length must be an integer from 0 through 65535.

Usage Guidelines Use this command to define rule expressions to match POP3 PDU length (header + payload) in bytes.

Example

The following command defines a rule expression to match PDU length of *1000* bytes:

```
pop3 pdu-length = 1000
```

pop3 pdu-type

This command allows you to define rule expressions to match POP3 Protocol Data Unit (PDU) type.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

`[ no ] pop3 pdu-type` *`operator pdu_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pdu_type

Specifies the POP3 PDU type to match.

pdu_type must be one of the following:

- **command-packet**
- **data-packet**
- **relay-packet**

Usage Guidelines

Use this command to define rule expressions to match POP3 PDU type.

Example

The following command defines a rule expression to match POP3 PDU type **relay-packet**:

```
pop3 pdu-type = relay-packet
```

pop3 previous-state

This command allows you to define rule expressions to match the previous state of POP3 sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] pop3 previous-state *operator pop3_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pop3_previous_state

Specifies the previous state to match.

pop3_previous_state must be one of the following:

- **connected**: Connected state
- **data transaction**: Data transaction state
- **init**: Initialized state
- **reply-error**: Reply error state
- **reply-ok**: Response ok state
- **waiting-for-reply**: Waiting for reply state

Usage Guidelines

Use this command to define rule expressions to match a POP3 previous state.

Example

The following command defines a rule expression to match user traffic for a POP3 previous state of **connected**:

```
pop3 previous-state = connected
```

pop3 reply args

This command allows you to define rule expressions to match specified arguments with POP3 reply.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] pop3 reply args [case-sensitive] *operator argument*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the reply argument to match.

In 11.0 and earlier releases, *argument* must be an alphanumeric string of 1 through 512 characters, and may contain punctuation characters.

In 12.0 and later releases, *argument* must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match specified arguments within a POP3 reply.

Example

The following command defines a rule expression to match the argument *test* with POP3 replies:

```
pop3 reply args = test
```

pop3 reply id

This command allows you to define rule expressions to match POP3 reply ID.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] pop3 reply id` *`operator reply_id`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

reply_id

Specifies the POP3 reply ID to match.

reply_id must be one of the following:

- **0**: Unknown reply
- **1**: +OK
- **2**: -Error

Usage Guidelines

Use this command to define rule expressions to match POP3 reply ID.

Example

The following command defines a rule expression to match POP3 reply ID of *2*:

```
pop3 reply id = 2
```

pop3 reply status

This command allows you to define rule expressions to match POP3 reply status.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] pop3 reply status` *`operator reply_status`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

reply_status

Specifies the reply status to match.

reply_status must be one of the following:

- **+OK**: Reply OK
- **-ERR**: Reply error

Usage Guidelines

Use this command to define rule expressions to match POP3 reply status.

Example

The following command defines a rule expression to match POP3 reply status **+OK**:

```
pop3 reply status = +OK
```

pop3 session-length

This command allows you to define rule expressions to match POP3 session-length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] pop3 session-length {` *`operator session_length`* **`| { range | !range }`** *`range_from`* **`to`** *`range_to`* **`}`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

session_length

Specifies the POP3 session length to match.

session_length must be an integer from 1 through 4000000000.

{ range | !range } ***range_from*** **to** ***range_to***

Enables or disables the range criteria for PoP3 session length.

- **range**: Enables the range criteria for POP3 session length.
- **!range**: Disables the range criteria for POP3 session length.
- *range_from*: Specifies the start of range of POP3 session as an integer from 1 through 4000000000, but less than or equal to *range_to*.
- *range_to*: Specifies the end of range of POP3 session as an integer from 1 through 4000000000, but greater than or equal to *range_from*.

Usage Guidelines Use this command to define rule expressions to match the total length of POP3 sessions.

Example

The following command defines a rule expression to match a POP3 session length of *40000*:

```
pop3 session-length = 40000
```

pop3 state

This command allows you to define rule expressions to match the current state of POP3 sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pop3 state** *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **close**
- **connected**
- **data-transaction**
- **reply-error**
- **reply-ok**

- **waiting-for-reply**

Usage Guidelines Use this command to define rule expressions to match the current state of POP3 sessions.

Example

The following command defines a rule expression to match the POP3 current state **close**:

```
pop3 state = close
```

pop3 user-name

This command allows you to define rule expressions to match POP3 user name.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pop3 user-name [case-sensitive]** *operator user_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with

- **starts-with**: Starts with

user_name

Specifies the POP3 user name to match.

user_name must be an alphanumeric string of 1 through 64 characters, and may contain punctuation characters and space.

Usage Guidelines

Use this command to define rule expressions to match POP3 user name.

Example

The following command defines a rule expression to match POP3 user name *test*:

```
pop3 user-name = test
```

pptp any-match

This command allows you to defines a rule expression to match all Point-to-Point Tunneling Protocol (PPTP) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] pptp any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to specify a ruledef to analyze user traffic based on the PPTP any match status.

Example

The following command creates a PPTP ruledef for analyzing user traffic using a PPTP any match status of *FALSE*:

```
pptp any-match = FALSE
```

pptp ctrl-msg-type

This command allows you to define rule expressions to match control message type in PPTP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pptp ctrl-msg-type =** *message_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

message_type

message_type must be one of the following:

- **call-clear-request**
- **call-disconnect-notify**
- **echo-reply**
- **echo-request**
- **incoming-call-connected**
- **incoming-call-reply**
- **incoming-call-request**

- **outgoing-call-reply**
- **outgoing-call-request**
- **set-link-info**
- **start-control-connection-reply**
- **start-control-connection-request**
- **stop-control-connection-reply**
- **stop-control-connection-request**
- **wan-error-notify**

Usage Guidelines Use this command to define rule expressions to match the control message type in PPTP packets.

Example

The following command specifies to match **echo-reply** message type:

```
pptp ctrl-msg-type = echo-reply
```

pptp gre any-match

This command allows you to define rule expressions to match all PPTP Generic Routing Encapsulation (GRE) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] pptp gre any-match =** *condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

condition

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match all PPTP GRE packets.

Example

The following command defines a rule expression to match all PPTP GRE packets:

```
pptp gre any-match = TRUE
```

radius any-match

This command allows you to define rule expressions to match all RADIUS packets.

Product

GGSN

PDSN

PGW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] radius any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define an any-match rule expression to match all RADIUS packets.

Example

The following command defines an any-match rule expression to match all RADIUS packets:

```
radius any-match = TRUE
```

radius error

This command allows you to define rule expressions to match for errors in RADIUS packets and errors in the RADIUS analyzer.

Product GGSN

PDSN

P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

```
[ no ] radius error operator condition
```

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match for errors in RADIUS packets and other errors in RADIUS analyzer.

Example

The following command defines a rule expression to match user traffic based on RADIUS error status of **TRUE**:

```
radius error = TRUE
```

radius state

This command allows you to define rule expressions to match the current state of an RADIUS session.

Product GGSN

PDSN

P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] radius state** *operator radius_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

radius_state

Specifies the RADIUS state to match.

radius_state must be one of the following:

- **auth-req-rcvd**: Analyzer received the Access-Request message from the client.
- **auth-rsp-fail**: Analyzer received the Access-reject message from the server.

- **auth-rsp-success**: Analyzer received the Access-Accept message from the server as a reply to Access-request.

Usage Guidelines Use this command to define rule expressions to match the current state of an RADIUS session.

Example

The following command defines a rule expression to match RADIUS current state **close**:

```
radius state = close
```

rtcp any-match

This command allows you to define rule expressions to match all Real-Time Transport Control Protocol (RTCP) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] rtcp any-match`** *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **TRUE**: The rule matches any RTCP traffic.
- **FALSE**: The rule does not match any RTCP traffic.

Usage Guidelines Use this command to define rule expressions to match all RTCP packets.

Example

The following command defines a rule expression to match all RTCP packets:

```
rtcp any-match = TRUE
```

rtcp jitter

This command allows you to define rule expressions to match the jitter parameter in RTCP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtcp jitter** *operator jitter*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

jitter

Specifies the RTCP inter-arrival jitter value (in milliseconds) to match.

jitter must be an integer from 0 through 4294967295.

Usage Guidelines Use this command to define rule expressions to match jitter parameter found in the RTCP sender report or receiver report packets.

Example

The following command matches packets for jitter greater than or equal to 1295 milliseconds:

```
rtcp jitter >= 1295
```

rtcp parent-proto

This command allows you to define rule expressions to match the parent protocol of the RTCP flow.

Important This command is available only in 8.1 and 9.0 and later releases.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtcp parent-proto` *`operator parent_protocol`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

parent_protocol

Specifies the RTCP parent protocol to match.

parent_protocol must be one of the following:

- **rtsp**: Real Time Streaming Protocol
- **sip**: Session Initiation Protocol

Usage Guidelines Use this command to define rule expressions to match user traffic based on the parent protocol of the RTCP flow.

Example

The following command defines a rule expression to match user traffic based on SIP being the parent protocol of the RTCP flow:

```
rtcp parent-proto = sip
```

rtcp pdu-length

This command allows you to define rule expressions to match Protocol Data Unit (PDU) length of RTCP packets, (RTCP header + RTCP payload).

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtcp pdu-length** *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the RTCP length (in bytes) to match.

In 8.1 and later releases, *pdu_length* must be an integer from 1 through 65535.

In 8.0, *pdu_length* must be an integer from 1 through 2000.

Usage Guidelines Use this command to define rule expressions to match RTCP PDU length (header + payload) in bytes.

Example

The following command defines a rule expression to match user traffic based on an RTCP PDU length of *10000* bytes:

```
rtcp pdu-length = 10000
```

rtcp rtsp-id

This command allows you to define rule expressions to match user traffic based on a Real-time Streaming Protocol (RTSP) ID associated with an RTCP flow.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] rtcp rtsp-id [ case-sensitive ]`** *`operator rtsp_id`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with

- **starts-with**: Starts with

rtsp_id

Specifies the value to match.

rtsp_id must be an alphanumeric string of 1 through 32 characters.

Usage Guidelines Use this command to define rule expressions to match an RTSP ID associated with an RTCP flow.

Example

The following command defines a rule expression to match user traffic containing RTSP message ID of *test1*:

```
rtcp rtsp-id contains test1
```

rtcp session-length

This command allows you to define rule expressions to match the total length of RTCP sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtcp session-length** *operator session_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the RTCP total session length (in bytes) to match.

In 8.1 and later releases, *session_length* must be an integer from 1 through 4000000000.

In 8.0, *session_length* must be an integer from 1 through 40000000.

Usage Guidelines

Use this command to define rule expressions to match RTCP total session length.

Example

The following command defines a rule expression to match user traffic for a total RTCP session length of *200000*:

```
rtcp session-length = 200000
```

rtcp uri

This command allows you to define rule expressions to match URI associated with RTCP flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtcp uri [ case-sensitive ]` *`operator uri`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with

- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

uri

Specifies the URI to match.

uri must be an alphanumeric string of 1 through 127 characters and may include punctuation characters.

Usage Guidelines Use this command to define rule expressions to match URI associated with RTCP flow.

Example

The following command defines a rule expression to match user traffic for RTCP URI *rtsp://www.example.org*:

```
rtcp uri = rtsp://www.example.org
```

rtp any-match

This command allows you to define rule expressions to match all Real-time Transport Protocol (RTP) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtp any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all RTP packets.

Example

The following command defines a rule expression to match all RTP packets:

```
rtp any-match = TRUE
```

rtp parent-proto

This command allows you to define rule expressions to match the parent protocol of the RTP flow.

Important This command is available only in 8.1 and in 9.0 and later releases.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtp parent-proto *operator parent_protocol*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

parent_protocol

Specifies the RTP parent protocol to match.

parent_protocol must be one of the following:

- **rtsp**: Real Time Streaming Protocol
- **sip**: Session Initiation Protocol

Usage Guidelines Use this command to define rule expressions to match user traffic based on the parent protocol of the RTP flow.

Example

The following command defines a rule expression to match user traffic with parent protocol of the RTP flow being SIP:

```
rtp parent-proto = sip
```

rtp pdu-length

This command allows you to define rule expressions to match PDU length of RTP packets, equal to the RTP header + RTP payload.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtp pdu-length** *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals

- >=: Greater than or equals

pdu_length

Specifies the RTP PDU length (in bytes) to match.

In 8.1 and later releases, *pdu_length* must be an integer from 1 through 65535.

In 8.0, *pdu_length* must be an integer from 1 through 2000.

Usage Guidelines

Use this command to define rule expressions to match PDU length (header + payload) of RTP packets in bytes.

Example

The following command defines a rule expression to match an RTP PDU length of *1000* bytes:

```
rtp pdu-length = 1000
```

rtp rtsp-id

This command allows you to define rule expressions to match RTSP ID associated with RTP flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtp rtsp-id [case-sensitive] *operator rtsp_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain

- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- =: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

rtsp_id

Specifies the RTSP ID to match.

rtsp_id must be an alphanumeric string of 1 through 32 characters.

Usage Guidelines Use this command to define rule expressions to match RTSP ID associated with RTP flows.

Example

The following command defines a rule expression to match RTSP message ID of *test1*:

```
rtp rtsp-id contains test1
```

rtp session-length

This command allows you to define rule expressions to match the total length of RTP sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtp session-length** *operator session_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal

- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

session_length

Specifies the RTP total session length (in bytes) to match.

In 8.1 and later releases, *session_length* must be an integer from 1 through 4000000000.

In release 8.0, *session_length* must be an integer from 1 through 40000000.

Usage Guidelines

Use this command to define rule expressions to match the RTP total session length. The session-length is calculated by adding together the "rtp pdu-length" values of all relevant packets.

Example

The following command defines a rule expression to match a total RTP session length of *200000*:

```
rtp session-length = 200000
```

rtp uri

This command allows you to define rule expressions to match the media URI associated with RTP flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtp uri [ case-sensitive ]` *`operator uri`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

uri

Specifies the RTP URI to match.

uri must be an alphanumeric string of 1 through 127 characters. *uri* allows punctuation characters and excludes the "host" portion.

Usage Guidelines Use this command to define rule expressions to match media URI associated with RTP flow.

Example

The following command defines a rule expression to match the RTP URI string *rtsp://www.example.org*:

```
rtp uri = rtsp://www.example.org
```

rtsp any-match

This command allows you to define rule expressions to match all Real Time Streaming Protocol (RTSP) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] rtsp any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all RTSP packets.

Example

The following command defines a rule expression to match all RTSP packets:

```
rtsp any-match = TRUE
```

rtsp content length

This command allows you to define rule expressions to match the content length field in RTSP header.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp content length` *`operator content_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

content_length

Specifies the content length (in bytes) to match.

content_length must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match "content length" field in RTSP headers.

Example

The following command defines a rule expression to match content length of *10000* in RTSP headers:

```
rtsp content length = 10000
```

rtsp content type

This command allows you to define rule expressions to match the content type field in RTSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp content type [ case-sensitive ]` *`operator content_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the content type to match.

content_type must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match "content type" field in RTSP headers.

Example

The following command defines a rule expression to match RTSP content type *abc100*:

```
rtsp content type = abc100
```

rtsp date

This command allows you to define rule expressions to match the date field in the RTSP message headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp date [ case-sensitive ]` *`operator date`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

date

Specifies the date in RTSP header to match.

date must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the "date" field in the RTSP message headers.

Example

The following command defines a rule expression to match the date *12_04_2006* in RTSP message headers:

```
rtsp date = 12_04_2006
```

rtsp previous-state

This command allows you to define rule expressions to match the previous state of RTSP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtsp previous-state *operator rtsp_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

rtsp_previous_state

Specifies the previous state to match.

rtsp_previous_state must be one of the following:

- **init**
- **open**
- **play**
- **ready**
- **record**

Usage Guidelines

Use this command to define rule expressions to match the previous state of RTSP sessions.

Example

The following command defines a rule expression to match RTSP previous state **ready**:

```
rtsp previous-state = ready
```

rtsp reply code

This command allows you to define rule expressions to match the return code in RTSP responses.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] rtsp reply code`** *`operator reply_code`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the RTSP reply code to match.

reply_code must be an integer from 100 through 599.

Usage Guidelines Use this command to define rule expressions to match the return code in RTSP response.

Example

The following command defines a rule expression to match RTSP return code *302*:

```
rtsp reply code = 302
```

rtsp request method

This command allows you to define rule expressions to match the method in RTSP responses.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] rtsp request method`** *`operator request_method`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

request_method

Specifies the RTSP request method to match.

request_method must be one of the following requests:

- **announce**
- **describe**
- **get-parameter**
- **options**
- **pause**
- **play**
- **record**
- **redirect**
- **set-parameter**
- **setup**
- **teardown**

Usage Guidelines

Use this command to define rule expressions to match the method in RTSP responses.

Example

The following command defines a rule expression to match RTSP request method **announce**:

```
rtsp request method = announce
```

rtsp request packet

This command allows you to define rule expressions to match all RTSP request messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp request packet` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **TRUE**: Is request
- **FALSE**: Is response

Usage Guidelines

Use this command to define rule expressions to match all RTSP request messages.

Example

The following command defines a rule expression to match all RTSP request messages:

```
rtsp request packet = TRUE
```

rtsp rtp-seq

This command allows you to define rule expressions to match the "seq" field in the RTP-Info header of RTSP responses.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

`[ no ] rtsp rtp-seq` *`operator sequence_number`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

sequence_number

Specifies the sequence number in the RTSP RTP-Info field to match.

sequence_number must be an alphanumeric string of 0 through 65535 characters in Normal Play Time (NPT) time format.

Usage Guidelines

Use this command to define rule expressions to match user traffic matching the "seq" field in the RTP-Info header of RTSP response for a PLAY request.

Example

The following command defines a rule expression to match user traffic based on RTP-seq number *npt-12:34:59*:

```
rtsp rtp-seq = npt-12:34:59
```

rtsp rtp-time

This command allows you to define rule expressions to match the "time" field in RTP-Info header of RTSP responses.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

[no] rtsp rtp-time *operator time*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

time

Specifies the time to match.

time must be an alphanumeric string of 1 through 2147483647 characters in Normal Play Time (NPT) time format.

Usage Guidelines

Use this command to define rule expressions to match the "time" field in the RTP-Info header of RTSP response for a PLAY request.

Example

The following command defines a rule expression to match RTP timestamp of *20120123T153600Z*:

```
rtsp rtp-time = 20120123T153600Z
```

rtsp rtp-uri

This command allows you to define rule expressions to match the URI field in the RTP-Info header of RTSP responses.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtsp rtp-uri [case-sensitive] *operator uri*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

uri

Specifies the value to match with the URI in RTP-Info header of the RTSP message.

uri must be an alphanumeric string of 1 through 127 characters. *uri* allows punctuation characters and excludes the "host" portion.

Usage Guidelines

Use this command to define rule expressions to match the URI field in the RTP-Info header of the RTSP response for a PLAY request.

Example

The following command defines a rule expression to match user traffic based on RTP-URI string *rtsp://www.foo.com* in the RTP-info header of RTSP packet:

```
rtsp rtp-uri = rtsp://www.foo.com
```

rtsp session-id

This command allows you to define rule expressions to match the session ID in RTSP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp session-id [ case-sensitive ]` *`operator session_id`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

session_id

Specifies the session ID to match.

session_id must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the session ID in RTSP messages.

Example

The following command defines a rule expression to match the RTSP session ID *0123abc100*:

```
rtsp session-id = 0123abc100
```

rtsp session-length

This command allows you to define rule expressions to match the total length of RTSP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp session-length` *`operator session_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the RTSP session length (in bytes) to match.

session_length must be an integer from 1 through 40000000.

Usage Guidelines

Use this command to define rule expressions to match the total length of RTSP sessions. That is, the sum of the "rtsp pdu-length" values of all relevant packets.

Example

The following command defines a rule expression to match RTSP session length of *3000000* bytes:

```
rtsp session-length = 3000000
```

rtsp state

This command allows you to define rule expressions to match the current state of RTSP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtsp state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **end**
- **init**
- **open**
- **play**
- **ready**
- **record**

Usage Guidelines Use this command to define rule expressions to match the current state of RTSP sessions.

Example

The following command defines a rule expression to match RTSP current state **init**:

```
rtsp state = init
```

rtsp uri

This command allows you to define rule expressions to match URI in RTSP request message.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] rtsp uri [ case-sensitive ]`** *`operator uri`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression

- **starts-with**: Starts with

uri

Specifies the URI to match.

uri must be an alphanumeric string of 1 through 127 characters. *uri* allows punctuation characters and excludes the "host" portion.

Usage Guidelines

Use this command to define rule expressions to match URI in RTSP request.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 8: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character

Regex Character	Description
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match user traffic based on RTSP URI *rtsp://www.example.com:554/twister/audiotrack*:

```
rtsp uri = rtsp://www.example.com:554/twister/audiotrack
```

The following command defines a regex rule expression to match either of the following or similar values in the RTSP URI string: rtsp://pvs29p.cvf.fr:554/t1/live/Oui17, rtsp://pvs00p.cvf.fr:554/t1/live/Nrj12, rtsp://pvs90p.cvf.fr:554/t1/live/France24_fr.

```
rtsp uri regex
"rtsp://pvs([0-9][0-9])p.cvf.fr:554/t1/live/(Gulli|Tf1|Tmc|Nrj12|Star|France24_fr|Oui17)*"
```

rtsp uri sub-part

This command allows you to define rule expressions to match user traffic by parsing sub-parts of the URI in an RTSP request message.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] rtsp uri sub-part { { absolute-path | host | query } [case-sensitive] *operator string* **| port {** *port_operator port_value* **| { range | !range }** *range_from* **to** *range_to* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

absolute-path

Specifies the absolute path matching criteria to RTSP URI in an RTSP request message.

host

Specifies the host name matching criteria to RTSP URI in an RTSP request message.

query

Specifies the query string matching criteria to RTSP URI in an RTSP request message.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

string

Specifies the absolute path/host name or query string to match with the URI in RTSP header.

string must be an alphanumeric string of 1 through 127 characters. *string* allows punctuation characters and excludes the "host" portion.

port

Specifies the port related matching for RTSP URI in an RTSP request message.

port_operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_value

Specifies the RTSP port number to match with port rule in the RTSP flow as an integer from 0 through 65535.

{ range | !range } ***range_from*** **to** ***range_to*** **}**

Enables or disables the range criteria for RTSP flow ports.

- **range**: Enables the range criteria for RTSP flow ports.
- **!range**: Disables the range criteria for RTSP flow ports.
- *range_from*: Specifies the start of range of RTSP flow ports as an integer from 0 through 65535, but less than or equal to *range_to*.
- *range_to*: Specifies the end of range of RTSP flow ports as an integer from 0 through 65535, but more than or equal to *range_from*.

Usage Guidelines

Use this command to define rule expressions to match URI sub parts like host, absolute path, port, and query in RTSP request messages.

Example

The following command defines a URI sub part rule expression to analyze user traffic based on an RTSP URI port number between *1023* and *1068*:

```
rtsp uri sub-part port range 1023 to 1068
```

rtsp user-agent

This command allows you to define rule expressions to match the user-agent field in RTSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

[no] rtsp user-agent [case-sensitive] *operator user_agent*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

user_agent

Specifies the user agent to match.

user_agent must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the "user-agent" field in RTSP header.

Example

The following command defines a rule expression to match *test* in "user-agent" field of RTSP header:

```
rtsp user-agent = test
```

rtsp-stream any-match

This command allows you to define rule expressions to match all user traffic of type RTSP, RTCP, and RTP to achieve an unified charging for RTSP correlated flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

`[ no ] rtsp-stream any-match` *`operator condition`*

no

If previously configured, deletes the rtsp-stream any match rule definition.

operator

Specifies how to logically match the information in the analyzed field.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to specify a rule definition to analyze all RTSP, RTCP, and RTP traffic.

Example

The following command defines a rule expression to match all RTSP, RTCP, and RTP user traffic:

```
rtsp-stream any-match = TRUE
```

rtsp-stream first-setup-url

This command allows you to define rule expressions to match user traffic of type RTSP, RTCP, and RTP on the first setup URL of the parent RTSP flow to achieve an unified charging for RTSP correlated flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] rtsp-stream first-setup-url [ case-sensitive ]` *`operator url`*

no

If previously configured, deletes the rtsp-stream any match rule definition.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to logically match the information in the analyzed field.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

url

Specifies the URL to match.

url must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to specify a rule definition to analyze RTSP, RTCP, and RTP traffic based on the first setup URL of the parent RTSP flow.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 9: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character

Regex Character	Description
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match all RTSP, RTCP, and RTP traffic when the parent RTSP's first setup URL contains *cisco.com* :

```
rtsp-stream first-setup-url contains cisco.com
```

The following command defines a rule expression to match all RTSP, RTCP, and RTP traffic when the parent RTSP's first setup URL matches the given regular expression: *rtsp://tvs100.google.fr/t1/M6*

```
rtsp-stream first-setup-url regex
rtsp://tvs(a|l|b)[0-9][0-9].google.(fr|:554)/t1/(M6|W9_)*
```

rule-application

This command allows you to specify the purpose of a ruledef, such as for charging, post-processing, routing, and so on.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

```
rule-application { charging | post-processing | routing | tpo }
no rule-application
```

no

Disables the rule application configuration.

charging

Specifies that the current ruledef is for charging purposes.

Up to 2,048 rule definitions can be defined for the charging application in an Active Charging Service.

Default: Enabled

post-processing

Important The **post-processing** keyword is available only in 8.3 and later releases.

Specifies that the current ruledef is for post-processing purposes. This enables processing of packets even if the rule matching for them has been disabled.

routing

Specifies that the current ruledef is for routing purposes. Up to 256 rule definitions can be defined for routing in an Active Charging Service. Default: Disabled

tpo

Important The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

Usage Guidelines

Use this command to specify the rule application for a rule definition.

If, when configuring a ruledef, the rule-application is not specified, by default the system configures the ruledef as a charging ruledef.

Example

The following command configures the rule application "charging" to the current rule definition:

```
rule-application charging
```

sdp any-match

This command allows you to define rule expressions to match all packets that contain Session Description Protocol (SDP) descriptions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-ruledef)#`

Syntax Description

[no] sdp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all packets containing SDP descriptions.

Example

The following command defines a rule expression to match all packets containing SDP descriptions:

```
sdp any-match = TRUE
```

sdp connection-ip-address

This command allows you to define rule expressions to match the IP address in the connection field of SDP descriptions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sdp connection-ip-address *operator ipv4_address*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

ipv4_address

Specifies the IP address to match.

ipv4_address must be in IPv4 dotted-decimal notation.

Usage Guidelines

Use this command to define rule expressions to match IP address in the connection field of SDP descriptions.

Example

The following command defines a rule expression to match the IP address *209.165.200.225* in the connection field of SDP descriptions:

```
sdp connection-ip-address = 209.165.200.225
```

sdp media-audio-port

This command allows you to define rule expressions to match media audio ports specified in the media sections of SDP descriptions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sdp media-audio-port *operator port*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

port

Specifies the port number to match.

port must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match media audio ports specified in the media sections of SDP descriptions.

Example

The following command defines a rule expression to match media audio port *100* in the media sections of SDP descriptions:

```
sdp media-audio-port = 100
```

sdp media-video-port

This command allows you to define rule expressions to match media video ports specified in the media sections of SDP descriptions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sdp media-video-port *operator port*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

port

Specifies the port number to match.

port must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match media video ports specified in the media sections of SDP descriptions.

Example

The following command defines a rule expression to match media video port *100* in the media sections of SDP descriptions:

```
sdp media-video-port = 100
```

sdp uplink

This command allows you to define rule expressions to match SDP descriptions in the uplink (subscriber to network) direction.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sdp uplink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Is not uplink
- **TRUE**: Is uplink

Usage Guidelines Use this command to define rule expressions to match SDP descriptions in uplink direction.

Example

The following command defines a rule expression to match all SDP descriptions in the uplink direction:

```
sdp uplink = TRUE
```

secure-http any-match

This command allows to match traffic analyzed by the Secure HTTP (HTTPS) analyzer in uplink or downlink direction.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] secure-http any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal

- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match traffic analyzed by the Secure HTTP (HTTPS) analyzer in uplink or downlink direction. The analysis does not differentiate between HTTPS and non-HTTP packets if the traffic is analyzed by HTTPS analyzer.

Example

The following command defines a rule expression to match HTTPS packets analyzed by the HTTPS analyzer:

```
secure-http any-match = TRUE
```

secure-http uplink

This command allows you to define rule expressions to match uplink (subscriber to network) HTTPS packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] secure-http uplink** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Is not uplink
- **TRUE**: Is uplink

Usage Guidelines Use this command to define rule expressions to match uplink HTTPS packets.

Example

The following command defines a rule expression to match all uplink HTTPS packets:

```
secure-http uplink = TRUE
```

sip any-match

This command allows you to define rule expressions to match all Session Initiation Protocol (SIP) packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] sip any-match** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all SIP packets.

Example

The following command defines a rule expression to match all SIP packets:

```
sip any-match = TRUE
```

sip call-id

This command allows you to define rule expressions to match the Call ID in SIP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sip call-id [case-sensitive] *operator call_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains

- **ends-with**: Ends with
- **starts-with**: Starts with

call-id

Specifies the call ID to match.

call-id must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match the call ID in SIP messages.

Example

The following command defines a rule expression to match the call ID *test* in SIP messages:

```
sip call-id = test
```

sip content length

This command allows you to define rule expressions to match the content-length field in SIP headers.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] sip content length** *operator content_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

content_length

Specifies the SIP content length to match.

content_length must be an integer from 0 through 65535.

Usage Guidelines Use this command to define rule expressions to match the content-length field in SIP headers.

Example

The following command defines a rule expression to match the content length *10000* in SIP headers:

```
sip content length = 10000
```

sip content type

This command allows you to define rule expressions to match the content type field in SIP headers.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] sip content type [case-sensitive]** *operator content_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals

- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the content type to match.

content_type must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines Use this command to define rule expressions to match the content type field in SIP headers.

Example

The following command defines a rule expression to match content type *download_string* in SIP headers:

```
sip content type = download_string
```

sip from

This command allows you to define rule expressions to match the from field in SIP messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] sip from [case-sensitive]** *operator string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal

- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

string

Specifies the value to match.

string must be an alphanumeric string of 1 through 127 characters, and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match the "from" field in SIP messages.

Example

The following command defines a rule expression to match *test1* in the "from" field in SIP messages:

```
sip from contains test1
```

sip previous-state

This command allows you to define rule expressions to match previous state of SIP sessions.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] sip previous-state`** *`operator sip_previous_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

sip_previous_state

Specifies the previous state to match.

sip_previous_state must be one of the following:

- **init**
- **provisional-response**
- **request-sent**
- **response-fail**
- **response-ok**

Usage Guidelines Use this command to define rule expressions to match a previous state of SIP sessions.

Example

The following command defines a rule expression to match user traffic based on the SIP previous state of **request-sent**:

```
sip previous-state = request-sent
```

sip reply code

This command allows you to define rule expressions to match the reply code in SIP responses.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] sip reply code** *operator reply_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the SIP reply code to match.

reply_code must be an integer from 100 through 699.

Usage Guidelines

Use this command to define rule expressions to match the reply code in SIP responses.

Example

The following command defines a rule expression to match *180* in the reply code in SIP responses:

```
sip reply code = 180
```

sip request method

This command allows you to define rule expressions to match the method in SIP requests.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] sip request method` *`operator method`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

method

Specifies the SIP method to match.

method must be one of the following:

- **ack**
- **bye**
- **cancel**
- **info**
- **invite**
- **message**
- **notify**
- **options**
- **prack**
- **publish**
- **refer**
- **register**
- **subscribe**
- **update**

Usage Guidelines Use this command to define rule expressions to match the method in SIP requests.

Example

The following command defines a rule expression to match the method **bye** in SIP request messages:

```
sip request method = bye
```

sip request packet

This command allows you to define rule expressions to match all SIP request packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] sip request packet`** *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **=**: Equals
- **!=**: Does not equal

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Is a response
- **TRUE**: Is a request

Usage Guidelines Use this command to define rule expressions to match all SIP request packets.

Example

The following command defines a rule expression to match all SIP request packets:

```
sip request packet = TRUE
```

sip state

This command allows you to define rule expressions to match current state of the SIP session.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] sip state`** *`operator current_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **ack-received**
- **provisional-response**
- **request-sent**
- **response-fail**
- **response-ok**

Usage Guidelines Use this command to define rule expressions to match the current SIP session.

Example

The following command defines a rule expression to match user traffic based on SIP current state **request-sent**:

```
sip state = request-sent
```

sip to

This command allows you to define rule expressions to match the "to" field in SIP messages.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] sip to [ case-sensitive ]` *`operator to_address`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

to_address

Specifies the "to" address/name to match.

to_address must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the "to" field in SIP messages.

Example

The following command defines a rule expression to match *test1* in the "to" field of SIP messages:

```
sip to contains test1
```

sip uri

This command allows you to define rule expressions to match the URI in SIP messages.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] sip uri [sub-part { headers | host | parameters | port | userinfo }] [case-sensitive] *operator uri*

no

If previously configured, deletes the specified rule expression from the current ruledef.

sub-part { headers | host | parameters | port | userinfo }

This is an optional keyword that defines what sub-part of a SIP URI to check.

- **headers**: Apply the rule to SIP URI header field.
- **host**: Apply the rule the SIP URI host field.
- **parameters**: Apply the rule to the SIP URI parameters field.
- **port**: Apply the rule to the SIP URI port field.
- **userinfo**: Apply the rule to the SIP URI userinfo field.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

The string for sub-part keyword **port** must be an integer and requires different operators. Use the following operators with the **port** keyword:

- **!=**: Does not equal

- <=: Is less than
- =: Equals
- >=: Is greater than

uri

Specifies the SIP URI to match.

uri must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

The string for sub-part keyword **port** must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match the URI in SIP messages.

Example

The following command defines a rule expression to match the URI string *sip:209.165.200.225:5060* in SIP messages:

```
sip uri = sip:209.165.200.225:5060
```

The following command defines a rule expression to match the URI string *sip:nnnn@host:5060;user=phone* in SIP messages:

```
sip uri = sip:nnnn@host:5060;user=phone
```

smtp any-match

This command allows you to define rule expressions to match all Simple Mail Transfer Protocol (SMTP) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match all SMTP packets.

Example

The following command defines a rule expression to match all SMTP packets:

```
smtp any-match = TRUE
```

smtp command arguments

This command allows you to define rule expressions to match SMTP command arguments.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] smtp command arguments [case-sensitive]** *operator argument*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the command argument to match.

argument must be an alphanumeric string of 1 through 63 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match SMTP command arguments.

Example

The following command defines a rule expression to match SMTP command argument *test*:

```
smtp command arguments = test
```

smtp command id

This command allows you to define rule expressions to match SMTP command IDs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp command id *operator command_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

command_id

Specifies the command argument to match.

command_id must be an integer from 0 through 10.

Usage Guidelines

Use this command to define rule expressions to match SMTP command IDs.

Example

The following command defines a rule expression to match SMTP command ID *8*:

```
smtp command id = 8
```

smtp command name

This command allows you to define rule expressions to match commands sent in SMTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp command name *operator command_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

command_name

Specifies the command name to match.

command_name must be one of the following:

- **bdat**
- **data**
- **ehlo**
- **expn**
- **helo**
- **mail-from**
- **noop**
- **quit**
- **rcpt-to**
- **rset**
- **vrfy**

Usage Guidelines Use this command to define rule expressions to match commands sent in SMTP packets.

Example

The following command defines a rule expression to match **data** command in SMTP packets:

```
smtp command name = data
```

smtp mail-size

This command allows you to define rule expressions to match the size of mail sent by a SMTP client.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] smtp mail-size { operator mail_size | { { range | !range } range_from to range_to } }`

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

mail_size

Specifies the mail size (in bytes) to match.

mail_size must be an integer from 1 through 40000000.

{ range | !range } *range_from* to *range_to*

Enables or disables the range criteria.

- **range**: Enables the range criteria.
- **!range**: Disables the range criteria.
- *range_from*: Specifies the start of range as an integer from 1 through 40000000.
- *range_to*: Specifies the end range. *range_to* must be an integer from 1 through 40000000, and must be greater than *range_from*.

Usage Guidelines

Use this command to define rule expressions to match the size of mail sent by an SMTP client.

Example

The following command defines a rule expression to match mail size of *40000* bytes:

```
smtp mail-size = 40000
```

smtp pdu-length

This command allows you to define rule expressions to match the Protocol Data Unit (PDU) length of SMTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp pdu-length { *operator pdu_length* **| { { range | !range }** *range_from* **to** *range_to* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the SMTP PDU length (in bytes) to match.

pdu_length must be an integer from 1 through 65535.

{ range | !range } *range_from* to *range_to*

Enables or disables the range criteria.

- **range**: Enables the range criteria.
- **!range**: Disables the range criteria.
- *range_from*: Specifies the start of range as an integer from 1 through 65535.
- *range_to*: Specifies the end range. *range_to* must be an integer from 1 through 65535, and must be greater than *range_from*.

Usage Guidelines

Use this command to define rule expressions to match PDU length of SMTP packets, that is headers + payload.

Example

The following command defines a rule expression to match a PDU length of *1600* bytes:

```
smtp pdu-length = 1600
```

smtp previous-state

This command allows you to define rule expressions to match previous state of SMTP command sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] smtp previous-state` *`operator smtp_previous_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

smtp_previous_state

Specifies the previous state to match.

smtp_previous_state must be one of the following:

- **close**: Closed state
- **init**: Initialized state
- **response-error**: Reply error state
- **response-ok**: Response ok state
- **waiting-for-response**: Waiting for response state

Usage Guidelines

Use this command to define rule expressions to match a previous state of SMTP command sessions.

Example

The following command defines a rule expression to match user traffic based on SMTP previous state **close**:

```
smtp previous-state = close
```

smtp recipient

This command allows you to define rule expressions to match the recipient e-mail ID in the current SMTP transaction.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] smtp recipient [ case-sensitive ]` *`operator argument`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the response argument to match.

argument must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match the recipient e-mail ID in the current SMTP transaction.

Example

The following command defines a rule expression to match recipient e-mail ID containing *test* in the current SMTP transaction:

```
smtp recipient contains test
```

smtp reply arguments

This command allows you to define rule expressions to match the arguments within SMTP responses.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] smtp reply arguments [case-sensitive]** *operator argument*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

argument

Specifies the reply argument to match.

argument must be an alphanumeric string of 1 through 63 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the arguments with SMTP response.

Example

The following command defines a rule expression to match reply argument *forward-path* in SMTP response:

```
smtp reply arguments = forward-path
```

smtp reply id

This command allows you to define rule expressions to match reply ID assigned to SMTP responses.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp reply id *operator reply_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

reply_id

Specifies the reply ID to match.

reply_id must be one of the following:

- **0**: +NO reply

- **1**: +OK reply
- **2**: -ERR reply

Usage Guidelines Use this command to define rule expressions to reply ID assigned to SMTP response.

Example

The following command defines a rule expression to match reply ID *2* assigned to SMTP response:

```
smtp reply id = 2
```

smtp reply status

This command allows you to define rule expressions to match the reply status in SMTP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] smtp reply status** *operator reply_status*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

reply_status

Specifies the SMTP reply status to match.

reply_status must be one of the following:

- **+OK**: Response OK
- **-ERR**: Response error

Usage Guidelines Use this command to define rule expressions to match reply status in SMTP packets.

Example

The following command defines a rule expression to match reply status **+OK** in SMTP packets:

```
smtp reply status = +OK
```

smtp sender

This command allows you to define rule expressions to match sender e-mail ID in the current SMTP transaction.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] smtp sender [ case-sensitive ]`** *`operator sender`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

sender

Specifies the sender value to match.

sender must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match sender e-mail ID in the current SMTP transaction.

Example

The following command defines a rule expression to match sender e-mail ID containing *test* in the current SMTP transaction:

```
smtp sender contains test
```

smtp session-length

This command allows you to define rule expressions to match total length of SMTP sessions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] smtp session-length {` *`operator session_length`* **`| { range | !range }`** *`range_from`* **`to`** *`range_to`* **`}`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

session_length

Specifies the session length to match.

session_length must be an integer from 1 through 40000000.

{ range | !range } ***range_from*** **to** ***range_to***

Enables or disables the range criteria.

- **range**: Enables the range criteria.
- **!range**: Disables the range criteria.
- *range_from*: Specifies the start of range as an integer from 1 through 40000000.
- *range_to*: Specifies the end range. *range_to* must be an integer from 1 through 40000000, and must be greater than *range_from*.

Usage Guidelines

Use this command to define rule expressions to match total length of SMTP session.

Example

The following command defines a rule expression to match SMTP session length of *4000000*:

```
smtp session-length = 4000000
```

smtp state

This command allows you to define rule expressions to match current state of a SMTP command session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] smtp state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **close**: Closed state
- **init**: Initialized state
- **response-error**: Response of error state
- **response-ok**: Response of ok state
- **waiting-for-response**: Waiting for response state

Usage Guidelines Use this command to define rule expressions to match current state of SMTP command session.

Example

The following command defines a rule expression to match current state as **close** of SMTP command session:

```
smtp state = close
```

tcp analyzed out-of-order

This command allows you to define rule expressions to determine whether the received TCP packet was received before all of the earlier sequenced packets have been received. This functionality is for whether the packet was analyzed or discarded because the earlier sequenced packet(s) was (were) not received before a timeout expired.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] tcp analyzed out-of-order`** *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Not analyzed
- **TRUE**: Analyzed

Usage Guidelines

This command is used to set the status flag to 'analyzed' or 'not analyzed' for all TCP packets received at the ACSMgr/SessMgr prior to their earlier packets.

When a packet reaches ACSMgr/SessMgr prior to earlier packet(s), it and subsequent packets are buffered at ACSMgr/SessMgr as TCP out-of-order packets and ACSMgr/SessMgr waits for missing packet(s) until the time-out duration expires. If the packet(s) with the missing sequence number(s) arrives within the time-out duration, all buffered packets with the correct sequence will be presented to upper layers (HTTP etc.) for analysis; otherwise buffered TCP out-of-order packets will be sent to charging with analysis done flag at the TCP/IP layer only.

If this command is enabled the TCP out-of-order packets are marked and sent to TCP analyzer as analyzed for charging action, otherwise they are discarded.

Example

The following command sets to analyze TCP out-of-order packets:

```
tcp analyzed out-of-order = TRUE
```

tcp any-match

This command allows you to define rule expressions to match all TCP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Not analyzed
- **TRUE**: Analyzed

Usage Guidelines

Use this command to define rule expressions to match all TCP packets.

Example

The following command defines a rule expression to match all TCP packets:

```
tcp any-match = TRUE
```

tcp client-port

This command allows you to define rule expressions to match client port number in TCP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp client-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match a client port number in TCP headers.

Example

The following command defines a rule expression to analyze user traffic matching TCP client port *5000*:

```
tcp client-port = 5000
```

tcp connection-initiator

This command allows you to define rule expressions to match the TCP connection initiator.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] tcp connection-initiator** *operator* **subscriber**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

subscriber

Specifies that the connection is being initiated by the subscriber.

Usage Guidelines Use this command to define rule expressions to match the TCP connection initiator, and to allow the operator to differentiate when the connection initiated by subscriber or the subscriber is acting as a Transaction Control Server (TCS) server.

Example

The following command defines a rule expression to match user traffic based on TCP connection initiator **subscriber**:

```
tcp connection-initiator = subscriber
```

tcp downlink

This command allows you to define rule expressions to match downlink (network to subscriber) TCP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp downlink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match downlink (to subscriber) TCP packets.

Example

The following command defines a rule expression to match downlink TCP packets:

```
tcp downlink = TRUE
```

tcp dst-port

This command allows you to define rule expressions to match destination port number in TCP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp dst-port { *operator port_number* | { !range | range } { *start_range* to *end_range* | port-map *port_map_name* } }

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria:

- **!range**: Not in the range
- **range**: In the range

start_range to *end_range*

Specifies the starting and ending port numbers for the range of destination TCP ports.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match destination port number in TCP headers.

Example

The following command defines a rule expression to match destination port number *10* in TCP headers:

```
tcp dst-port = 10
```

tcp duplicate

This command allows you to define rule expressions to match TCP retransmissions.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] tcp duplicate` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Not duplicated/retransmitted
- **TRUE**: Duplicated/retransmitted

Usage Guidelines

Use this command to specify rule expressions to match TCP retransmission.

Example

The following command defines a rule expression to match TCP retransmissions:

```
tcp duplicate = TRUE
```

tcp either-port

This command allows you to define rule expressions to match either a destination or source port number in TCP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp either-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria:

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match either a destination or source port number in TCP headers.

This command expression allows you to create a single ruledef using either-port, rather than needing two ruledefs (one with dst-port and one with src-port).

Example

The following command defines a rule expression to match destination/source port number *10* in TCP header:

```
tcp either-port = 10
```

tcp error

This command allows you to define rule expressions to identify errors, either in the packet (for example, TCP checksum error) or in the TCP analyzer's Finite State Machine (FSM).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] tcp error` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define a rule expression to identify errors, either in the packet (for example, TCP checksum error) or in the TCP analyzer's FSM.

Example

The following command defines a rule expression to match TCP errors:

```
tcp error = TRUE
```

tcp flag

This command allows you to define rule expressions to match bit within the flag field of TCP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp flag *operator flag*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!contains**: Does not contain
- **contains**: Contains
- **!=**: Does not equal
- **=**: Equals

flag

Specifies the flag value to match.

flag must be one of the following:

- **ack**: TCP FLAG ACK
- **fin**: TCP FLAG FIN
- **push**: TCP FLAG PUSH
- **reset**: TCP FLAG RESET
- **syn**: TCP FLAG SYN

Usage Guidelines

Use this command to define rule expressions to match a bit within the flag field of TCP headers.

Example

The following command defines a rule expression to match **reset** within flag field of TCP headers:

```
tcp flag = reset
```

tcp initial-handshake-lost

This command allows you to define rule expressions to match data packets when there has been no TCP handshaking to establish TCP connection.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp initial-handshake-lost *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match data packets when there has been no TCP handshaking to establish TCP connection.

Example

The following command defines a rule expression to identify TCP flow where the initial handshake was not seen:

```
tcp initial-handshake-lost = TRUE
```

tcp payload

This command allows you to define rule expressions to match hexadecimal or ASCII string content in the payload protocol-signature field of the TCP payload.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] tcp payload starts-with { hex-signature** *hex_string* **| string-signature** *string* **}**

no

If previously configured, deletes the specified rule expression from the current ruledef.

hex-signature *hex_string*

Specifies hexadecimal protocol signature in payload field.

hex_string must be a dash-delimited list of hex data of size smaller than 32.

string-signature *string*

Specifies protocol signature in payload field.

string must be an alphanumeric string of 1 through 32 characters.

Usage Guidelines

Use this command to define rule expressions to match for Hex/ASCII string content in payload protocol-signature field.

This rule expression is useful for detecting certain applications.

Example

The following command defines a rule expression to identify user traffic based on TCP protocol signature *tcp1*:

```
tcp payload starts-with string-signature tcp1
```

tcp payload-length

This command allows you to define rule expressions to match the length of a TCP payload.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] tcp payload-length` *`operator payload_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

payload_length

Specifies the TCP payload length to match.

payload_length must be an integer from 0 through 40000000.

Usage Guidelines Use this command to define rule expressions to match length of TCP payload, excluding the TCP or lower layer headers.

To match TCP control packets configure a payload-length of 0 (zero).

Example

The following command defines a rule expression to match TCP payload length of *10000*:

```
tcp payload-length = 10000
```

tcp previous-state

This command allows you to define rule expressions to match previous state of TCP connections.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] tcp previous-state** *operator tcp_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

tcp_previous_state

Specifies the previous state to match.

tcp_previous_state must be one of the following:

- **close**
- **close-wait**
- **closing**

- **established**
- **fin-wait1**
- **fin-wait2**
- **last-ack**
- **listen**
- **syn-received**
- **syn-sent**
- **time-wait**

Usage Guidelines Use this command to define rule expressions to match a TCP previous state.

Example

The following command defines a rule expression to match user traffic based on previous state **time-wait**:

```
tcp previous-state = time-wait
```

tcp proxy-prev-state

This command allows you to define rule expressions to match TCP previous state on the ingress side of the TCP proxy.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] tcp proxy-prev-state`** *`operator previous_state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal

- =: Equals

previous_state

Specifies the previous state to match.

previous_state must be one of the following:

- **close**
- **close-wait**
- **closing**
- **established**
- **fin-wait1**
- **fin-wait2**
- **last-ack**
- **listen**
- **syn-received**
- **syn-sent**
- **time-wait**

Usage Guidelines

If there is no TCP proxy configured, this configuration is not applicable.

For proxy-enabled flows, TCP state handling interprets the ingress side as the radio side and the egress side as the Internet side of the TCP connection.

tcp state and **tcp prev-state** is the state of the client stack, which would be either the state of the subscriber's stack (if flow is not proxy enabled) or the MS state of proxy on the egress-side (if flow is proxy-enabled).

tcp proxy-state and **tcp proxy-prev-state** is the state of the embedded TCP proxy server, that is the proxy ingress-side.

So, depending on the use case, if using **tcp state** and **tcp prev-state** an existing configuration may work fine regardless of whether proxy is enabled. For other use cases, other ruledefs may have to be created.

Both **tcp state** and **tcp proxy-state** can be used in the same ruledef. If proxy was being used, they would map to the egress-side and ingress-side, respectively. If proxy was not being used, then this would not match ruledef because proxy state would not be applicable.

Example

The following command defines a rule expression to match user traffic based on TCP proxy previous state of established:

```
tcp proxy-prev-state = established
```

tcp proxy-state

This command allows you to define rule expressions to match the TCP state on the ingress side of the TCP proxy.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] tcp proxy-state` *`operator state`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

state

Specifies the state to match.

state must be one of the following:

- **close**
- **close-wait**
- **closing**
- **established**
- **fin-wait1**
- **fin-wait2**
- **last-ack**
- **listen**
- **syn-received**

- **syn-sent**
- **time-wait**

Usage Guidelines

If there is no TCP proxy configured, this configuration is not applicable.

For proxy-enabled flows, TCP state handling interprets the ingress side as the radio side and the egress side as the Internet side of the TCP connection.

tcp state and **tcp prev-state** is the state of the client stack, which would be either the state of the subscriber's stack (if flow is not proxy enabled) or the MS state of proxy on egress-side (if flow is proxy-enabled).

tcp proxy-state and **tcp proxy-prev-state** is the state of the embedded TCP proxy server, that is the proxy ingress-side.

So, depending on the use case, if using **tcp state** and **tcp prev-state** an existing configuration may work fine regardless of whether proxy is enabled. For other use cases, other ruledefs may have to be created.

Both **tcp state** and **tcp proxy-state** can be used in the same ruledef. If proxy was being used, they would map to the egress-side and ingress-side, respectively. If proxy was not being used, then this would not match the ruledef because proxy state would not be applicable.

Example

The following command defines a rule expression to match user traffic based on TCP proxy previous state of established:

```
tcp proxy-state = established
```

tcp server-port

This command allows you to define rule expressions to match server port number in TCP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp server-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria:

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match server port number in TCP headers.

Example

The following command defines a rule expression to analyze user traffic matching TCP server port *10*:

```
tcp server-port = 10
```

tcp session-length

This command allows you to define rule expressions to match the total length of a TCP session.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] tcp session-length`** *`operator session_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

session_length

Specifies the TCP session length (in bytes) to match as be an integer from 0 through 4000000000.

Usage Guidelines Use this command to define rule expressions to match the total length of a TCP session.

The session-length is calculated by adding together the TCP payload-length values of all relevant packets.

Example

The following command defines a rule expression to match user traffic based on TCP session length of *2000* bytes:

```
tcp session-length = 2000
```

tcp src-port

This command allows you to define rule expressions to match source a port number in TCP headers.

Product ACS

Privilege Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp src-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria:

- **!range**: Not in the range
- **range**: In the range

start_range to *end_range*

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match source a port number in TCP headers.

Example

The following command defines a rule expression to analyze user traffic matching TCP source port *10*:

```
tcp src-port = 10
```

tcp state

This command allows you to define rule expressions to match current state of TCP connections.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] tcp state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **close**
- **close-wait**
- **closing**
- **established**
- **fin-wait1**

- **fin-wait2**
- **last-ack**
- **listen**
- **syn-received**
- **syn-sent**
- **time-wait**

Usage Guidelines Use this command to define rule expressions to match a current state of TCP connections.

Example

The following command defines a rule expression to match user traffic based on current state **close**:

```
tcp state = close
```

tcp uplink

This command allows you to define rule expressions to match uplink (subscriber to network) TCP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] tcp uplink** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to uplink TCP packets.

Example

The following command defines a rule expression to uplink TCP packets:

```
tcp uplink = TRUE
```

tethering-detection

This command allows you to define rule expressions to match tethered or non-tethered flows.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

```
tethering-detection [ application | dns-based | ip-ttl | os-ua ] {
flow-not-tethered | flow-tethered }
no tethering-detection
```

no

Deletes the tethering detection configuration from the ruledef.

application

Specifies to select flows that were tethered or non-tethered based on App-based detection solution.

With release 21.1.3, the App-based Tethering Detection is introduced only for Netflix and YouTube.

dns-based

Specifies to select flows that were tethered or non-tethered based on DNS-based detection solution.

ip-ttl

Specifies to select flows that were tethered or non-tethered as per IP-TTL values.

os-ua

Specifies to select flows that were tethered or non-tethered as per OS-UA lookups.

In 18 and later releases, IPv6 OS-based tethering detection is supported.

flow-not-tethered

Specifies to match if tethering is not detected on flow.

flow-tethered

Specifies to match if tethering is detected on flow.

Usage Guidelines

Use this command to define rule expressions to match tethered/non-tethered flows.

Note that in order for the rule containing the tethering-detection configuration to get matched, at least one valid rule line has to be present in it.

This configuration is treated in a special manner by the rule matching engine in that it is excluded from the condition **multi-line-or all-lines**. For example, if there are three rule-lines in a ruledef and multi-line-or is enabled as follows:

```
ruledef all-tethered-web-traffic
     http any-match = TRUE
     wsp any-match = TRUE
     multi-line-or all-lines
     tethering-detection flow-tethered
     exit
```

In this case, if for a packet only the rule line **tethering-detection flow-tethered** matches, it is not sufficient to result in a rule match even though **multi-line-or all-lines** is enabled in the ruledef.

Example

The following command defines a rule expression to match tethered flows:

tethering-detection flow-tethered

tftp any-match

This command allows you to define rule expressions to match all Trivial File Transfer Protocol (TFTP) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] tftp any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Not analyzed
- **TRUE**: Analyzed

Usage Guidelines

Use this command to define rule expressions to match all TFTP packets.

Example

The following command defines a rule expression to match all TFTP packets:

```
tftp any-match = TRUE
```

tftp data-any-match

This command allows you to define rule expressions to match all TFTP data packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] tftp data-any-match`** *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**: Not analyzed
- **TRUE**: Analyzed

Usage Guidelines Use this command to define rule expressions to match all TFTP data packets.

Example

The following command defines a rule expression to match all TFTP data packets:

```
tftp data-any-match = TRUE
```

tls

This command allows to configure TLS/SSL Server Name Indication (SNI) and corresponding custom defined protocol (CDP).

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] tls { set-app-proto`** *`cdp_name_string`* **`| sni`** *`operator server_name_string`* **`}`**

no

If previously configured, deletes the configuration in the current ruledef.

set-app-proto *cdp_name_string*

Specifies the name of the custom defined protocol (CDP) for TLS/SSL flows matching the ruledef.

cdp_name_string must be an alphanumeric string of 1 through 19 characters.

sni *operator server_name_string*

Specifies the TLS/SSL Server Name Indication (SNI) field value in the Client Hello packet.

operator: Specifies how to match and must be one of the following:

- **!=**: Does not equal
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

server_name_string: Specifies the server name and must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines Use this command to configure the TLS/SSL SNI and corresponding CDP. The CDP name for a TLS/SSL flow must match a set of SNI rule lines in multiline-and or multiline-or manner.

Example

The following command configures the SNI to *facebook.com*:

```
tls sni = facebook.com
```

The following command configures the name of the corresponding protocol to *facebook*:

```
tls set-app-proto facebook
```

udp any-match

This command allows you to define rule expressions to match all UDP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] udp any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all UDP packets.

Example

The following command defines a rule expression to match all UDP packets:

```
udp any-match = TRUE
```

udp client-port

This command allows you to define rule expressions to match client port number in UDP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] udp client-port {` *`operator port_number`* **`| { !range | range } {`** *`start_range`* **`to`** *`end_range`* **`| port-map`** *`port_map_name`* **`} }`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match client port number in UDP headers.

Example

The following command defines a rule expression to analyze user traffic matching UDP client port *500*:

```
udp client-port = 500
```

udp downlink

This command allows you to define rule expressions to match downlink (network to subscriber) UDP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] udp downlink` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match downlink UDP packets.

Example

The following command defines a rule expression to match downlink UDP packets:

```
udp downlink = TRUE
```

udp dst-port

This command allows you to define rule expressions to match destination port number in UDP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] udp dst-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

!range | range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match destination port number in UDP headers.

Example

The following command defines a rule expression to match user traffic based on destination port number *10*:

```
udp dst-port = 10
```

udp either-port

This command allows you to define rule expressions to match either a destination or source port number in UDP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] udp either-port { `*`operator port_number`*** **` | { !range | range } { `***`start_range`*** **` to `***`end_range`*** **` | port-map `***`port_map_name`*** **` } }`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

!range | range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

start_range must be an integer from 1 through 65535.

end_range must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match either destination or source port number in UDP headers.

Example

The following command defines a rule expression to match user traffic based on match either source/destination port number *10*:

```
udp either-port = 10
```

udp payload starts-with

This command allows you to define rule expressions to match hex/ASCII string content in UDP payload protocol-signature field.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] udp payload starts-with { hex-signature` *`hex_string`* **`| string-signature`** *`string`* **`}`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

hex-signature *hex_string*

Specifies hexadecimal protocol signature in payload field.

hex_string must be a dash-delimited list of hex data of size smaller than 32.

string-signature *string*

Specifies protocol signature in payload field.

string must be an alphanumeric string of 1 through 32 characters.

Usage Guidelines

Use this command to define rule expressions to match for Hex/ASCII string content in UDP payload protocol-signature field.

This rule expression is useful for detecting certain applications.

Example

The following command defines a UDP rule expression to analyze user traffic based on UDP protocol signature *udp1*:

`udp payload starts-with string-signature udp1`

udp server-port

This command allows you to define rule expressions to match server port number in UDP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-ruledef)#`

Syntax Description

`[ no ] udp server-port {` *`operator port_number`* **`| { !range | range } {`** *`start_range`* **`to`** *`end_range`* **`| port-map`** *`port_map_name`* **`} }`**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

range | !range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

- *start_range* must be an integer from 1 through 65535.
- *end_range* must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match source a server port number in UDP headers.

Example

The following command defines a rule expression to analyze user traffic matching UDP server port *53*:

```
udp server-port = 53
```

udp src-port

This command allows you to define rule expressions to match source port number in UDP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] udp src-port { *operator port_number* **| { !range | range } {** *start_range* **to** *end_range* **| port-map** *port_map_name* **} }**

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

port_number

Specifies the port number to match.

port_number must be an integer from 1 through 65535.

!range | range

Specifies the range criteria.

- **!range**: Not in the range
- **range**: In the range

start_range* to *end_range

Specifies the starting and ending port numbers for the port range.

start_range must be an integer from 1 through 65535.

end_range must be an integer from 1 through 65535, and must be greater than *start_range*.

port-map *port_map_name*

Specifies the port map for the port range. *port_map_name* must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define rule expressions to match source port number in UDP headers.

Example

The following command defines a rule expression to match source port number *10* in UDP headers:

```
udp src-port = 10
```

udp uplink

This command allows you to define rule expressions to match uplink (subscriber to network) UDP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] udp uplink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- =: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match uplink UDP packets.

Example

The following command defines a rule expression to match uplink (from subscriber) UDP packets:

```
udp uplink = TRUE
```

wsp any-match

This command allows you to define rule expressions to match all Wireless Session Protocol (WSP) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp any-match *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to specify a rule expression to match all WSP packets.

Example

The following command defines a rule expression to match all WSP packets:

```
wsp any-match = TRUE
```

wsp content type

This command allows you to define rule expressions to match the content type field in WSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wsp content type [ case-sensitive ]` *`operator content_type`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies content type to match.

content_type must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines Use this command to define rule expressions to match "content type" field in WSP headers.

Example

The following command defines a rule expression to WSP content type *test*:

```
wsp content type = test
```

wsp domain

This command allows you to define rule expressions to match domain portion of the URI for WSP packets.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **`[ no ] wsp domain [ case-sensitive ]`** *`operator domain`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

domain

Specifies the domain to match.

domain must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the domain portion of URIs in WSP packets.

From the URL, after http:// (if present) is removed, everything until the first "/" is the domain.

Example

The following command defines a rule expression to match user traffic based on domain name *testdomain*:

```
wsp domain = testdomain
```

wsp downlink

This command allows you to define rule expressions to match downlink (network to subscriber) WSP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp downlink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the downlink (from the Mobile Node direction) status to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match downlink WSP packets.

Example

The following command defines a rule expression to match downlink WSP packets:

```
wsp downlink = TRUE
```

wsp first-request-packet

This command allows you to define rule expressions to match WSP first-request-packet.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp first-request-packet** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match the GET or POST request, if it is the first WSP request for the subscriber's session.

Example

The following command defines a rule expression to match WSP first-request-packet:

```
wsp first-request-packet = TRUE
```

wsp host

This command allows you to define rule expressions to match the host name header field in WSP headers.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp host [case-sensitive]** *operator host_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

host_name

Specifies the WSP host name to match.

host_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match host name header field in WSP headers.

Example

The following command defines a rule expression to match host name *host1* in WSP headers:

```
wsp host contains host1
```

wsp pdu-length

This command allows you to define rule expressions to match WSP PDU length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp pdu-length *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the WSP PDU length (in bytes) to match.

pdu_length must be an integer from 1 through 65535.

Usage Guidelines Use this command to define rule expressions to match WSP PDU length (header + payload) in bytes.

Example

The following command defines a rule expression to match user traffic based on WSP PDU length of *10000* bytes:

```
wsp pdu-length = 10000
```

wsp pdu-type

This command allows you to define rule expressions to match WSP PDU type in the current packet.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp pdu-type** *operator pdu_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pdu_type

Specifies the WSP PDU type to match.

pdu_type must be one of the following:

- **confirmed push**
- **connect-reply**
- **connect-request**
- **data-fragment**

- **delete**
- **disconnect**
- **get**
- **head**
- **options**
- **post**
- **push**
- **put**
- **redirect**
- **reply**
- **resume**
- **suspend**
- **trace**

Usage Guidelines Use this command to define rule expressions to match WSP PDU type value in current packet.

Example

The following command defines a rule expression to match WSP PDU type **resume**:

```
wsp pdu-type resume
```

wsp previous-state

This command allows you to define rule expressions to match previous WSP method invocation state.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp previous-state** *operator wsp_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

wsp_previous_state

Specifies the previous state to match.

wsp_previous_state must be one of the following:

- **init**
- **response-error**
- **response-ok**
- **waiting-for-response**

Usage Guidelines Use this command to define rule expressions to match WSP previous state.

Example

The following command defines a rule expression to match WSP previous state of *response-ok*:

```
wsp previous-state = response-ok
```

wsp reply code

This command allows you to define rule expressions to match WSP reply code.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp reply code** *operator reply_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the WSP reply code to match.

reply_code must be an integer from 0 through 101.

Usage Guidelines

Use this command to define rule expressions to match WSP reply code.

Example

The following command defines a rule expression to match WSP reply code of *50*:

```
wsp reply code = 50
```

wsp session-length

This command allows you to define rule expressions to match total length of a WSP session.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp session-length *operator session_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: less than equals
- **=**: Equals
- **>=**: greater than equals

session_length

Specifies the WSP session length (in bytes) to match.

session_length must be an integer from 1 through 65535.

Usage Guidelines Use this command to define rule expressions to match total length of WSP session.

Example

The following command defines a rule expression to match WSP session length of *2000* bytes:

```
wsp session-length = 2000
```

wsp session-management

This command allows you to define rule expressions to match WSP Session Management state.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] wsp session-management { previous-state | state }** *operator state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

previous-state

Specifies the previous WSP Session Management state.

state

Specifies current WSP Session Management Finite State Machine (FSM) state.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

state

Specifies the state to match.

For **previous-state**, *state* must be one of the following:

- **connected**
- **connecting**
- **init**
- **resuming**
- **suspended**

For **state**, *state* must be one of the following:

- **close**
- **connected**
- **connecting**
- **init**
- **resuming**
- **suspended**

Usage Guidelines

Use this command to define rule expressions to match a WSP Session Management state.

Example

The following command defines a rule expression to match previous WSP Session Management state of **connecting**:

```
wsp session-management previous-state = connecting
```

wsp state

This command allows you to define rule expressions to match WSP Method Invocation state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **close**
- **response-error**
- **response-ok**
- **waiting-for-response**

Usage Guidelines

Use this command to define rule expressions to match WSP Method Invocation state.

Example

The following command defines a rule expression to match a WSP Method Invocation state **close**:

```
wsp state = close
```

wsp status

This command has been deprecated. See the **wsp reply-code** command.

wsp tid

This command allows you to define rule expressions to match Transaction Identifier (TID) field for connection-less WSP.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp tid *operator transaction_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

transaction_id

Specifies the transaction identifier to match.

transaction_id must be an integer from 0 through 255.

Usage Guidelines

Use this command to define rule expressions to match TID field for connection-less WSP.

Example

The following command defines a rule expression to match a TID value of *22* for connection-less WSP:

```
wsp tid = 22
```

wsp total-length

This command has been deprecated. See the **wsp session-length** command.

wsp transfer-encoding

This command allows you to define rule expressions to match transfer encoding present in WSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wsp transfer-encoding [ case-sensitive ]` *`operator transfer_encoding`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

transfer_encoding

This must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match transfer encoding present in WSP header.

Example

The following command defines a rule expression to match user traffic based on WSP transfer encoding *7*:

```
wsp transfer-encoding contains 7
```

wsp uplink

This command allows you to define rule expressions to match uplink (subscriber to network) WSP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp uplink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the uplink (to the Mobile Node direction) status to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match uplink WSP packets.

Example

The following command defines a rule expression to match uplink WSP packets:

```
wsp uplink = TRUE
```

wsp url

This command allows you to define rule expressions to match WSP URL.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wsp url [ case-sensitive ]` *`operator url`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

url

Specifies the URL to match.

url must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the complete URL, including the host portion.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 10: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character

Regex Character	Description
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

Example

The following command defines a rule expression to match user traffic based on WSP URL *wsp://wiki.tcl.tk*:

```
wsp url = wsp://wiki.tcl.tk
```

The following command defines a regex rule expression to match any of the following or similar values in the WSP URL string: wsp://home.opera.yahoo.com, wsp://dwld.yahoo.com, wsp://dwld2.yahoo.com.

```
wsp url regex "wsp://(dwld|opera|home.opera|dwld[1-3]).yahoo.com"
```

wsp user-agent

This command allows you to define rule expressions to match user agent field in WSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp user-agent [case-sensitive] *operator user_agent*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

user_agent

Specifies the WSP user agent to match.

user_agent must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match a user agent field in WSP headers.

Example

The following command defines a rule expression to match value *test* in user agent field in WSP headers:

```
wsp user-agent contains test
```

wsp x-header

This command allows you to define rule expressions to match WSP extension-headers (x-headers).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wsp x-header *name* **[case-sensitive]** *operator string*

no

If previously configured, deletes the specified rule expression from the current ruledef.

name

Specifies the x-header value as an alphanumeric string of 1 through 31 characters.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

string

Specifies the value of the extension header as an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to configure any x-header field in WSP and parse it. The extension-header mechanism allows additional header fields to be defined without changing the protocol. The extension-header can be any header fields that are not specified in the RFC standard.

Example

The following command defines a rule expression to analyze user traffic containing WSP extension-header of *test_field* and value of *test_string*:

```
wsp x-header test_field = test_string
```

wtp any-match

This command allows you to define rule expressions to match all Wireless Transaction Protocol (WTP) packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-ruledef)#`

Syntax Description

`[ no ] wtp any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all WTP packets.

Example

The following command defines a rule expression to match all WTP packets:

```
wtp any-match = TRUE
```

wtp downlink

This command allows you to define rule expressions to match downlink (network to subscriber) WTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wtp downlink` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the downlink (from the Mobile Node direction) status to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match downlink WTP packets.

Example

The following command defines a rule expression to match all downlink WTP packets:

```
wtp downlink = TRUE
```

wtp gtr

This command allows you to define rule expressions to match Group Transmission (GTR) flag in the current WTP PDU.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wtp gtr *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match the GTR flag (that indicates the last packet of a packet group) in the current WTP PDU.

Example

The following command defines a rule expression to match WTP user traffic based on WTP GTR:

```
wtp gtr = TRUE
```

wtp pdu-length

This command allows you to define rule expressions to match WTP PDU length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wtp pdu-length` *`operator pdu_length`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pdu_length

Specifies the WTP PDU length (in bytes) to match.

pdu_length must be an integer from 1 through 65535.

Usage Guidelines

Use this command to define rule expressions to match WTP PDU length (header + payload) in bytes.

Example

The following command defines a rule expression to match WTP PDU length of *9647* bytes:

```
wtp pdu-length = 9647
```

wtp pdu-type

This command allows you to define rule expressions to match WTP PDU type.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wtp pdu-type *operator pdu_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

pdu_type

Specifies the WTP PDU type to match.

pdu_type must be one of the following:

- **abort**
- **ack**
- **invoke**
- **negative-ack**
- **result**
- **segment-invoke**
- **segment-result**

Usage Guidelines

Use this command to define rule expressions to match WTP PDU type.

Example

The following command defines a rule expression to match the WTP PDU type **result**:

```
wtp pdu-type = result
```

wtp previous-state

This command allows you to define rule expressions to match previous WTP state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wtp previous-state *operator wtp_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

wtp_previous_state

Specifies the previous state to match.

wtp_previous_state must be one of the following:

- **ack-sent**
- **init**
- **invoke-sent**
- **rcvd**
- **result-rcvd**

Usage Guidelines

Use this command to define rule expressions to match WTP previous state.

Example

The following command defines a rule expression to match user traffic based on WTP previous state of **ack-sent**:

```
wtp previous-state = ack-sent
```

wtp rid

This command allows you to define rule expressions to match Re-transmission Indicator (RID) flag set in WTP traffic.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wtp rid` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match WTP RID flag.

Example

The following command defines a rule expression to match user traffic containing WTP RID flag:

```
wtp rid = TRUE
```

wtp state

This command allows you to define rule expressions to match current WTP state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wtp state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **ack-sent**
- **close**
- **init**
- **invoke-sent**
- **rcvd**
- **result-rcvd**

Usage Guidelines

Use this command to define rule expressions to match current WTP state.

Example

The following command defines a rule expression to match user traffic based on current WTP state **close**:

```
wtp state = close
```

wtp tid

This command allows you to define rule expressions to match WTP Transaction Identifier (TID).

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] wtp tid *operator transaction_id*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

transaction_id

Specifies the transaction identifier to match.

transaction_id must be an integer from 0 through 65535.

Usage Guidelines

Use this command to define rule expressions to match WTP TID. This expression ignores the high order bit in the protocol that indicates the direction.

Example

The following command defines a rule expression to match user traffic containing WTP TID value of *22*:

```
wtp tid = 22
```

wtp transaction class

This command allows you to define rule expressions to match WTP Transaction Class (TCL) state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-ruledef)#`

Syntax Description

`[ no ] wtp transaction class` *`operator transaction_class`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

transaction_class

Specifies the WTP TCL to match.

transaction_class must be an integer from 0 through 2.

Usage Guidelines

Use this command to define rule expressions to match WTP transaction class.

Example

The following command defines a rule expression to match WTP traffic based on WTP transaction class *2*:

```
wtp transaction class = 2
```

wtp ttr

This command allows you to define rule expressions to match WTP Trailer Transmission (TTR) flag.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wtp ttr` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match TTR flag (used to indicate the last packet in a segmented message) in the current WTP PDU.

Example

The following command defines a rule expression to match WTP traffic based on the presence of the WTP TTR flag:

```
wtp ttr = TRUE
```

wtp uplink

This command allows you to define rule expressions to match uplink (subscriber to network) WTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] wtp uplink` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match uplink WTP packets.

Example

The following command defines a rule expression to match all uplink WTP packets:

```
wtp uplink = TRUE
```

www any-match

This command allows you to define rule expressions to match all WWW packets. It is true for HTTP, WAP1.x, and WAP2.0 protocols.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] www any-match` *`operator condition`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines

Use this command to define rule expressions to match all WWW packets. This expression is true for HTTP, WAP1.x, and WAP2.0 protocols

Example

The following command defines a rule expression to match all WWW packets:

```
www any-match = TRUE
```

www content type

This command allows you to define rule expressions to match the Content-Type field of HTTP/WSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www content type [case-sensitive] *operator content_type*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

content_type

Specifies the value to match.

content_type must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the "content type" field of HTTP/WSP header.

Example

The following command defines a rule expression to match the WWW content type *Accept*:

```
www content type = Accept
```

www domain

This command allows you to define rule expressions to match the domain portion of URIs in WSP/HTTP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

`[ no ] www domain [ case-sensitive ]` *`operator domain`*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

domain

Specifies the domain to match.

domain must be an alphanumeric string of 1 through 127 characters.

Usage Guidelines

Use this command to define rule expressions to match the domain portion of URIs in WSP/HTTP packets.

From the URL, after http:// (if present) is removed, everything until the first "/" is the domain.

Example

The following command defines a rule expression to match user traffic based on domain name *testdomain*:

```
www domain = testdomain
```

www downlink

This command allows you to define rule expressions to match downlink (network to subscriber) HTTP/WSP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www downlink *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match downlink HTTP/WSP packets.

Example

The following command defines a rule expression to match all downlink WWW packets:

```
www downlink = TRUE
```

www first-request-packet

This command allows you to define rule expressions to match the GET or POST request, if it is the first WSP/HTTP request for the subscriber's session.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] www first-request-packet** *operator condition*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- **FALSE**
- **TRUE**

Usage Guidelines Use this command to define rule expressions to match the GET or POST request, if it is the first WSP/HTTP request for the subscriber's session.

Example

The following command defines a rule expression to match user traffic based on the WWW first-request-packet:

```
www first-request-packet = TRUE
```

www header-length

This command allows you to define rule expressions to match WWW packet header length.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] www header-length** *operator header_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- <=: Lesser than or equals
- =: Equals
- >=: Greater than or equals

header_length

Specifies the WWW packet header length (in bytes) to match, *header_length* must be an integer from 0 through 65535.

Usage Guidelines Use this command to define rule expressions to match WWW packet header length.

Example

The following command defines a rule expression to match user traffic based on WWW packet header length of *10000* bytes:

```
www header-length = 10000
```

www host

This command allows you to define rule expressions to match the "host name" header field present in HTTP/WSP headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www host [case-sensitive] *operator host_name*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

host_name

Specifies the WWW host name to match.

host_name must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the host name header field present in HTTP/WSP headers.

Example

The following command defines a rule expression to match user traffic based on WWW host name *host1*:

```
www host = host1
```

www payload-length

This command allows you to define rule expressions to match WWW payload length.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www payload-length *operator payload_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

payload_length

Specifies the payload length (in bytes) to match.

payload_length must be an integer from 1 through 4000000000.

Usage Guidelines Use this command to define rule expressions to match WWW payload length.

Example

The following command defines a rule expression to match user traffic based on WWW payload length of *10000*:

```
www payload-length = 10000
```

www pdu-length

This command allows you to define rule expressions to match WWW PDU length.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description **[no] www pdu-length** *operator pdu_length*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

pdu_length

Specifies the WWW PDU length (in bytes) to match.

pdu_length must be an integer from 0 through 65535.

Usage Guidelines Use this command to define rule expressions to match WWW PDU length (header + payload) in bytes.

Example

The following command defines a rule expression to match user traffic based on WWW PDU length of *9767* bytes:

```
www pdu-length = 9767
```

www previous-state

This command allows you to define rule expressions to match previous HTTP/WSP(HTTP) state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www previous-state *operator www_previous_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

www_previous_state

Specifies the previous state to match.

www_previous_state must be one of the following:

- **init**
- **response-error**
- **response-ok**
- **waiting-for-response**

Usage Guidelines

Use this command to define rule expressions to match a previous HTTP/WSP(HTTP) state.

Example

The following command defines a rule expression to match user traffic based on WWW previous state **init**:

```
www previous-state = init
```

www reply code

This command allows you to define rule expressions to match WWW reply code arguments.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www reply code *operator reply_code*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **<=**: Lesser than or equals
- **=**: Equals
- **>=**: Greater than or equals

reply_code

Specifies the reply code to match.

reply_code must be an integer from 100 through 599.

Usage Guidelines

Use this command to define rule expressions to match HTTP 1.1 status code, or WSP status code that has been remapped to the corresponding HTTP value.

WSP status codes 0 – 101 are automatically remapped to the HTTP status code values, as defined by Table 36 WAP-230-WSP Version 5.

Example

The following command defines a rule expression to analyze WWW user traffic based on reply code of *125*:

```
www reply code = 125
```

www state

This command allows you to define rule expressions to match current HTTP/WSP(HTTP) state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www state *operator current_state*

no

If previously configured, deletes the specified rule expression from the current ruledef.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

current_state

Specifies the current state to match.

current_state must be one of the following:

- **close**
- **response-error**
- **response-ok**
- **waiting-for-response**

Usage Guidelines

Use this command to define rule expressions to match current HTTP/WSP state.

Example

The following command defines a rule expression to match user traffic based on the current WWW state **close**:

```
www state = close
```

www transfer-encoding

This command allows you to define rule expressions to match the transfer encoding field present in HTTP/WSP(HTTP) headers.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* > **ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www transfer-encoding [case-sensitive] *operator transfer_encoding*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with
- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **starts-with**: Starts with

transfer_encoding

Specifies the WWW transfer encoding to match.

transfer_encoding must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the "transfer encoding" field present in HTTP/WSP(HTTP) headers.

Example

The following command defines a rule expression to match user traffic based on the WWW transfer encoding *user1*:

```
www transfer-encoding = user1
```

www url

This command allows you to define rule expressions to match URL for any Web protocol analyzer—HTTP, WAP1.X, WAP2.0.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Ruledef Configuration

active-charging service *service_name* **> ruledef** *ruledef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-ruledef)#
```

Syntax Description

[no] www url [case-sensitive] *operator url*

no

If previously configured, deletes the specified rule expression from the current ruledef.

case-sensitive

Specifies that the rule expression be case-sensitive. By default, rule expressions are not case-sensitive.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **!contains**: Does not contain
- **!ends-with**: Does not end with

- **!starts-with**: Does not start with
- **=**: Equals
- **contains**: Contains
- **ends-with**: Ends with
- **regex**: Regular expression
- **starts-with**: Starts with

url

Specifies the URL to match.

url must be an alphanumeric string of 1 through 127 characters and may contain punctuation characters.

Usage Guidelines

Use this command to define rule expressions to match the URL for any Web protocol analyzer—HTTP, WAP1.X, WAP2.0.

The following table lists the special characters that you can use in regex rule expressions. For more information on regex support, refer to the *Enhanced Charging Service Administration Guide*.

Table 11: Special Characters Supported in Regex Rule Expressions

Regex Character	Description
*	Zero or more characters
+	Zero or more repeated instances of the token preceding the +
?	Match zero or one character **Important** The CLI does not support configuring "?" directly, you must instead use "\077". For example, if you want to match the string "xyz<any one character>pqr", you must configure it as: **http host regex** *"xyz\077pqr"* In another example, if you want to exactly match the string "url?resource=abc", you must configure it as: **http uri regex** *"url\\077resource=abc"* Where, the first "\" (backslash) is for the escaping of "?", and then "\077" for specifying "?" to the CLI.
\character	Escaped character
\?	Match the question mark (\<ctrl-v>?) character
\+	Match the plus character
*	Match the asterisk character
\a	Match the Alert (ASCII 7) character

Regex Character	Description
\b	Match the Backspace (ASCII 8) character
\f	Match the Form-feed (ASCII 12) character
\n	Match the New line (ASCII 10) character
\r	Match the Carriage return (ASCII 13) character
\t	Match the Tab (ASCII 9) character
\v	Match the Vertical tab (ASCII 11) character
\0	Match the Null (ASCII 0) character
\\	Match the backslash character
Bracketed range [0-9]	Match any single character from the range
A leading ^ in a range	Do not match any in the range. All other characters represent themselves.
.\x##	Any ASCII character as specified in two-digit hex notation. For example, \x5A yields a "Z".
|	Specify OR regular expression operator **Important** When using the regex operator "|" in regex expressions, always wrap the string in double quotes. For example, if you want to match the string "pqr" OR "xyz", you must configure it as: **http host regex** *"pqr|xyz"*.

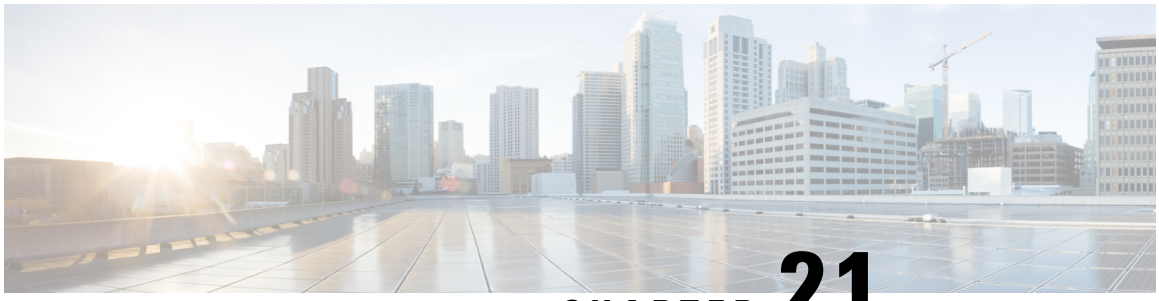
Example

The following command defines a rule expression to match user traffic based on WWW URL *www.abc.com*:

```
www url = www.abc.com
```

The following command defines a regex rule expression to match either of the following values in the WWW URL string:
http://tp2.site.com/httppvc_clnsssite.com.wap.symphonieserver.musicwaver.com/,
http://134.210.11.13/httppvc_clnsssite.com.wap.symphonieserver.musicwaver.com/.

```
www url regex
"http://(tp2.site.com|134.210.11.3)/httppvc_clnsssite.com.wap.symphonieserver.musicwaver.com/"
```



CHAPTER 21

ACS Rulebase Configuration Mode Commands

Command Modes

The ACS Rulebase Configuration Mode is used to configure Active Charging Service (ACS) rulebases.

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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action priority

This command allows you to configure the action priority for a ruledef / group-of-ruledefs in the current rulebase.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
action priority action_priority { [ dynamic-only [ adc [ mute ] ] |
static-and-dynamic | timedef timedef_name ] { group-of-ruledefs
ruledefs_group_name | ruledef ruledef_name } charging-action charging_action_name [
 monitoring-key monitoring_key ] [ description description ] }
no action priority action_priority
```

no

If previously configured, deletes the specified action priority configuration from the current rulebase.

priority *action_priority*

Specifies a priority for the specified ruledef / group-of-ruledefs in the current rulebase.

action_priority must be unique in the current rulebase, and must be an integer from 1 through 65535.

The priority controls the order in which this instance of the CLI command will be examined. Lower numbered priorities are examined first.

Up to 2048 instances may be configured, totaled among all rulebases in releases prior to 21.1. In 21.1 and later releases, up to 2500 instances can be configured.

Important If there are any changes to action priority and the Override Control/Inheritance feature is enabled, then execute the CLI command "**update active-charging override-control rulebase-config**". For more information on this command, see the *Command Line Interface Reference*.

dynamic-only

Enables matching of dynamic rules with static rules for this action priority on a flow.

Configuring the **dynamic-only** keyword causes the configuration to be defined, but not enabled. If enabled, the action associated with this option will not be matched against a flow until it is enabled from a dynamic charging interface like Gx. Gx can disable or enable this action entry in the rulebase using Gx messages.

Default: Disabled

adc

Specifies the ruledef to-be given as ADC rule. This keyword is optional and only visible when configured with the **dynamic-only** keyword.

Default: Disabled

mute

Disables application reporting to PCRF. This keyword is optional and visible only after configuring the **adc** keyword.

Default: Disabled

static-and-dynamic

The static-and-dynamic option causes the configuration to be defined and enabled, and allows a dynamic protocol (such as the Gx interface) to disable or re-enable the configuration.

Default: Enabled

Important When R7 Gx is enabled, "static-and-dynamic" rules behave exactly like "dynamic-only" rules. That is, they must be activated explicitly by the Policy and Charging Rules Function (PCRF). When Gx is not enabled, "static-and-dynamic" rules behave exactly like static rules.

timedef *timedef_name*

Important This keyword is only available in StarOS 8.1 and StarOS 9.0 and later releases.

Associates the specified time definition with the ruledef / group-of-ruledefs. Timedefs activate or deactivate ruledefs / groups-of-ruledefs, making them available for rule matching only when they are active.

timedef_name must be the name of a timedef, and must be an alphanumeric string of 1 through 63 characters.

A timedef can be used with several ruledefs / group-of-ruledefs. When a packet is received, and a ruledef / group-of-ruledefs is eligible for rule matching, if a timedef is associated with the ruledef / group-of-ruledefs, before rule matching the packet-arrival time is compared with the timeslots configured in the timedef. If the packet arrived in any of the timeslots configured in the associated timedef, rule matching is undertaken, else the next ruledef / group-of-ruledefs is considered.

Important The time considered for timedef matching is the system's local time.

ruledef *ruledef_name*

Adds the specified ruledef to the current rulebase.

ruledef_name must be the name of a ruledef, and must be an alphanumeric string of 1 through 63 characters.

If the specified ruledef does not exist, there will be no ruledef triggers for this action priority within the current rulebase.

Important If the ruledef specified here is deleted or is not configured, the system accepts it without applying any ruledef under current rulebase for this action priority.

group-of-ruledefs *ruledefs_group_name*

Adds the specified group-of-ruledefs to the current rulebase.

ruledefs_group_name must be the name of a group-of-ruledefs, and must be an alphanumeric string of 1 through 63 characters.

When a group-of-ruledefs is specified, if any of the ruledefs within the group matches, the specified charging-action is applied, any more of the action instances are not processed.

Important If the group-of-ruledefs specified here is deleted or is not configured, the system accepts it without applying any ruledefs under current rulebase for this action priority.

charging-action *charging_action_name*

Specifies the charging action.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

If the specified charging action does not exist, there will be no charging action triggers for this action priority within the current rulebase.

Important If the charging action specified here is not configured or is later deleted, the system will not apply any charging action under current rulebase for this action priority.

monitoring-key *monitoring_key*

Associates the specified monitoring-key with ruledefs for usage monitoring.

monitoring_key must be an integer from 1 through 4000000000.

description *description*

Adds specified text to the rule and action.

description must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure action priorities for ruledefs / group-of-ruledefs in a rulebase.

This CLI command can be entered multiple times to specify multiple ruledefs and charging actions. The ruledefs are examined in priority order, until a match is found and the corresponding charging action is applied.

Example

The following command assigns a rule and action with the action priority of *23*, a ruledef named *test*, and a charging action named *test1* to the current rulebase:

```
action priority 23 ruledef test charging-action test1
```

active-charging rf

This command allows you to enforce default rating group / service identifier on all PCC rules, predefined ACS rules, and static ACS rules for Rf-based accounting.

Important This command is customer specific. For more information contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

active-charging rf { rating-group-override *rating_group* **| service-id-override** *service_id* **}**
{ default | no } active-charging rf { rating-group-override | service-id-override }

default

Configures this command with its default setting.

Default: Override configuration is disabled; same as no.

no

Disables the override configuration.

no active-charging rf rating-group-override: Rating group override will not be enforced on the PCC rules, predefined ACS rules, and static ACS rules. If any of these rules have their own rating group, it will continue to use that.

no active-charging rf service-id-override: Service ID override will not be enforced on the PCC rules, predefined ACS rules, and static ACS rules. If any of these rules have their own service ID, it will continue to use that.

rating-group-override ***rating_group***

Enforces the specified rating group on all PCC rules, predefined ACS rules, and static ACS rules. If any of these rules have their own rating group, it will be overridden by the specified rating group.

rating_group must be an integer from 1 through 65535.

service-id-override ***service_id***

Enforces the specified service ID on all PCC rules, predefined ACS rules, and static ACS rules. If any of these rules have their own service ID, it will be overridden by the specified service ID.

service_id must be an integer from 1 through 65535.

Usage Guidelines

Use this command to enforce a specific rating group / service identifier on all PCC rules, predefined ACS rules, and static ACS rules for Rf-based accounting. As this CLI configuration is applied at the rulebase level, all the APNs that have the current rulebase defined will inherit the configuration.

Example

The following command configures the service ID *100*:

```
active-charging rf service-id-override 100
```

adc notify

This command allows you to configure a single "application start" or "application stop" notification for the ADC flow matching per rule is sent to the PCRF.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[no] adc notify [once]
```

no

Disables the ADC notifications and ADC notifications are sent as per default behavior.

adc

Configures the ADC notifications.

notify

Configures the application notification. If this keyword is not configured, ADC notifications are sent as per default behavior.

once

Configures the application notification only once. PCRF takes the priority.

Usage Guidelines

Use this command to configure a single "application start" or "application stop" notification for the ADC flow matching per rule is sent to the PCRF. If this CLI is configured and the PCRF sends the custom mute notification, then the PCRF notification takes precedence over the standard behavior for reporting the notification.

Important If the CLI command **adc notify once** is configured at the rulebase, the converse **no adc notify** does not have any impact. To converse the CLI impact, do either of the following tasks:

- Switch the rulebase in which the CLI command **adc notify** once is not configured.
- Send the **custom unmute** for that particular dynamic rule.

Example

The following command configures a single "application start" or "application stop" notification for the ADC flow matching per rule is sent to the PCRF:

```
adc notify once
```

app-notification

This command enables APP_STOP buffering.

Note In 21.3.12 and later releases, the **notify** command is deprecated. The **notify** command has been replaced by the **app-notification** command.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no ] adc app-notification { once-per-app [ once-per-ipflow ] | once
per-ipflow [ once-per-app ] }
```

no

Disables the ADC notifications and ADC notifications are sent as per default behavior.

adc

Configures the ADC notifications.

app-notification

This command enables APP_STOP buffering. A maximum of five APP_STOP messages is buffered per flow.

once-per-app

Notifies APP_START or APP_STOP notification once per App ID.

once-per-ipflow

Notifies APP_START or APP_STOP notifications per App ID per IP flow.

Usage Guidelines

Use this command to enable APP_STOP buffering. This command should be applied when the flow is being created. Changes to the configuration will be applied to the newly created flows.

The APP_STOP is buffered at a flow-level. Therefore, there is an increase in memory for every rule stored in the session manager.

Note This command does not affect the Custom-Mute feature as it is implemented at a flow-level.

bandwidth default-policy

This command allows you to configure the default bandwidth policy for the current rulebase.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

bandwidth default-policy *bandwidth_policy_name* **[fallback-enabled]**
no bandwidth default-policy

no

If previously configured, deletes the bandwidth default-policy configuration from the current rulebase.

bandwidth_policy_name

Specifies the default bandwidth policy for the current rulebase.

bandwidth_policy_name must be the name of a bandwidth policy, and must be an alphanumeric string of 1 through 63 characters.

fallback-enabled

Determines whether policy under rulebase can be applied as a fallback value. Fallback is disabled by default.

Usage Guidelines

Use this command to configure the default bandwidth policy for a rulebase.

For subscribers using the current rulebase, the default bandwidth policy will be used if in the APN/subscriber profile the **default active-charging bandwidth-policy fallback-enabled** command is configured, or no bandwidth policy is configured.

Example

The following command configures a bandwidth policy named *standard* for the rulebase:

```
bandwidth default-policy standard
```

billing-records

This command allows you to configure the type of billing to be performed for subscriber sessions.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
billing-records { egcdr | radius | rf | udr udr-format udr_format_name [
failure-handling-udr-format udr_format_name ] } +
no billing-records
```

no

If previously configured, deletes the billing-records configuration from the current rulebase.

egcdr

Generates an enhanced G-CDR (eG-CDR) for GGSN / P-GW-CDR for P-GW, and/or UDR with specified format on the occurrence of an interim trigger condition at the end of a subscriber session, or an SGSN-to-SGSN handoff.

radius

Generates postpaid RADIUS accounting records at the start and end of a subscriber session, and on the occurrence of an interim trigger condition. RADIUS accounting records are generated for each content ID.

Important In the GGSN, if in the APN configuration the "accounting-mode" is set to "none", the system continues to send ACS-generated RADIUS accounting messages. In the PDSN, if in the subscriber default configuration the "accounting-mode" is set to "none", the system does not send any RADIUS accounting messages (including ACS accounting messages).

rf

Enables Rf accounting.

Rf accounting is applicable only for dynamic and predefined rules that are marked for it. Dynamic rules have a field offline-enabled to indicate this. To mark a predefined rule as offline-enabled, use this keyword and the **billing-action** command in the ACS Charging Action Configuration Mode.

udr udr-format *udr_format_name*

Generates UDRs with specified the format on the occurrence of an interim trigger condition, at the end of a subscriber session, or a handoff.

udr_format_name must be the name of an UDR format, and must be an alphanumeric string of 1 through 63 characters.

+

Indicates that more than one of the keywords can be entered in a single command.

Usage Guidelines Use this command to generate enhanced G-CDRs (eG-CDRs), P-GW-CDR for P-GW, RADIUS CDRs and/or UDRs for billing records. The format of eG-CDRs for the default GTPP group is controlled by the **inspector** command in the Context Configuration Mode.

If, in the APN configuration, the "accounting-mode" is set as default (GTPP), and in the rulebase configuration "billing-records egcdr" is configured, both G-CDRs and eG-CDRs are generated if configured. If, in the APN, the accounting-mode is set to "none" G-CDRs will not be generated.

Example

The following command sets the billing record to UDR with UDR format named *udr_format1*:

```
billing-records udr udr-format udr_format1
```

cca diameter requested-service-unit

This command allows you to specify the Diameter sub-AVPs to be included in the Diameter group AVP "Requested-Service-Unit" sent with DCCA Credit Control Requests (CCRs).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
cca diameter requested-service-unit sub-avp { time cc-time duration | units
 cc-service-specific-units charging_unit | volume { cc-input-octets bytes |
cc-output-octets bytes | cc-total-octets bytes } + }
no cca diameter requested-service-unit sub-avp
```

no

No sub-AVPs are included in the Requested-Service-Unit grouped AVP.

time cc-time *duration*

Specifies requested service unit for charging time duration in seconds in included sub-AVP.

duration specifies charging time in seconds, and must be an integer from 1 through 4000000000.

units cc-service-specific-units *charging_unit*

Specifies requested service unit by service specific units in bytes/packets in included sub-AVP.

charging_unit specifies service-specific charging unit and must be an integer from 1 through 4000000000.

volume { cc-input-octets *bytes* | cc-output-octets *bytes* | cc-total-octets *bytes* } +

Specifies requested service unit for charging octets by input, output, and total volume in included sub AVP.

- **cc-input-octets**: Specifies input charging octets.
- **cc-output-octets**: Specifies output charging octets.
- **cc-total-octets**: Specifies total charging octets.
- *bytes*: Specifies volume in bytes and must be an integer from 1 through 4000000000.

+: Indicates that more than one of the previous keywords can be entered within a single command.

Usage Guidelines

Use this command to include sub-AVPs based on time, volume, and service specific unit in the "Requested-Service-Unit" grouped AVP with CCRs through Gy interface.

Example

The following command sets the time based sub-AVP with charging duration of 45 seconds in "Requested-Service-Unit" group AVP on DCCA CCRs:

```
cca diameter requested-service-unit sub-avp time cc-time 45
```

cca quota

This command allows you to configure various time- and threshold-based quotas in the Prepaid Credit Control Service (Credit Control Application).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

cca quota { holding-time *holding_time* **content-id** *content_id* **| retry-time** *retry_time* **[max-retries** *retries* **] }**
{ default | no } cca quota { holding-time content-id *content_id* **| retry-time }**

holding-time *holding_time*

Specifies the value for the Quota Holding Time (QHT). QHT is used with both time-based and volume-based quotas. After *holding_time* seconds has passed without user traffic, the quota is reported back and the charging stops until new traffic starts.

holding_time must be an integer from 1 through 4000000000.

content-id *content_id*

Specifies the content ID (Rating group AVP) to use for the Quota holding time for the current rulebase.

content_id is the content ID specified for credit control service in ACS.

In 12.1 and earlier releases, *content_id* must be an integer from 1 through 65535.

In 12.2 and later releases, *content_id* must be an integer from 1 through 2147483647.

retry-time *retry_time* [max-retries *retries*]

Specifies the retry time for the quota request, in seconds.

retry_time must be an integer from 0 through 86400. To disable this assign 0.

Default: 60

This parameter defines the maximum frequency at which the Credit-Control Application (CCA) tries to obtain quota for a subscriber passing traffic for a category with no/exhausted quota.

For a subscriber not passing traffic, the CCA will not try to obtain quota (except once at session start time, if so configured). The quota request from the no quota state is sent in response to user packets only (never based on a timer).

When subscriber hits a charging action that is a flow redirect, the operator can optionally specify that this redirection shall clear the retry-time timer.

This allows the immediately following chargeable user traffic to trip a quota request, even if it would otherwise have been subject to the retry time limit. Such configuration allows quite a large value for retry-time in quota charging or a top-up scenario.

max-retries *retries* configures the maximum number of retries allowed for blockedlisted categories. This option has a default value of 65535 retries (the maximum value).

retries must be an integer from 1 through 65535. To disable the **max-retries** CLI command, use the **cca quota retry-time** *retry_time* CLI command.

To disable the **cca quota retry-time** command, use the **no** variant of the command, that is to say **no cca quota retry-time**.

Usage Guidelines

Use this command to set the prepaid credit control quotas.

cca quota retry time allows an operator to set the amount of time that the ACS waits before it retries the prepaid server for a content ID for which quota was exhausted earlier.

When the server sends the quota holding time (QHT) it has highest priority to use that QHT regardless of the value configured in the rulebase or Credit Control Application Configuration Mode. QHT configured here has the second priority for the content ID (rating group) configured here.

If the QHT is not available from the server or rulebase configuration mode, the QHT values configured via the Credit Control Application Configuration Mode are used.

Example

The following command configures the prepaid credit control request retry time to *30* seconds:

```
cca quota retry-time 30
```

The following command specifies the system to use the QHT value configured in the Credit Control Application Mode:

```
no cca quota holding-time content-id 1
```

The following command specifies the system to ignore the QHT value configured in the Credit Control Application Mode:

```
default cca quota holding-time content-id 1
```

The following command configures the prepaid credit control request retry time to *60* seconds and the maximum number of retries to *65535*:

```
default cca quota retry-time max-retries
```

cca quota time-duration algorithm

This command allows you to specify the algorithm to compute time duration for Prepaid Credit Control Application quotas in the current rulebase.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

cca quota time-duration algorithm { consumed-time *seconds* **[plus-idle] | continuous-time-periods** *seconds* **| parking-meter** *seconds* **} [content-id** *content_id* **]**
default cca quota time-duration algorithm
no cca quota time-duration algorithm { consumed-time | continuous-time-periods | parking-meter } [content-id *content_id* **]**

no

If previously configured, deletes the quota time-duration algorithm configuration from the current rulebase.

default

Configures this command with its default setting.

consumed-time *seconds*

Specifies the Quota Consumption Time (QCT) in seconds. QCT is used with active time-based quotas and to determine chargeable time envelopes for consuming time quota.

seconds must be an integer from 1 through 4294967295.

Default: 0 (disabled)

A time envelope is the basis for reporting active usage. For each time envelope, the quota consumption includes the last QCT (duration between first packet and last packet + QCT).

plus-idle

Specifies the idle time for QCT.

When used along with **consumed-time** it indicates the active usage + idle time, when no traffic flow occurs.

continuous-time-periods *seconds*

Specifies the charging quota continuous period, in seconds.

seconds must be an integer from 1 through 4294967295.

Default: 0 (disabled)

The Continuous Time Periods (CTP) mechanism constructs time-envelopes from consecutive base time intervals in which traffic has occurred up to and including a base time interval which contains no traffic. As with Quota-Consumption-Time envelopes, the end of an envelope can only be determined "retrospectively". Again, as with Quota-Consumption-Time, the envelope for CTP includes the last base time interval (the one which contained no traffic).

parking-meter *seconds*

Specifies the Parking Meter (PM) period, in seconds, for a particular rating group.

seconds must be an integer from 1 through 4294967295.

Default: 0 (disabled)

This mechanisms utilizes time quota, but instead of consuming linearly—once a decision to consume has been taken—the granted quota is consumed discretely in "chunks" of the base time interval at the start of each base time interval. Traffic is then allowed to flow for the period of the consumed quota.

The time interval seconds defines the length of the Parking Meter. A time-envelope corresponds to exactly one PM (and thus to one base time interval).

content-id *content_id*

Specifies the content ID (Rating group AVP) to use for the CCA Quota time duration algorithm selection in the current rulebase.

content_id is the content ID specified for credit control service in ACS.

In 12.1 and earlier releases, *content_id* must be an integer from 1 through 65535.

In 12.2 and later releases, *content_id* must be an integer from 1 through 2147483647.

Usage Guidelines

Use this command to set the various time charging algorithms/schemes for prepaid credit control charging.

If operator chooses **parking-meter** *seconds* style charging, then time is billed in *seconds* chunks.

Example

The following command configures the QCT to consumed-time duration of *400* seconds:

```
cca quota time-duration algorithm consumed-time 400
```

cca radius accounting interval

This command allows you to configure how often interim updates are generated by the RADIUS Credit Control Application to be sent to the prepaid server.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
cca radius accounting interval interval
{ default | no } cca radius accounting interval
```

default

Configures the command with its default setting.

Default: Disabled; same as **no cca radius accounting interval**

no

Disables interim updates.

interval

Specifies the time interval, in seconds, between interim updates generated by the RADIUS Credit Control Application.

interval must be an integer from 1 through 3600.

Default: 1 (Disabled)

Usage Guidelines

Use this command to specify the RADIUS accounting interval between accounting of a prepaid subscriber. The same parameters are applicable for RADIUS server group.

Example

The following command defines RADIUS accounting interval of *20* seconds for RADIUS prepaid service in the rulebase:

```
cca radius accounting interval 20
```

cca radius charging context

This command allows you to specify the RADIUS servers used for the current rulebase when RADIUS credit control is enabled.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
cca radius charging context vpn_context [ group server_group_name ]
no cca radius charging context
```

no

RADIUS credit control will not be performed.

vpn_context

Specifies the charging context where RADIUS prepaid charging parameters are configured.

vpn_context must be an alphanumeric string of 1 through 79 characters.

group *server_group_name*

Specifies the RADIUS server group.

server_group_name must be the name of a RADIUS server group, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the RADIUS charging context where RADIUS prepaid charging parameters are configured. The same parameters are applicable for RADIUS server group.

Example

The following command defines RADIUS charging context *prepaid_rad1* for RADIUS prepaid charging in the rulebase:

```
cca radius charging context prepaid_rad1
```

cca radius user-password

This command allows you to configure the value to use for the "User-Password" attribute in RADIUS messages sent to the prepaid server.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
cca radius user-password [ encrypted ] password password
no cca radius user-password
```

no

If previously configured, deletes the RADIUS prepaid service user password configured in the current rulebase.

[encrypted] password *password*

Specifies the password for prepaid services within the current rulebase.

In 12.1 and earlier releases, *password* must be an alphanumeric string of 1 through 63 characters with or without encryption.

In 12.2 and later releases, *password* must be an alphanumeric string of 1 through 63 characters without encryption, and 1 through 132 characters with encryption enabled.

The **encrypted** keyword is intended only for use by the system while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **password**

keyword is the encrypted version of the plain text password. Only the encrypted password is saved as part of the configuration file.

Usage Guidelines

Use this command to specify the RADIUS user password for prepaid services within the current rulebase.

Example

The following command configures the user password as *user_123* without encryption in the current rulebase:

```
cca radius user-password password user_123
```

charging-action-override

This command allows you to enable/disable overriding charging parameters of static rule with those of an ip-any rule or a specified dynamic rule.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
charging-action-override custom1 [ use-rule dynamic_rule_name ]
{ default | no } charging-action-override
```

default

Configures this command with its default setting.

Default: Disables overriding charging parameters of static rule with those of an ip-any or a specified dynamic rule.

no

Disables overriding charging parameters of static rule with those of an ip-any or a specified dynamic rule.

custom1

Specifies overriding Online/Offline, Service ID, Content ID, Flow Control, ARP, and QCI.

use-rule *dynamic_rule_name*

Optional: Specifies the dynamic rule to inherit charging parameters from. If a dynamic rule name is not specified, the charging properties will be inherited from any dynamic rule.

dynamic_rule_name specifies name of the dynamic rule, and must be an alpha and/or numeric string of 1 through 63 characters in length.

Usage Guidelines

Use this command to enable/disable overriding charging parameters of static rule with those of a dynamic ip-any rule or a specified dynamic rule.

Example

The following command specifies to enable overriding charging parameters of static rule with those of a dynamic rule named *test*:

```
charging-action-override custom1 use-rule test
```

charging-rule-optimization

This command allows you to configure the internal optimization level to use, for improved performance, when evaluating each instance of the **action priority** command.

Important In StarOS 14.0 and later releases, this command is deprecated. In StarOS 14.0 and later releases, rule optimization is always enabled with the optimization level set to high.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
charging-rule-optimization { high | low | medium }
default charging-rule-optimization
```

default

Configures this command with its default setting.

Default: In 11.0 and later releases: **high** In 10.0 and earlier releases: **low**

high

Enables the highest level of optimization with high memory utilization.

low

Enables minimal level of optimization with minimal memory utilization.

medium

Important In 11.0 and later releases, the **medium** keyword is deprecated.

Enables medium level of optimization with moderate memory utilization.

Usage Guidelines Use this command to specify the level of internal optimization for improved performance when evaluating each instance of the **action priority** command.

Both the high and medium options cause re-organization of the entire memory structure whenever any change is made, such as on the addition of an **action priority** command.

Example

The following command specifies the highest optimization level for rule search and matching in the rulebase:

```
charging-rule-optimization high
```

check-point accounting

This command configures micro checkpoint syncup timer for ICSR and Session Recovery for Rf-Gy synchronization.

Product GGSN

P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
check-point accounting sync-timer { icsr | sr } timer_value [ sr | icsr ]
timer_value
no check-point accounting sync-timer { icsr | sr }
```

no

If the micro checkpoint syncup timer is already configured, then the **no** variant will delete the configuration.

sr *timer_value*

Configures micro check-pointing timer for Session Recovery (SR). By default, the session recovery check-pointing will be done on 8 seconds.

timer_value: Time configured will be in multiples of 2 seconds. Note that the timer value less than 4 seconds and greater than 60 seconds will not be accepted.

icsr *timer_value*

Configures micro check-pointing timer for ICSR. By default, the ICSR check-pointing will be done on 18 seconds.

timer_value: Time configured will be in multiples of 2 seconds. Note that the timer value less than 4 seconds and greater than 60 seconds will not be accepted.

Usage Guidelines

Use this command to configure micro checkpoint syncup timer for ICSR and Session Recovery. Micro Checkpoint Sync-up timer is an internal timer utilized by Rf and Gy modules to check point corresponding billing information.

Releases prior to 17.0, micro checkpoint sync-up timer was hardcoded with a value of 18 seconds for ICSR and 8 seconds for Session Recovery (SR). In 17.0 and later releases, the micro checkpoint sync-up timer is made configurable with an expectation that it be set at a value as low as 4 seconds. The timer value is reduced to ensure the accurate billing information during the ICSR or SR switchover event.

This CLI is available at both active charging service level and rulebase level. If the timer value is configured at both service and rulebase level, then the service level value will be overridden with rulebase level values.

This feature provides the operator with the flexibility to provision timer for accurate billing information in case of session recovery or ICSR switchover. However, this is a performance impacting feature and the impact of the micro checkpoint sync timer reduction needs to be carefully considered by the operator before provisioning a lower value.

Example

The following command configures the micro checkpoint syncup timer for Session Recovery as *8* seconds:

```
check-point accounting sync-timer sr 8
```

constituent-policies

This command allows you to configure the Bandwidth, Content Based Billing (CBB), and Firewall/Firewall-and-NAT constituent policies. The combination of the values of all three policies will uniquely identify the associated rulebase.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

constituent-policies { bandwidth-policy *bandwidth_policy_name* **| cbb-policy** *cbb_policy_name* **| firewall-policy** *fw_policy_name* **| fw-and-nat-policy** *fw_nat_policy_name* **} +**
no constituent-policies

no

If previously configured, deletes the constituent-policies configuration from the current rulebase.

bandwidth-policy *bandwidth_policy_name*

Specifies the Bandwidth policy.

bandwidth_policy_name must be the name of a bandwidth policy, and must be an alphanumeric string of 1 through 63 characters.

cbb-policy *cbb_policy_name*

Specifies the Content Based Billing (CBB) policy.

cbb_policy_name must be the name of a CBB policy, and must be an alphanumeric string of 1 through 63 characters.

firewall-policy *fw_policy_name*

Important This keyword is customer specific. For more information, please contact your Cisco account representative.

Specifies the Stateful Firewall policy.

fw_policy_name must be the name of a Stateful Firewall policy, and must be an alphanumeric string of 1 through 63 characters.

fw-and-nat-policy *fw_nat_policy_name*

Important This keyword is customer specific, and is only available in StarOS 8.1 and in StarOS 9.0 and later releases.

Specifies the Firewall-and-NAT policy.

fw_nat_policy_name must be the name of a Firewall-and-NAT policy, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the bandwidth, CBB, and Firewall/Firewall-and-NAT constituent policies that will identify the rulebase. The combination of the values of all three policies will uniquely identify the rulebase associated.

Example

The following command configures the constituent bandwidth policy named *test123*:

```
constituent-policies bandwidth-policy test123
```

content-filtering category policy-id

This command allows you to configure the Content Filtering Category Policy Identifier for Policy-based Content Filtering support in the current rulebase.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
content-filtering category policy-id cf_policy_id
no content-filtering category policy-id [ cf_policy_id ]
```

no

If previously configured, deletes the configuration from the current rulebase.

In StarOS 8.1 and later releases, optionally the policy ID can be specified. If the specified policy ID is invalid, or is not configured in the rulebase, an error message is displayed. If no policy ID is specified, whatever policy is configured, if any, is removed from the rulebase.

content-filtering category policy-id *cf_policy_id*

Configures the specified Content Filtering Category Policy in the current rulebase.

cf_policy_id must be the ID of an existing Content Filtering Category Policy, and must be an integer from 1 through 4294967295.

Important If the specified Content Filtering Category Policy does not exist, all packets will be passed regardless of the categories/actions determined for such packets.

Important The category policy ID that is configured using the **category policy-id** *cf_policy_id* command in the APN/Subscriber Configuration Mode prevails over this configuration.

Usage Guidelines

Use this command to configure the Content Filtering Category Policy ID for Policy-based Content Filtering support in the rulebase.

The Content Filtering Category Policy is created/deleted in the ACS Configuration Mode, and is configured in the Content Filtering Policy Configuration Mode.

Example

The following command configures the Content Filtering Category Policy ID *101* in the rulebase:

```
content-filtering category policy-id 101
```

content-filtering flow-any-error

This command allows you to specify action to take on Content Filtering packets in the case of ACS error scenarios.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
content-filtering flow-any-error { deny | permit }
default content-filtering flow-any-error
```

default

Configures this command with its default setting.

Default: **permit**

deny

Configures flow-any-error configuration as deny.

All the denied packets will be accounted for by the **discarded-flow-content-id** configuration in the Content Filtering Policy Configuration Mode. This content ID will be used to generate UDRs for packets denied via content filtering.

permit

Configures flow-any-error configuration as permit.

Usage Guidelines

Use this command to allow/discard content filtering packets in case of ACS error scenarios.

Example

The following command allows content filtering packets in case of an ACS error:

```
content-filtering flow-any-error permit
```

content-filtering mode

This command allows you to enable/disable the specified Category-based Content Filtering mode in the current rulebase.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
content-filtering mode { category { static-and-dynamic | static-only } |
 server-group cf_server_group }
no content-filtering mode
```

no

If previously configured, deletes the content-filtering mode configuration from the current rulebase. Content filtering will not to be performed for the current rulebase. This is the default setting.

category { static-and-dynamic | static-only }

Specifies the Category-based Content Filtering mode.

- **static-only**: Configures Category-based Content Filtering in static only mode, wherein all URLs are compared against an internal database to categorize the requested content.

  Using Category-based Content Filtering support requires configuration of the **require active-charging content-filtering category** command in the Global Configuration Mode.

- **static-and-dynamic**: Configures Category-based Content Filtering in Static-and-Dynamic mode, wherein a static rating of the URL is first performed, and only if the static rating fails to find a match, dynamic rating of the content that the server returns is then performed.

Important Before enabling static-and-dynamic rating in the rulebase, it must be enabled at the global level as the resources required for dynamic rating are allocated at the global level. To enable static-and-dynamic rating at the global level, in the Global Configuration Mode use the **require active-charging content-filtering category static-and-dynamic** command.

server-group *cf_server_group*

Enables and configures the Content Filtering Server Group (CFSG) mode within the rulebase to manage an external content filtering server with an Internet Content Adaptation Protocol (ICAP) client system.

cf_server_group must be the name of a CFSG, and must be unique, and must be an alphanumeric string of 1 through 63 characters.

If configured, ACS attempts to establish TCP connections to every server in the named group.

Usage Guidelines

Use this command to enable and apply the content filtering mode in the rulebase to manage a content filtering server with an ICAP client system.

Example

The following command enables the content filtering mode for external content filtering server group *CF_Server1* in the rulebase:

```
content-filtering mode server-group CF_Server1
```

The following command enables the category based static and dynamic content filtering mode for in the rulebase:

```
content-filtering mode category static-and-dynamic
```

credit-control-group

Configures the credit control group to be used for subscribers who use this rulebase.

Product

GGSN

HA

HSGW

IPSG

PDSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

credit-control-group *cc_group_name*

no credit-control-group

no

Removes the credit-control group configuration from the current rulebase, if previously configured. This is the default setting.

cc_group_name

Specifies name of the credit-control group as an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the desired CC group whenever the rulebase is selected during the subscriber session setup. This is an optional CLI configuration, and used only when customized Assume Positive behavior is required for subscribers. This CLI configuration is applicable only during the session setup. Mid-session change in the CC group is not allowed.

The **credit-control-group cc-group-name** command is used to specify a credit-control group name association to the rulebase. The **no credit-control-group** CLI is to remove the association. The default setting is **no credit-control-group**.

If this CLI command is configured, the selection of the CC group is based on the following precedence order.

- PCRF provided CC group
- AAA provided CC group
- Rulebase configured CC group
- Subscriber Profile/APN selected CC group
- Default Credit-Control group

For example, if a CC group is configured in the rulebase then this CC group has higher precedence over the CC group value specified in the Subscriber/APN profile.

If the CC group configuration is not present in the rulebase, the default subscriber/APN profile configuration is applied.

Example

The following command configures the association of a credit-control group named *test* for the current rulebase:

```
credit-control-group test
```

description

Allows you to enter descriptive text for this configuration.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

dynamic-rule order

This command allows you to specify whether dynamic rules are matched before statically configured rules.

Product GGSN

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
dynamic-rule order { always-first | first-if-tied }
no dynamic-rule order
```

no

If previously configured, changes the dynamic-rule order configuration to its default behavior. By default, dynamic rules are matched against the flow prior to static or predefined rules.

always-first

Specifies to match all the dynamic rules against the flow prior to any static rule. This is the default value.

first-if-tied

Specifies to match rules against the flow based on their priority with the condition that dynamic rules match before a static rule of the same priority.

A rule is a combination of a ruledef, charging action, and precedence. Static rules are defined by the **action** CLI command in the ACS Rulebase Configuration Mode, and are applicable to all subscribers that are associated with the rulebase. Dynamic rules are obtained via a dynamic protocol, such as, the Gx-interface for a particular subscriber session.

Usage Guidelines Use this command to configure the order in which rules are selected for matching in between dynamic rules (per subscriber) and static rules (from rulebase).

Example

The following command matches all dynamic rules against the flow prior to any static rule:

```
dynamic-rule order always-first
```

edr edr-dcca-fh

This command configures generation of EDRs when the OCS is in unreachable state.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

edr edr-dcca-fh [charging-edr *charging_edr_format_name* **| edr-format** *edr_format_name* **| reporting-edr** *reporting_edr_format_name* **] +**
{ default | no } edr edr-dcca-fh

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the configuration from the current rulebase.

charging-edr *charging_edr_format_name*

Specifies to generate charging EDR during OCS unreachable period.

charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

edr-format *edr_format_name*

Specifies to generate EDR during OCS unreachable period.

edr_format_name must be the name of an EDR format, and must be an alphanumeric string of 1 through 63 characters.

reporting-edr *reporting_edr_format_name*

Specifies to generate reporting EDR during OCS unreachable period.

reporting_edr_format_name must be the name of a reporting EDR format, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the trigger to generate EDRs when the OCS is in unreachable state. This configuration provides the facility to track and report the actual quota usage through EDRs during Assume Positive scenarios for HA.

This feature has been enhanced to support reporting / recording the appropriate usage in volume and time during regular OCS sessions and during assume positive scenarios separately. In this release, EDRs will be generated with new closure reasons when OCS goes down for HA.

Example

The following command configures the generation of charging EDRs when OCS is unreachable:

```
edr edr-dcca-fh charging-edr edr1
```

edr p2p

This command configures generation of Event Detail Records (EDR) for P2P events. This command is associated with the Dynamic Software Upgrade process.

Product

ACS

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

edr p2p *p2p_event_list* **[charging-edr** *charging_edr_format_name* **| edr-format** *edr_format_name* **| reporting-edr** *reporting_edr_format_name* **] +**
{ default | no } edr p2p *p2p_event_list*

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the configuration from the current rulebase.

p2p_event_list

Specifies the name of the P2P EDR Event. The plugin supports only the "audio-end" and "video-end" events. This P2P event list can be any P2P event that is supported by the plugin.

p2p_event_list must be an alphanumeric string of 1 through 128 characters.

charging-edr *charging_edr_format_name*

Specifies to generate charging EDR for P2P events.

charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

edr-format *edr_format_name*

Specifies to generate EDR for P2P events.

edr_format_name must be the name of an EDR format, and must be an alphanumeric string of 1 through 63 characters.

reporting-edr *reporting_edr_format_name*

Specifies to generate reporting EDR for P2P events.

reporting_edr_format_name must be the name of a reporting EDR format, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the P2P events to generate EDRs. The list of P2P events will be populated from the currently loaded plugin.

A plugin is a functional software entity that provides incremental updates to a pre-existing StarOS software component. Plugins can be dynamically loaded at runtime and do not require a system restart. For more information on the Dynamic Software Upgrade feature, refer to *Application Detection and Control Administration Guide*.

Example

The following command configures the generation of EDRs for P2P *audio-end* event specifying to use the EDR format named *edr1*:

```
edr p2p audio-end edr-format edr1
```

edr nemo-call

This command enables/disables the NEMO feature for populating the EDRs with source IP, destination IP and VRF name of the NEMO Mobile Router (MR) host.

Product

Important This CLI command is available only with NEMO license. Contact your Cisco account representative for more information.

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ default | no ] edr nemo-call
```

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the configuration from the current rulebase.

nemo-call

This keyword controls the feature of populating the EDRs with source IP, destination IP and VRF name associated with UEs behind the NEMO MRs.

By default this keyword option will be disabled i.e. this CLI should be configured if the feature needs to be turned ON.

Usage Guidelines

Use this command to enable this feature of creating the EDRs with the source IP, destination IP and VRF name of the NEMO host.

Important This feature requires a valid license to be installed prior to configuring this feature. Contact your Cisco account representative for more information.

Releases prior to 18.0, ECS did not see the inner user packet i.e. it sees only MIP packet containing user data in both uplink and downlink direction. For example, it sees [IP header1][GRE header] [IP header2] [payload].

In 18.0 and later releases, ECS will see and analyze the inner IP packets i.e. [IP header2] [payload], and determine the source IP, destination IP and VRF name of the NEMO hosts.

Example

The following command enables the generation of EDRs with source IP, destination IP and VRF name of the NEMO host:

```
edr nemo-call
```

edr sn-charge-volume

This command allows you to exclude/include packets/bytes that are dropped/retransmitted by the ACS in the total charge volume — "sn-charge-volume" EDR attribute.

Product

Important In release 17.0, this command has been deprecated. This configuration is available at rulebase level as **[local]host_name(config-rule-base)# [no] retransmissions-counted.**

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

[default | no] edr sn-charge-volume { count-dropped-units | count-retransmitted-units }

default

Configures this command with its default setting.

Default: Exclude, in the total charge volume, packets/bytes dropped/retransmitted by ACS.

no

Exclude, in the total charge volume, packets/bytes dropped/retransmitted by ACS.

count-dropped-units

Specifies to include dropped units in the total charge volume.

count-retransmitted-units

Specifies to include retransmitted units in the total charge volume.

Usage Guidelines

Use this command to exclude/include packets/bytes that are dropped/retransmitted by ACS in the total charge volume — "sn-charge-volume" EDR attribute.

This command applies only to the "sn-charge-volume" attribute and does not affect the "sn-volume-amt" counts in any way.

Example

The following specifies to include units retransmitted by ACS in the sn-charge-volume EDR attribute:

edr sn-charge-volume count-retransmitted-units

edr suppress-zero-byte-records

This command disables/enables the creation of EDRs when there is no data for the flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

[default | no] edr suppress-zero-byte-records

default

Configures this command with its default setting.

Default: Disabled; same as **no edr suppress-zero-byte-records**

no

Disables the suppression of zero-byte EDRs.

edr suppress-zero-byte-records

Suppresses zero-byte EDRs.

Usage Guidelines

Use this command to disable/enable the creation of EDRs that are empty. The situation where there is a zero-byte EDR would typically be possible when two successive EDRs are generated for a flow. This CLI command suppresses the second such EDR for the flow.

edr transaction-complete

This command enables/disables the generation of an EDR on the completion of a transaction.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

edr transaction-complete { dns | http } [charging-edr *charging_edr_format_name* **| edr-format** *edr_format_name* **| reporting-edr** *reporting_edr_format_name* **]**
{ default | no } edr transaction-complete

default

Configures this command with its default setting.

Default: Disabled; same as **no edr transaction-complete**

no

If previously configured, deletes the configuration from the current rulebase.

dns | http

- **dns**: DNS protocol related configuration
- **http**: HTTP protocol related configuration

edr-format *edr_format_name*

Specifies to generate EDR on transaction completion for DNS or HTTP protocol.

edr_format_name must be the name of an EDR format, and must be an alphanumeric string of 1 through 63 characters.

charging-edr *charging_edr_format_name*

Specifies to generate charging EDR on transaction completion.

charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

reporting-edr *reporting_edr_format_name*

Specifies to generate reporting EDR on transaction completion.

reporting_edr_format_name must be the name of a reporting EDR, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the generation of an EDR when certain application transactions (for example, request/response pairs) complete. EDR generation is supported for DNS or HTTP protocol. Note that these EDRs are in addition to those that might be generated due to other conditions, for example, EDR configurations in a Charging Action.

Example

The following command configures the generation of charging EDRs on the completion of transactions for HTTP protocol specifying the EDR format as *test123*:

```
edr transaction-complete http charging-edr test123
```

edr voip-call-end

This command enables/disables generation of EDRs on the completion of Voice over IP (VoIP) calls. This command is no longer supported for ADC in 14.0 and later releases.

Product

ACS

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

In StarOS 12.2 and later releases:

edr voip-call-end { charging-edr *charging_edr_format_name* **| edr-format** *edr_format_name* **| reporting-edr** *reporting_edr_format_name* **} +**
{ default | no } edr voip-call-end

In StarOS 12.1 and earlier releases:

edr voip-call-end edr-format *edr_format_name*
{ default | no } edr voip-call-end

default

Configures this command with its default setting.

Default: Disabled; same as **no edr voip-call-end**

no

If previously configured, deletes the edr voip-call-end configuration from the current rulebase.

edr-format *edr_format_name*

Important This option is available only in 12.1 and earlier releases. In 12.2 and later releases, it has been deprecated and is replaced by the **charging-edr** option.

Specifies to generate an EDR when a VoIP call ends.

edr_format_name must be the name of an EDR format, and must be an alphanumeric string of 1 through 63 characters.

charging-edr *charging_edr_format_name*

Important This option is available only in 12.2 and later releases.

Specifies to generate a charging EDR when a VoIP call ends.

charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

reporting-edr *reporting_edr_format_name*

Important This option is available only in 12.2 and later releases.

Specifies to generate a reporting EDR when a VoIP call ends.

reporting_edr_format_name must be the name of a reporting EDR format, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to generate an EDR on the completion of voice calls. Note that these EDRs are in addition to those that might be generated due to other conditions, for example EDR configurations in a Charging Action. This command facilitates P2P voice duration reporting.

Example

In 12.1 and earlier releases, the following command specifies generating EDRs on completion of VoIP calls using the EDR format *test13*:

```
edr voip-call-end edr-format test13
```

In 12.2 and later releases, the following command specifies generating charging EDRs on completion of VoIP calls using the EDR format named *test23*:

```
edr voip-call-end charging-edr test23
```

egcdr inactivity-meter

Description This command has been deprecated. It is included in the CLI for backward compatibility with older configuration files. When executed performs no function. Use the **egcdr threshold interval** *interval* **[regardless-of-other-triggers]** command for this functionality.

egcdr cdr-encoding

This command allows you to configure the eG-CDR encoding type.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
egcdr cdr-encoding { ascii [ delimiter { colon | comma | pipe } ] | asn.1
 }
default egcdr cdr-encoding
```

default

Configures the default eG-CDR CDR-encoding format.

Default: **asn.1**

ascii [delimiter { colon | comma | pipe }]

Specifies to use ASCII encoding type to generate eG-CDR in ASCII format.

delimiter { colon | comma | pipe }: Specifies the delimiter character to use in eG-CDRs in ASCII format.

- **colon**: Specifies to use ":" (colon) as a delimiter in eG-CDR.
- **comma**: Specifies to use "," (comma), as a delimiter in eG-CDR.
- **pipe**: Specifies to use "|" (pipe) as a delimiter in eG-CDR.

Default: **pipe**

asn.1

Specifies to use ASN.1 encoding type to generate eG-CDR in ASN.1 format.

This is the default setting.

Usage Guidelines

Use this command to configure the eG-CDR encoding type.

For more information on using eG-CDR ASCII encoding type in your deployment, contact your Cisco account representative.

Example

The following command specifies to use ASCII encoding type to generate eG-CDR in ASCII format while specifying the delimiter character as comma:

```
egcdr cdr-encoding ascii delimiter comma
```

egcdr tariff

This command allows you to configure the eG-CDR tariff time to generate new eG-CDRs for GGSN and P-GW-CDRs for P-GW.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

`[ no ] egcdr tariff minute` *`minute`* **`hour`** *`hour`*

no

If previously configured, deletes the configuration from the current rulebase.

minute *minute*

Specifies the minute for the time-of-day configuration.

minute must be an integer from 0 through 59.

hour *hour*

Specifies the hour for the time-of-day configuration.

hour must be an integer from 0 through 23.

Usage Guidelines

Use this command to configure the eG-CDR tariff time to generate new eG-CDRs for GGSN and P-GW-CDRs for P-GW. Up to four different time-of-day settings may be configured. When any configured tariff time is reached, the current eG-CDR/P-GW-CDR will be closed and a new eG-CDR/P-GW-CDR is opened.

Example

The following command defines an eG-CDR tariff for the 23rd minute of the 22nd hour of the day (10:23 PM):

```
egcdr tariff minute 23 hour 22
```

egcdr threshold

This command allows you to configure the thresholds for generating eG-CDRs for GGSN and P-GW-CDRs for P-GW.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
egcdr threshold { interval interval [ regardless-of-other-triggers ] |
volume { downlink | total | uplink } bytes }
{ default | no } egcdr threshold { interval | volume }
```

no

If previously configured, deletes the eG-CDR threshold configuration from the current rulebase.

default

Configures this command with the default settings.

Default: Disabled; same as **no egcdr threshold interval** and **no egcdr threshold interval volume** commands.

interval *interval* [regardless-of-other-triggers]

Specifies the time interval, in seconds, for closing the eG-CDR/P-GW-CDR if the minimum time duration thresholds are satisfied.

interval must be an integer from 60 through 40000000.

regardless-of-other-triggers: This option enables eG-CDR/P-GW-CDR generation at the fixed time interval irrespective of any other eG-CDR/P-GW-CDR triggers that may have happened in between.

Default: Disabled.

volume { downlink | total | uplink } *bytes*

Specifies the uplink/downlink volume octet counts for the generation of the interim eG-CDRs/P-GW-CDRs.

- **downlink** *bytes*: Specifies the limit for the number of downlink (from network to subscriber) octets after which the eG-CDR/P-GW-CDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: 4000000000

- **total** *bytes*: Specifies the limit for the total number of octets (uplink+downlink) after which the eG-CDR/P-GW-CDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: Disabled

- **uplink** *bytes*: Specifies the limit for the number of uplink (from subscriber to network) octets after which the eG-CDR/P-GW-CDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: 4000000000

Usage Guidelines

Use this command to configure thresholds to generate eG-CDRs/P-GW-CDRs.

Thresholds can be specified for both time interval and for data volume, by entering the command twice (once with interval and once with volume). When either configured threshold is reached, the eG-CDR/P-GW-CDRs will be closed. The volume trigger can be specified for uplink or downlink or combined total (uplink + downlink) byte thresholds. The exact keyword forces the configured volume to exactly match the volume in the eG-CDR/P-GW-CDRs, so the triggering packet might have to be divided across two eG-CDRs/P-GW-CDRs.

When both interval and volume triggers are configured, we'll reset the interval time and accumulated volume amount whenever the eG-CDR/P-GW-CDRs is closed regardless of whether it was due to the interval time expiration or reaching the volume limit. Use the regardless-of-other-triggers optional keyword, if you want the eG-CDRs/P-GW-CDRs closed at the configured regular intervals, regardless of whether eG-CDRs/P-GW-CDRs are being closed due to reaching a volume limit.

When the PDP context is terminated, the eG-CDR/P-GW-CDRs will be closed regardless of whether the thresholds have been reached.

Example

The following command defines an eG-CDR threshold interval of *600* seconds:

```
egcdr threshold interval 600
```

egcdr time-duration algorithm

This command allows you to specify the algorithm to compute the duration of time utilization in an eG-CDR for the current rulebase.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

egcdr time-duration algorithm { consumed-time *consumed_time* **[plus-idle] | continuous-time-periods** *ctp_time* **| parking-meter** *seconds* **}**
{ default | no } egcdr time-duration algorithm

no

If previously configured, deletes the eG-CDR time-duration algorithm configuration from the current rulebase.

default

Configures this command with its default setting.

Default: Algorithm configured for CCA, or the CCA default if none is configured.

consumed-time *consumed_time* [plus-idle]

Specifies the actual consumption time in seconds. This is used to determine the actual used chargeable time envelopes for the purpose of consuming time quota.

consumed_time must be an integer from 1 through 4294967295.

Default: 0 (disabled)

Time envelope is the basis for reporting active usage. For each time envelope, the time consumption includes the time duration between arrival of last packet and first packet only.

plus-idle: Specifies the idle time between arrival of two packets to include in time usage record in eG-CDR.

When used along with **consumed-time** it indicates the active usage + idle time, when no traffic flow occurs.

continuous-time-periods *ctp_time*

Specifies the continuous time period to compute the usage record in eG-CDR.

ctp_time sets the audition, in seconds, to start a counter on arrival of the first packet and thereafter include only that period in charging in which one or more packets arrived. For the period where no packets arrived or no traffic was detected, usage will not be computed.

ctp_time must be an integer from 1 through 4294967295.

parking-meter *seconds*

Specifies the Parking Meter (PM) period, in seconds.

seconds must be an integer from 1 through 4294967295.

Parking meter is the method with which the usage time is set in the content-id containers in eG-CDRs. When a parking meter value is set, the user is charged for time in increments of the value set. For example, if the parking meter is set to 300 seconds (5 minutes) and the subscriber only uses one minute, the charge is for 5 minutes.

Usage Guidelines

Use this command to set the various time charging algorithms/schemes for time usage in eG-CDR.

For example, packets arrive at times T1, T2, T3 and T4. Then the typical time usage might be computed to be T4 – T1. However, if say there is an idle period between times T2 and T3, then system will compute the time usage to be (T2 – T1) + (T4 – T3).

consumed-time in above scenario calculates the time duration as (T2 – T1) + (T4 – T3) where **consumed-time** with **plus-idle** calculates the time duration as (T2-T1)+I + (T4 – T3)+I or (T4-T1).

Example

The following command sets consumed time duration to *400* seconds:

```
egcdr time-duration algorithm consumed-time 400
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

extract-host-from-uri

This command allows you to configure whether to use the host name embedded in the URI as the host field, when the host field option in the HTTP or Wireless Session Protocol (WSP) header is absent.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
extract-host-from-uri { http | wsp ) +
{ default | no } extract-host-from-uri
```

default

Configures this command with its default setting.

Default: Disabled; same as **no extract-host-from-uri**

no

If previously configured, disables the extract-host-from-uri configuration, for both HTPP and WSP, from the current rulebase.

http | wsp

Specifies the protocol(s).

+

Indicates that more than one of the previous keywords can be entered within a single command.

Usage Guidelines

If the host field is not present in HTTP/WSP header, this command will extract host from the URI, and store it in the host field to enable "http host" and "wsp host" rule matches using the stored value.

Important Applying the **extract-host-from-uri** command a second time will overwrite the previous configuration. For example, if you apply the command **extract-host-from-uri http wsp http**, and then apply the command **extract-host-from-uri http wsp**, extraction of host from URI will happen only for WSP analyzer.

Example

The following command configures extraction of host from URI for both HTTP and WSP protocols:

```
extract-host-from-uri http wsp
```

firewall dos-protection

This command allows you to configure Stateful Firewall protection for subscribers from Denial-of-Service (DoS) attacks.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no ] firewall dos-protection { all | flooding { icmp | tcp-syn | udp }
 | ftp-bounce | ip-unaligned-timestamp | mime-flood | port-scan |
tcp-window-containment | source-router | teardrop | winnuke }
default firewall dos-protection
```

no

If previously enabled, disables Stateful Firewall protection for subscribers from all or specified DoS attack(s).

default

Configures this command with its default setting.

Default: Protection from all DOS attacks is disabled.

all

Enables protection against all DoS attacks supported by the Stateful Firewall in-line service.

flooding { icmp | tcp-syn | udp }

Enables protection against specified flooding attacks:

- **icmp**: Enables protection against ICMP Flood attacks
- **tcp-syn**: Enables protection against TCP SYN Flood attacks
- **udp**: Enables protection against UDP Flood attacks

ftp-bounce

Enables protection against FTP Bounce attacks.

In an FTP Bounce attack, an attacker is able to use the PORT command to request access to ports indirectly through a user system as an agent for the request. This technique is used to port scan hosts discreetly, and to access specific ports that the attacker cannot access through a direct connection.

ip-unaligned-timestamp

Enables protection against IP Unaligned Timestamp attacks.

In an IP Unaligned Timestamp attack, certain operating systems crash if they receive a frame with the IP timestamp option that is not aligned on a 32-bit boundary.

mime-flood

Enables protection against HTTP Multiple Internet Mail Extension (MIME) Header Flooding attacks.

In a MIME Flood attack an attacker sends huge amount of MIME headers which consumes a lot of memory and CPU usage.

port-scan

Enables protection against Port Scan attacks.

tcp-window-containment

Enables protection against TCP Sequence Number Out-of-Range attacks.

In a Sequence Number Out-of-Range attack the attacker sends packets with out-of-range sequence numbers forcing the system to wait for missing sequence packets.

source-router

Enables protection against IP Source Route IP Option attacks.

Source routing is an IP option mainly used by network administrators to check connectivity. When an IP packet leaves a system, its path through various networks to its destination is controlled by the routers and their current configuration. Source routing provides a means to override the control of the routers. Strict source routing specifies the path through all the routers to the destination. The same path in reverse is used to return responses. Loose source routing allows the attacker to spoof both an address and sets the loose source routing option to force the response to return to the attacker's network.

teardrop

Enables protection against Teardrop attacks.

In a Teardrop attack, overlapping IP fragments are exploited causing the TCP/IP fragmentation re-assembly to improperly handle overlapping IP fragments.

winnuke

Enables protection against WIN-NUKE attacks.

This is a type of Nuke denial-of-service attack against networks consisting of fragmented or otherwise invalid ICMP packets sent to the target, achieved by using a modified ping utility to repeatedly send this corrupt data, thus slowing down the affected computer until it comes to a complete stop.

The WinNuke exploits the vulnerability in the NetBIOS handler and a string of out-of-band data sent to TCP port 139 of the victim machine causing it to lock up and display a Blue Screen of Death.

Usage Guidelines

Use this command to enable Stateful Firewall protection from different types of DoS attacks. This command can be used multiple times for different DoS attacks.

Important The DoS attacks are detected only in the downlink direction.

Example

The following command enables Stateful Firewall protection from all supported DoS attacks:

```
firewall dos-protection all
```

firewall flooding

This command allows you to configure Stateful Firewall protection from Packet Flooding attacks.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`firewall flooding { { protocol { icmp | tcp-syn | udp } packet limit` *`packets`* **`} | { sampling-interval`** *`interval`* **`} }`**
`default firewall flooding { { protocol { icmp | tcp-syn | udp } packet limit } | { sampling-interval } }`

default

Configures this command the default setting for the specified keyword.

protocol { icmp | tcp-syn | udp }

Specifies the transport protocol:

- **icmp**: Configuration for ICMP protocol.
- **tcp-syn**: Configuration for TCP-SYN packet limit.
- **udp**: Configuration for UDP protocol.

packet limit *packets*

Specifies the maximum number of specified packets a subscriber can receive during a sampling interval.

packets must be an integer from 1 through 4294967295.

Default: 1000 packets per sampling interval for all protocols.

sampling-interval *interval*

Specifies the flooding sampling interval, in seconds.

interval must be an integer from 1 through 60.

Default: 1 second

Usage Guidelines

Use this command to configure the maximum number of ICMP, TCP-SYN, / UDP packets allowed to prevent the packet flooding attacks to the host.

Example

The following command ensures a subscriber will not receive more that 1000 ICMP packets per sampling interval:

```
firewall flooding protocol icmp packet limit 1000
```

The following command ensures a subscriber will not receive more than 1000 UDP packets per sampling interval on different 5-tuples. That is, if an attacker is sending lot of UDP packets on different ports or using different spoofed IPs, those packets will be limited to 1000 packets per sampling interval. This way only "suspected" malicious packets are limited and not "legitimate" packets:

```
firewall flooding protocol udp packet limit 1000
```

The following command ensures a subscriber will not receive more than 1000 TCP-SYN packets per sampling interval:

```
firewall flooding protocol tcp-syn packet limi 1000
```

The following command specifies a flooding sampling interval of 1 second:

```
firewall flooding sampling-interval 1
```

firewall icmp-destination-unreachable-message-threshold

This command allows you to configure a threshold on the number of ICMP error messages sent by the subscriber for a particular data flow.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall icmp-destination-unreachable-message-threshold messages
then-block-server
{ default | no } firewall icmp-destination-unreachable-message-threshold
```

default

Configures this command with its default setting.

Default: No limit

no

If previously configured, deletes the configuration from the current rulebase.

messages

Specifies the threshold on the number of ICMP error messages sent by the subscriber for a particular data flow.

messages must be an integer from 1 through 100.

Usage Guidelines

Use this command to configure a threshold on the number of ICMP error messages sent by the subscriber for a particular data flow. After the threshold is reached, it is assumed that the server is not reacting properly to the error messages, and further downlink traffic to the subscriber on the unwanted flow is blocked.

Some servers that run QChat ignore the ICMP error messages (Destination Port Unreachable and Host Unreachable) from the mobiles. So the mobiles continue to receive unwanted UDP traffic from the QChat servers, and their batteries get exhausted quickly.

Example

The following command configures a threshold of 10 ICMP error messages:

```
firewall icmp-destination-unreachable-message-threshold 10
then-block-server
```

firewall max-ip-packet-size

This command allows you to configure the maximum IP packet size (after IP reassembly) allowed over Stateful Firewall.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-rule-base)#`

Syntax Description

firewall max-ip-packet-size *packet_size* **protocol { icmp | non-icmp }**
default firewall max-ip-packet-size protocol { icmp | non-icmp }

default

Configures the default maximum IP packet size configuration.

Default: 65535 bytes (for both ICMP and non-ICMP)

packet_size

Specifies the maximum packet size.

packet_size must be an integer from 30000 through 65535.

protocol { icmp | non-icmp }

Specifies the transport protocol:

- **icmp**: Configuration for ICMP protocol.
- **non-icmp**: Configuration for protocols other than ICMP.

Usage Guidelines

Use this command to configure the maximum IP packet size allowed for ICMP and non-ICMP packets to prevent packet flooding attacks to the host. Packets exceeding the configured size will be dropped for "Jolt Attack" and "Ping-Of-Death Attack".

Example

The following command allows a maximum packet size of *60000* for ICMP protocol:

firewall max-ip-packet-size 60000 protocol icmp

firewall mime-flood

This command allows you to configure Stateful Firewall protection from Multipurpose Internet Mail Extensions (MIME) Flood attacks.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall mime-flood { http-headers-limit max_limit |
max-http-header-field-size max_size }
default firewall mime-flood { http-headers-limit |
max-http-header-field-size }
```

default

Configures this command with its default setting.

http-headers-limit *max_limit*

Specifies the maximum number of headers allowed in an HTTP packet. If the number of HTTP headers in a page received is more than the specified limit, the request will be denied.

max_limit must be an integer from 1 through 256.

Default: 16

max-http-header-field-size *max_size*

Specifies the maximum header field size allowed in the HTTP header, in bytes. If the size of HTTP header in the received page is more than the specified number of bytes, the request will be denied.

max_size must be an integer from 1 through 8192.

Default: 4096 bytes

Usage Guidelines

Use this command to configure the maximum number of headers allowed in an HTTP packet, and the maximum header field size allowed in the HTTP header to prevent MIME flooding attacks.

Example

The following command sets the maximum number of headers allowed in an HTTP packet to *100*:

```
firewall mime-flood http-headers-limit 100
```

The following command sets the maximum header field size allowed in the HTTP header to *1000* bytes:

```
firewall mime-flood max-http-header-field-size 1000
```

firewall no-ruledef-matches

This command allows you to configure the default action for packets when no Stateful Firewall ruledef matches.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, use the **access-rule no-ruledef-matches** command available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall no-ruledef-matches { downlink | uplink } action { deny [
charging-action charging_action_name ] | permit [ bypass-nat | nat-realm
nat_realm_name ] }
default firewall no-ruledef-matches { downlink | uplink } action
```

default

Configures the default action for packets with no Stateful Firewall ruledef match.

downlink | uplink

Specifies the packet type:

- **downlink**: Downlink (from network to subscriber) packets with no Stateful Firewall ruledef match.

  Default: **deny**

- **uplink**: Uplink (from subscriber to network) packets with no Stateful Firewall ruledef match.

  Default: **permit**

action { deny [charging-action *charging_action_name*] | permit [bypass-nat | nat-realm *nat_realm_name*] }

Specifies the default action for packets with no Stateful Firewall ruledef match.

permit [bypass-nat | nat-realm *nat_realm_name* **]**: Permit packets.

Important The **bypass-nat** keyword is only available in StarOS 8.3 and later releases.

Optionally specify:

- **bypass-nat**: Specifies to bypass Network Address Translation (NAT).
- **nat-realm** *nat_realm_name*: Specifies a NAT realm to be used for performing NAT on subscriber packets.

  nat_realm_name must be the name of a NAT realm, and must be an alphanumeric string of 1 through 31 characters.

Important If neither **bypass-nat** or **nat-realm** are configured, NAT is performed if the **nat policy nat-required** CLI command is configured with the **default-nat-realm** option.

deny [charging-action *charging_action_name* **]**: Denies specified packets.

Optionally, a charging action can be specified.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the default action to be taken on packets with no Stateful Firewall ruledef matches.

If, for deny action, the optional charging action is configured, the action taken depends on what is configured in the charging action. For the Stateful Firewall rule, the "flow action", "billing action", and "content ID" of the charging action will be used to take action. If flow exists, flow statistics are updated.

Allowing/dropping of packets is determined in the following sequence:

- Check is done to see if the packet matches any pinholes. If yes, no rule matching is done and the packet is allowed.
- Stateful Firewall ruledef matching is done. If a rule matches, the packet is allowed or dropped as per the **firewall priority** configuration.
- If no Stateful Firewall ruledef matches, the packet is allowed or dropped as per the **no-ruledef-matches** configuration.

For a packet dropped due to Stateful Firewall ruledef match or no match (first packet of a flow), the charging action applied is the one configured in the **firewall priority** or the **firewall no-ruledef-matches** command respectively.

In StarOS 8.1, in the case of Policy-based Stateful Firewall, the charging action applied is the one configured in the **access-rule priority** or the **access-rule no-ruledef-matches** command respectively.

For action on packets dropped due to any error condition after data session is created, the charging action must be configured in the **flow any-error charging-action** command.

Example

The following command configures Stateful Firewall to permit downlink packets with no ruledef matches:

```
firewall no-ruledef-matches downlink action permit
```

firewall policy

This command allows you to enable/disable Stateful Firewall support for all subscribers using the current rulebase.

Important In StarOS 8.0, this command is available in the APN/Subscriber Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall policy firewall-required
{ default | no } firewall policy
```

default

Configures this command with its default setting.

Default: Stateful Firewall support is disabled for all subscribers using the current rulebase.

no

If previously enabled, disables Stateful Firewall support for all subscribers using the current rulebase.

firewall-required

Enables Stateful Firewall support for all subscribers using the current rulebase.

Usage Guidelines

Use this command to enable/disable Stateful Firewall support for all subscribers using the current rulebase.

Example

The following command enables Stateful Firewall support:

```
firewall policy firewall-required
```

The following command disables Stateful Firewall support:

```
no firewall policy
```

firewall priority

This command allows you to add and specify the priority and type of a Stateful Firewall ruledef in the current rulebase, and allows you to configure a single or range of ports to be allowed on the server for auxiliary/data connections.

Important In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, use the **access-rule priority** command available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall priority priority [ dynamic-only | static-and-dynamic ]
firewall-ruledef firewall_ruledef_name { { deny [ charging-action
charging_action_name ] } | { permit [ nat-realm nat_realm_name | [ trigger
open-port { aux_port_number | range start_port_number to end_port_number } direction
 { both | reverse | same } ] ] } }
no firewall priority priority
```

no

If previously configured, deletes the specified Stateful Firewall ruledef priority configuration from the current rulebase.

priority

Specifies the Stateful Firewall ruledef's priority in the current rulebase.

priority must be a unique value in the current rulebase, and must be an integer from 1 through 65535.

[dynamic-only | static-and-dynamic] firewall-ruledef *firewall_ruledef_name*

Specifies the Stateful Firewall ruledef to add to the rulebase. Optionally, the Stateful Firewall ruledef type can be specified.

- **dynamic-only**: Firewall Dynamic Ruledef—Predefined ruledef that can be enabled/disabled by the policy server, and is disabled by default.
- **static-and-dynamic**: Firewall Static and Dynamic Ruledef—Predefined ruledef that can be disabled/enabled by the policy server, and is enabled by default.
- *firewall_ruledef_name* must be the name of a Stateful Firewall ruledef, and must be an alphanumeric string of 1 through 63 characters.

deny [charging-action *charging_action_name*]

Denies packets if the rule is matched. An optional charging action can be specified. If a packet matches the deny rule, action is taken as configured in the charging action. For Stateful Firewall ruledefs, only the terminate-flow action is applicable, if configured in the specified charging action.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

permit [nat-realm *nat_realm_name* | [bypass-nat] [trigger open-port { *aux_port_number* | range *start_port_number* to *end_port_number* }]]

Permits packets.

- **nat-realm** *nat_realm_name*: Specifies the NAT realm to be used for performing NAT on subscriber packets matching the Stateful Firewall ruledef.

  If the NAT realm is not specified, then NAT will be bypassed. That is, NAT will not be applied on subscriber packets that are matching a Stateful Firewall ruledef with no NAT realm name configured.

  nat_realm_name must be the name of a NAT realm, and must be an alphanumeric string of 1 through 31 characters.

- **bypass-nat**: Specifies that packets bypass NAT.

Important If the **nat-realm** is not configured, NAT is performed if the **nat policy nat-required** CLI command is configured with the **default-nat-realm** option.

- **trigger open-port {** *aux_port_number* **|** **range** *start_port_number* **to** *end_port_number* **}**: Permits packets if the rule is matched, and allows the creation of data flows for Stateful Firewall. Optionally a port trigger can be specified to be used for this rule to limit the range of auxiliary data connections (a single or range of port numbers) for protocols having control and data connections (like FTP). The trigger port will be the destination port of an association which matches a rule.
  - *aux_port_number*: Specifies the number of auxiliary ports to open for traffic, and must be an integer from 1 through 65535.
  - **range** *start_port_number* **to** *end_port_number*: Specifies the range of ports to open for subscriber traffic.

- *start_port_number* must be an integer from 1 through 65535. This is the start of the port range and must be less than *end_port_number*.
- *end_port_number* must be an integer from 1 through 65535. This is the end of the port range and must be greater than *start_port_number*.

direction { both | reverse | same }

Specifies the direction from which the auxiliary connection is initiated. This direction can be same as the direction of control connection, or the reverse of the control connection direction, or in both directions.

- **both**: Provides the trigger to open port for traffic in either direction of the control connection.
- **reverse**: Provides the trigger to open port for traffic in the reverse direction of the control connection (from where the connection is initiated).
- **same**: Provides the trigger to open port for traffic in the same direction of the control connection (from where the connection is initiated).

Usage Guidelines

Use this command to add Stateful Firewall ruledefs to the rulebase and configure the priority, type, and port triggers. Port trigger configuration is optional. Port trigger can be configured only if a rule action is permit.

The rulebase specifies the Stateful Firewall rules to be applied on the calls. The ruledefs within a rulebase have priorities, based on which priority matching is done. Once a rule is matched and the rule action is permit, if the trigger is configured, the appropriate check is made. The trigger port will be the destination port of an association which matches the rule.

Multiple triggers can be defined for the same port number to permit multiple auxiliary ports for subscriber traffic.

Once a rule is matched and if the rule action is deny, the action taken depends on what is configured in the specified charging action. If the flow exists, flow statistics are updated and action is taken as configured in the charging action:

- If the billing action is configured as EDR enabled, an EDR is generated.
- If the content ID is configured, UDR information is updated.
- If the flow action is configured as "terminate-flow", the flow is terminated instead of just discarding the packet.

If the billing action, content ID, and flow action are not configured, no action is taken on the dropped packets.

Important For Stateful Firewall ruledefs, only the terminate-flow action is applicable if configured in the specified charging action.

For a packet dropped due to Stateful Firewall ruledef match or no match (first packet of a flow), the charging action applied is the one configured in the **firewall priority** or the **firewall no-ruledef-matches** command respectively.

In StarOS 8.1, in the case of Policy-based Firewall, the charging action applied is the one configured in the **access-rule priority** or the **access-rule no-ruledef-matches** command respectively.

For action on packets dropped due to any error condition after data session is created, the charging action must be configured in the **flow any-error charging-action** command.

The GGSN can dynamically activate/deactivate dynamic Stateful Firewall ruledefs for a subscriber based on the rule name received from a policy server. At rule match, if a rule in the rulebase is a dynamic rule, and if the rule is enabled for the particular subscriber, rule matching is done for the rule. If the rule is disabled for the particular subscriber, rule matching is not done for the rule.

Example

The following command assigns a priority of *10* to the Stateful Firewall ruledef *fw_rule1*, adds it to the rulebase, and permits port trigger to be used for the rule to open ports in the range of *100* to *200* in either direction of the control connection:

```
firewall priority 10 firewall-ruledef fw_rule1 permit trigger open-port
range 100 to 200 direction both
```

The following command configures the Stateful Firewall ruledef *fw_rule2* as a dynamic ruledef:

```
firewall priority 7 dynamic-only firewall-ruledef fw_rule2 deny
```

firewall tcp-first-packet-non-syn

This command allows you to configure the action to take on TCP flows starting with a non-syn packet.

Important In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall tcp-first-packet-non-syn { drop | reset }
default firewall tcp-first-packet-non-syn
```

default

Configures this command with its default setting.

Default: **drop**

drop

Specifies to drop the packet or session.

reset

Specifies to send reset.

Usage Guidelines

Use this command to configure action to take on TCP flow starting with a non-syn packet.

Example

The following command configures action to take on TCP flow starting with a non-syn packet to drop:

```
firewall tcp-first-packet-non-syn drop
```

firewall tcp-idle-timeout-action

This command allows you to configure the Stateful Firewall action to be taken on TCP idle timeout expiry.

Important In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall tcp-idle-timeout-action { drop | reset }
default firewall tcp-idle-timeout-action
```

default

Configures this command with its default setting.

Default: **reset**

drop

Specifies to drop the packet or session on TCP timeout expiry.

reset

Specifies to send reset on TCP timeout expiry.

Usage Guidelines

Use this command to configure action to take on TCP idle timeout expiry.

Example

The following command configures action to take on TCP idle timeout expiry to drop:

```
firewall tcp-idle-timeout-action drop
```

firewall tcp-reset-message-threshold

This command allows you to configure a threshold on the number of TCP reset messages sent by the subscriber for a particular data flow. After this threshold is reached, further downlink traffic to the subscriber on the unwanted flow is blocked.

Important This command is only available in StarOS 8.3 and later releases. In StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall tcp-reset-message-threshold messages then-block-server
{ default | no } firewall tcp-reset-message-threshold
```

default

Configures this command with its default setting.

Default: **no firewall tcp-reset-message-threshold**

no

If previously configured, deletes the firewall tcp-reset-message-threshold configuration from the current rulebase.

messages

Specifies the threshold on the number of TCP reset messages sent by the subscriber for a particular data flow.

messages must be an integer from 1 through 100.

Usage Guidelines

Use this command to configure a threshold on the number of TCP reset messages sent by the subscriber for a particular data flow. After the threshold is reached, assuming the server is not reacting properly to the reset messages further downlink traffic to the subscriber on the unwanted flow is blocked. This configuration enables QCHAT noise suppression for TCP.

Example

The following command sets the threshold on the number of TCP reset messages to *10*:

```
firewall tcp-reset-message-threshold 10 then-block-server
```

firewall tcp-syn-flood-intercept

This command allows you to configure the TCP intercept parameters to prevent TCP SYN flooding attacks by intercepting and validating TCP connection requests for DoS protection mechanism configured with the **dos-protection** command.

Important In StarOS 8.0, this command is available in the ACS Configuration Mode. In StarOS 8.1 and StarOS 8.3, use this command for Rulebase-based Firewall-and-NAT configuration. In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT configuration, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
firewall tcp-syn-flood-intercept { mode { none | watch [ aggressive ] }
| watch-timeout intercept_watch_timeout }
default firewall tcp-syn-flood-intercept { mode | watch-timeout }
```

default

Sets the default values of TCP intercept parameters for SYN Flood DoS protection.

mode { none | watch [aggressive] }

Specifies the TCP SYN flood intercept mode:

- **none**: Disables TCP SYN flood intercept feature.
- **watch**: Configures TCP SYN flood intercept feature in watch mode. Stateful Firewall passively watches to see if TCP connections become established within a configurable interval. If connections are not established within the timeout period, Stateful Firewall clears the half-open connections by sending RST to TCP client and server. The default watch-timeout for connection establishment is 30 seconds.
- **aggressive**: Configures TCP SYN flood Intercept or Watch feature for aggressive behavior. Each new connection request causes the oldest incomplete connection to be deleted. When operating in watch mode, the watch timeout is reduced by half. If the watch-timeout is 30 seconds, under aggressive conditions it becomes 15 seconds. When operating in intercept mode, the retransmit timeout is reduced by half (i.e. if the timeout is 60 seconds, it is reduced to 30 seconds). Thus the amount of time waiting for connections to be established is reduced by half (i.e. it is reduced to 150 seconds from 300 seconds under aggressive conditions).

Default: **none**

watch-timeout *intercept_watch_timeout*

Specifies the TCP intercept watch timeout, in seconds.

intercept_watch_timeout must be an integer from 5 through 30.

Default: 30

Usage Guidelines

This TCP intercept functionality provides protection against TCP SYN Flooding attacks.

The system captures TCP SYN requests and responds with TCP SYN-ACKs. If a connection initiator completes the handshake with a TCP ACK, the TCP connection request is considered as valid by system and system forwards the initial TCP SYN to the valid target which triggers the target to send a TCP SYN-ACK. Now system intercepts with TCP SYN-ACK and sends the TCP ACK to complete the TCP handshake. Any TCP packet received before the handshake completion will be discarded.

Example

The following command sets the TCP intercept watch timeout setting to *5* seconds:

```
firewall tcp-syn-flood-intercept watch-timeout 5
```

flow any-error

This command allows you to specify the charging action to be used for packets dropped by Stateful Firewall due to any error conditions.

Product

PSF

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

flow any-error charging-action *charging_action_name*
default flow any-error

default

Configures the default action for packets dropped by Stateful Firewall due to any errors.

Default: Update the flow statistics if flow is available

charging_action_name

Specifies the charging action based on which accounting action is taken on packets dropped by Stateful Firewall due to any errors.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

Important The charging action specified here should preferably not be used for action on packets dropped due to Stateful Firewall ruledef match or no-match (in the **firewall priority** and **firewall no-ruledef-matches** commands) and the content ID within the charging action must be unique so that dropped counts will not interfere with other content IDs.

Usage Guidelines

Use this command to configure the charging action for packets dropped by Stateful Firewall due to any error conditions, such as, a packet being inappropriate based on the state of the protocol of the packet's session, or DoS protection causing the packet to be discarded, and so on.

For a packet dropped due to Stateful Firewall ruledef match or no match (first packet of a flow), the charging action applied is the one configured in the **firewall priority** or the **firewall no-ruledef-matches** command respectively.

In StarOS 8.1, in the case of Policy-based Firewall, the charging action applied is the one configured in the **access-rule priority** or the **access-rule no-ruledef-matches** command respectively.

For a packet dropped due to any error condition after data session is created, the charging action used is the one configured in the **flow any-error charging-action** command.

If the charging action applied on a packet is the one specified in the **flow any-error charging-action** command, flow statistics are updated and action is taken as configured in the charging action:

- If the billing action is configured as EDR enabled, an Event Data Record (EDR) is generated.
- If the content ID is configured, Usage Data Record (UDR) information is updated.
- If the flow action is configured as "terminate-flow", the flow is terminated instead of just discarding the packet.

If the billing action, content ID, and flow action are not configured, no action is taken on the dropped packets.

Example

The following command specifies the charging action *test2* for accounting action on packets dropped/discarded by Stateful Firewall due to any error:

```
flow any-error charging-action test2
```

flow control-handshaking

This command allows you to specify how to charge for the control traffic associated with an application.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
flow control-handshaking { charge-to-application { [ all-packets ] [
initial-packets ] [ mid-session-packets ] [ tear-down-packets ] } |
charge-separate-from-application }
default flow control-handshaking
no flow control-handshaking [ charge-to-application ]
```

default flow control-handshaking

Configures this command with its default setting.

Default: Same as **no flow control-handshaking**

no flow control-handshaking [charge-to-application]

If previously configured, deletes the flow control-handshaking configuration from the current rulebase. The control packets will use whatever content-id is determined by the normal use of the **action** commands.

In this command, the optional keyword **charge-to-application** is deprecated and has no effect.

charge-to-application { [all-packets] [initial-packets] [mid-session-packets] [tear-down-packets] }

Configures the charging action to include the flow control packets either during initial handshaking only or specified control packets during session for charging.

- **all-packets**: Specifies that the initial setup packets will wait until the application has been determined before assigning the content-id, and all mid-session ACK packets as well as the final tear-down packets will use that content-id.
- **initial-packets**: Specifies that only the initial setup packets will wait for content-id assignment.

- **mid-session-packets**: Specifies that the ACK packets after the initial setup will use the application's or content-id assignment.
- **tear-down-packets**: Specifies that the final tear-down packets (TCP or WAP) will use the application's or content-id assignment.

charge-separate-from-application

Configures the charging action to separate the charging of the initial control packets or all subsequent control packets from regular charging.

Usage Guidelines

Use this command to configure how to charge for the control traffic associated with an application ruledef. Applications like HTTP use TCP to set up and tear down connections before the HTTP application starts. This command controls whether the packets that set up and tear down the connections should use the same content ID as the application's flow.

In normal mode 3-way handshake TCP packets (SYN, SYN-ACK, and ACK) and closing or intermittent packets (FIN, RST, etc.) directed and charged based on configured matched rules. This command makes the system to wait for the start and stop of layer 7 packet flow and content ID and charge the initial, intermittent, and closing TCP packets as configured to the same matching rules and content ID as of the flow.

This command also affects applications that do not use TCP but use other methods for control packets, for example WAP, where WTP/UDP may be used to set up and tear down connection-oriented WSP.

Example

Following command enables the charging for initial TCP handshaking control packets and wait for content-id of data traffic flow:

```
flow control-handshaking charge-to-application initial-packets
```

The following command enables charging all mid-session ACKs as well as tear-down packets to application:

```
flow control-handshaking charge-to-application mid-session-packets
tear-down-packets
```

flow end-condition

This command allows you to configure the end condition of the session flows related to a user session and triggers EDR generation.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

flow end-condition { hagr | handoff | normal-end-signaling | session-end | tethering-signature-change | interim *interim_timer_value* **| timeout } [flow-overflow] + { charging-edr** *charging_edr_format_name* **| reporting-edr** *reporting_edr_format_name* **}**
no flow end-condition

no

If previously configured, deletes the flow end-condition configuration from the current rulebase.

hagr

Creates an EDR with the specified EDR format whenever a flow is terminated due to Inter-chassis Session Recovery action.

handoff

Creates an EDR with the specified EDR format whenever a flow ends due to hand-off. Whenever a handoff occurs, ACS closes the EDRs for all current flows using the specified EDR format, and begins new statistics collection for the flows for the EDRs that will be generated when the flows actually end.

normal-end-signaling

Creates an EDR with the specified EDR format whenever flow end is signaled normally, for example like detecting FIN and ACK for a TCP flow, or a WSP-DISCONNECT terminating a connection-oriented WSP flow over UDP) and create an EDR for the flow using the specified EDR format.

session-end

Creates an EDR with the specified EDR format whenever a subscriber session ends. By this option ACS creates an EDR with the specified format name for every flow that has had any activity since last EDR was created for the flow on session end.

tethering-signature-change

Creates an EDR with specified EDR format for tethering signature change of a flow because of mid flow SYN packets.

Whenever a tethering signature change occurs, ACS closes the EDR with the specified closure reason and begins new statistics collection for the flow. If enabled, flow statistics may get split across multiple EDRs of the flow if tethering signature change occurs.

The maximum limit for tethering signature change detection depends on the **tethering-detection max-syn-packet-in-flow** CLI command. EDR/REDR generation for tethering signature change is also dependent on this CLI configuration.

interim *interim_timer_value*

This condition specifies the interim threshold condition of the flow where an EDR is generated based on the configured timer value. The *interim_timer_value* is configured in minutes with a configurable range from 15 to 1440 minutes.

The interim keyword is applicable only for new flows that are created and not on existing flows.

timeout

Creates an EDR with the specified EDR format whenever a flow ends due to a timeout condition.

flow-overflow

Important This keyword is applicable only when used with the **hagr**, **handoff**, **tethering-signature-change**, and **session-end** keywords.

Creates an EDR with the specified EDR format whenever there is a flow-overflow condition. If any of the specified end-conditions that affect subscriber information stored at ACS (such as call line) is configured, the "flow-overflow" EDR is generated.

+

Indicates that more than one of the keywords can be entered within a single command.

charging-edr *charging_edr_format_name*

Specifies the charging EDR format.

charging_edr_format_name must be the name of a charging EDR format, and must be an alphanumeric string of 1 through 63 characters.

reporting-edr *reporting_edr_format_name*

Specifies the reporting EDR format.

reporting_edr_format_name must be the name of a reporting EDR format, and must be a unique alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to enable or disable the capturing of EDRs based on flow end condition.

Example

The following command configures the flow end condition as handoff and creates a charging EDR with format named *EDR_format1*:

```
flow end-condition handoff charging-edr EDR_format1
```

flow limit-across-applications

This command allows you to limit the total number of simultaneous flows per Subscriber/APN sent to a rulebase regardless of the flow type, or limit flows based on the protocol type under the Session Control feature.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
flow limit-across-applications { limit | non-tcp limit | tcp limit }
no flow limit-across-applications [ non-tcp | tcp ]
```

no

If previously configured, deletes the flow limit-across-applications configuration from the current rulebase.

flow limit-across-applications *limit*

Specifies the maximum number of flows across all applications for the rulebase.

limit must be an integer from 1 through 4000000000.

Default: No limits

non-tcp *limit*

Specifies the maximum limit of non-TCP type flows.

limit must be an integer from 1 through 4000000000.

Default: No limits

tcp *limit*

Specifies the maximum limit of TCP flows.

limit must be an integer from 1 through 4000000000.

Default: No limits

Usage Guidelines

Use this command to limit the total number of flows allowed per subscriber for a rulebase regardless of flow type, or limit flows based on the protocol—non-TCP (connection-less) or TCP (connection-oriented).

If a subscriber attempts to exceed these limits system discards the packets of new flow. This limit processing of this command has following aspects for UDP, TCP, ICMP and some of the exempted flows:

- UDP/ICMP: System waits for the flow timeout before updating the counter and removing it from the count of number of flows.
- TCP: After a TCP flow ends, system waits for a short period of time to accommodate the retransmission of any missed packet from one end. TCP flows those are ended, but are still in wait period for timeout are exempted for this limit processing.
- Exempted flows: System exempts all the other flows specified with the **flow limit-for-flow-type** command in the ACS Charging Action Configuration Mode set to **no**.

Example

The following command defines the maximum number of *200000* flows for the rulebase:

```
flow limit-across-applications 200000
```

flow rtsp-all-pkts

This command allows you to delay charge packets in an RTSP flow.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no | default ] flow rtsp-all-pkts charge-to-application
```

no

If previously configured, deletes the flow rtsp-all-pkts configuration from the current rulebase.

default

Configures this command with its default setting.

Default: Same as **no flow rtsp-all-pkts charge-to-application**.

flow rtsp-all-pkts charge-to-application

Configures delay charging for RTSP traffic. When this configuration is enabled, all packets (TCP control packets and RTSP packets) prior to the RTSP SETUP will be charged to application as per the application ruledef. In other words, they will be charged to the content-id established by the first SETUP of the RTSP flow.

Usage Guidelines

Use this command to delay charge packets in a RTSP flow. All initial packets (TCP control packets (all packets including initial, mid-session, end-session) and RTSP packets prior to the first SETUP) can be delay charged. Apart from the initial packets, all intermittent TCP control packets are also charged to the last matched Ruledef for the given RTSP flow. This command is used in conjunction with the **rtsp initial-bytes-limit** *RTSP_bytes* command.

The following command enables the RTSP flow's delay charging:

```
flow rtsp-all-pkts charge-to-application
```

fw-and-nat default-policy

This command allows you to configure the default Firewall-and-NAT policy for the current rulebase. This command must be used to configure the Policy-based Firewall-and-NAT feature.

Important This command is only available in StarOS 8.1 and StarOS 9.0 and later releases.

Product

PSF

NAT

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

fw-and-nat default-policy *fw_nat_policy_name*
no fw-and-nat default-policy

no

If previously configured, deletes the Firewall-and-NAT default policy configuration from the current rulebase.

fw_nat_policy_name

Specifies the default Firewall-and-NAT policy for the current rulebase.

fw_nat_policy_name must be the name of a Firewall-and-NAT policy, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the default Firewall-and-NAT policy for a rulebase.

For subscribers using the current rulebase, the default Firewall-and-NAT policy will be used if in the APN/subscriber profile the **default fw-and-nat policy** command is configured, and a policy to use is not received from the AAA/OCS.

For more information, see the *Personal Stateful Firewall Administration Guide*.

Example

The following command configures a Firewall-and-NAT policy named *standard* to the rulebase:

```
fw-and-nat default-policy standard
```

http header-parse-limit

This command allows you to configure the HTTP header parse limit, on exceeding which the flow is marked as permanent failure and is matched and charged against **http error = TRUE** ruledef.

Important This command is customer specific. For more information contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

http header-parse-limit *parse_limit_bytes*
{ default | no } http header-parse-limit

default

Configures the default setting for this command.

Default: 12000 bytes

no

If enabled, disables the header-parse-limit configuration in the current rulebase.

Important Disabling header parse limit may lead to uncharged bytes (due to no rule-matching until header is complete) if header is not correctly terminated.

parse_limit_bytes

Specifies the header-parse-limit, number of bytes.

parse_limit_bytes must be an integer from 1 through 256000.

Usage Guidelines

If a user sends HTTP LF terminated traffic instead of the usual HTTP CRLF terminated traffic, and similarly the server is responding with LF terminated traffic, the traffic does not result in any rule match, and rule match happens only at flow idle or at call clear when the quota for the same is not requested/updated. This results in a revenue hole for prepaid subscribers.

For operators who have Stateful Firewall in-line service enabled, and are okay if packets are dropped, a workaround is to configure the **firewall mime-flood** command in the ACS Configuration Mode, which enables to configure the maximum number of headers allowed in an HTTP packet and the maximum header field size

allowed in the HTTP header (in bytes). However, a limitation of this workaround is that Stateful Firewall supports MIME flood detection only in the downlink direction.

The support for LF termination has been added in StarOS 14.0 and later releases. For this release, with the help of configurable maximum header length support, HTTP analyzer would be allowing such LF terminated HTTP request/responses to pass through without rule matching only until the configured maximum header length is reached. When this threshold is reached, immediately the analyzer marks such HTTP session as failure and rule match would occur for **http error = TRUE** for the current packet as well as for all the previous packets that passed through unmatched. At this point, the quota for all such packets will be requested and reported.

Example

The following command sets the HTTP header parse limit to *10000* bytes:

```
http header-parse-limit 10000
```

ip readdress

This command allows you to configure the LBO restriction on Downlink and Uplink data volume transfer.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
ip readdress failure-action terminate
{ default | no } ip readdress failure-action
```

default

Configures the default setting for this command.

no

If previously configured, disables the LBO restriction on Downlink and Uplink data volume transfer.

ip readdress

Configures the IP Readdress options.

failure-action

Configures the failure action for IP Readdress.

terminate

Terminates the flow.

Usage Guidelines

After the subscriber quota is exhausted, all the ongoing download of files must be terminated and the UE must be allowed access to only user-defined servers (Self-Care Portal). Use this CLI command to achieve the functionality of Local Break Out (LBO) restriction on Downlink and Uplink data volume transfer.

ip reassembly-timeout

This command allows you to configure how long to hold onto IP fragments for reassembly, while waiting for the complete packet to arrive.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

ip reassembly-timeout *timeout_duration*
default ip reassembly-timeout

default

Configures the default setting for this command.

Default: 5000 milliseconds

timeout_duration

Specifies the timeout duration, in milliseconds, to hold fragmented packets before reassembly.

timeout_duration must be an integer from 100 through 30000.

Usage Guidelines

Use this command to configure duration for timeout timer to hold IP fragmented packets before reassembly is needed.

IP fragmented packet are retained, until either all fragmented packets have been received or the configured timeout has expired for the oldest fragment. If all fragments have been received, a temporary complete packet is reconstructed for analysis. Then all fragments are forwarded in order from first to last. If all fragments are not received, the fragments will be forwarded without being passed through the protocol analyzers, except for the IP analyzer.

Example

The following command sets the timeout timer to *15000* milliseconds:

```
ip reassembly-timeout 15000
```

ip reset-tos

This command allows you to reset the IP Type of Service (ToS) value of incoming packets to the default QCI value, before proceeding with the rest of ACS processing.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

[default | no] ip reset-tos

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the IP reset-tos configuration from the current rulebase.

Usage Guidelines

Use this command to reset the ToS field of any packet after it reaches ACS, or to broaden the range of values that are used in the ToS field in the IP header of any packet.

ip ttl

This command allows you to rewrite the TTL/Hop-limit value in the IP header downlink packets.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

ip ttl *ttl_value* **downlink**
{ no } ip ttl

no

If previously configured, disables the rewriting of TTL/Hop-limit value in the IP header downlink packets.

ip

Specifies the IP related to a user session.

ttl *ttl_value*

Rewrites the TTL value for the IP packet. The *ttl_value* specifies the value to be configured.

downlink

Modifies the IP header TTL on downlink packets.

Usage Guidelines

When the TTL/Hop-limit value is configured under the rulebase, all the subscribers under this rulebase are enabled for this feature, and TTL is rewritten as per the configured CLI value in all the downlink packets. The TTL is rewritten in all the downlink packets under that rulebase irrespective of service and access technology. The feature supports Flow Aware Packet Acceleration (FAPA), fragmentation, and buffering.

nat binding-record

This command allows you to configure NAT Binding Record (NBR) generation.

Important This command is only available in StarOS 8.3. In StarOS 9.0 and later releases this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

nat binding-record edr-format *edr_format_name* **[port-chunk-allocation] [port-chunk-release] +**
{ default | no } nat binding-record

default

Configures this command with its default setting.

Default: **port-chunk-release**

no

If previously configured, deletes the configuration from the current rulebase.

edr-format *edr_format_name*

Specifies the EDR format.

edr_format_name must be the name of an EDR format, and must be an alphanumeric string of 1 through 63 characters.

port-chunk-allocation

Specifies generating NBR when a port chunk is allocated.

port-chunk-release

Specifies generating NBR when a port chunk is released.

+

Indicates that more than one of the previous keywords can be entered within a single command.

Usage Guidelines

Use this command to configure NBR generation.

Example

The following command configures an EDR format named *test123* and specifies generating NBR when a port chunk is allocated, and when a port chunk is released:

```
nat binding-record edr-format test123 port-chunk-allocation
port-chunk-release
```

nat policy

This command allows you to enable/disable Network Address Translation (NAT) processing for all subscribers using the current rulebase.

Important In StarOS 8.1 and StarOS 9.0 and later releases, for Policy-based Firewall-and-NAT, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Important Before enabling NAT processing for a subscriber, Stateful Firewall must be enabled for the subscriber. See the firewall policy CLI command.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

nat policy nat-required [default-nat-realm *nat_realm_name* **]**
{ default | no } nat policy

default

Configures this command with its default setting.

Default: NAT processing is disabled for all subscribers using the current rulebase.

no

If previously enabled, disables NAT processing for all subscribers using the current rulebase.

nat policy nat-required

Enables NAT processing for all subscribers using the current rulebase.

default-nat-realm *nat_realm_name*

Important This keyword is only available in StarOS 8.3 and later releases.

Specifies the default NAT realm to be used if one is not already configured.

nat_realm_name must be the name of a NAT realm, and must be an alphanumeric string of 1 through 31 characters.

Important Including the default NAT realm, a maximum of three NAT realms are supported.

Usage Guidelines

Use this command to enable/disable NAT processing for all subscribers using the current rulebase.

After NAT is enabled for a subscriber, the NAT IP address to be used is chosen from the NAT realms defined in the rule priority lines within the rulebase. See the firewall priority CLI command.

NAT enable/disable status in the rulebase can be changed any time, however the changed NAT status will not be applied for active calls using the rulebase. The new NAT status is only applied to new calls.

Example

The following command enables NAT processing:

```
nat policy nat-required
```

The following command disables NAT processing:

```
no nat policy
```

nat suppress-aaa-update call-termination

This command allows you to suppress sending NAT Bind Updates (NBU) to the AAA server when a call gets terminated.

Important This command is customer-specific. For more information please contact your Cisco account representative. In release 9.0, this command is available in the Firewall-and-NAT Policy Configuration Mode.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
nat suppress-aaa-update call-termination
default nat suppress-aaa-update
```

default

Configures this command with its default setting.

Default: Disabled. No suppression of AAA updates.

Usage Guidelines

Use this command to suppress the sending of NAT Bind Updates (NBU) to the AAA server when the call gets terminated, as these NBUs would be cleared at the AAA after receiving the accounting-stop. This enables to minimize the number of messages between the chassis and AAA server. When not configured, NBUs are sent to the AAA server whenever a port chunk is allocated, de-allocated, or the call is cleared (PPP disconnect).

Example

The following command suppresses the sending of NBU to the AAA server when PPP disconnect happens:

```
nat suppress-aaa-update call-termination
```

override-control

This command enables or disables Override Control (OC) feature. The Diameter capability exchange message should indicate support for OC feature when this CLI command is enabled.

Product

Important Override Control is a license-controlled feature. A valid feature license must be installed prior to configuring this feature. Contact your Cisco account representative for more information.

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`[ default | no ] override-control[ align-with-gor | with-oc-name [ align-with-gor ]]`

default

Configures this command with its default setting.

Default: Disabled

In 20 and later releases: If **with-oc-name** option is not configured in rulebase, OC will be identified using the Rule/CA and exclude rule as keys. This is the default behavior.

no

If previously enabled, disables Override control in the current rulebase.

align-with-gor

Resolves ambiguity when same ruledefs are defined in multiple Group of Ruledefs.

with-oc-name

This optional keyword specifies to use OC-name as the unique key to identify an OC for a subscriber session.

Default: Disabled

In releases prior to 20, PCRF uses a combination of the following key parameters for identification of OC.

- Rule names
- Charging-action names
- Exclude-rule names

There is no unique OC name or ID to identify the OC for a particular subscriber session. In release 20, a new Diameter AVP "Override-Control-Name" is defined in the Override-Control grouped AVP. This OC name is used as the unique key to identify OC for any further updates like OC modification or deletion.

This keyword "**with-oc-name**" is added to the **override-control** CLI command to support Override-Control-Name AVP in the Override-Control AVP. If the **override-control with-oc-name** CLI is configured in rulebase, only OCs with Override-Control-Name AVP are supported and the OCs without name AVP are rejected.

If Override-Control-Name AVP is received when the **override-control** CLI command is configured, i.e. OC install is supported without OC name, appropriate error is reported in error logs. Then OC is dropped and OC failure statistics is incremented. Similarly if **override-control with-oc-name** CLI is configured and OC is received without the name AVP, appropriate error is reported, OC is dropped and OC failure statistics is incremented. On receiving an OC without name, installed OC list (without name) is searched for secondary identification criteria. If no OC with same rule/charging-action/exclude rule list is found, it is installed as a different OC.

Also, for OCs with the name AVP, operator can add rule/charging-action/exclude rule to the existing OC in the same category. That means, the rules can be added to a rule level OC, CA names can be added to a CA level OC, and exclude rules can be added to a wildcard or CA level OC.

OCs received with Override-Control-Name AVP are uniquely identified by the OC name. When the Override-Control-Name AVP is not present in Override-Control AVP, the OCs are identified based on the secondary identification criteria, i.e., the list of rule names, charging-action names, and exclude-rule names as these were the criteria before this feature change.

During rulebase change, the feature to support OC name will be controlled based on the configuration of new rulebase. After rulebase change OC will be accepted as per the CLI configured in new rulebase. This is the only scenario where for a single call session, OC can be installed with both OC name and without OC name.

When software upgrade is done on a standby setup where same rulebase is configured with the CLI **override-control with-oc-name**, then no calls are dropped and OC installation status will remain the same as before upgrade. Any new call which is established after upgrade and OC is installed with-oc-name then this will be accepted and applied on new call. Any calls which were established pre-upgrade will accept OC without name and will be identified uniquely by rule/charging-action/exclude rule.

During the downgrade, OC-name will be dropped and OCs will be recreated assuming Rule/CA/Exclude rule name list as the primary key for unique identification.

Usage Guidelines

Use this command to enable or disable Override Control feature and also specify to use Rule/CA list as unique key to identify OC for a session. This feature is available at the rulebase level and is license controlled. The Diameter capability exchange message should indicate support for Override control feature when this CLI command is enabled.

Inheritance feature does not support overwriting parameters at Rule level and charging action level and supports exclusion of only one rule. In order to provide this flexibility and also have a generic capability on chassis, Override Control feature is introduced. This feature will define a set of custom AVPs that will enable the PCRF to override charging and policy parameters for all rules (wildcard) or a specified set of rules or charging actions.

The override values should be sent by PCRF over Gx using the custom AVPs. Override Control provides this capability while addressing the limitations with Inheritance feature like rule level control, charging action level control, exclusion of more than one rule, different override values to be specified for a subscriber, etc. So, the Override Control feature will replace the Inheritance feature.

Important In this release, both Inheritance and the Override Control features will be supported. Note that both these two features should not be enabled simultaneously. If by mistake, both these features are enabled, only Override Control is applied.

The Gx interface is updated to include custom AVPs for the PCRF to send override values to P-GW. These override values may be sent for all rules (wildcard) or for specific rule(s) or for charging action(s). In case the override values are sent for a charging action, a rule or some of the rules may be excluded from using the override values by sending the rules names in the Gx message. The override values will be check pointed and recovered in case of either standalone recovery or ICSR.

This Override Control feature is expected to maintain existing active calls using inheritance post upgrade. Inheritance feature and Override control should not be enabled simultaneously. It is necessary that Inheritance feature be turned off once Override Control feature is enabled. Override Control once enabled will apply only to new calls and does not effect existing calls.

Override Control feature allows the customer to dynamically modify the parameters of static or predefined rules with parameters sent by PCRF over the Gx interface.

When multiple overrides are received from PCRF, the following is the priority in which they are applied:

- Rule level override control
- Charging action level override control
- Wildcard level override control

When installing a predef rule, if override control is received for that predef rule and QCI/ARP is overridden, then the new overridden QCI/ARP values are used for bearer binding of the predef rule. If the QCI/ARP is not overridden, then the values configured in charging action is used. The override charging and policy parameters received from PCRF will continue to apply for the entire duration of the call. These values may be modified by PCRF by sending the modified values with the same override control criteria (Rule name(s), Charging Action Name(s) and Exclude Rule(s)). Any change in the Override Control criteria will be interrupted as a new OC. There can only be one wildcard OC installed for a subscriber.

p2p dynamic-flow-detection

This command allows you to enable/disable the P2P analyzer to detect peer-to-peer (P2P) applications.

Product

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

`[ default | no ] p2p dynamic-flow-detection`

default

Configures this command with its default setting.

Default: Disabled

no

If previously enabled, disables P2P dynamic flow detection in the current rulebase.

p2p dynamic-flow-detection

Enables dynamic P2P flow detection.

Usage Guidelines Use this command to enable dynamic-flow detection. This allows the P2P analyzer to detect the P2P applications configured for the ACS.

pcp service

This command allows you to configure the PCP service for the current rulebase.

Important This command is customer specific. Contact your Cisco account representative for more information.

Product NAT

PSF

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
pcp service pcp_service_name
no pcp service
```

no

If previously configured, deletes the PCP service configuration from the current rulebase. This service is disabled by default.

pcp_service_name

Specifies the PCP service name for the current rulebase.

pcp_service_name must be the name of a PCP service, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to configure the PCP service for the current rulebase.

Example

The following command configures a PCP service named *pcp1* for the rulebase:

```
pcp service pcp1
```

post-processing dynamic

This command allows you to specify ruledefs/group-of-ruledefs as dynamic post-processing ruledefs/group-of-ruledefs. This allows the system to differentiate normal post-processing rules from preconfigured ones. By default, this configuration is disabled.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

post-processing dynamic { group-of-ruledefs *ruledefs_group_name* **| ruledef** *ruledef_name* **} charging-action** *charging_action_name* **[description** *description* **]**
no post-processing dynamic { group-of-ruledefs *ruledefs_group_name* **| ruledef** *ruledef_name* **}**

no

If previously configured, deletes the specified configuration from the current rulebase.

group-of-ruledefs *ruledefs_group_name*

Adds the specified group-of-ruledefs to the current rulebase.

ruledefs_group_name must be the name of a group-of-ruledefs, and must be an alphanumeric string of 1 through 63 characters.

ruledef *ruledef_name*

Adds the specified ruledef to the current rulebase.

ruledef_name must be the name of a ruledef, and must be an alphanumeric string of 1 through 63 characters.

charging-action *charging_action_name*

Specifies the charging action.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

description *description*

Specifies an optional description for this configuration.

description must be an alphanumeric string of 1 through 31 characters.

Usage Guidelines

Use this command to configure specific ruledefs/group-of-ruledefs as dynamic post-processing ruledefs/group-of-ruledefs. This allows the system to differentiate normal post-processing rules from the

preconfigured ones. This makes possible enabling/disabling ruledefs/groups-of-ruledefs entry from an external server.

Example

The following command specifies the ruledef named *test_rule* as a dynamic post-processing ruledef configured with the charging action *ca13* and a description of *testing*:

```
post-processing dynamic ruledef test_rule charging-action ca13 description
 testing
```

post-processing policy

This command allows you to specify the post-processing policy to be applied on Limit-Reached packets.

Product

GGSN

PDSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
post-processing policy { always | not-for-dynamic-discard }
default post-processing policy
```

default

Configures this command with its default setting.

Default: **not-for-dynamic-discard**

always

Specifies to apply post-processing even if the Credit Control Application (CCA) decides to discard packets due to limit-reached condition. If there are post-processing priority-based rules, CCA will check for any redirection rules. Otherwise, by default, CCA will discard the packets. No other post-processing actions like forward, next-hop, or xheader-insertion will be applied on the limit-reached packets.

not-for-dynamic-discard

Specifies to apply post-processing only if CCA decides not to discard packet. Will directly discard the limit-reached context and will not apply post-processing priority based rules.

Usage Guidelines

This command allows to enable post-processing priority based rules for content in blockedlisted state. Whenever RADIUS/Diameter prepay server blockedlists content the packets are generally discarded. To enable redirection of such content, post-processing should be enabled on the blockedlisted content. With this command, RADIUS/Diameter Credit-Control application will decide whether to allow post-processing to be enabled or not for the blockedlisted content.

The following is a sample configuration:

```
configure
 active-charging service service1
  ruledef http_low
   http any-match = TRUE
   cca quota-state = limit-reached
   rule-application post-processing
  #exit
  ruledef httpany
   http any-match = TRUE
  #exit
  charging-action standard1
   content-id 1
   cca charging credit
  #exit
  charging-action redirect
   flow action redirect-url http://aoc.com
  #exit
  rulebase base1
   action priority 30 ruledef httpany charging-action standard1
   post-processing policy always
   post-processing priority 1 ruledef http_low charging-action redirect
  #exit
end
```

Example

The following command will enable post processing on Limit-Reached packets:

post-processing policy always

post-processing priority

This command allows you to configure the post-processing priority and action to be taken on specific ruledef in the current rulebase.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

post-processing priority *priority* **{ group-of-ruledefs** *ruledefs_group_name* **| ruledef** *ruledef_name* **} charging-action** *charging_action_name* **[description**

```
description ]
no post-processing priority priority
```

no

If previously configured, deletes the specified post-processing priority configuration from the current rulebase.

priority *priority*

Specifies priority for the ruledef/group-of-ruledefs in the current rulebase.

priority must be a unique value in the current rulebase, and must be an integer from 1 through 65535.

group-of-ruledefs *ruledefs_group_name*

Important Post-processing with group-of-ruledefs is not supported in this release.

Specifies the group-of-ruledefs.

ruledefs_group_name must be the name of a group-of-ruledefs, and must be an alphanumeric string of 1 through 63 characters.

Important The group-of-ruledefs specified must be configured for post-processing. See the **group-of-ruledefs-application** command in the ACS Group-of-Ruledefs Configuration mode.

ruledef *ruledef_name*

Specifies the ruledef.

ruledef_name must be the name of a ruledef, and must be an alphanumeric string of 1 through 63 characters.

Important The ruledef specified must be configured for post-processing. See the **rule-application** command in the *ACS Ruledef Configuration Mode Commands* chapter.

charging-action *charging_action_name*

Specifies the charging action.

charging_action_name must be the name of a charging action, and must be an alphanumeric string of 1 through 63 characters.

description *description*

Specifies an optional description for this configuration.

description must be an alphanumeric string of 1 through 31 characters.

Usage Guidelines

Use this command to configure the post-processing priority and action to be taken on a ruledef in the rulebase.

Example

The following command configures the ruledef named *test_ruledef* with a priority of *10*, and the charging action named *test_ca* for post processing:

```
post-processing priority 10 ruledef test_ruledef charging-action test_ca
```

qos-renegotiate timeout

This command allows you to configure the timeout setting for the Quality of Service (QoS) Renegotiation feature.

Important This command is license dependent. For more information contact your Cisco account representative.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
qos-renegotiate timeout timeout
no qos-renegotiate timeout
```

no

If previously configured, deletes the qos-renegotiate timeout configuration from the current rulebase.

timeout

Specifies the timeout period for the QoS Renegotiation feature in the current rulebase.

timeout is the timeout period in seconds, and must be an integer from 0 through 4294967295. If set to 0, timeout is disabled.

Usage Guidelines

Use this command to configure timeout setting for the QoS Renegotiation feature.

Example

The following command sets the QoS renegotiate timeout period to 1000 seconds:

```
qos-renegotiate timeout 1000
```

radius threshold

This command allows you to configure the interval and volume thresholds to generate interim RADIUS Charging Data Records (CDRs) and write them to CDR file for ACS postpaid billing.

Product

HA

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

radius threshold { interval *interval* **| volume total** *volume* **}**
{ default | no } radius threshold { interval | volume total }

no

If previously configured, deletes the RADIUS threshold configuration from the current rulebase.

default

Configures this command with the default settings.

Default: Disabled

interval *interval*

Specifies the time interval, in seconds, for generating RADIUS interim accounting requests.

interval must be an integer from 60 through 40000000.

Default: Disabled

volume total *volume*

Specifies the limit for the total number of octets (uplink+downlink) after which a stop-start pair will be sent to RADIUS.

volume must be an integer from 100000 through 4000000000.

Default: Disabled

Usage Guidelines

Use this command to specify a time interval threshold to generate interim RADIUS CDRs and write it to RADIUS CDR file for postpaid billing.

Example

The following command configures a time threshold interval of *600* seconds for RADIUS CDRs:

```
radius threshold interval 600
```

retransmissions-counted

This command allows to count retransmissions in all charging modules.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`[ no ] retransmissions-counted`

no

Retransmissions will be counted for all the charging modules. This command will override the CLI at the charging action as well as the CLI pertaining to the retransmissions at the rulebase.

Usage Guidelines

Use this command to count retransmissions for all the charging modules.

Example

With the following command, retransmissions will not be counted for any of the charging modules:

`no retransmissions-counted`

ran bandwidth optimize

This command is used to enable optimized calculation of [MBR, GBR] when a subscriber (voice) call is put on hold in case of VoLTE.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`[ default | no ] ran-bandwidth optimize`

no

If previously configured, disables the optimization feature for calculating [MBR, GBR] values based on Flow-Status AVP value.

Usage Guidelines

Use this command to enable optimized calculation of [MBR, GBR] values when a subscriber (voice) call is put on hold in case of VoLTE.

When the rule is installed and active, the system uses the GBR/MBR assigned in the rule for calculating the GBR / MBR values towards the bearers created. When more than one rule is installed, P-GW adds the GBR / MBR values from all the active and installed rules even if the flow of a certain rule is marked as disabled. This current behavior is in accordance with 3GPP TS standard specification 29.212, and this might result in RAN bandwidth wastage. To avoid this wastage, some optimization is done while calculating MBR and GBR for GBR bearer.

This optimization feature provides the ability to configure a list of APNs, for which the optimized calculation of MBR, GBR can be enabled. By default, this optimized calculation should be enabled only for the IMS APN.

This feature further helps optimize the logic of aggregating MBR and GBR values, based on "Flow-Status" AVP value received in the rule definition through RAR.

During session setup, when a CCA-I is received, and if **ran bandwidth optimize** is configured for the associated rulebase, the system will aggregate [MBR, GBR] of only the rules which have flow-status='ENABLED'. This information will subsequently be sent to UE.

Important The last used [MBR, GBR] for GBR bearer needs to be recovered in the event of a session manager or chassis switchover. Failure to do so can result in miscalculation of [MBR, GBR] after recovery.

By default, this CLI will be disabled. Any change in this configuration will not affect existing calls on the system. Optimized bandwidth calculation will be done only for the new calls established after enabling this CLI command.

route priority

This command allows you to configure the routing of packets to protocol analyzers.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

route priority *route_priority* **ruledef** *ruledef_name* **analyzer { dns | file-transfer | ftp-control | ftp-data | h323 | http | imap | mipv6 | mms | pop3 | pptp | radius | rtcp | rtp | rtsp | sdp | secure-http | sip [advanced |**

```
 basic-and-advanced ] | smtp | tftp | wsp-connection-less |
wsp-connection-oriented } [ description description ]
no route priority route_priority
```

no

If previously configured, deletes the specified route priority configuration from the current rulebase.

route priority *route_priority*

Specifies the route priority for the specified ruledef in the current rulebase.

route_priority must be an integer from 1 through 65535.

Lower numbered priorities are examined first. Up to 1024 instances can be configured across all rulebases.

ruledef *ruledef_name*

Specifies the ruledef to evaluate packets to determine analyzer.

ruledef_name specifies the name of the ruledef configured for the route application using the **rule-application** command in the ACS Ruledef Configuration Mode.

ruledef_name must be the name of a ruledef, and must be an alphanumeric string of 1 through 63 characters.

analyzer

Specifies the analyzer for the ruledef, and must be one of the following:

- **dns**: Route to DNS protocol analyzer.
- **file-transfer**: Route to file analyzer.
- **ftp-control**: Route to FTP control protocol analyzer.
- **ftp-data**: Route to FTP data protocol analyzer.
- **h323**: Route to H323 protocol analyzer.
- **http**: Route to HTTP protocol analyzer.
- **imap**: Route to IMAP protocol analyzer.
- **mipv6**: Route to MIPv6 protocol analyzer.
- **mms**: Route to MMS protocol analyzer.
- **pop3**: Route to POP3 protocol analyzer.
- **pptp**: Route to PPTP protocol analyzer.
- **radius**: Route to RADIUS protocol analyzer.
- **rtcp**: Route to RTCP protocol analyzer.
- **rtp**: Route to RTP protocol analyzer.
- **rtsp**: Route to RTSP protocol analyzer.
- **sdp**: Route to SDP protocol analyzer.

- **secure-http**: Route to secure HTTP protocol analyzer.
- **sip [advanced | basic-and-advanced]**: Route to SIP protocol analyzer.
  - **advanced**: For SIP calls to work with NAT/Stateful Firewall, a SIP Application-Level Gateway (ALG) is required to do payload translation of SIP packets and pin-hole (dynamic flow) creation for media packets. A SIP routing rule must to be configured for routing the packets to the SIP ALG for processing. If the keyword **advanced** is configured, the packets matching the routing rule will be routed to SIP ALG for processing and not to ACS SIP analyzer. If not configured, then packets will not be routed to SIP ALG and will be routed to ACS SIP analyzer for processing.

    Also, see **firewall nat-alg** CLI command in the ACS Configuration Mode.
  - **basic-and-advanced**: For SIP ALG to co-exist with SIP Analyzer, the packets are routed through ACS SIP Analyzer and SIP ALG. The SIP packets can pass through ACS functionality (by ACS SIP Analyzer processing) and at the same time payload translation/pinhole-creation can happen successfully (by SIP ALG processing). If **basic-and-advanced** is configured, then the packets matching the routing rule will be routed through the SIP Analyzer and then through SIP ALG for processing.
- **tftp**: Route to TFTP protocol analyzer.
- **smtp**: Route to SMTP protocol analyzer.
- **wsp-connection-less**: Route to WSP connection-less protocol analyzer.
- **wsp-connection-oriented**: Route to WSP connection-oriented protocol analyzer.

Important To route packets to the P2P analyzer, the ruledef should have rules to match all IP packets. Otherwise, the analyzer may not detect all P2P traffic.

Important Use the **show active-charging analyzer statistics** command in the Exec Mode to see the list of supported analyzers.

description *description*

Enables to add a description to the rule and action for later reference in saved configuration file.

description must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Instances of this CLI command control which packets are routed to which protocol analyzers. Packets sent to ACS are always passed through the IP protocol analyzer. This CLI command controls which higher layer analyzers are also invoked.

Analyzer	Common ways to route to the analyzer
dns	UDP destination port or source port is DNS (53).
file-transfer	FTP and the command name is **retr** or **stor**; or, HTTP and the request method is **get** or **post**.

Analyzer	Common ways to route to the analyzer
ftp	TCP destination port or source port is FTP control (21) or FTP data (20); or, ftp analyzer (for FTP control packets) dynamically detected an FTP data flow over TCP (tcp dynamic-flow = ftp-data).
http	TCP destination port or source port is HTTP (80).
icmp	All IPv4 packets with IP protocol = ICMP (1) are automatically routed here.
imap	TCP destination port or source port is IMAP (143).
ip	All IPv4 packets are automatically routed here.
mipv6	MIPv6 analyser can be routed in one of the following ways: • All IPv4 UDP packets with destination port = 5846 • All IPv4 UDP packets with destination port = 5846, and destination IP present in LMA server host-pool • All IPv6 packets with destination IP present in LMA server host-pool
mms	WSP content type is application/vnd.wap.**mms**-message; or, WSP uri contains "**mms**"; or, HTTP content type is application/vnd.wap.mms-message; or, HTTP uri contains "**mms**".
p2p	Use the **p2p dynamic-flow-detection** CLI command to enable detection of the different P2P applications specified by the **p2p application** CLI command; that will cause every TCP or UDP packet to be automatically routed here
pop3	TCP destination port or source port is POP3 (110).
radius	UDP source or destination port 1812 to be used.
rtp and **rtcp**	RTSP has embedded RTP/RTCP payloads (you need to enable RTP dynamic flow detection to catch those flows); or, RTSP or SDP (for SDP within SIP) creates an RTP/RTCP flow over UDP (in addition to enabling the aforementioned dynamic flow detection, you must make sure that UDP packets are routed to the UDP analyzer) or, RTP/RTCP uses predefined UDP port numbers (e.g. default UDP port numbers of 5004/5005).
rtsp	TCP destination port or source port is RTSP (554).
sdp	RTSP or SIP content type is application/sdp
secure-http	TCP destination port or source port is HTTPS (443). Note that HTTP may use the CONNECT method (see RFC 2817), in which case, the subscriber will be upgraded with transport layer security, but the traffic to/from the chassis will still be HTTP and be passed through the http rather than the secure-http analyzer (assuming that routing to the http analyzer has been configured).
sip	UDP destination port or source port is SIP (5060).
smtp	TCP destination port or source port is SMTP (25).
tcp	All IPv4 packets with IP protocol = TCP (6) are automatically routed here.

Analyzer	Common ways to route to the analyzer
udp	All IPv4 packets with IP protocol = UDP (17) are automatically routed here.
wap2	TCP destination port or source port of the carrier-specific port number for WAP-2 (e.g. one carrier uses 8799); or, send all HTTP traffic to the **wap2** analyzer if the carrier does not use a special port number.
wsp	UDP destination port or source port is connection-less WSP (9200) or connection-oriented WSP (9201).
wtp	Packets are automatically routed here, if you specified "wsp-connection-oriented" as described above.

Example

The following command assigns a route and rule action with the route priority of 23, a ruledef named *test*, and an analyzer *test_analyzer* with description as *route_test1* to the current rulebase:

```
route priority 23 ruledef test analyzer test_analyzer description
route_test1
```

rtp dynamic-flow-detection

This command allows you to enable/disable the Real Time Streaming Protocol (RTSP) and Session Description Protocol (SDP) analyzers to detect the start/stop of RTP and RTCP flows.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ default | no ] rtp dynamic-flow-detection
```

default

Configures this command with its default setting.

Default: Disabled; same as **no rtp dynamic-flow-detection**.

no

If previously configured, deletes this configuration from the current rulebase.

Usage Guidelines Use this command to enable the RTSP and SDP analyzer to detect the start/stop of RTP and RTCP flows. This command is used in conjunction with the **route priority** command.

Example

The following command enables RTP dynamic flow detection:

```
rtp dynamic-flow-detection
```

rtsp initial-bytes-limit

This command allows to set the maximum number of uplink and downlink bytes, added together to accumulate, while rule matching and charging is being delayed for RTSP flows. The limit is per RTSP flow.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
rtsp initial-bytes-limit rtsp_bytes
default rtsp initial-bytes-limit
```

default

Configures the RTSP initial packets limit to 6000 bytes.

RTSP_bytes

Specifies the maximum number of uplink and downlink bytes limit.

rtsp_bytes must be an integer from 1 through 256000.

Usage Guidelines Use this command to configure the maximum number of uplink and downlink bytes per RTSP flow that can be accumulated before the first SETUP request. The accumulated bytes include both TCP-control packets as well as RTSP packets. Once this limit is reached, rule matching occurs and charging is enforced on the flow. This command is used in conjunction with the **flow rtsp-all-pkts charge-to-application** command.

Example

The following command sets the RTSP initial bytes limit to 9000 bytes:

```
rtsp initial-bytes-limit 9000
```

ruledef-parsing

This command allows you to configure whether to consider or ignore the port number embedded in the application header (for example, the ":80" in www.star.com:80) when comparing the ruledef expressions to the packet contents.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no ] ruledef-parsing ignore-port-numbers-embedded-in-application-headers
 analyzers { http rtsp sip wsp }
default ruledef-parsing
```

no

If previously configured, deletes the ruledef-parsing configuration from the current rulebase.

default

Configures this command with its default setting.

Default: Same as **no ruledef-parsing ignore-port-numbers-embedded-in-application-headers analyzers { http rstp sip wsp }**— not ignoring port numbers that are embedded in application headers.

ignore-port-numbers-embedded-in-application-headers analyzers { http rtsp sip wsp }

Ignore the port numbers present in application header.

Specifies analyzers for which the port number must be ignored.

Usage Guidelines

Use this command to make the HTTP, RTSP, SIP, and WSP analyzer ignore port numbers embedded in application headers.

Example

The following command makes the HTTP analyzer in the current rulebase ignore port numbers embedded in application headers:

```
ruledef-parsing ignore-port-numbers-embedded-in-application-headers
analyzers http
```

tcp 2msl-timeout

This command allows you to configure how long to retain the TCP flow after the FIN has been acknowledged.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

tcp 2msl-timeout *2msl_timeout* **[port-reuse]**
{ default | no } tcp 2msl-timeout

default

Configures this command with its default setting.

Default: 2 seconds

no

Disables the timeout and sets the system to delete the flow immediately upon seeing the FIN acknowledged.

tcp 2msl-timeout *2msl_timeout*

Specifies the duration to keep the TCP flow.

2msl_timeout specifies the timeout duration, in seconds, and must be an integer from 1 through 20.

port-reuse

Allows the source port reuse to reopen the TCP flow in 2msl timeout.

Usage Guidelines

Use this command to configures how long to retain the TCP flow after the FIN has been acknowledged.

Acknowledgment to the FIN is not guaranteed to be received by the destination, then the FIN could be resent and re-acknowledged. In this scenario, it is desirable to still have the flow, so that the re-sends do not create a new flow.

Example

The following command sets the timeout to *4* seconds:

tcp 2msl-timeout 4 port-reuse

tcp rst-robustness

This command allows you to configure the TCP RST robustness.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`tcp rst-robustness`
`{ default | no } tcp rst-robustness`

default

Configures this command with its default setting.

no

Disables the TCP RST robustness feature.

tcp rst-robustness

Enables or disables TCP RST robustness as per RFC 5961 in the ACS Rulebase Configuration Mode.

Usage Guidelines

Use this command to enable the TCP robustness RFC 5961. The feature is disabled by default.

Example

The following command enables the TCP RST robustness in the ACS Rulebase Configuration Mode:

`tcp rst-robustness`

tcp check-window-size

This command allows you to enable/disable TCP window-size checking.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ default | no ] tcp check-window-size
```

default

Configures this command with its default setting.

Default: Enabled (packets after the erroneous packet (with size greater than the receiver's window size) will hit tcp-error ruledef).

Default: Disabled. The TCP window-size check has been disabled, only the L7 parsing is continued. The operator can configure the TCP window-size check, if required.

no

Disables the window-size check and continues with normal L7 parsing.

tcp check-window-size

Enables the window-size check and continues with normal L7 parsing.

Usage Guidelines

Use this command to enable/disable TCP window-size check for packets out of TCP window.

Example

The following command enables TCP window-size check:

```
tcp check-window-size
```

tcp mss

This command allows you to configure the TCP Maximum Segment Size (MSS) in TCP SYN packets.

Important This command is only available in StarOS 8.1 and later releases.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description `tcp mss tcp_mss { add-if-not-present | limit-if-present } + { default | no } tcp mss`

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the TCP MSS configuration from the current rulebase.

tcp mss *tcp_mss*

Specifies the TCP MSS.

tcp_mss must be an integer from 496 through 65535.

add-if-not-present

Specifies to add the TCP MSS if not present in the packet.

limit-if-present

Specifies to limit the TCP MSS if present in the packet.

Usage Guidelines Using this command, TCP MSS can be limited if already present in the TCP SYN packets. If there are no errors detected in IP header/TCP mandatory header and there are no memory allocation failures, TCP optional header is parsed. If TCP MSS is present in the optional header and its value is greater than the configured MSS value, the value present in the TCP packet is replaced with the configured one.

If the TCP optional header is not present in the SYN packet and there are no errors in already present TCP header, the TCP MSS value configured will be inserted while sending the current packet out.

Example

The following command limits the TCP maximum segment size to *3000*, and if not present adds it to the packets:

```
tcp mss 3000 limit-if-present add-if-not-present
```

tcp out-of-order-timeout

Description This command has been deprecated, and is replaced by the **tcp packets-out-of-order** command.

tcp packets-out-of-order

This command allows you to configure processing of TCP packets that are out of order, while waiting for the earlier packet(s) to arrive.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

tcp packets-out-of-order { timeout *timeout_duration* **| transmit [after-reordering | immediately] }**
default tcp packets-out-of-order { timeout | transmit }

default

Configures this command with its default setting.

- **timeout**: 5000 milliseconds
- **transmit**: **immediately**

timeout *timeout_duration*

Specifies the timeout duration for re-assembly of TCP out-of-order packets.

timeout_duration is the timeout duration, in milliseconds, and must be an integer from 100 through 30000.

Default: 5000 milliseconds

transmit [after-reordering | immediately]

Configures the TCP out-of-order segment behavior after buffering a copy.

- **after-reordering:** Delivers the TCP out-of-order segments in-sequence to the ECS analyzer after all packets are received and successfully reordered. The 'after-reordering' feature is doing this by buffering out-of-order packets, and only releasing them after the missing out-of-order packets are received (or after OOO timeout).

  When the missing packet is received, complete deep packet inspection of all the packets and all relevant in-line services is done, and then the last packet is forwarded (as the latest). If reordering is not successful within the specified OOO timeout, all the subsequent received packets in that TCP flow are forwarded without being passed through the analysers (except the L3/L4 analyzer). As a consequence only L3/L4 rule matching will take place. If memory allocation fails or the received packet is partial retransmitted data, the packet will also be forwarded immediately without being passed through the protocol analyzers, except for the L3/L4 analyzers.

Important On the outgoing interface, no in-sequence delivery is guaranteed. This feature is intended to: -deliver the TCP segments in-order to the ECS analysers -buffer the original packets during OOO conditions, such that application-based flow actions (ex: Header insertion) can still take place on the actual data packets Its not intended to put the packets in-sequence on the outgoing interface (although some improvement can be seen there as well) -the cost of this feature is additional delay for OOO packets (up to a maximum of the OOO timeout).

- **Immediately:** Delivers the TCP out-of-order segments in-sequence to the ECS analyzer after all packets are received and successfully reordered. The 'immediately' feature is accomplishing this by making a copy of out-of-order packets, and buffering those, while transmitting the original data packets through the outgoing interface immediately. When the missing packet is received, complete deep packet inspection of all the packets and all relevant in-line services is done, and then the last packet is forwarded.

  If reordering of the buffered packets is not successful within the specified OOO timeout, all the subsequent received packets in that TCP flow are forwarded without being passed through the analysers (except the L3/L4 analyzer). As a consequence only L3/L4 rule matching will take place.

  If memory allocation fails or the received packet is partial retransmitted data, the packet will also be forwarded immediately without being passed through the protocol analyzers, except for the L3/L4 analysers.

Important This feature is not changing anything on the sequencing of the packets -This feature has the consequence that during OOO conditions, certain application-based flow actions (ex: Header insertion) could not take place as the original packets are already sent out by the time the ECS analyser receives the (copies of) in-sequence packets.

Default: **immediately**

Usage Guidelines

Use this command to configure how to process TCP packets that are out of order, while waiting for the earlier packet(s) to arrive.

Important When TCP OOO processing has been configured in the rulebase, a session manager crash might be observed due to overlapping TCP segments and/or reordering packet arriving within TCP OOO configured timeout value or default value (5 sec). This issue can be resolved by changing the rulebase configuration for TCP OOO packets from **transmit after-reordering** to **transmit immediately**.

Example

The following command sets the timeout timer to *10000* milliseconds:

```
tcp packets-out-of-order timeout 10000
```

tcp proxy-mode

This command allows you to enable/disable TCP Proxy mode for all subscribers using the current rulebase.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

ACS

CF

MVG

TPO

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
tcp proxy-mode { dynamic { all | content-filtering | dcca | ip-readdressing
 | nexthop-readdressing | xheader-insert } + | static [ port [ port_number
 [ to port_number ] ] ] }
default tcp proxy-mode
no tcp proxy-mode [ dynamic { content-filtering | dcca | ip-readdressing
 | nexthop-readdressing | xheader-insert } + | static [ port [ port_number
 [ to port_number ] ] ] ]
```

default

Configures this command with its default setting.

Default: Disabled

no

If previously enabled, disables TCP Proxy mode.

Optionally, TCP Proxy can be disabled for specific options that were previously enabled.

dynamic { all | content-filtering | dcca | ip-readdressing | nexthop-readdressing | xheader-insert } +

Enables TCP proxy for subscriber-initiated TCP flows under the specified condition(s).

- **all**: Specifies that subscriber-initiated TCP flows be proxied if all/any of the following conditions are satisfied.

- **content-filtering**: Specifies that subscriber-initiated TCP flows be proxied if a URL is requested, and that URL is checked because Category-based Content Filtering is enabled in the rulebase.
- **dcca**: Specifies that subscriber-initiated TCP flows be proxied if DCCA is enabled in the charging action.
- **ip-readdressing**: Specifies that subscriber-initiated TCP flows be proxied if IP Readdressing feature is enabled in the charging action.
- **nexthop-readdressing**: Specifies that subscriber-initiated TCP flows be proxied if Nexthop Readdressing feature is enabled in the charging action.
- **xheader-insert**: Specifies that subscriber-initiated TCP flows be proxied if x-Header Insertion feature is enabled in the charging action.

static [port [*port_number* [to *port_number*]]]

Enables static TCP proxy for every subscriber-initiated TCP flow, unless specific ports are specified.

port [*port_number* **[to** *port_number* **]]]**

Specifies port numbers and/or range of port numbers.

port_number must be an integer from 1 through 65535.

Important Up to 32 port numbers and eight port ranges can be specified.

Usage Guidelines

Important In release 11.0, TCP Proxy functions only in Static mode. Dynamic TCP Proxy mode is supported only in 12.0 and later releases.

Use this command to enable/disable TCP Proxy mode for all subscribers using this ACS rulebase. Optionally, TCP Proxy can be enabled/disabled for specific ACS features. Note that enabling/disabling the TCP Proxy feature for any of the optional ACS features, does not affect that feature.

Note that the last command overwrites any previous configuration. For example, when the following commands are applied in sequence:

tcp proxy-mode dynamic nexthop-readdressing

tcp proxy-mode dynamic xheader-insert

The nexthop configuration is overwritten by the x-header configuration.

Example

The following command enables TCP proxy for subscriber-initiated TCP flows whenever next-hop-forwarding-address is configured in the charging action:

```
tcp proxy-mode dynamic nexthop-readdressing
```

tcp window-size

This command allows the operator to configure the maximum window size of a TCP packet.

Product

P-GW

SAE-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-rule-base)#`

Syntax Description

`[ no ] tcp window-size downlink` *`tcp_window_size`*
`[ no ] tcp window-size`

no

Disables the TCP window size configuration.

tcp window-size

Configures the maximum window size of the TCP packet. The window size value is an integer ranging from 16384 to 1073725440.

downlink

This keyword applies the window size configuration only for the downlink packets.

Usage Guidelines

Use this command to configure the maximum window size of a TCP packet. The operator can restrict the effective window size of all downlink TCP packets.

Example

The following command configures a window-size value 17890 :

`tcp window-size downlink 17890`

tethering-detection

This command allows you to enable/disable the Tethering Detection feature for the current rulebase, and specifies the database to use.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

tethering-detection [application | dns-based | ip-ttl value *ttl_value* **| max-syn-packet-in-flow** *max_syn_packets* **| os-db-only | os-ua-db | ua-db-only]**
{ default | no } tethering-detection

default

Configures this command with its default setting.

Default: By default, the Tethering Detection feature is disabled. When enabled, unless a specific database is specified to be used, by default tethering detection will make use of both the databases.

no

If previously configured, deletes the tethering detection configuration from the current rulebase.

application

Specifies to perform tethering detection based on App-based method.

With release 21.1.3, the App-based Tethering Detection is introduced only for Netflix and YouTube.

dns-based

Specifies to perform tethering detection based on DNS-based method.

ip-ttl value *ttl_value*

Specifies to perform tethering detection using IP-TTL configuration. *ttl_value* must be an integer from 1 through 255 to configure TTL values for tethered flows.

max-syn-packet-in-flow *max_syn_packets*

Specifies the number of SYN packets applicable for tethering detection in a flow. *max_syn_packets* must be an integer from 1 through 3.

Default number of SYN packets is 1. This means that only the first SYN packet in flow will be analyzed for IP-TTL/OS signature generation and tethering detection. All other mid-flow SYN packets will be ignored for IP-TTL/OS signature generation and tethering detection.

os-db-only

In 17 and earlier releases: Specifies to perform tethering detection using only the OS signature database.

In 18 and later releases: Specifies to perform tethering detection using IPv4 and IPv6 OS signature databases.

os-ua-db

In 17 and earlier releases: Specifies to perform tethering detection using only OS and UA signature databases.

In 18 and later releases: Specifies to perform tethering detection using IPv4 OS, IPv6 OS, and UA signature databases.

ua-db-only

Specifies to perform tethering detection using only the UA signature database.

Usage Guidelines

Use this command to enable/disable the Tethering Detection feature for a rulebase, and configures the database to use. Tethering Detection can be done for IPv4, IPv6, TCP and UDP flows.

Changing the configuration does not affect existing flows of the subscriber. If Tethering Detection was disabled and is turned enabled, it will be applied only to new flows of subscribers using the rulebase.

Important IPv6 Tethering Detection is supported only with TTL and UA signatures, and not supported for OS signatures.

Also, see the **tethering-database** command in the *ACS Configuration Mode Commands* chapter.

Example

The following command enables the Tethering Detection feature in the rulebase, and specifies to use only the OS database:

```
tethering-detection os-db-only
```

tft-notify-ue-def-bearer

This command allows you to control whether TFT updates are sent to UE or not for default bearer for the specified rulebase.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
{ default | no } tft-notify-ue-def-bearer
```

default

The default behavior is to send the TFT updates of default bearer for the specified APN to UE.

no

This keyword controls the TFT updates of default bearer for the APN attached to the chassis, from being sent to the UE.

Usage Guidelines

Use this command at the rulebase level to control whether TFT updates are sent to UE or not for default bearer for the specified rulebase.

This feature provides the operator the flexibility to configure this per Rulebase and also configure to suppress TFT updates only. The CLI command allows sending other QoS updates to the UE and controls only the TFT related updates. This CLI is supported only for default bearer.

In releases prior to 15.0, the "**no policy-control update-default-bearer**" CLI command is used to suppress all the TFT updates to the UE on the default bearer including the initial TFTs sent in the Create Session Response. Also, this configuration is available for the entire system and not per rulebase. Additionally, this CLI command suppresses all the QoS related updates (including change in bit rate) to the UE.

timestamp rounding

This command allows you to enable/disable timestamp rounding in EDRs or eG-CDRs.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

timestamp rounding { edr | egcdr } { ceiling | floor | round-off } { default | no } timestamp rounding { edr | egcdr }

default

Configures this command with its default setting.

Default: **round-off**

no

Disables timestamp rounding.

edr

Enables timestamp rounding for EDRs.

egcdr

Enables timestamp rounding for eG-CDRs.

ceiling

If the fractional part of the seconds is greater than 0, adds 1 to the number of seconds and discards the fraction.

floor

Discards the fractional part of the second.

round-off

Sets the fractional part of the seconds to nearest integer value. If the fractional value is greater than or equal to 0.5, it adds 1 to the number of seconds and discards the fractional part of second.

Usage Guidelines

Use this command to configure the timestamp rounding setting.

The specified rounding will be performed before system attempts any calculation. For example using round-off, if the start time is 1.4, and the end time is 1.6, then the calculated duration will be 1 (for example, 2 – 1 = 1).

This command may be repeated for each type of EDR or eG-CDR.

Example

The following command sets the EDR timestamp to nearest integer value second; for example, 34:12.23 to 34:12.00:

```
timestamp rounding edr round-off
```

tpo default-policy

The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

traffic-optimization

This command allows you to turn ON/OFF the traffic optimization for UDP traffic.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no ] traffic-optimization udp
```

no

If previously configured, turns OFF the traffic optimization for UDP traffic.

By default, traffic optimization for UDP traffic is disabled.

udp

Specifies traffic optimization for UDP traffic.

Usage Guidelines Use this command to turn ON/OFF the traffic optimization for UDP traffic.

Important Enabling/Disabling traffic optimization is controlled by service-scheme framework.

transactional-rule-matching

This command allows you to enable or disable transactional rule matching (TRM) which allows the Enhanced Charging Service (ECS) to bypass per-packet rule matching on a transaction once the transaction is fully classified.

Important The TRM feature is supported in SSI platform; earlier it was restricted only to ASR5500.

Product

ACS

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

[default | no] transactional-rule-matching

default

Configures this command with its default setting.

Default: Disabled.

no

If already configured, disables transactional rule matching.

Usage Guidelines

Use this command to enable or disable transactional rule matching. This allows the Enhanced Charging Service (ECS) to bypass per-packet rule matching on a transaction once the transaction is fully classified.

A transaction for TRM can be defined as the entire UDP flow, the ACK of the 3-way handshake to the FIN/RST of a TCP flow, or the HTTP request to the next HTTP request, or HTTP request to the FIN/RST for the final request of the flow. Rule matching can be performed on IP L4 rules (UDP, TCP), HTTP, and HTTPS.

In 16.0 and later releases, ADC and TRM/FP can be enabled together. ADC flows will be considered for TRM optimization. Most VoIP applications that require all packets of the flow do not support TRM. When TRM/FP is enabled with ADC, such protocols will not take TRM/FP.

Important From 16.0 release, **Transactional Rule Matching** and **Fastpath** functionalities have been merged, and will be governed by only the **transactional-rule-matching** keyword alone. The keyword **fastpath** independently can no longer be used to turn on or turn off this functionality.

Example

The following command enables transactional rule matching:

```
transactional-rule-matching
```

transport-layer-checksum

This command allows you to enable/disable checksum verification for TCP and UDP packets.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
[ no ] transport-layer-checksum verify-during-packet-inspection [ tcp |
udp ]
default transport-layer-checksum
```

no

Disables the checksum calculation for the specified packet type.

default

Configures this command with its default setting.

Default: Same as **transport-layer-checksum verify-during-packet-inspection**—to perform the checksum verification calculation on all TCP and UDP packets.

[tcp | udp]

Specifies that either TCP or UDP packets should be verified/not verified.

If neither of these keywords is specified the command applies to both TCP and UDP packets.

Usage Guidelines

Use this command to disable or enable performing checksum verification calculations on TCP or UDP packets.

If the checksum is not verified, the packets will go through the TCP/UDP analyzers (and deeper analyzers, if so configured via the **route** command) regardless of the value of the TCP/UDP checksum.

If the checksum is verified, only packets with good checksums will go through the TCP/UDP analyzers (and deeper analyzers, if so configured).

Example

The following command disables checksum verification calculations on all TCP and UDP packets:

```
no transport-layer-checksum verify-during-packet-inspection
```

udr threshold

This command allows you to configure the threshold limit to generate Usage Data Records (UDRs) that provide Comma Separated Value (CSV) records written periodically in a fixed schema designed to reflect a total billable quantity.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
udr threshold { interval interval | volume { downlink bytes [ uplink bytes ]
 | total bytes | downlink bytes [ uplink bytes ] } }
default udr threshold { interval | volume }
no udr threshold { interval | volume { downlink [ uplink ] | total |
uplink [ downlink ] } }
```

no

If previously configured, deletes the UDR threshold configuration from the current rulebase.

default

Configures this command with its default setting.

Default: Disabled; same as **no udr threshold interval** and **no udr threshold volume**.

interval *interval*

Specifies the time interval, in seconds, for closing the UDR if the minimum time duration thresholds are satisfied. By default, this option is disabled.

interval must be an integer from 60 through 40000000.

Default: 0 (Disabled)

volume

Specifies uplink/downlink volume octet counts for the generation of interim UDRs.

- **downlink** *bytes*: Specifies the limit for the number of downlink octets after which the UDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: 4000000000

- **total** *bytes*: Specifies the limit for the total number of octets (uplink+downlink) after which the UDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: Disabled

- **uplink** *bytes*: Specifies the limit for the number of uplink octets after which the UDR is closed.

  bytes must be an integer from 100000 through 4000000000.

  Default: 4000000000

UDR records are generated whenever either threshold is reached.

Usage Guidelines

Use this command to enable thresholds for generation of UDRs.

Example

The following command specifies that UDR records should be generated every 10 minutes (*600* seconds):

```
udr threshold interval 600
```

udr trigger

This command allows you to configure additional triggers for generating UDRs.

Important This command is only available in StarOS 8.3 and later releases.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
udr trigger { first-hit-content-id | tariff-time minute minutes hour hours
| nemo-prefix-update }
no udr trigger { first-hit-content-id | tariff-time | nemo-prefix-update
 }
default udr trigger [ nemo-prefix-update ]
```

no

Disables first-hit-content-id UDR trigger.

default

Configures this command with its default setting.

Default: Disabled; no additional triggers.

first-hit-content-id

Specifies to generate interim UDR on first packet hit per rating group/content ID.

tariff-time minute *minutes* hour *hours*

This keyword allows to configure tariff time trigger to close ongoing UDR buckets and save all data traffic up to tariff time in a single UDR file. By default, this CLI keyword is disabled.

Configuring this keyword enables the PDSN/PCEF to generate content base UDR record for each concurrent online subscriber in each of day cross and place them in a single UDR file. The charging records include content based service (by duration and by volume).

Tariff time is stored at rulebase level. Therefore if the tariff time is updated while there are ongoing calls in the network, the old tariff time will be ignored and the new tariff time will be applied to the existing as well as upcoming calls.

At the end of the "Tariff Time" period, the UDR files are created and the next set of records are stored in a new UDR file.

nemo-prefix-update

Important This keyword is available only with NEMO license.

On configuring this keyword/trigger, UDRs will be generated in case a NEMO update event is received. If this trigger is not configured UDRs will not be generated even if a NEMO update event is received from session manager. If the "**no**" or "**default**" option is used, it will disable the UDR trigger for nemo-prefix-update.

Usage Guidelines

This command enables to assign first packet trigger to interim UDRs—for generating UDR for first packet hit per rating group/content ID. The first-hit-content-id trigger when configured causes an UDR to be generated as soon as a packet hits a Charging Action with a content ID. UDR generation will be triggered when this command is configured and present in the rulebase.

Example

The following command assigns first packet trigger to interim UDRs, for generating UDR for first packet hit per rating group/content ID:

```
udr trigger first-hit-content-id
```

uidh-insertion

This command allows you to enable insertion of UIDH Hash values in HTTP requests that require UIDH service.

Product

ACS

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

uidh-insertion server-name *server_name* **[bypass wl-lookup]**
no uidh-insertion

no

If previously configured, deletes the UIDH insertion configuration from the current rulebase.

server-name

Specifies the UIDH server name The server_name is a string ranging in size from 1 to 63 characters.

bypass wl-lookup

This command if configured bypasses the URL Host look-up. By default, URL Host whitelist is enabled, that is, bypass is not applied. However, Bypass with permitlist look-up can be applied during run-time.

Note From StarOS 21.26 and later releases, the term “whitelist” is replaced with “permitlist” in the help string.

Usage Guidelines

Use this command to enable insertion of UIDH Hash values in HTTP requests that require UIDH service.

The UIDH value is inserted in the HTTP header of the traffic flows for permitlisted destination URLs and whitelisted subscribers MDNs.

Note The term “whitelist” is replaced with “permitlist” in the CLI from StarOS 21.26 and later releases.

When a session is attached to P-GW, the P-GW queries the UIDH server. If there is no response from the UIDH server, the UIDH service is not enabled for this session.

url-preprocessing

This command allows you to enable/disable a group-of-prefixed-urls for preprocessing of embedded URLs.

Important This command is customer specific. For more information, please contact your Cisco account representative.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* **> rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

[no] url-preprocessing bypass group-of-prefixed-urls *prefixed_urls_group_name*

no

If previously configured, deletes the URL-preprocessing bypass configuration from the current rulebase.

group-of-prefixed-urls *prefixed_urls_group_name*

Specifies the group-of-prefixed-urls.

prefixed_urls_group_name must be the name of a group-of-prefixed-urls, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to enable/disable a group-of-prefixed-urls for preprocessing of embedded URLs. This command can be issued multiple times to enable multiple groups. If an embedded URL begins with the string specified within any of the groups, that prefix text will be removed from the URL.

Example

The following command enables looking for prefixed URLs of the group-of-prefixed-urls named *test5*:

url-preprocessing bypass group-of-prefixed-urls test5

video optimization-preprocessing cae-readdressing

This command allows you to enable/disable CAE readdressing at the rulebase level.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

ACS

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
video optimization-preprocessing cae-readdressing
[ default | no ] video optimization-preprocessing
```

default

Configures this command with its default setting.

no

If already configured, disables CAE readdressing.

Usage Guidelines

Use this command to configure ACS to readdress the flows to CAE.

websocket flow-detection

This command allows you to enable or disable websocket flow detection at rulebase level.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description `[ no ] websocket flow-detection [ protocol1 | protocol2 | protocol3 | ...]`

no

Disables the websocket flow detection.

[protocol 1 | protocol2 | protocol3 | ...]

Specifies protocol for detection.

If both protocol1 and protocol2 are specified, then specifies protocol detection of both protocols.

Usage Guidelines Use this command to disable or enable websocket flow detection identification of protocols.

Important Currently, websocket is only using HTTP protocol as a transport layer, so the CLI will have only http as option.

Example

The following command disables websocket flow detection identification of protocols:

```
no websocket flow-detection [proto1 | proto2 | proto3 ]
```

wtp out-of-order-timeout

Description This command has been deprecated, and is replaced by the command.

wtp packets-out-of-order

This command allows you to configure how to process Wireless Transaction Protocol (WTP) packets that are out of order, while waiting for the earlier packet(s) to arrive.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
wtp packets-out-of-order { out-of-order-timeout timeout | transmit [
after-reordering | immediately ] }
default wtp packets-out-of-order { out-of-order-timeout | transmit }
```

default

Configures this command with its default setting.

- **out-of-order-timeout**: 5000 milliseconds
- **transmit**: **immediately**

out-of-order-timeout *timeout*

Specifies the maximum duration for which WTP out-of-order packets are retained, before reassembly is needed.

timeout is the timeout duration, in milliseconds, and must be an integer from 100 through 30000.

Default: 5000 milliseconds

transmit [after-reordering | immediately]

Specifies the WTP out-of-order segment behavior after buffering a copy:

- **after-reordering**: Sends WTP out-of-order segment after it becomes ordered
- **immediately**: Sends WTP out-of-order segment immediately after buffering a copy

Default: **immediately**

Usage Guidelines

Use this command to configure TCP out-of-order segment options.

If out-of-order-timeout is specified, out-of-order packets are retained, until either all packets have been received or the configured timeout has expired for the oldest packet. If all packets have been received, a temporary complete packet is reconstructed for analysis. Then all packets are forwarded in order from first to last. If all packets are not received, the packets will be forwarded without being passed through the protocol analyzers, except for the IP analyzer.

If **after-reordering** transmitting is specified, the packets are held onto and reordered. After successfully reordering the packets, they are processed in the proper order. If reordering is not successful due to timeout (wtp out-of-order-timeout), the received packets are forwarded without being passed through the protocol analyzers.

If **immediately** is specified, the packets are transmitted as they are received without any in-line services or Charging Action processing, however a copy of each packet is retained. When the missing packet is received, complete deep packet inspection of all the packets and all relevant in-line services is undertaken, and then the last packet is forward (unless otherwise configured by the in-line services or Charging Action).

Example

The following command sets the timeout timer to *10000* milliseconds:

```
wtp packets-out-of-order out-of-order-timeout 10000
```

xheader-encryption

This command allows you to configure X-Header Encryption feature's parameters.

Product

Important This command is license dependent. For more information please contact your Cisco account representative.

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > Rulebase Configuration

active-charging service *service_name* > **rulebase** *rulebase_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-rule-base)#
```

Syntax Description

```
xheader-encryption { certificate-name certificate_name | re-encryption period
 period }
default xheader-encryption re-encryption period
no xheader-encryption { certificate-name | re-encryption }
```

default

Configures this command with its default setting.

Default: Disabled

no

If previously configured, deletes the configuration from the current rulebase.

certificate-name *certificate_name*

Specifies the encryption certificate to use for the X-Header Encryption feature.

certificate_name must be the name of an encryption certificate, and must be an alphanumeric string of 1 through 63 characters.

Default: Disabled; no encryption certificate

re-encryption period *period*

Specifies how often to re-generate the encryption keys.

period specifies the re-encryption time period in minutes, and must be an integer from 1 through 10000.

Default: Disabled; no re-encryption

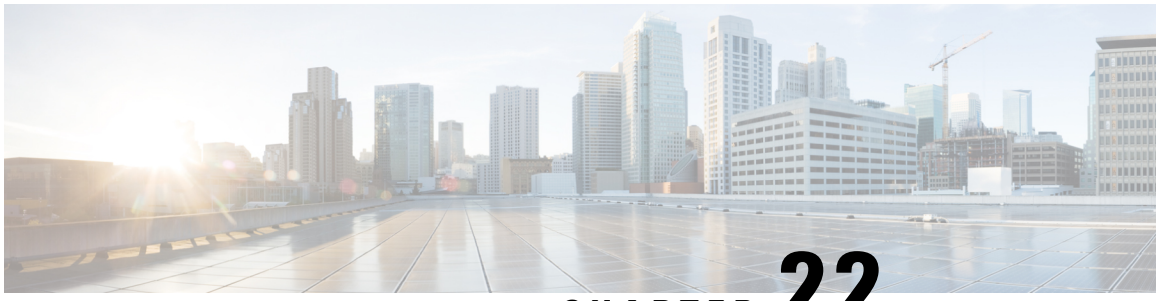
Usage Guidelines

Use this command to configure the X-Header Encryption feature's certificate and re-encryption parameters.

Example

The following command configures the X-Header Encryption feature to use the certificate named *testcert*:

```
xheader-encryption certificate-name testcert
```



CHAPTER 22

ACS Service Scheme Configuration Mode Commands

The ACS Service Scheme Configuration Mode is used to enable the association of service-scheme based on subscriber class.

Command Modes

Exec > ACS Configuration > ACS Service Scheme Configuration

active-charging service *service_name* > **service-scheme** *service_scheme_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-servscheme)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 961
- exit, on page 962
- trigger, on page 962

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

trigger

This command allows you to specify the trigger that needs to be handled for the associated service-scheme.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Service Scheme Configuration

active-charging service *service_name* **> service-scheme** *service_scheme_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-servscheme)#`

Syntax Description **[no] trigger { bearer-creation | flow-create | loc-update | monitor-bearer-bandwidth | sess-setup | nsh-response-received }**

no

If previously configured, deletes the specified configuration.

bearer-creation |flow-create | loc-update | monitor-bearer-bandwidth | sess-setup

Specifies the trigger action for service-scheme.

- **bearer-creation**: Triggers for every new bearer.
- **flow-create**: Triggers for every new flow.
- **loc-update**: Triggers whenever location changes for the subscriber.
- **monitor-bearer-bandwidth**: Triggers whenever bearer bandwidth is evaluated.
- **nsh-response-received**: Triggers on NSH response packet.
- **sess-setup**: Triggers at session setup.

Usage Guidelines

Use this command to configure trigger events such as session-setup and location-update that will be handled under the service-scheme.

On entering this command, the CLI prompt changes to:

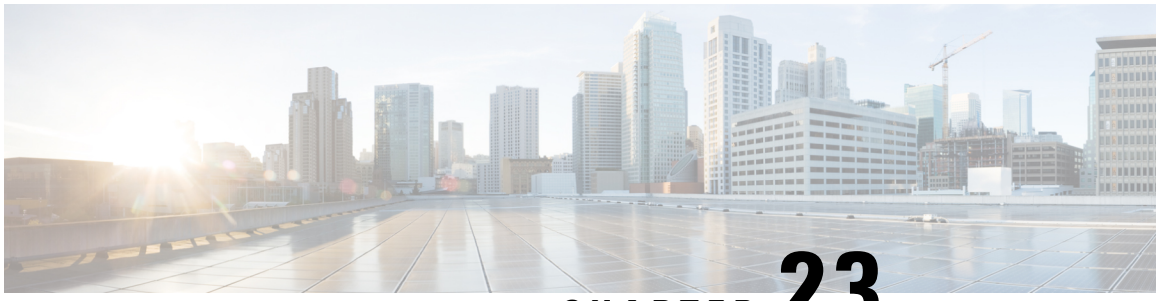
[*context_name*]*hostname*(config-servscheme-trigger)#

Also see the *ACS Service Scheme Trigger Configuration Mode Commands* chapter.

Example

The following command is configured to define session setup event as an event type that will be handled in the service-scheme:

```
trigger sess-setup
```



CHAPTER 23

ACS Service Scheme Trigger Configuration Mode Commands

The ACS Service Scheme Trigger Configuration Mode is used to configure the set of triggers to be handled under the associated service-scheme.

Command Modes

Exec > ACS Configuration > ACS Service Scheme Configuration > ACS Service Scheme Trigger Configuration

active-charging service *service_name* **> service-scheme** *service_scheme_name* **> trigger { flow-create | loc-update | sess-setup }**

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-servscheme-trigger)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 965
- exit, on page 966
- priority, on page 966

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

priority

This command allows you to assign priority to the trigger events in service-scheme.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Service Scheme Configuration > ACS Service Scheme Trigger Configuration

active-charging service *service_name* **> service-scheme** *service_scheme_name* **> trigger { flow-create | loc-update | sess-setup }**

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-servscheme-trigger)#
```

Syntax Description

```
priority priority trigger-condition trigger_condn_name trigger-action
trigger_action_name
no priority priority
```

no

If previously configured, deletes the specified configuration.

priority

Specifies the priority to be assigned to the trigger events.

priority must be an integer from 1 through 127.

trigger-condition *trigger_condn_name*

Specifies the trigger condition definition.

trigger_condn_name must be an alphanumeric string of 1 through 63 characters.

trigger-action *trigger_action_name*

Specifies the trigger action definition.

trigger_action_name must be an alphanumeric string of 1 through 63 characters.

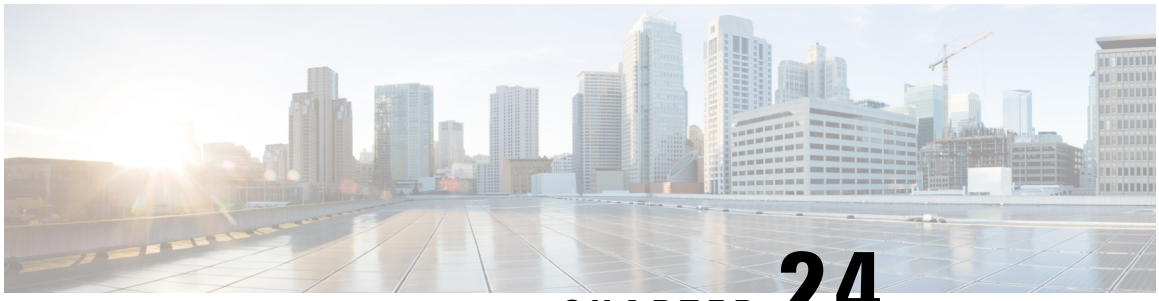
Usage Guidelines

Use this command to assign priority to the trigger events configured in service-scheme. The priority must be unique within a trigger.

Example

The following command is configured to set priority as *10* with respective trigger condition *tc1* and trigger action *ta1*:

```
priority 10 trigger-condition tc1 trigger-action ta1
```



CHAPTER 24

ACS Subscriber Base Configuration Mode Commands

The ACS Subscriber Base Configuration Mode is used to configure Active Charging Service subscriber base.

Command Modes

Exec > ACS Configuration > ACS Subscriber Base Configuration

active-charging service *service_name* **> subscriber-base** *subs_base_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-subscriber-base)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 969
- exit, on page 969
- priority, on page 970

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

priority

This command allows you to assign priority to the service-scheme association within a subscriber base.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Subscriber Base Configuration

active-charging service *service_name* > **subscriber-base** *subs_base_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-subscriber-base)#`

Syntax Description **priority** *priority* **subs-class** *subs_class_name* **bind service-scheme** *serv_scheme_name*
no priority *priority*

no

If previously configured, deletes the specified configuration.

priority

Specifies the priority to be assigned to service-scheme.

priority must be an integer from 1 through 127.

subs-class *subs_class_name*

Specifies the subscriber class definition to a subscriber base.

*subs_class_name*must be an alphanumeric string of 1 through 63 characters.

bind

Specifies the association of service-scheme within subscriber class.

service-scheme *serv_scheme_name*

Specifies the service scheme definition.

serv_scheme_name must be an alphanumeric string of 1 through 63 characters.

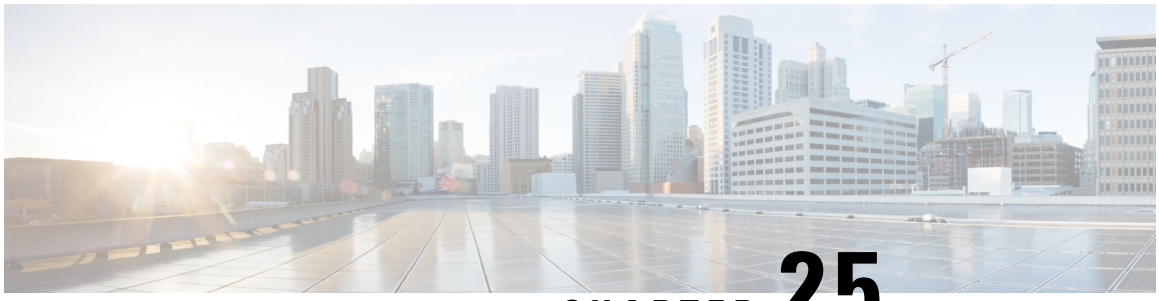
Usage Guidelines

Use this command to assign priority to the service-scheme association within a subscriber base. This priority has to be unique within a subscriber base.

Example

The following command is configured to set priority as *5* to associate service-scheme named *ss1*:

```
priority 5 subs-class sc1 bind service-scheme ss1
```



CHAPTER 25

ACS Subscriber Class Configuration Mode Commands

The ACS Subscriber Class Configuration Mode is used to configure Active Charging Service subscriber class.

Command Modes

Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* > **subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-subsclass)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- any-match, on page 973
- apn, on page 974
- end, on page 975
- exit, on page 975
- multi-line-or, on page 975
- rulebase, on page 976
- v-apn, on page 977

any-match

This command is used to enable or disable the wildcard configuration.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* > **subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-subsclass)#
```

Syntax Description **[no] any-match** *operator condition*

no

If previously configured, deletes the specified configuration.

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- FALSE
- TRUE

Usage Guidelines Use this command to enable or disable the wildcard configuration.

apn

This command allows you to specify the APN name as a condition.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* **> subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-subsclass)#
```

Syntax Description **[no] apn** *operator apn_name*

no

If previously configured, deletes the specified configuration.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

apn_name

Specifies the APN name.

apn_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines Use this command to specify the APN name as a condition.

Example

The following command configures an APN named *xyz.com*:

```
apn = xyz.com
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

multi-line-or

This command allows to check if the OR operator must be applied to all lines in a subscriber class.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* **> subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-subsclass)#`

Syntax Description **`[ no ] multi-line-or all-lines`**

no

If previously configured, deletes the specified configuration.

Usage Guidelines Use this command to check if the OR operator must be applied to all lines in a subscriber class.

rulebase

This command allows you to specify the rule base name as a condition.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* **> subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-subsclass)#`

Syntax Description **`[ no ] rulebase`** *`operator rulebase_name`*

no

If previously configured, deletes the specified configuration.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

rulebase_name

Specifies the rule base name.

rulebase_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the rule base name as a condition.

Example

The following command configures a rule base named *plan1*:

```
rulebase = plan1
```

v-apn

This command allows you to specify the virtual APN name as a condition.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Subscriber Class Configuration

active-charging service *service_name* **> subs-class** *subs_class_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-subsclass)#
```

Syntax Description

[no] v-apn *operator v_apn_name*

no

If previously configured, deletes the specified configuration.

operator

Specifies how to match.

operator must be one of the following:

- **!=**: Does not equal
- **=**: Equals

v_apn_name

Specifies the virtual APN name.

v_apn_name must be an alphanumeric string of 1 through 63 characters.

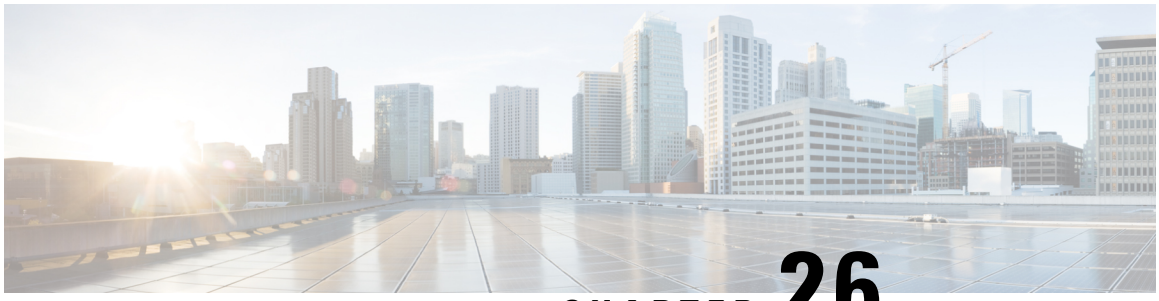
Usage Guidelines

Use this command to specify the virtual APN name as a condition.

Example

The following command configures a virtual APN named *vapn12*:

```
v-apn = vapn12
```



CHAPTER 26

ACS TCP Acceleration Profile Configuration Mode Commands

The ACS TCP Acceleration Profile Configuration Mode is used to configure Active Charging Service (ACS) TCP Acceleration Profile for Inline TCP Optimization.

Command Modes

Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- accl-flags, on page 979
- buffer-size, on page 980
- cwnd-gain, on page 981
- end, on page 982
- exit, on page 982
- initial-cwnd-size, on page 982
- max-rtt, on page 983
- mss, on page 983

accl-flags

This command configures TCP acceleration related optimization flags.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Syntax Description

accl-flags *flag_value*
default accl-flags

default

Restores default values assigned to its following options.

value

The value is an integer ranging from 0 to 65535.

Usage Guidelines

Use this command to configure the acceleration related optimization flags for a TCP connection.

Example

The following command configures a TCP acceleration optimization flag with value 20.

```
accl-flags 20
```

buffer-size

This command configures the TCP Proxy buffer size for downlink and uplink data in Kilobytes

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Syntax Description

buffer-size { [downlink [128KB | 256KB | 512KB | 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB] [uplink [128KB | 256KB | 512KB | 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB]]] | [uplink [128KB | 256KB | 512KB | 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB] [downlink [128KB | 256KB | 512KB | 1024KB | 1536KB | 2048KB | 2560KB | 3072KB | 3584KB | 4096KB]]] }
default buffer-size

default

Restores default values assigned to its following options.

Usage Guidelines

Use this command to configure the TCP Proxy buffer size for downlink and uplink data in Kilobytes

Example

The following command configures a TCP Proxy buffer size for downlink data as 256KB and uplink data as 256KB:

```
buffer-size downlink 256KB uplink 256KB
```

cwnd-gain

This command configures the TCP congestion window gain by continuously evaluating the actual congestion window size.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Syntax Description

```
cwnd-size { dynamic { off | on } [ factor factor_value ] | factor factor_value
 [ dynamic { off | on } ] }
default cwnd-gain
```

default

Restores default values assigned to its following options.

dynamic

Automatically scales-up the congestion window gain to ensure that it is sized correctly to allow for RTT variation during the flow.

factor *factor_value*

Configures the TCP congestion window gain factor. The *factor_value* is an integer ranging from 1 to 16378.

Usage Guidelines

Use this command to configure the TCP congestion window gain by continuously evaluating the actual congestion window size. This command is used by the TCP optimization engine to continuously calculate the actual congestion window size. Scaling the window size allows the TCP optimization engine to manage the in-flight of data in the engine.

Example

The following command configures TCP congestion window size dynamically along with a gain factor value 10:

```
cwnd-size dynamic on factor 10
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

initial-cwnd-size

This command configures the initial congestion window size is segments

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-tcp-accl-profile)#`

Syntax Description **initial-cwnd-size** *window_segment_size*
default initial-cwnd-size

default

Restores default values assigned to its following options.

window_segment_size

The *window_segment_size* is an integer ranging from 1 to 65535.

Usage Guidelines Use this command to configure the initial congestion window size is segments

Example

The following command configures the initial congestion window size with a segment value 200:

```
initial-cwnd-size 200
```

max-rtt

This command configures the maximum RTT value.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Syntax Description

```
max-rtt max_rtt_value
default max-rtt
```

default

Restores default values assigned to its following options.

max_rtt_value

The *max_rtt_value*is an integer ranging from 1 to 10000.

Usage Guidelines Use this command to configure the maximum RTT value in Milliseconds.

Example

Use the following command to configure the maximum RTT value of 500 milliseconds:

```
max-rtt 500
```

mss

This command configures the maximum segment size for TCP.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS TCP Acceleration Profile Configuration

active-charging service *service_name* **> tcp-acceleration-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-tcp-accl-profile)#
```

Syntax Description

mss *mss_value*
default mss

default

Restores default values assigned to its following options.

mss_value

The *mss_value*is an integer ranging from 496 to 65535.

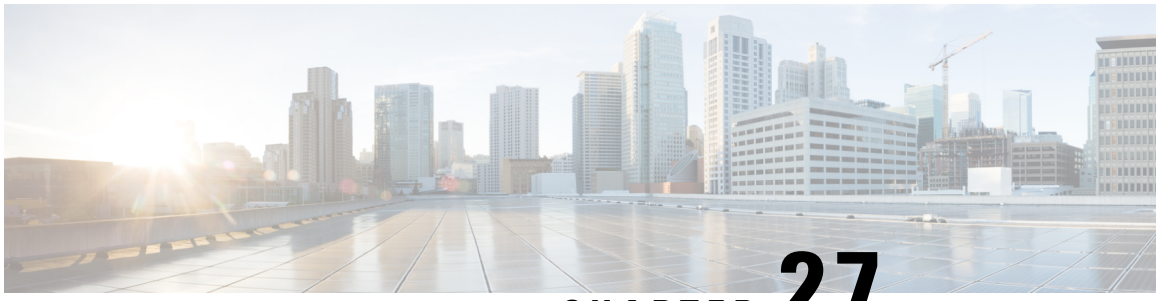
Usage Guidelines

Use this command to configure the maximum segment size in Bytes.

Example

Use the following command to configure the maximum segment size value of 500 bytes:

```
mss 500
```



CHAPTER 27

ACS Timedef Configuration Mode Commands

Important This configuration mode is only available in StarOS 8.1 and in StarOS 9.0 and later releases.

Command Modes The ACS Timedef Configuration Mode enables configuring the Time-of-Day Activation/Deactivation feature.

Exec > ACS Configuration > Timedef Configuration

active-charging service *service_name* **> timedef** *timedef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-timedef)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 985
- exit, on page 986
- start, on page 986

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `end`

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

start

This command allows you to configure timeslots in the current timedef.

Important This command is only available in StarOS 8.1 and in StarOS 9.0 and later releases.

Important A maximum of 24 timeslots can be specified within a timedef.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > Timedef Configuration

active-charging service *service_name* > **timedef** *timedef_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-timedef)#
```

Syntax Description

```
[ no ] start day { friday | monday | saturday | sunday | thursday | tuesday
 | wednesday } time hh mm ss end day { friday | monday | saturday | sunday
 | thursday | tuesday | wednesday } time hh mm ss
[ no ] start time hh mm ss end time hh mm ss
```

no

If previously configured, removes the specified timeslot from the current timedef.

start day { friday | monday | saturday | sunday | thursday | tuesday | wednesday } time *hh mm ss* end day { friday | monday | saturday | sunday | thursday | tuesday | wednesday } time *hh mm ss*

Specifies a timeslot with a start day and time, and an end day and time.

- **start day**: Specifies the start day and start time.
- **end day**: Specifies the end day and end time.
- **time** *hh mm ss*: Specifies the start/end time:
  - *hh*: Specifies the start/end hour, and must be an integer from 0 through 23.
  - *mm*: Specifies the start/end minute, and must be an integer from 0 through 59.
  - *ss*: Specifies the start/end second, and must be an integer from 0 through 59.

start time *hh mm ss* end time *hh mm ss*

Specifies a timeslot with a start time and an end time to be applicable for all days of the week.

In specifying the start/end time:

- *hh*: Specifies the start/end hour, and must be an integer from 0 through 23.
- *mm*: Specifies the start/end minute, and must be an integer from 0 through 59.
- *ss*: Specifies the start/end second, and must be an integer from 0 through 59.

Usage Guidelines

Use this command to create timeslots in a timedef during which rules have to be active. Timedefs enable activation/deactivation of ruledefs/groups-of-ruledefs such that they are available for rule matching only when they are active.

When a packet is received, and a ruledef/group-of-ruledefs is eligible for rule matching, if a timedef is associated with the ruledef/group-of-ruledefs, before rule matching, the packet-arrival time is compared with the timeslots configured in the timedef. If the packet arrived in any of the timeslots configured in the associated timedef, rule matching is undertaken, else the next ruledef/group-of-ruledefs is considered.

Important The time considered for timedef matching is the system's local time.

This release does not support configuring a timeslot for a specific date.

If in a timeslot, only the time is specified that timeslot will be applicable for all days.

If for a timeslot "start time" is after "end time", that rule will span midnight and be considered to be active from the current day until the next day.

If for a timeslot, "start day" is after "end day", that rule will span the current week until the end day in the next week.

In the following cases a rule will be active all the time:

- A timedef is not configured in an action priority
- A timedef is configured in an action priority, but the named timedef is not defined
- A timedef is defined but without timeslots

Example

The following command specifies a timeslot that starts on *Tuesday* at *09:00:00* and ends on *Friday* at *21:30:00*:

```
start day tuesday time 9 0 0 end day friday time 21 30 0
```

The following command specifies a timeslot that starts at *15:00:00* and ends at *17:00:00* on all days of the week:

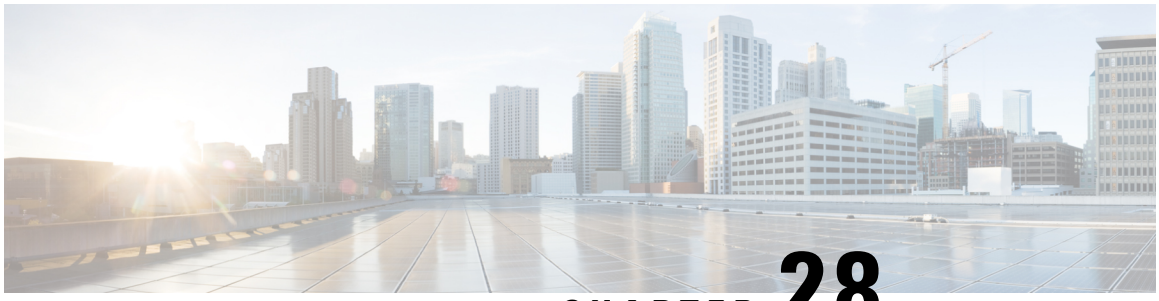
```
start time 15 0 0 end time 17 0 0
```

The following command specifies a timeslot that starts on *Friday* at *22:00:00* and ends on *Tuesday* at *08:00:00*. This timeslot spans the complete week until the end day, up to *Tuesday*.

```
start day friday time 22 0 0 end day tuesday time 8 0 0
```

The following command specifies a timeslot that starts at *16:00:00* and ends at *09:00:00* on all days of the week. Also, as start time > end time, this timeslot spans midnight too (that is, from *16:00:00* to *23:59:59* and from *00:00:00* to *09:00:00*).

```
start time 16 0 0 end time 9 0 0
```



CHAPTER 28

ACS Trigger Action Configuration Mode Commands

The ACS Trigger Action Configuration Mode is used to configure Active Charging Service (ACS) trigger actions.

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* > **trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- activate-predef-rule, on page 989
- charge-request-to-response, on page 990
- end, on page 991
- exit, on page 991
- flow-recovery, on page 992
- map charging-action, on page 992
- service-chain, on page 993
- step-down, on page 993
- step-up, on page 994
- tcp-acceleration, on page 995
- throttle-suppress, on page 996
- transactional-rule-matching, on page 997

activate-predef-rule

This command allows you to enable predefined rules or group of rules for a trigger-action.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

[no] activate-predef-rule

no

Disables predefined rules or group of rules for a trigger-action.

activate-predef-rule

Activates predefine rule or group of rules for a trigger action.

Usage Guidelines

When this CLI command is configured, the dedicated bearer is created by service flow at a specific location.

charge-request-to-response

This command allows you to delay charging till the HTTP response for the configured HTTP request method(s).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

[no] charge-request-to-response http { all | connect | delete | get | head | options | post | put | trace }

no

Disables the response-based charging feature in the trigger-action.

all | connect | delete | get | head | options | post | put | trace

Specifies the HTTP methods applicable to delay charging for a flow.

The Response-based Charging feature supports pipelined HTTP requests (both concatenated and non-concatenated). For pipelined HTTP requests and persistent connections of different HTTP methods, this feature is applied only to those HTTP methods for which it is configured.

- **all**: Applies to all HTTP methods
- **connect**: HTTP Connect method

- **delete**: HTTP Delete method
- **get**: HTTP Get method
- **head**: HTTP Head method
- **options**: HTTP Options method
- **post**: HTTP Post method
- **put**: HTTP Put method
- **trace**: HTTP Trace method

Usage Guidelines Use this command to delay charging until HTTP response for the configured HTTP request method(s). This CLI command is introduced in support of the Response-based Charging feature. This feature is limited to specified HTTP methods.

Important Response-based charging is supported only for the HTTP protocol.

The Service Scheme configuration is required to configure and enable this feature for a subscriber. For more information on the Response-based TRM feature, see the *ECS Administration Guide*.

Example

The following command is configured to delay charging for only HTTP Get requests:

```
charge-request-to-response http get
```

The following command is configured to delay charging for HTTP Get and Connect requests:

```
charge-request-to-response http get connect
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

flow-recovery

This command allows you to enable flow recovery for a trigger-action.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description **[no] flow-recovery**

no

Disables flow recovery for a trigger-action.

Usage Guidelines When this CLI command is configured, the flows for the rule will be checkpointed as per session level and call level limit.

map charging-action

This command applies the rating group, content ID, online and offline charging based on the rule set for video shaping.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax

[no] map charging-action*charging_action_name* **attribute charging**

no

Disables the rating group, content ID, online and offline charging based on the rule set for video shaping.

map charging-action *charging_action_name* attribute charging

Applies the rating group, content ID, online and offline charging based on the rule set for video shaping.

Usage Guidelines Use this command to apply charging based on the video shaping rule set.

Example

The following command is configured to apply charging for the charging action named *test123*:

map charging-action test123 attribute charging

service-chain

This command associates a service chain to a trigger action.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-acs-trig-action)#`

Syntax Description **[no] service-chain** *service_chain_name*

no

Removes the service-chain association from the assigned trigger-action.

Usage Guidelines Use this command to associate a service chain with a trigger action.

step-down

This command allows you to step down the initial configured value of committed data rate.

Product P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

[no] step-down committed-data-rate *<negotiated_value>*

no

If previously configured, deletes the specified configuration.

step-down

Steps down the value of committed data rate.

committed-data-rate

Defines the committed data rate.

negotiated_value

Specifies the percentage of initial configured committed-data-rate value. This is an integer value of 0 through 100.

Usage Guidelines

The following command steps down the committed data rate by 30% of initial configured committed-data-rate value.

```
step-down committed-data-rate 30
```

step-up

This command allows you to step up the initial configured value of committed data rate.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

[no] step-up committed-data-rate *<negotiated_value>*

no

If previously configured, deletes the specified configuration.

step-up

Steps up the value of committed data rate.

committed-data-rate

Defines the committed data rate.

negotiated_value

Specifies the percentage of initial configured committed-data-rate value. This is an integer value of 0 through 100.

Usage Guidelines

The following command steps up the committed data rate by 20% of initial configured committed-data-rate value.

```
step-up committed-data-rate 20
```

tcp-acceleration

This command enables the TCP Acceleration feature for a trigger action.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

tcp-acceleration { profile *profile_name* **flow-length threshold** *threshold_value*
no tcp-acceleration flow-length threshold

no

Disables flow recovery for a trigger-action.

profile

Identifies the TCP acceleration profile. The *profile_name* is a string ranging from 1 to 63 characters

flow-length

Specifies the flow length action for a TCP flow.

threshold *threshold_value*

Specifies the threshold value of the flow length in bytes, for a TCP flow. The threshold value is an integer ranging from 1 to 10000 bytes.

Usage Guidelines

Use this command to enable TCP Acceleration for a trigger action.

The flow length threshold of a TCP flow is configured using Trigger Action under the service-scheme framework. The threshold value of the flow length is used to engage the TCP Acceleration module dynamically.

throttle-suppress

This command allows you to enable throttle suppression based on trigger condition matched.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* **> trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

`[ no ] throttle-suppress`

no

Disables the Location based QoS Override feature for the subscriber.

throttle-suppress

This keyword allows the operators to suppress the throttling when the subscriber is in a particular LAC or TAC location.

Usage Guidelines

Use this command to perform throttle suppression to provide unlimited bandwidth based on the subscriber location. This CLI command is introduced to support Location based QoS Override feature.

To enable this feature for the subscriber, both local-policy and service-scheme framework must be configured. For redundancy support, the corresponding ICSR configuration must also be present.

The service-scheme framework helps in overriding feature behavior specific to a subscriber or a set of subscribers. The user can update the policies specific to subscribers based on pre-configured events. For more information on the service-scheme framework, see the *ECS Administration Guide*.

Important This feature requires the license to configure local-policy. For more information on the licensing requirements, contact Cisco account representative.

The previous implementation limits the subscriber bandwidth based on QoS provided by PCRF in order to comply with 3GPP standards. In release 20.2 and beyond, subscriber is provided with unlimited bandwidth by allowing QoS override based on LAC and/or TAC (individual or range) configured in a local-policy (LP) rule on the gateway. If the subscriber is in the LAC or TAC region and hits the LP rule, the gateway ignores the QoS limits imposed by PCRF and allows the subscriber to have unlimited bandwidth.

For more information on this feature, see the *ECS Administration Guide*.

Example

The following command enables throttle suppression for the subscriber:

```
throttle-suppress
```

transactional-rule-matching

This command allows you to delay engagement of TRM till the specified HTTP response method(s) for the flow received.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Action Configuration

active-charging service *service_name* > **trigger-action** *trigger_action_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-action)#
```

Syntax Description

```
[ no ] transactional-rule-matching response http { all | connect | delete
 | get | head | options | post | put | trace }
```

no

Disables the response-based TRM feature for the subscriber.

all | connect | delete | get | head | options | post | put | trace

Specifies the HTTP methods applicable to delay engagement of TRM for a flow.

The Response-based TRM feature supports pipelined HTTP requests (both concatenated and non-concatenated). For HTTP requests of different HTTP methods, this feature is applied only to those HTTP methods for which it is configured.

- **all**: Applies to all HTTP methods
- **connect**: HTTP Connect method
- **delete**: HTTP Delete method
- **get**: HTTP Get method
- **head**: HTTP Head method

- **options**: HTTP Options method
- **post**: HTTP Post method
- **put**: HTTP Put method
- **trace**: HTTP Trace method

Usage Guidelines

Use this command to delay engagement of TRM till the HTTP response for the configured HTTP request method(s). This CLI command is introduced in support of the Response-based TRM feature. This feature is applicable to all HTTP transactions of a method type for the subscriber, when an HTTP method is configured.

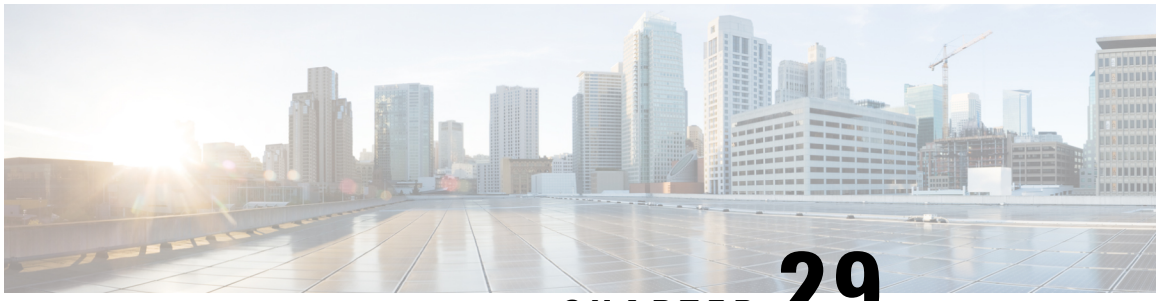
Important Response-based TRM is supported only for the HTTP protocol.

The Service Scheme configuration is required to configure and enable this feature for a subscriber. For more information on the Response-based charging feature, see the *ECS Administration Guide*.

Example

The following command is configured to delay engagement of TRM till HTTP Connect response:

```
transactional-rule-matching response http connect
```



CHAPTER 29

ACS Trigger Condition Configuration Mode Commands

The ACS Trigger Condition Configuration Mode is used to configure Active Charging Service (ACS) trigger conditions.

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* > **trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- any-match, on page 999
- content-type, on page 1000
- committed-data-rate, on page 1001
- delay, on page 1002
- end, on page 1003
- exit, on page 1004
- flow-length, on page 1004
- local-policy-rule, on page 1004
- multi-line-or, on page 1006
- rule-name, on page 1006
- tdf-app-id, on page 1007
- tethered-flow, on page 1008

any-match

This command will be applied to analyze all flows created after event activation.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

[no] any-match *operator condition*

no

If previously configured, deletes the specified configuration.

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals

condition

Specifies the condition to match.

condition must be one of the following:

- FALSE
- TRUE

Usage Guidelines

Use this command to analyze all flows created after event activation.

Example

The following command defines any-match rule to analyze all flows:

```
any-match = TRUE
```

content-type

This command specifies the content-type.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* > **trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

content-type *operator condition*

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals
- !contains: does not contain
- !ends-with: does not end with
- !starts-with: does not start with
- case-sensitive: strings are matched in case sensitive manner
- contains: contains
- ends-with: ends with
- starts-with: starts with

condition

Specifies the condition to match.

condition must be one of the following:

- FALSE
- TRUE

Usage Guidelines

Use this command to analyze all flows created after event activation.

Example

The following command defines content-type to be matched:

```
content-type = TRUE
```

committed-data-rate

This command configures the committed data rate of the current negotiated value.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

`[ no ] committed-data-rate { lower_threshold` *`<value_in_percentage>`* **`| upper_threshold`** *`<value_in_percentage>`* **`}`**

no

Disables the committed data rate of the current negotiated value.

committed-data-rate

Specifies the committed data rate of the current negotiated value.

lower_threshold

Configures threshold as a percentage of the current negotiated value.

upper_threshold

Configures threshold as a percentage of the current negotiated value.

value_in_percentage

Specifies the percentage of initial configured committed-data-rate value. This is an integer value of 0 through 100.

Usage Guidelines

Use the **committed-data-rate** command to configure the upper-threshold or lower-threshold of the committed data rate of the current negotiated value.

For more information on this feature, see the *ECS Administration Guide*.

Example

The following command defines the upper-threshold of committed-data-rate value:

```
committed-data-rate upper-threshold 80
```

delay

This command allows you to specify the delay for the configured time in seconds.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* > **trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

delay = *delay_time*
no delay

no

Use the **no delay** command to checkpoint all eligible rules immediately without any delay.

delay_time

Specifies the delay time in seconds and must be an integer from 1 through 600.

Default: 0 (immediate checkpointing)

Usage Guidelines

Use this command to specify the delay after which the flows can be checkpointed. This CLI command is introduced in support of the Flow Recovery feature. If the "delay" CLI command is not configured under trigger-condition, any flow for the rule will be checkpointed immediately on flow creation.

When configured in conjunction with the flow-recovery trigger, the flows for the rule(s) will be checkpointed as per session level and call level limit after the delay timer is expired.

Important Flow Recovery is a licensed Cisco feature requiring a separate feature license. Contact your Cisco account representative for more information.

For more information on this feature, see the *ECS Administration Guide*.

Example

The following command specifies a delay of **40** seconds after which the flows can be checkpointed:

```
delay = 40
```

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

flow-length

This command specifies the flow length condition for a TCP flow.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

```
flow-length threshold exceed
no delay
```

no

Disables flow recovery for a trigger-action.

threshold

Specifies the threshold value configured in the trigger-action configuration.

exceed

Invokes the exceed condition when the flow length is exceeded.

Usage Guidelines Use this command to specify the trigger condition **exceed** for a given threshold value.

local-policy-rule

This command allows you to specify the local-policy rule within ECS for enabling trigger condition.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

`[ no ] local-policy-rule =` *`local_policy_rule`*

no

If previously configured, deletes the specified configuration.

local-policy-rule

This keyword allows operators to suppress the throttling when the subscriber is in a particular LAC or TAC location and hits the specified local-policy rule. The local-policy-rule contains either a list, range, or index of LAC and/or TAC entries.

local_policy_rule

Specifies the local-policy rule name. *local_policy_rule* must be an existing local-policy rule within the service scheme expressed as an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the local-policy rule within ECS for enabling trigger condition. This CLI command is introduced in support of the Location based QoS Override feature.

To enable this feature for the subscriber, both local-policy and service-scheme framework must be configured. For redundancy support, the corresponding ICSR configuration must also be present.

The service-scheme framework helps in overriding feature behavior specific to a subscriber or a set of subscribers. The user can update the policies specific to subscribers based on pre-configured events. For more information on the service-scheme framework, see the *ECS Administration Guide*.

Important This feature requires the license to configure local-policy. For more information on the licensing requirements, contact Cisco account representative.

Local-policy provides ECS, the list of rules to activate and the list of rules to delete. In case, the rule to be activated is already installed, ECS ignores this rule. Similarly if the rule to be deleted was not installed, ECS ignores this rule as well. The trigger action will be applied only to a subset of traffic that matches the criteria defined under trigger condition.

For more information on this feature, see the *ECS Administration Guide*.

Example

The following command defines the local-policy rule as zone1.

```
local-policy-rule = zone1
```

multi-line-or

This command allows to check if the OR operator must be applied to all lines in a trigger-condition.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

[no] multi-line-or all-lines

no

If previously configured, deletes the specified configuration.

Usage Guidelines

Use this command to check if the OR operator must be applied to all lines in a trigger-condition.

rule-name

This command allows you to define a particular rule/GoR for flow checkpoint.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description

[no] rule-name *operator rule_name*

no

Use the **no rule-name** command to remove the particular rule from the list of eligible rules for flow checkpoint. For wildcard-based rule definition, this command must contain the rule name in the same format.

operator

Specifies how to match.

operator must be one of the following:

- =: Equals
- !=: Not Equals
- contains: Contains
- ends-with: Ends with
- starts-with: Starts with

These operators cannot be used with dynamic rule names. For dynamic rules, the entire rule name must be mentioned with the "=" operator.

rule_name

Specifies the rule name and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to define the a particular rule/GoR for flow checkpoint. This CLI command is introduced in support of the Flow Recovery feature. To have more rules eligible for flow checkpoint, a user can configure multiple trigger condition(s) associated with the same trigger-action. In any defined trigger-condition, a user can configure upto a maximum of 15 entries.

When configured in conjunction with flow-recovery trigger, the flows for the rule(s) will be checkpointed as per session level and call level limit after the delay timer is expired.

Important Flow Recovery is a licensed Cisco feature requiring a separate feature license. Contact your Cisco account representative for more information.

For more information on this feature, see the *ECS Administration Guide*.

Example

The following command defines a rule to match the **rule01** rule name for flow checkpoint:

```
rule-name = rule01
```

tdf-app-id

This command specifies the content-type.

Product

ACS

Privilege

Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-acs-trig-condn)#
```

Syntax Description **tdf-app-id***operator condition*

operator

Specifies how to match.

operator must be one of the following:

- !=: Does not equal
- =: Equals
- !contains: does not contain
- !ends-with: does not end with
- !starts-with: does not start with
- case-sensitive: strings are matched in case sensitive manner
- contains: contains
- ends-with: ends with
- starts-with: starts with

condition

Specifies the condition to match.

condition must be one of the following:

- FALSE
- TRUE

Usage Guidelines Use this command to analyze all flows created after event activation.

Example

The following command defines tdf-app-id value to be matched:

```
tdf-app-id = TRUE
```

tethered-flow

This command configures the tethered traffic flow.

Product ACS

P-GW

Privilege Security Administrator, Administrator

Command Modes

Exec > ACS Configuration > ACS Trigger Condition Configuration

active-charging service *service_name* **> trigger-condition** *trigger_condn_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-acs-trig-condn)#`

Syntax Description

`[ no ] tethered-flow`

no

Disables the tethered traffic flow.

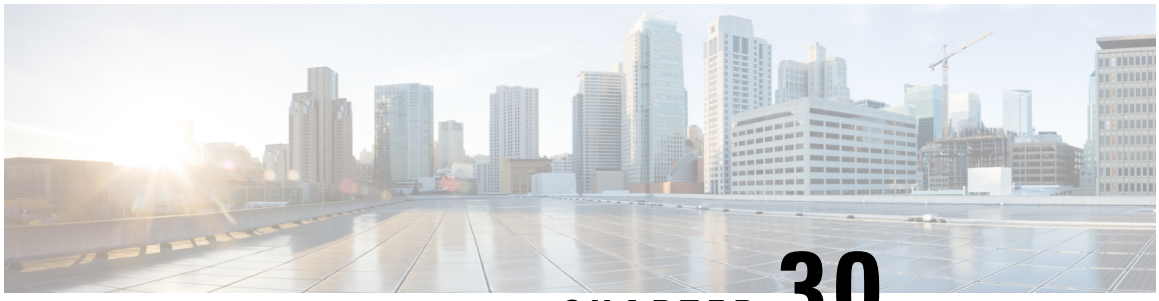
tethered-flow

Specifies the tethered traffic.

Usage Guidelines

Use this command to configure the tethered traffic.

For more information on this feature, see the *P-GW Administration Guide*.



CHAPTER 30

ACS x-Header Format Configuration Mode Commands

The ACS x-header Format Configuration Mode is used to create and configure extension-header (x-header) formats.

Important This feature is license dependent. Please contact your Cisco sales representative for more information.

Command Modes

Exec > ACS Configuration > ACS xheader Format Configuration

active-charging service *service_name* **> xheader-format** *format_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acs-xheader)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1011
- exit, on page 1012
- insert, on page 1012

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

insert

This command allows you to configure the x-header fields to be inserted in HTTP/WSP GET and POST request packets.

Important This command is license dependent. Please contact your Cisco accounts representative for more information.

Product ACS

Privilege Security Administrator, Administrator

Command Modes Exec > ACS Configuration > ACS xheader Format Configuration

active-charging service *service_name* **> xheader-format** *format_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-acs-xheader)#
```

Syntax Description In StarOS 8.1, StarOS 9.0, and later releases:

```
insert xheader_field_name { string-constant xheader_field_value | variable {
bearer { 3gpp { apn | charging-characteristics | charging-id | imei |
imsi | qos | rat-type | s-mcc-mnc | sgsn-address } | acr | congestion-level
 | customer-id  | dest-server-ip-address-port  | ggsn-address | mdn  |
msisdn-no-cc  radius-string  | radius-calling-station-id  | session-id
 | sn-rulebase | subscriber-ip-address | time-of-day | uidh-value [
delete-existing ] | username } [ encrypt ] gx hash-value [ delete-existing
 | encrypt [ delete-existing ] ]| http { host | url } } [ delete-existing
 ] }
no insert xheader_field_name
```

In StarOS 8.0:

```
insert xheader_field_name { string-constant xheader_field_value | variable {
bearer { 3gpp charging-id | ggsn-address | imsi | radius-string |
radius-calling-station-id | sgsn-address | sn-rulebase |
```

subscriber-ip-address } | http { host | url } }
no insert *xheader_field_name*

no

If previously configured, removes the specified x-header field configuration.

xheader_field_name

Specifies the x-header field name to be inserted in the packets.

xheader_field_name must be an alphanumeric string of 1 through 31 characters.

Up to ten fields can be inserted in each x-header format.

string-constant *xheader_field_value*

Specifies constant a string value for x-header field to be inserted in the packets.

xheader_field_value must be the x-header field value, and must be an alphanumeric string of 1 through 63 characters.

variable

Specifies name of the x-header field whose value must be inserted in the packets.

bearer { 3gpp { apn | charging-characteristics | charging-id | imei | imsi | qos | rat-type | s-mcc-mnc | sgsn-address } | acr | congestion-level | customer-id | dest-server-ip-address-port | ggsn-address | mdn | msisdn-no-cc | radius-string | radius-calling-station-id | session-id | sn-rulebase | subscriber-ip-address | time-of-day | username } [encrypt]

bearer { 3gpp { apn | charging-characteristics | charging-id | imei | imsi | qos | rat-type | s-mcc-mnc | sgsn-address } | acr | congestion-level | customer-id | dest-server-ip-address-port | ggsn-address | mdn | msisdn-no-cc | radius-string | radius-calling-station-id | session-id | sn-rulebase | subscriber-ip-address | uidh-value [delete-existing]| time-of-day | username } [encrypt]

Specifies value of x-header field to be inserted:

- **3gpp**: 3GPP service.
  - **apn**: APN of the bearer flow. This field is deprecated from under **bearer apn** and has been added within **bearer 3gpp apn**.The APN added via **bearer 3gpp apn**
  - **charging-characteristics**: Charging characteristics of the bearer flow.
  - **charging-id**: Charging ID of the bearer flow.
  - **imei**: IMEI or IMEISV (depending on the case) associated with the bearer flow.
  - **imsi**: Specific Mobile Station Identification number.
  - **qos**: EPC QoS associated with the bearer flow.

    The inserted x-header is seen as:

    x-bearer-qos: 020400000100000002000000010000000200\r\n
  - **rat-type**: This field is deprecated from under **bearer rat-type** and has been added within **bearer 3gpp rat-type**.The RAT type as added via **bearer 3gpp rat-type**.

- **s-mcc-mnc**: 3GPP serving node MCC + MNC associated with the bearer.

  The inserted x-header is seen as: x-s-mcc-mnc: 123765\r\n

- **sgsn-address**: SGSN associated with the bearer flow.

- **acr**: Anonymous Customer Reference. Only MSISDN part of this is encrypted, if encrypt flag is set.
- **congestion-level**: Cell level congestion currently experienced by the subscriber.
- **customer-id**: Customer ID of the bearer.
- **dest-server-ip-address-port**: The IPv4 or IPv6 address of the Origin Server, and the TCP port of the HTTP request to the Origin Server.
- **ggsn-address**: GGSN IP address field.
- **imsi**: This field is deprecated from within **bearer imsi** and has been moved within **bearer 3gpp imsi**. The IMSI as added via **bearer 3gpp imsi**.
- **mdn**: MDN of the bearer flow.
- **msisdn-no-cc**: MSISDN of the mobile handling the flow without the country code.
- **radius-string**: SN-Transparent-Data Attribute received in RADIUS ACCESS ACCEPT message.
- **radius-calling-station-id**: Calling Station ID of the mobile handling the flow. Use this for MSISDN of the mobile handling the flow with the country code.
- **session-id**: Accounting session ID of the bearer flow.
- **sn-rulebase**: Name of the ACS rulebase.
- **sgsn-address**: This field is deprecated from under **bearer sgsn-address** and has been moved within **bearer 3gpp sgsn-address**.The SGSN address as added via **bearer 3gpp sgsn-address**.
- **subscriber-ip-address**: Subscriber IP address.
- **uidh-value [delete-existing]**: Specifies the UIDH hash value received from the UIDH server. **delete-existing** enables detection of spoofing in X-header file.
- **time-of-day**: The current date, time, and time zone offset of the subscriber.
- **username**: User name of the bearer flow.

encrypt: Specifies encryption of x-header field configuration. This option must only be configured when x-header encryption is enabled.

gx hash-value

Receives hash value strings over the Gx interface. The **hash-value** command specifies the hashed value string received in the Hash-Value AVP.

http { host | url }

Specifies value of the x-header field to be inserted:

- **host**: Host

- **url**: Uniform Resource Locator

delete-existing

Specifies enabling detection of spoofing in x-header fields. The x-header field configured with this keyword will be removed from the HTTP header if it already exists, and only the gateway inserted field will remain. By default, anti spoofing is disabled, and if required, should be enabled at a field level.

Usage Guidelines

Use this command to configure the x-header fields to be inserted in HTTP/WSP GET and POST request packets. The x-headers would be inserted at the end of the HTTP/WSP header. This CLI command may be used up to 10 times. There is no control over the order of the fields that are to be inserted. Any of the indicated ruledef variables may be inserted using the variable option, or a static string may be inserted using the string-constant option.

Operators may insert x-headers in some HTTP/WSP packets, for which some rules will be configured. The charging-action associated with these rules will contain the list of x-headers to be inserted in the packets.

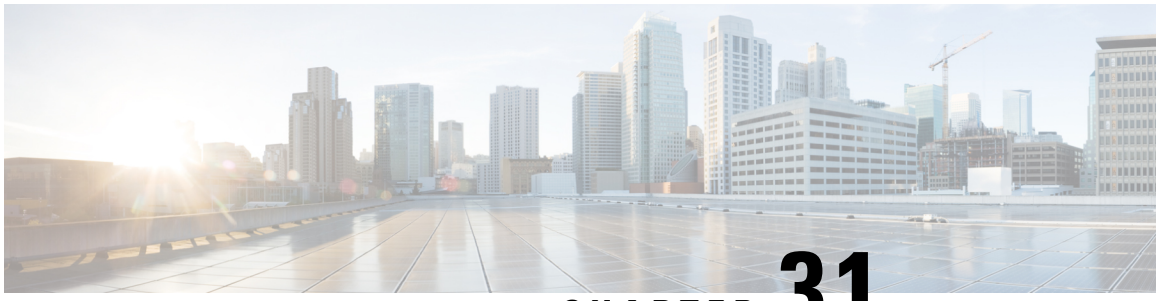
Example

The following command configures an x-header field named *test12* with a constant string value of *testing* to be inserted in HTTP/WSP GET and POST request packets:

```
insert test12 string-constant testing
```

The following command receives hash value strings over the Gx interface for a x-header field named *TEST*:

```
insert TEST variable gx hash-value
```



CHAPTER 31

ALCAP Configuration Mode Commands

Important In Release 20 and later, HNBGW is not supported. Commands in this configuration mode must not be used in Release 20 and later. For more information, contact your Cisco account representative.

The ALCAP Service Configuration Mode is used to create, provide, and manage the Access Link Control Application Part (ALCAP) on HNB-GW to support IuCS-over-ATM connectivity to HNB subscriber in a 3G UMTS networks towards CS core network.

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-alcap-service-service_name)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- aal2-node, on page 1017
- aal2-route, on page 1019
- associate, on page 1020
- end, on page 1021
- exit, on page 1021
- maximum reset-retransmission, on page 1021
- self-point-code, on page 1022
- timeout alcap, on page 1023
- timeout stc, on page 1025

aal2-node

This command creates/configures AAL2 node configuration to defined AAL2 node properties for IuCS-over-ATM function.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-alcap-service-service_name)#`

Syntax Description

aal2-node *aal2_node_name* [**-noconfirm**]
no aal2-node *aal2_ndoe_name*

no

Removes the configured AAL2 node from ALCAP service configuration.

aal2_node_name

Identifies the name of the AAL2 node name to configure the AAL2 node parameters.

The *aal2_node_name* must be an alphanumerical string from 1 through 63 characters.

Usage Guidelines

Use this command to create/configure the AAL2 node configuration and switch to AAL2 Node Configuration mode.

Entering this command results in the following prompt:

[*context_name*]*hostname*(config-aal2-node-*aal2_node_name*)#

A maximum of *TBD* AAL2 node can be configured in one ALCAP service.

Important The AAL2 Node configured here will be used to bind with ATM port in PVC Configuration sub-mode of ATM Configuration mode for IuCS-over-ATM functionality.

Important For more information on AAL2 node configuration, refer *AAL2 Node Configuration Mode Commands*.

Example

Following command creates AAL2 node configuration mode named *aal2_1* within the specific ALCAP service for IuCS-over-ATM support towards CS core networks and switch the user to AAL2 Node Configuration Mode named *aal2_1*:

aal2-node *aal2_node_name* **-noconfirm**

aal2-route

This command defines a route for each ATM Endpoint Service Address (AESA) with which it can have transport layer communication. This route actually maps an AESA to one or more AAL2 paths which will be used to setup an end to end communication path.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-alcap-service-service_name)#
```

Syntax Description

aal2-route end-point {*AESA_address* | **default**} **aal2-node** *aal2_node_name*
no aal2-route end-point {*AESA_address* | **default**} [**aal2-node** *aal2_node_name*]

no

Removes defined AAL2 route from ALCAP service configuration.

end-point [*AESA_address* | default]

Specifies the AESA address in an ATM (or AAL2) network to map with adjacent AAL2 node. The AESA is based on the generic network service access point (NSAP) format. The ATM connection from HNB-GW terminates at this point.

The *AESA_address* must be an alpha/numeric string from 1 through 63 characters.

The **default** keyword is used to configure a default AAL2 route which will match any AESA received from MSC and for which AESA specific route is not configured. When a connection is established an AESA specific route will have higher priority than **default** route.

aal2-node *aal2_node_name*

Identifies the name of the AAL2 node name to configure in AAL2 route.

The *aal2_node_name* must be an alphanumerical string from 1 through 63 characters.

Usage Guidelines

Use this command to create a mapping between ATM endpoint and adjacent node for AAL2 connection routing purposes.

It defines a route for each ATM Endpoint Service Address (AESA) with which it can have transport layer communication. This route actually maps an AESA to one or more AAL2 paths which will be used to setup an end to end communication path.

The **default** keyword can be used to configure a default **aal2-route** which will match any AESA received from MSC and for which AESA specific route is not configured. When a connection is established an AESA specific route will have higher priority than default route.

Important The default route shall not be used when AESA specific route exists.

If an HNB-GW configured with a route for *MGW1* which consists of *AAL2_path_A* and *AAL2_path_B* for **AAL2 switch-A** and **AAL2 switch-B** switch respectively then similarly **AAL2 switch-A** and **AAL2 switch-B** need to be configured with routes for *MGW1*.

A maximum of *TBD* AAL2 routes can be configured in one ALCAP service.

Example

Following command create a mapping between ATM endpoint *MGW1* and AAL2 node *aal2_1* for AAL2 connection routing purposes:

aal2-route end-point *MGW1* **aal2-node** *aal2_1*

associate

This command associates a previously configured SS7 routing domain with this ALCAP service on HNB-GW node which will be used to define the SS7 routing domain in 3G UMTS networks.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-alcap-service-service_name)#`

Syntax Description

associate ss7-routing-domain *ss7_rd_id*
no associate ss7-routing-domain

no

Removes the associated SS7 routing domain ID from this ALCAP service configuration.

ss7_rd_id

Identifies the SS7 routing domain index configured in Global configuration mode to associate with ALCAP service for IuCS-over-ATM support.

The *ss7_rd_id* must be an integer from 1 through 12.

Important For SS7 routing domain configuration, refer *SS7 Routing Domain Configuration Commands Mode* chapter.

Usage Guidelines Use this command to associate a pre-configured SS7 routing domain index to provide IuCS-over-ATM support towards CS core network for HNB subscriber.

A maximum of *TBD* SS7 routing domains can be configured in one ALCAP service.

Example

Following command associates a predefined SS7 routing domain id *3* with ALCAP service to define routing domain for IuCS-over-ATM supprot towards CS core networks:

```
associate ss7-routing-domain 3
```

end

Exits the current mode and returns to the Exec Mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Change the mode back to the Exec mode.

exit

Exits the current mode and returns to the previous mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Return to the previous mode.

maximum reset-retransmission

This command sets the maximum number of retries allowed for transmission of RESET message to reset the AAL2 path.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-alcap-service-service_name)#
```

Syntax Description

```
maximum reset-retransmissions retries
default maximum reset-retransmissions
```

default

Sets the number of RESET message retries to default value of 1.

retires

Sets the maximum number of retries allowed for transmission of RESET message to reset the AAL2 path by ALCAP service.

retries must be an integer value from 0 through 4. When 0 is used retransmission will be disabled.

Default: 1

Usage Guidelines

Use this command to sets the maximum number of retries allowed for transmission of RESET message by ALCAP service to reset the AAL2 path when **Timer_RES** expires. Once the maximum number of RESET retries have been performed the ALCAP service shall stop the RESET procedure for the affected path and path will become available for connections.

Example

The following command configures ALCAP service to send maximum number of *2* RESET messages after expiry of RESET timer for AAL2 path RESET procedure:

```
maximum reset-retransmissions 2
```

self-point-code

This command specifies the SS7 point code address for ALCAP service.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > **context** *context_name* > **alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-alcap-service-service_name)#
```

Syntax Description

```
self-point-code point_code
no self-point-code
```

no

Deletes the configured self point code for this ALCAP service.

point_code

Defines the point code to assign to this ALCAP service.

point_code: value entered must adhere to the point code variant selected when the ALCAP service instance was defined:

- ITU Range 0.0.1 to 7.255.7
- ANSI Range 0.0.1 to 255.255.255
- TTC Range 0.0.1 to 15.31.255
- a string of 1 to 11 combined digits and period.

Usage Guidelines

Use this command to assign the self point code to use for this ALCAP service.

Example

The following command sets an ITU-based point code for this ALCAP service:

```
self-pointcode 4.121.5
```

The following command removes the configured self-point code:

```
no self-pointcode
```

timeout alcap

This command configures the timeout duration for various ALCAP procedure timers in ALCAP service.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > context *context_name* **> alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-alcap-service-service_name)#
```

Syntax Description

```
timeout alcap {blo blo_timer_value | erq erq_timer_value | mod mod_timer_value | rel
 rel_timer_value | res res_timer_value | ubl ubl_timer_value}
default timeout alcap {blo | erq | mod | rel | res | ubl}
```

default

Sets the timer values to default duration for specific ALCAP procedure in an ALCAP service.

blo *blo_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Path Block procedure. When a request to block a particular AAL2 path is

recieved by ALCAP service, the ALCAP service sends ALCAP-BLOCK-REQEST message to AAL2 node/peer ALCAP Manage and starts **Timer_BLO** timer. The timer waits for specified timeout duration *blo_timer_value* for ALCAP-BLOCK-CONFRIM message before reporting error in procedure.

If AAL2 Node responds with ALCAP-BLOCK-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

blo_timer_value must be an integer value from 2 through 60.

Default: 5

erq *erq_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Establish Request procedure. When a request to esblish a connection through ALCAP-ESTABLISH-REQUEST message is sent to AAL2 node the system starts the **Timer_ERQ** timer. The timer waits for specified timeout duration *erq_timer_value* for ALCAP-ESTABLISH-CONFRIM message before reporting error in procedure and system requests ALCAP Manager to free the AAL2-channel used for connection and also indicates to start the RESET procedure for this channel.

If AAL2 Node responds with ALCAP-ESTABLISH-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

erq_timer_value must be an integer value from 5 through 30.

Default: 5

mod *mod_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Modify Request procedure. When a request to modify a connection or channel through ALCAP-MODIFY-REQUEST message is sent to AAL2 node the system starts the **Timer_MOD** timer. The timer waits for specified timeout duration *mod_timer_value* for ALCAP-MODIFY-CONFRIM message before reporting error in procedure and system requests ALCAP Manager to initiates the RESET or any other appropriate procedure for this channel and HNB-GW shall release the RUA connection towards HNB and SCCP connection towards CN.

If AAL2 Node responds with ALCAP-MODIFY-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

mod_timer_value must be an integer value from 5 through 30.

Default: 5

rel *rel_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Release Request procedure. When a request to release a connection or channel through ALCAP-RELEASE-REQUEST message is sent to AAL2 node the system starts the **Timer_REL** timer and sends RAB-ASST-REQ to HNB. The timer waits for specified timeout duration *rel_timer_value* for ALCAP-RELEASE-CONFRIM message before reporting error in procedure and system requests ALCAP Manager to release the AAL2 channel. System also indicates to start RESET procedure for this channel.

If AAL2 Node responds with ALCAP-RELEASE-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

rel_timer_value must be an integer value from 2 through 60.

Default: 2

res *res_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Reset Request procedure. When a request to reset a connection or channel through ALCAP-RESET-REQUEST message is sent to AAL2 node the system starts the **Timer_RES** timer. The timer waits for specified timeout duration *res_timer_value* for ALCAP-RESET-CONFRIM message before retrying the RESET procedure. The system will retry the RESET procedure for configured number of times and on completion of retry limit the stops the RESET procedure for the affected path and path will become available for connections.

If AAL2 Node responds with ALCAP-RESET-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

res_timer_value must be an integer value from 2 through 60.

Default: 2

ubl *ubl_timer_value*

Specifies the maximum time, in seconds, the system waits for response from adjacent AAL2 node before reporting the failure of AAL2 Path UnBlock procedure. When a request to unblock a particular AAL2 path is recieved by ALCAP service, the ALCAP service sends ALCAP-UNBLOCK-REQEST message to AAL2 node/peer ALCAP Manager and start **Timer_BLO** timer. The timer waits for specified timeout duration *ubl_timer_value* for ALCAP-UNBLOCK-CONFRIM message before reporting error in procedure.

If AAL2 node/peer ALCAP Manager responds with ALCAP-BLOCK-CONFRIM message the timer will stop before the expiry of timeout duration and system reports the successful completion of the procedure.

ubl_timer_value must be an integer value from 2 through 60.

Default: 2

Usage Guidelines

Use this command to configure the timeout duration for various ALCAP procedures in ALCAP service.

Example

The following command sets the timeout duration of 10 seconds for ALCAP-MODIFY-REQUEST procedure:

```
timeout alcap mod 10
```

timeout stc

This command configures the timeout duration for STC long (T30) and STC short (T29) timers used in congestion indication procedure at Signaling Transport Converter (STC) layer in ALCAP service.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > ALCAP Service Configuration

configure > **context** *context_name* > **alcap-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-alcap-service-service_name)#
```

Syntax Description

```
timeout stc {long long_timer_value | short short_timer_value}
default timeout stc {long | short}
```

default

Sets the timer values to default duration for specific STC procedure in an ALCAP service.

long *long_timer_value*

Specifies the duration in milliseconds for STC long timer. This timer is used by the congestion indication procedure. Receipt of a repeated congestion indication from MTP3B before the expiry of this timer is interpreted as the congestion situation. On the other hand, if no congestion indication is received from MTP3B before expiry of this timer, the congestion situation is considered to have improved.

long_timer_value must be an integer value from 5000 through 10000.

Default: 5000

short *short_timer_value*

Specifies the duration in milliseconds for STC short timer. This timer is used by the congestion indication procedure. The role of this timer is to avoid overreacting if multiple congestion indications are received from MTP3B in quick succession.

short_timer_value must be an integer value from 300 through 600.

Default: 300

Usage Guidelines

Use this command to configure the long (T30) and short (T29) timer for congestion indication procedure in ALCAP service.

When the first congestion indication is received by, the traffic load into the affected destination point code is reduced and the same time two timers STC short timer (T29) and STC long timer (T30) are started. During STC short timer, all received congestion indications for the same destination point code are ignored in order not to reduce traffic too rapidly. Reception of a congestion indication after the expiry of STC short timer, but still during STC long timer, will decrease the traffic load by one more step and restart both the timers again.

If STC long timer expires (i.e. no congestion indications having been received during the STC long timer period), traffic will be increased by one step and STC long timer will be restarted unless full traffic load has been resumed.

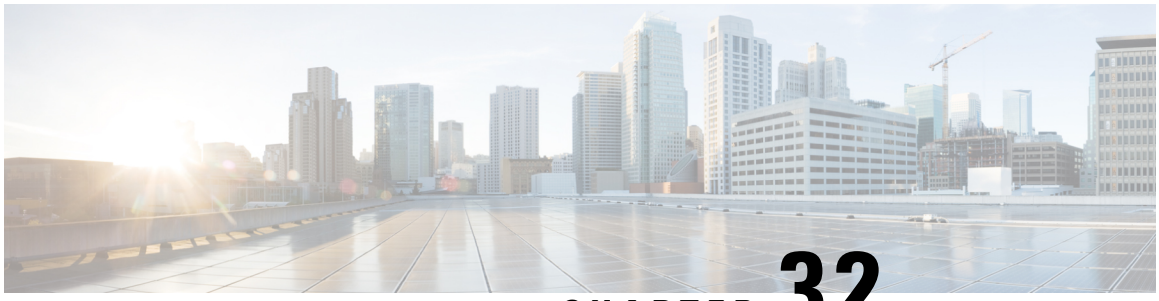
Example

The following command sets the timeout duration of 5000 milliseconds for STC long timer:

```
default timeout stc long
```

The following command sets the timeout duration of 300 milliseconds for STC short timer:

```
default timeout stc short
```



CHAPTER 32

APN Profile Configuration Mode

Essentially, an APN profile is a template that consists of a set of APN-specific commands that may be applicable to one or more APNs. When a subscriber requests an APN that has been identified in a selected operator policy, the set of commands in the associated APN profile will be applied. The same APN profile can be associated with multiple APNs and multiple operator policies.

The SGSN and the MME each support a total of 1,000 APN profile configurations per SGSN/MME; up to 50 APN profiles can be associated with a single operator policy. For additional SGSN limit information, refer to *Engineering Rules* in the *SGSN Administration Guide*.

Command Modes

The APN Profile configuration mode defines a set of parameters controlling the SGSN or MME behavior when a specific APN is received or no APN is received in a Request. An APN profile is a key element in the Operator Policy feature and an APN profile is not used or valid unless it is associated with an APN and this association is specified in an operator policy (see the *Operator Policy Configuration Mode Commands*).

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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accounting context

This command allows you to define the name of the accounting context and associate a GTPP group with this APN profile.

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

accounting context *context_name* **gtpp group** *group_name*
remove accounting context

remove

Removes the accounting configuration from this profile's configuration.

context_name

Specifies the accounting context. *context_name* must be an alphanumeric string of 1 through 79 characters.

gttp group *group_name*

Identifies the GTPP group, where the GTPP related parameters have been configured in the GTPP Group Configuration mode, to associate with this SaMOG APN profile.

group_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to associate a predefined GTPP server group, including all its associated configuration, with a specific SaMOG APN profile. Even if an accounting context is also specified in a call control profile, the priority is given to the accounting context of the APN profile.

Example

The following command identifies an accounting context called *account1* and associates a GTPP server group named *roaming* with defined charging gateway accounting functionality:

```
accounting context account1 gttp group roaming
```

accounting mode

This command allows you to define the mode of accounting to be performed for this SaMOG APN profile.

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

`accounting mode { gtpp | none }`
`{ default | remove } accounting mode`

default

Resets the accounting mode to GTPP.

remove

Removes the accounting mode from this profile's configuration.

gtpp

Specifies that GTPP accounting is performed. This is the default method.

none

Specifies that no accounting will be performed for the APN profile.

Usage Guidelines

Use this command to specify the accounting mode for an SaMOG APN profile to generate bearer-based SaMOG CDRs. Even if an accounting mode is also specified in a call control profile, the priority is given to the accounting mode of the APN profile.

Example

The following command specifies that no accounting will be used for the APN profile:

`accounting mode none`

active-charging rulebase

Configure the name of the rulebase that contains the charging action for the HTTP redirection and the URL for the portal for SaMOG web authorization, and/or the rulebase that contains the NAT policy for the SaMOG Local Breakout feature.

Product SaMOG

Privilege Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

active-charging rulebase *rulebase_name*
no active-charging rulebase

no

If previously configured, removes the ACS rulebase to be used.

rulebase *rulebase_name*

Specifies the active charging rulebase to be used.

rulebase_name must be the name of an ACS rulebase, and must be an alphanumeric string of 1 through 63 characters, and can contain punctuation characters.

Usage Guidelines Use this command to configure the name of the rulebase that contains the charging action for the HTTP redirection and the URL for the authentication portal to facilitate HTTP redirection to the authorization portal during the pre-authentication phase, and/or the rulebase that contains the NAT policy for the SaMOG Local Breakout feature. The ACS rulebase specified in this configuration will be used only if the AAA server does not specify the ACS rulebase during the pre-authentication phase.

Important This command is license dependent. Contact your Cisco account representative for more information on SaMOG feature license requirements.

Example

The following command configures the rulebase *webauthredir*:

active-charging rulebase webauthredir

address-resolution-mode

Identifies the address resolution mode for this APN profile.

Product

Important From release 16.2 onwards, the S4-SGSN also supports this command.

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

address-resolution-mode { fallback-for-dns | local }
default address-resolution-mode

default

Resets the configuration to the default value, that is, **fallback-for-dns**.

fallback-for-dns

Instructs the system to try DNS resolution. If the DNS query fails, the SGSN will use locally configured addresses, if they have been configured. The pgw-address configured under apn-profile will be treated as fallback for dns address and will used only after dns failure.

Default: enabled

Important This address will be used on DNS SNAPTR Failure except on Service parameter mismatch.

If pgw-address-resolution-mode fallback-for-dns is not configured then the gateway-address will be treated as fallback for DNS address and UE will fallback to Gn-SGSN, if GPRS-Subscription is available.

local

Instructs the system to only use locally configured addresses and not to use DNS query.

Default: disabled

Usage Guidelines

Use this command to specify the DNS query or local address resolution for this APN profile.

Example

The following command sets the address resolution mode to use local addresses *only if* the DNS query fails:

address-resolution-mode fallback-for-dns

apn-resolve-dns-query

Command enables the SGSN to send Straightforward Name Authority Pointer (SNAPTR) type DNS query for APN resolution on a per APN basis.

Product SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

```
apn-resolve-dns-query snaptr [ epc-ue | non-epc-ue ]
remove apn-resolve-dns-query snaptr
```

remove

Removes the DNS SNAPTR function from the configuration.

epd-ue

Configures the S-NAPTR queries to be applicable for EPC-capable UE.

non-epc-ue

Configures the S-NAPTR queries to be applicable for non-EPC-capable UE.

Usage Guidelines SNAPTR filters based on the EPC-capability of the user equipment (UE). Use this command to enable SNAPTR type DNS query for APN resolution for 3G subscribers with EPC subscription. Configuration in this mode promotes control of this feature per APN.

If neither of the keywords is included with the configuration, then S-NAPTR query is applicable to all UE, both EPC-capable UE and non-EPC capable UE.

By default, this functionality is not enabled.

Example

Enable the SGSN to select a PGW during APN resolution:

```
apn-resolve-dns-query snaptr
```

apn-restoration

Configures the APN restoration priority value.

Product MME

SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

apn-restoration priority *priority_value*
remove apn-restoration priority

remove

Removes the APN restoration priority value from the configuration.

priority *priority_value*

Configures the APN restoration priority value. The reactivation of PDNs after a P-GW restart notification is processed in the order of this priority.

priority_value

The priority value is an integer value from 1 through 16. Where "1" is the highest priority and "16" is the lowest priority. Default: 16 (lowest priority).

Usage Guidelines

The PGW Restart Notification (PRN) message is sent by the S-GW when it detects a peer P-GW has restarted. After the affected subscribers have been deactivated, the MME/S4-SGSN will prioritize the re-activation of impacted PDN connections based on subscribed APN restoration priority, if received from the HSS. If an APN restoration priority is not received from the HSS, then this locally configured value is used. If there is no local configuration then by default such PDNs will be assigned the lowest restoration priority.

The MME will only restore PDNs for which the APN restoration priority is configured and/or received from HSS. Otherwise PDNs will be released by regular deactivation.

For the MME, refer to the LTE Policy > LTE Emergency Profile > **apn** command to define a different APN restoration priority for emergency sessions for this APN profile.

Example

The following command is used to configure the APN restoration priority value of "10" for an APN profile:

apn-restoration priority *10*

apn-type

Identifies the type of APN as an IMS APN.

Product

ePDG

SGSN

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

```
apn-type { emergency | ims } [ pcscf-restoration { pco-update |
pdn-deactivate } ]
remove apn-type ims
```

remove

Erases this identification configuration from the APN profile and resets the APN profile to the default behavior which disables the APN type as IMS.

emergency

Identifies the APN as EMERGENCY APN.

ims

Identifies the APN as IMS APN. If an IMS APN is present, Modify Bearer Req/Update PDP Req will be delayed during Inbound SRNS relocation for SGSN.

pcscf-restoration { pco-update | pdn-deactivate }

pcscf-restoration: The pcscf-restoration keyword in this command identifies P-CSCF restoration for IMS PDN. This keyword is functional only if the feature license is installed.

pco-update: The pco-update keyword selects P-CSCF restoration method as PDN Modification through PCO update.

pdn-deactivate: The pdn-deactivate keyword selects P-CSCF restoration method as PDN Deactivation. This is the default method.

Important If only "apn-type ims" is configured, then the default P-CSCF restoration method **pdn-deactivate** is enabled.

Usage Guidelines

This command identifies the APN as an IMS APN. This enables the SGSN to delay sending Modify Bearer Request to the S-GW until after receiving the Forward Relocation Complete Ack from the peer during SRNS procedure.

Also, The following CLI identifies an APN as IMS APN and to configure to indicate whether the PGW supports optional extension or if the MME initiates PDN deactivation for HSS initiated P-CSCF restoration. To enable HSS-based P-CSCF Restoration, use the pcscf-restoration command under the Call Control Profile mode.

Example

Identify the APN for this profile as an IMS type APN:

```
apn-type ims
```

The following command selects pco-update as the P-CSCF Restoration method:

apn-type ims pcscf-restoration pco-update

The following command selects pdn-deactivate as the P-CSCF Restoration method:

apn-type ims pcscf-restoration pdn-deactivate

associate accounting-policy

Associates the APN with specific pre-configured policies configured in the same context for SaMOG charging.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

associate accounting-policy *policy_name*
remove associate accounting-policy

remove

Removes the association of the policy from the APN profile.

policy_name

Specified the policy name to associate to the APN profile. *policy_name* must be an existing accounting policy, and must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to associate the SaMOG APN profile with an accounting policy configured in this context to provide triggers to generate CDRs. The accounting policy configured under the APN profile takes priority over the accounting poilcy configured under the call control profile.

Example

The following command associates this SaMOG APN with an accounting policy called *acct1*:

associate accounting-policy acct1

associate ddn-apn-profile

Associates a DDN APN Profile with an APN Profile configuration.

Product

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

associate ddn-apn-profile*apn_profile_name*
remove associate ddn-apn-profile

remove

Removes the DDN APN Profile from the APN Profile.

Usage Guidelines

Use this command to associate an S-GW paging profile with an APN profile on the S-GW.

Example

This example associates a DDN APN Profile called *ddn-apn-profile1* with an APN Profile on the S-GW.

associate ddn-apn-profile ddn-apn-profile1

associate qci-qos-mapping

Provides operators with a configuration to associate a Qos Class Identifier (QCI) Qualityof Service (QoS) mapping table with a specified APN profile configuration.

Product

SGW

SAE-GW

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

[remove] associate qci-qos-mapping *mapping_table_name*

remove

Removes the specified QCI to QoS mapping table association.

associate qci-qos-mapping *mapping_table_name*

Intructs the application to associate the specified QCI QoS mapping to this APN profile.

Usage Guidelines

Associates a QCI QoS mapping table with an APN profile.

Note

- If you choose virtual-apn during call establishment, ensure that virtual-apn configuration has the association of **qci-qos-mapping** for DSCP marking.
- If you do not choose virtual-apn during call establishment, the association of **qci-qos-mapping** in APN level works as expected.
- If **qci-qos-mapping** is configured under APN or virtual APN level, its association in pgw-service is not required.

Example

This example associates a QCI QoS mapping table with the APN Profile 'QCIQOSMap'.

```
associate qci-qos-mapping QCIQOSMap
```

associate quality-of-service-profile

Associates the specified Quality of Service profile with the APN profile.

Product

MME

SGSN

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
associate quality-of-service-profile qos_profile_name access-type [ eps | gprs | umts ]
remove associate quality-of-service-profile access-type [ eps | gprs | umts ]
```

remove

Removes the association of the specified Quality of Service profile with the APN profile.

access-type

Configures the access-types to be associated with the QoS profile for this APN profile.

- **eps** identifies a 4G EPS network. (MME only)
- **gprs** identifies a 2G GPRS network.
- **umts** identifies a 3G UMTS network.

qos_profile_name

Identifies the name of the Quality of Service profile to be associated with the APN profile.

Usage Guidelines

This command identifies a specific Quality of Service profile to be associated with the APN profile.

Example

Use this command to associate a 3G (UMTS) QoS profile named *test* with the APN profile.

```
associate quality-of-service-profile test access-type umts
```

Use this command to associate a 4G QoS profile named *MMEqos1* with the APN profile.

```
associate quality-of-service-profile MMEqos1 access-type eps
```

associate sgw-paging-profile

This command allows the association of an SGW Paging Profile with an APN profile on the S-GW.

Product

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
[ remove ] associate sgw-paging-profile three-tupple
```

remove

Removes the S-GW Paging Profile from the APN Profile.

associate sgw-paging-profile three-tupple

Associates an SGW Paging Profile with an APN profile on the S-GW. S-GW Paging Profiles are configured in Global Configuration Mode with the **sgw-paging-profile three-tupple** command.

Usage Guidelines

Use this command to associate an S-GW paging profile with an APN profile on the S-GW.

Example

This example associates an S-GW paging profile with an APN profile on the S-GW.

```
associate sgw-paging-profile three-tupple
```

associate user-plane-profile

Associates the User Plane profile with the APN profile.

Important This command is available in this release only for testing purposes. For more information, contact your Cisco Account representative.

Product

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

`[ no ] associate user-plane-profile` *`user_plane_profile_id`*

no

Disassociates existing User Plane profile from the APN profile.

user_plane_profile_id

Specifies the policy name to be associated to the APN profile. The *user_plane_profile_id* must be an integer from 1 to 65535.

Usage Guidelines

This configuration is mandatory for creating CUPS enabled SAEGW Pure-S PDN.

Example

The following command associates the APN with a User Plane profile called *4*:

```
associate user-plane-profile 4
```

cc

Configures the charging characteristics (CC) for this APN profile.

Product

MME

SGSN

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

cc { local-value-for-scdrs behavior *bit_value* **profile** *index_bit* **| prefer { hlr-value-for-scdrs | local-value-for-scdrs } }**
cc behavior *bit_value* **profile** *index_bit* **action pdn-reject esm-cause-code** *cause_code_value*
remove cc behavior *bit_value* **profile** *index_bit* **action pdn-reject**
remove cc { local-value-for-scdrs | prefer }

remove

Removes the charging characteristics configuration from this APN profile.

behavior *bit_value* profile *index_bit*

The behavior and profile keywords sets the local behavior bit value and the profile index bit value for charging characteristics.

bit_value: must be a hexadecimal value between 0x0 and 0xFFF.

index_bit: must be an integer from 1 through 15.

action pdn-reject esm-cause-code *cause_code_value*

The above syntax rejects PDN connections based on a configured ESM Cause Code value. The cause code value is an integer from 0 to 255.

local-value-for-scdrs behavior *bit_value* profile *index_bit*

Sets the value of the behavior bits and profile index for the charging characteristics for S-CDRs locally, when the Home Location Register (HLR) does not provide these values.

If the HLR provides the charging characteristics with behavior bits and profile index, and the operator wants to ignore what the HLR provides, then specify the **prefer local-value-for-scdrs** keyword with this command.

bit_value: must be a hexadecimal value between 0x0 and 0xFFF.

index_bit: must be an integer from 1 through 15.

Some of the index values are predefined according to 3GPP standard:

- **1** for hot billing
- **2** for flat billing
- **4** for prepaid billing

- **8** for normal billing

Defaults: *bit_value* = 0x0; *index_bit* = 8

prefer { hlr-value-for-scdrs | local-value-for-scdrs }

Specify what charging characteristic settings the system will use for S-CDRs.

- **hlr-value-for-scdrs**: instructs the system to use charging characteristic settings received from the HLR for S-CDRs.
- **local-value-for-scdrs**: instructs the profile preference to only use locally configured/stored charging characteristic settings for S-CDRs.

Default: **hlr-value-for-scdrs**

Usage Guidelines

Use this command to specify the charging characteristic for S-CDRs -- either from the HLR or locally from the SGSN.

These charging characteristics parameters for S-CDRs and M-CDRs are also configurable in the Call-Control Profile configuration mode. When CC parameters are specified in both types of profiles, then:

- For generation of M-CDRs, the parameters configured in the Call-Control Profile configuration mode will take precedence.
- For generation of S-CDRs, the parameters configured in the APN Profile configuration mode will take precedence.
- S-CDR: activate/deactivate CDRs, time limit, volume limit, maximum number of charging conditions, tariff times.
- G-CDR: same as set for the SGSN, plus a maximum number of SGSN changes.
- eG-CDR: same as set for G-CDR.
- M-CDR: activate/deactivate CDRs, time limit, and maximum number of mobility changes.
- SMS-MO-CDR: activate/deactivate CDRs.
- SMS-MT-CDR: active/deactivate CDRs.
- LCS-MO-CDR
- LCS-MT-CDR
- LCS-NI-CDR.
- Select the applicable idle context purge timer, such as use global value or use special value. This feature could be used to distinguish between customers and/or APNs whose PDP contexts should be purged after short (for example 30 minutes) or long (for example 12 hours) periods of inactivity.
- Use specific charging gateway address (override all other configured/selected CG addresses).
- Deactivate SMS-MO-CDRs for customers of the own PLMN using pre-configured SMSC addresses.
- Disable G-CDRs or eG-CDRs for roamers that use the home PLMN GGSN.
- Allow or inhibit the use of own GGSNs by visitors.

- Allow or inhibit network triggered QoS change (upgrade and/or downgrade).

Example

The following command configures the APN profile to instruct the SGSN not to use charging characteristic settings received from the HLR for S-CDR generation:

```
cc prefer hlr-value-for-scdrs
```

Example

The following command configures the APN profile to

ciot

Configures the SCEF wait time value.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

ciot scef wait-time *wait_time*
remove ciot scef wait-time

ciot

Configures the parameters related to Cellular IoT features.

scef

Configures the SCEF specific parameters.

wait-time *wait_time*

Specifies the timeout value in seconds, before which MME is expected to send MT Data Answer (TDA) to SCEF in response to the MT Data Request (TDR) message.

wait_time is an integer ranging from 1 to 100.

remove

Removes the configured SCEF wait time.

Usage Guidelines Use this command to configure/override the SCEF Wait Time value in APN profile. The SCEF wait time configuration at MME overrides the value of SCEF wait time received in MT Data Request. MME will respond with MT Data Answer within the configured SCEF wait time value irrespective of the presence or absence of SCEF Wait Time AVP in MT Data Request sent by SCEF. This command is disabled by default.

Example

The following command configures the SCEF wait time for *10* seconds:

```
ciot scef wait-time 10
```

dedicated-bearers

Configures the MME to either accept or reject dedicated GBR and Non-GBR bearers.

Product MME

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
dedicated-bearers { gbr { accept | reject } | non-gbr { accept | reject
} }
[ remove ] dedicated-bearers { gbr | non-gbr }
```

remove

Removes the configuration, returning the system to the default setting where the MME accepts GBR or Non-GBR dedicated bearers.

gbr { accept | reject }

Configures the MME to **accept** or **reject** dedicated GBR bearers.

non-gbr { accept | reject }

Configures the MME to **accept** or **reject** dedicated Non-GBR bearers.

Usage Guidelines The MME differentiates GBR and Non-GBR dedicated bearers as follows: GBR Bearers - QCI value ranges from 1 to 4; Non-GBR bearers - QCI value ranges from 5-9.

In the case of a UE-initiated Bearer Resource Allocation Reject, the ESM cause "EPS QOS not accepted" is used and the corresponding bearer allocation reject MME statistic is incremented.

In the case of a Create Bearer Request Reject, the EGTP cause "Service denied" is used and the corresponding EGTP statistic is incremented.

Note: Handling of multiple bearers in a Create Bearer request from S-GW for Partial accept/reject of GBR/Non-GBR dedicated bearers is a current limitation.

Example

The following commands configure the MME to reject both GBR and Non-GBR dedicated bearers:

```
dedicated-bearers gbr reject
dedicated-bearers non-gbr reject
```

description

Defines a descriptive string relevant to the specific APN profile.

Product

MME

SGSN

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

description *description*
remove description

remove

Removes the configured description from this APN profile.

description

Specifies a description for this APN profile as an alphanumeric string of 1 through 100 characters. The string may include spaces, punctuation, and case-sensitive letters if the string is enclosed in double quotation marks (").

Usage Guidelines

Define information that identifies this particular APN profile.

Example

Indicate that APN profile *apnprof1* is to be used for customers in Saudi Arabia and that the profile was created on April 10th of 2010:

```
description "apnprof1 defines APNs for customers in Saudi Arabia
(4/10/10)."
```

dhcp lease

Configures a lease period for the UE's IP address during SaMOG Web Authorization pre-authentication and TAL phases.

Important This command requires the SaMOG Web Authorization feature license. For more information, contact your Cisco account representative.

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

```
dhcp lease { short duration | time duration }
default dhcp lease { short | time }
remove dhcp lease short
```

default

Restores the DHCP lease configuration for short lease time (pre-authentication phase) and DHCP lease time (TAL phae) to its default value.

remove

If previously configured, removes the DHCP short lease time configuration from this APN profile.

short *duration*

Specifies the DHCP short lease time for web authorization sessions to force the UE to initiate DHCP request after the pre-authentication phase completes.

duration must be an integer from 2 through 600.

Default: 20 seconds

time *duration*

Specifies the lease time for the UE's IP address during the web authorization TAL phase.

duration must be an integer from 600 through 4294967295.

Default: 4294967295 seconds

Usage Guidelines Use this command to configure a lease period for the UE's IP address during SaMOG Web Authorization pre-authentication and TAL phases.

Example

The following command configures a DHCP short lease period of 60 seconds and lease period of 3600 seconds:

```
dhcp lease short 60 time 3600
```

direct-tunnel

Defines the permission for direct tunnel establishment by GGSNs. This command is specific to the SGSN.

Product SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

```
direct-tunnel not-permitted-by-ggsn
remove direct-tunnel
```

remove

Removes the direct tunnel establishment configuration from this APN profile.

not-permitted-by-ggsn

Specifies that a direct tunnel is not permitted by the GGSN when resolved by this APN.

Default: disabled.

Usage Guidelines Use this command to enable/disable the permission for establishment of direct tunnels between an RNC and a GGSN.

Example

The following command instructs the SGSN not to permit establishment of a direct tunnel with a GGSN:

```
direct-tunnel not-permitted-by-ggsn
```

dns

Configure the primary and secondary IPv4 or IPv6 address of the DNS servers.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

dns [ipv6] { primary | secondary } *ip_address*
[no] dns [ipv6] { primary | secondary }

no

If previously configured, removes the DNS primary or secondary IP address to be used for web authorization.

ipv6

Specify IPv6 DNS server(s) to enable Flow-based Local Breakout GTPv2 sessions.

primary | secondary *IP_address*

Specify the primary or secondary DNS server address using the **primary | secondary** keywords.

ip_address must be expressed in IPv4 dotted-decimal or IPv6 colon-separated (when the **ipv6** keyword is configured)notation format.

Usage Guidelines

Use this command to configure the IPv4 or IPv6 address of the primary and secondary DNS servers to be used during session setup. The primary and secondary DNS servers specified in this configuration will be used only if the AAA server does not specify the same.

Important This command is license dependent. Contact your Cisco account representative for more information on SaMOG feature license requirements.

Example

The following command configures a primary DNS server with the IP address 162.123.23.1:

```
dns primary 162.123.23.1
```

dns-extn

Takes an offset group of digits from the MSISDN and appends the digits to the DNS query string to create a new APN intended to assist roaming subscribers to use the local GGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

dns-extn { charg-id { binary | decimal | hexadecimal } | lac-rac [fallback] | msisdn start-offset *start_digits* **end-offset** *end-digits* **| rnc-id [charg-id { binary | decimal | hexadecimal }] }**
remove dns-extn { charg-id | lac-rac [fallback] | msisdn | rnc-id [charg-id] }

charg-id { binary | decimal | hexadecimal }

Instructs the SGSN to take the profile index value of the charging characteristics, from the PDP subscription record (selected during APN selection) and include the profile index value in the APN name prior to sending out DNS queries. The operator can also specify the format (binary, decimal or hexadecimal) for the CC information to be included.

lac-rac [fallback]

Enables the SGSN to append geographical information to the APN string that is being sent in the DNS query. This information is used during the DNS query process to select the geographically closest GGSN.

The **fallback** keyword is configured to enable fallback to DNS-query only with APN-name and without lac-rac extension for Gn-SGSN activations.

msisdn start-offset *start_digits* end-offset *end-digits*

Defines an offset group of digits from the MSISDN and appends the digits to create a new APN DNS query string that is intended to assist roaming subscribers to use the local GGSN.

- *start_digits* is an integer from 1 through 14 that identifies the position of the first digit in the MSISDN to start the offset.
- *end-digits* is an integer from 2 through 15 that identifies the position of the last digit in the MSISDN to be part of the offset.

rnc-id [charg-id { binary | decimal | hexadecimal }]

Instructs the SGSN to include the ID of the calling RNC in the APN DNS query string. Optionally, the profile index value of the charging characteristics can be inserted into the APN name prior to sending out DNS

queries. As well, the operator can specify the format (binary, decimal or hexadecimal) for the CC information to be included.

Usage Guidelines

With this command, the APN in the DNS query string, used for querying the GGSN address, can be appended with additional information, such as

- digits from the MSISDN
- LAC/RAC info
- RNC-ID
- profile index from the charging characteristics information (SCHAR)

This additional information allows some customization of the DNS query string to facilitate selecting a specific (usually local or nearest) GGSN.

For example, roaming subscribers using a specific APN may want to be directed to a specific GGSN. This can be achieved by having an operator policy for roaming subscribers associated with an APN profile that includes a configuration specifying certain digits, from the MSISDN or geographical information from the LAC/RAC, be appended to the APN. This is then used as the DNS query string.

In addition, the operator must configure appropriate DNS entries to enforce the selection of the required GGSN. After appending the MSISDN digits to the DNS query string, the string will have the form:

ni.<digits>.mnc*.mcc*.gprs

After appending the LAC/RAC information to the DNS query string, the string will have the form:

<*apn_network_id*>.racAAAA.lacBBBB.<apn_operator_id>

where the AAAA and BBBB are Hex-coded digits (less than 4 significant digits and one or more zero ("0") digits will be inserted to the left side of the Hex to fill the 4-digit coding).

After appending the charging characteristic (SCHAR) information, the DNS string will take the following form:

<apn_network_id>.<profile_index>.<apn_operator_id>

The profile index in the following example has an integer value 10:

quicknet.com.uk.1010.mnc234.mcc027.gprs

If the RNC-ID information is configured to be a part of the APN name, and if inclusion of the profile index of the charging characteristics information is also enabled before the DNS query is sent, the profile index is included after the included RNC-ID and the DNS APN name will appear in the following form:

<apn_network_id>.<rnc_id>.<profile_index>.<apn_operator_id>

Once the DNS extension is defined, the selected extension is applicable when either the wildcard APN feature or the default APN feature are configured and used.

The information is appended to the DNS query and the actual APN string sent to the GGSN will not be modified in any way.

Example

A sample MSISDN is '112233445566778' and a sample APN NI (network identifier) is 'wap98.testnetz.ca'. The following command instructs the SGSN to create a new APN with digits pulled from the MSISDN and appended to the APN:

msisdn start-offset 3 end-offset 9

The resulting APN DNS query string would have appended 7 digits (2233445)to the APN NI so that it would appear something like wap98.testnetz.ca.2233445.MNC009.MCC262.GPRS

Enable inclusion of geographical information in the APN string used for the DNS query to locate the closest GGSN:

lac-rac

In the following example, the DNS query for a subscriber using RNC 0321 with the profile index of value 8 would appear as:

```
quicknet.com.uk.0321.1000.mnc234.mcc027.gprs
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

esm t3396-timeout

This command is used to configure the ESM T3396 timer to be sent to UE in ESM reject messages.

Product MME

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description **esm t3396-timeout** *timeout_value* **cause** *cause_code_value*
remove esm t3396-timeout cause *cause_code_value*

t3396-timeout *timeout_value*

Configures the value for ESM backoff timer (in seconds) to be sent to UE for ESM reject cause 'insufficient resources' and 'missing or unknown apn'. This value overrides the Call Control Profile and MME-service level configuration.

The *timeout_value* is an integer from 0 to 1116000.

cause *cause_code_value*

Configures the cause code value as an integer that is either 26 or 27. If the configured value is present in the ESM reject messages, the T3396 back-off timer will be included.

- The following cause values are supported:
  - 26 - Insufficient resources
  - 27 - Missing or Unknown APN
- Only one cause value can be configured with the **cause** keyword. Multiple cause values cannot be configured.

remove

Removes the T3396 timeout configuration for the specified cause code from APN profile. The T3396 timeout will then be applied from Call Control Profile if configured or from MME-service in decreasing order of precedence.

Usage Guidelines

This command configures the ESM T3396 timer to be sent to UE in ESM reject messages. There is no specified default value for T3396 timeout for a given cause code.

- To configure the T3396 timeout for different cause codes, the configuration must be done in multiple lines. For example:

  ```
  esm t3396-timeout 1100 cause 26
  esm t3396-timeout 1500 cause 27
  ```

- The new configuration for T3396 timeout for a given cause code will override the previous configuration. For example:

  ```
  esm t3396-timeout 1500 cause 26
  esm t3396-timeout 1800 cause 26
  ```

  The final T3396 timeout that will be applied for cause code 26 is 1800 seconds.

Example

The following command sets the ESM T3396 timeout value as *2000* seconds for cause code value *26*:

```
esm t3396-timeout 2000 cause 26
```

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

gateway-address

Configures the IPv4 or IPv6 address of the GGSN supporting the APN associated with this APN profile. Also, use this command to create a secondary pool of GGSNs. This command is specific to the SGSN.

Product SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

gateway-address *ip_address* **{ priority** *priority* **| weight** *weight* **[secondary-pool] }**
no gateway-address *ip_address*

no

Disables the GGSN address configured in this APN profile.

ip_address

Specifies the IP address for the GGSN in IPv4 dotted-decimal or IPv6 colon-separated notation.

priority *priority*

Specifies the priority, for the configured GGSN address, to be considered during address selection. If the highest priority GGSN fails to respond, the next priority level GGSN is selected. *priority* is an integer from 1 through 100. Note that the lower integer has the higher priority, so that 1 is the highest priority.

weight *weight* [secondary-pool]

Specifies the weight (preference) assigned to a GGSN to facilitate load balancing. *weight* is an integer from 1 to 100 where 1 is the least preferred and 100 is the most preferred.

If a weight is assigned to an address, then load balancing (of primary CPC requests) depends on the weight value. For example:

```
GGSN1 172.16.130.1 weight 30 and GGSN2 172.16.130.3 weight 70
```

With this configuration, 30% of the activation requests for this APN will go to GGSN1 and 70% of the requests will go to GGSN2. Also note that the sum of the weights does not need to be 100. The calculation of weight percentiles is carried out proportionately, so the following configuration will also yield the same 30% - 70% results:

```
GGSN1 172.16.130.1 weight 6 and GGSN2 172.16.130.3 weight 14
```

secondary-pool

This optional keyword allows the operator to enable multiple GGSN pools by assigning the GGSN to a secondary pool of GGSNs. The selection algorithm for GGSNs in a secondary pool is weight-based.

Usage Guidelines

Use this command to define priority or load balancing to be applied during GGSN selection. A maximum of 16 GGSN address can be configured for this APN profile.

Also use this command to setup GGSN pools - primary and secondary pools with up to 16 GGSNs in each pool. By default, GGSNs will always be selected from the primary pool. However, working in tandem with the **ggsn-fail-retry-timer** command configuration (SGTP service configuration mode) which enables the local DNS feature, some of the primary GGSNs can be temporarily blockedlisted if they become unavailable or overburdened.

Example

Set a GGSN address with a secondary priority level:

```
gateway-address 123.123.123.2 priority 2
```

Add a GGSN to the secondary GGSN pool and define selection weighting of 7th:

```
gateway-address 198.168.138.8 weight 7 secondary-pool
```

gateway-selection

Configures gateway selection related parameters for ePDG and SaMOG.

Privilege

ePDG

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

For ePDG,

```
gateway-selection { alternate-epdg strip-labels strip_labels |
max-alternate-pgw max_alternate_pgw_attempts | priority sgw }
remove gateway-selection { alternate-epdg strip-labels | max-alternate-pgw
  | priority sgw }
```

For SaMOG,

```
gateway-selection max-alternate-pgw max_alternate_pgw_attempts
remove gateway-selection max-alternate-pgw
```

remove

If previously configured, disables the maximum number of P-GW address resolution for this APN profile.

alternate-epdg

Important This keyword is license dependent. Contact your Cisco account representative for more information on ePDG feature license requirements.

(ePDG) Enables alternate ePDG selection.

strip-labels *strip_labels*

Important This keyword is license dependent. Contact your Cisco account representative for more information on ePDG feature license requirements.

(ePDG) Number of labels to be stripped off for domain matching.

strip_labels must be an integer between 0 to 10 separated by periods. Default value is 3.

max-alternate-pgw *max_alternate_pgw_attempts*

(ePDG/SaMOG) Configures maximum number of alternate P-GW attempts.

max_alternate_pgw_attempts must be an integer between 0 to 64.

priority sgw

Configures SGW to be selected first

Usage Guidelines

Use this command to configure the gateway selection related parameters.

For ePDG, use this command to configure the maximum number of labels to be stripped off for domain matching, and the maximum number of alternate P-GW attempts.

For SaMOG, use this command to configure the maximum number of alternate P-GW attempts during P-GW selection fall-back.

Example

The following example to set the maximum alternate P-GW selection attempts to **8**:

```
gateway-selection max-alternate-pgw 8
```

gn-gtp-version

This command enables the operator to prevent the SGSN from attempting GTPv0 Requests for GGSNs associated with specified APNs so that the SGSN tries activation with the next available GGSN if the current GGSN does not respond after the GTPv1 Request retries fail.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

[remove] gn-gtp-version v1-only

remove

Used with the command, this filter erases the previous GTPv1 configuration and returns the SGSN configuration to the default value of both GTPv1 and GTPv0.

v1-only

This extension must be included to complete the command. This extension disables GTPv0 fallback.

Usage Guidelines

During activation, the SGSN sends GTPv1 PDP Requests a GGSN and if no response is available from the GGSN after the maximum number of retransmissions and timeout, then before trying an alternate GGSN, the SGSN attempts to create GTPv0 PDP Requests and retries are carried out. Only after GTPv0 retransmissions and timeout would the SGSN try activation with the next available GGSN.

The SGSN supported GTPv0 fallback. After exhausting all configured retry attempts for GTPv1, the SGSN would retry the GTP-C Request using GTPv0. This fallback is conditional and is done only when the GTP version of a GGSN is unknown during the first attempt at activating a PDP context with the GGSN.

This command allows the operator to disable the GTPv0 fallback for GTP-C Requests to GGSNs corresponding to a specific APN, thus reducing unnecessary signalling if all known GGSN support GTPv1 only. Hence, if more than one GGSN address is returned by the DNS server during activation, then the SGSN more immediately attempts activation with the next GGSN after exhausting all the GTPv1 retry attempts. If only one GGSN address is returned, then the SGSN rejects the activation after exhausting all the configured GTPv1 retries.

Example

The following command disables GTPv0 fallback:

gn-gtp-version v1-only

The following command deletes the previous configuration and re-enables the default so the SGSN will attempt activation via both GTPv1 and if needed GTPv0 :

remove gn-gtp-version v1-only

gtp

Enables or disables the GTPC private extension for the Overcharging Protection feature. This command is specific to the SGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

`[ remove ] gtp private-extension loss-of-radio-coverage send-to-ggsn [ send-to-peer-sgsn ]`

remove

Disables the inclusion of the GTPC private extension, thereby disabling the Overcharging Protection feature.

private-extension loss-of-radio-coverage send-to-ggsn

Instructs the SGSN to set a proprietary GTPC private extension (in the LORC Intimation IEs) in the event of loss of radio coverage (LORC). These private extensions are only understood by a GGSN with an Overcharging Protection license.

The mandatory **loss-of-radio-coverage send-to-ggsn** keyword set instructs the SGSN to forward the private extension flag to the GGSN in the event of a loss of radio coverage (LORC).

send-to-peer-sgsn

This optional keyword instructs the SGSN to also forward the LORC private extension to the peer SGSN.

Usage Guidelines

gtp private-extension is one of the two commands required to enable the Overcharging Protection feature. The second command sets the RANAP cause code in the Iu Release to enable the SGSN to detect the LORC state of the MS/UE. This second command is configured in the IuPS service and is explained in the *IuPS Service Configuration Mode* chapter.

When there is a loss of coverage and the Overcharging Protection feature is enabled with the **gtp private-extension** command, the SGSN includes the proprietary private extension in the GTP LORC Intimation IE messages. This LORC IE is also included in UPCQ, DPCQ, and SGSN Context Response GTP messages.

Refer to the *SGSN Administration Guide* for additional information regarding the Overcharging Protection feature.

Example

Use the following command to have the SGSN send the GGSN the GTPC private extension in the LORC Intimation IE:

```
gtp private-extension loss-of-radio-coverage send-to-ggsn
```

idle-mode-acl

Configures a group of access control lists (ACLs) that define rules to apply to downlink data destined for UEs in an idle mode.

Product

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

[remove] idle-mode-acl { ipv4 | ipv6 } access-group *acl_name*

remove

Removes the specified ACL name from the access group.

{ ipv4 | ipv6 } access-group *acl_name*

Specifies the ACL type to add to the access group.

- **ipv4**: Specifies that an IPv4 ACL is being added to the access group.
- **ipv6**: Specifies that an IPv6 ACL is being added to the access group.

access-group *acl_name* specifies the name of the ACL being added to the access group as an existing IPv4 or IPv6 ACL name expressed as an alphanumeric string of 1 through 47characters.

Usage Guidelines

Use this command to create a group of ACLs that contain rules to apply to data sent to UEs that are currently in idle mode.

IPv4 ACLs are configured through the Context Configuration Mode using the **ip access-list** command.

IPv6 ACLs are configured through the Context Configuration Mode using the **ipv6 access-list** command.

Example

The following command configures the APN profile to use an IPv4 ACL named *acl-3-permit* to apply rules to downlink data sent to UEs that are currently in idle mode:

```
idle-mode-acl ipv4 access-group acl-3-permit
```

ip access-group

Configure the name of the access control list (ACL) for incoming and outgoing packets.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

`[ no ] ip access-group` *`group_name`* **`[ in | out ]`**

no

If previously configured, removes the IP access group.

group_name

group_name must be an alphanumeric string of 1 to 47 characters.

in | out

Specify the access group as inbound or outbound.

Usage Guidelines

Use this command to configure the ACL name for incoming and outgoing packets to redirect HTTP packtes, allow DNS packets and drop other packets. The IP access group specified in this configuration will be used only if the AAA server does not specify the same during authentication.

Important This command is license dependent. Contact your Cisco account representative for more information on SaMOG feature license requirements.

Example

The following command configures an IP access group called *webauthaccgroup* and sets it as inbound:

```
ip access-group webauthaccgroup in
```

ip address pool

Configure the name of the IP address pool from which the IP address needs to be allocated to the user equipment (UE).

Product SaMOG

Privilege Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description **`[ no ] ip address pool name`** *`pool_name`*

no

If previously configured, removes the IP address pool to be used for web authorization.

pool_name

pool_name must be an alphanumeric string of 1 to 31 characters.

Usage Guidelines Use this command to configure the name of the IP address pool from which the IP address is to be allocated to the UE. during the pre-authentication phase. The IP address pool name specified in this configuration will be used only if the AAA server does not specify the same during the pre-authentication phase.

Important This command is license dependent. Contact your Cisco account representative for more information on SaMOG feature license requirements.

Example

The following command configures an IP address pool name of *wapool*:

```
ip address pool name wapool
```

ip context-name

Configure the name of the context where the IP pool configuration needs to be obtained from.

Product SaMOG

Privilege Administrator

Command Modes Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

ip context-name *context_name*
no ip context-name

no

If previously configured, removes the IP context name to be used for web authorization.

context_name

context_name must be an alphanumeric string of 1 to 79 characters.

Usage Guidelines

Use this command to configure the name of the context where the IP pool configuration needs to be obtained from and provide the VPN through which the URL to the portal can be reached during the SaMOG web authorization pre-authentication phase, or the data can be offloaded for Local Breakout. If the IP context name is not configured here, and the AAA server does not provide one, the VPN context of the SaMOG service will be used.

Important This command is license dependent. Contact your Cisco account representative for more information on SaMOG feature license requirements.

Example

The following command configures the IP context name of *wacxt*

ip context-name wacxt

ip qos-dscp

Defines the IP parameters for this APN profile.

Product

MME

SGSN

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

ip { qos-dscp { { { downlink | uplink } { background*forwarding* **| conversational** *forwarding* **| interactive traffic-handling-priority** *priority forwarding* **| streaming** *forwarding* **} + } s11u-mme** *value* **} | source-violation**

```
 { deactivate [ all-pdp | exclude-from accounting | linked-pdp |
tolerance-limit } | discard [ exclude-from-accounting ] | ignore }
default ip { qos-dscp [ downlink | uplink | s11u-mme ] | source-violation
 }
no ip qos-dscp { downlink | uplink } { background | conversational |
interactive | streaming } +
```

Important All parameters not specifically configured will be included in the configuration with default values.

default

Resets the configuration to the default values.

no

Disables the specified IP QoS-DSCP mapping.

qos-dscp

Configures the Differentiated Services Code Point (DCSP) marking to be used for sending packets of a particular 3GPP QoS class.

downlink | uplink

Configures the packets for either downlink (network to subscriber) or uplink (subscriber to network) direction. **downlink** and **uplink** configuration must include one or more of the following:

- **background** - Configures the DSCP marking to be used for packets of sessions subscribed to 3GPP background class. Must be followed by a DSCP marking
- **conversational** - Configures the DSCP marking to be used for packets of sessions subscribed to 3GPP conversational class. Must be followed by a DSCP marking
- **interactive** - Configures the DSCP marking to be used for packets of sessions subscribed to different traffic priorities in the 3GPP interactive class. Must be followed by a traffic handling priority (THP): 1, 2, or 3.
- **streaming** - Configures the DSCP marking to be used for packets of sessions subscribed to 3GPP streaming class. Must be followed by a DSCP marking

DSCP marking options

Downlink and uplink must include a DSCP forwarding marking; supported options include:

- af11 - Designates use of Assured Forwarding 11 PHB
- af12 - Designates use of Assured Forwarding 12 PHB
- af13 - Designates use of Assured Forwarding 13 PHB
- af21 - Designates use of Assured Forwarding 21 PHB
- af22 - Designates use of Assured Forwarding 22 PHB
- af23 - Designates use of Assured Forwarding 23 PHB
- af31 - Designates use of Assured Forwarding 31 PHB

- af32 - Designates use of Assured Forwarding 32 PHB
- af33 - Designates use of Assured Forwarding 33 PHB
- af41 - Designates use of Assured Forwarding 41 PHB
- af42 - Designates use of Assured Forwarding 42 PHB
- af43 - Designates use of Assured Forwarding 43 PHB
- be - Designates use of Best Effort forwarding PHB
- ef - Designates use of Expedited Forwarding PHB

Forwarding defaults for both uplink and downlink are:

- conversational - ef;
- streaming - af11;
- interactive 1 - ef;
- interactive 2 - af21;
- interactive 3 - af21;
- background - be

s11u-mme *value*

This keyword is used to configure the S11-U interface parameters. The DSCP values can be specified using this keyword. The DSCP value for S11-U interface can be separately specified for each APN. This keyword is enabled by default. The default value is “be”. Listed below are DSCP values which can be configured for the S11U interface:

- af11 - Designates use of Assured Forwarding 11 PHB
- af12 - Designates use of Assured Forwarding 12 PHB
- af13 - Designates use of Assured Forwarding 13 PHB
- af21 - Designates use of Assured Forwarding 21 PHB
- af22 - Designates use of Assured Forwarding 22 PHB
- af23 - Designates use of Assured Forwarding 23 PHB
- af31 - Designates use of Assured Forwarding 31 PHB
- af32 - Designates use of Assured Forwarding 32 PHB
- af33 - Designates use of Assured Forwarding 33 PHB
- af41 - Designates use of Assured Forwarding 41 PHB
- af42 - Designates use of Assured Forwarding 42 PHB
- af43 - Designates use of Assured Forwarding 43 PHB
- be - Designates use of Best Effort forwarding PHB
- cs0 - Designates use of Class Selector 0 PHB
- cs1 - Designates use of Class Selector 1 PHB

- cs2 - Designates use of Class Selector 2 PHB
- cs3 - Designates use of Class Selector 3 PHB
- cs4 - Designates use of Class Selector 4 PHB
- cs5 - Designates use of Class Selector 5 PHB
- cs6 - Designates use of Class Selector 6 PHB
- cs7 - Designates use of Class Selector 7 PHB
- ef - Designates use of Expedited Forwarding PHB

source-violation

Configures settings related to IP source-violation detection with one of the following criteria:

- **deactivate** - deactivate the PDP context with one of the following conditions:
  - **all-pdp** - deactivates all PDP context of the MS/UE. Default is to deactivate errant PDP contexts.
  - **exclude-from-accounting** - excludes packets having an invalid source IP address from the statistics used in the accounting records.
  - **linked-pdp** - deactivate all associated pdp contexts (primary and secondary). Default is to deactivate errant pdp context.
  - **tolerance-limit** - Configures maximum number of allowed IP source violations before the session is deactivated.
- **discard** - discard errant packets, can include the following option:
  - **exclude-from-accounting** - excludes packets having an invalid source IP address from the statistics used in the accounting records.
- **ignore** - ignore checking of packets for MS/UE IP source violation.

Usage Guidelines

This command configures a range of IP functions to be associated with the APN profile; such as:

- SGSN/S-GW action in response to detected IP source violations,
- DSCP marking for downlink and uplink configuration per traffic class,
- QoS class diffserv code.
- Configures the S11U interface parameters.

Example

The following command configures the APN profile to instruct the SGSN or S-GW not to check incoming packets for IP source violation information:

```
ip source-violation ignore
```

The following command configures the S11-U interface parameters and specifies the DSCP marking value as “ef”:

```
ip qos-dscp s11u-mme ef
```

isr-sequential-paging

Enables or disables the Intelligent Paging for ISR feature.

Product

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
[ remove ] isr-sequential-paging
```

remove

Disables Intelligent Paging for ISR.

Usage Guidelines

This command initiates the Intelligent Paging for ISR feature for the specified APN Profile, where paging occurs first towards the last known RAT, then towards the other RAT.

The Intelligent Paging for ISR feature is license dependant. Contact your Cisco account representative for more information.

ipv6

Configures the IPv6 pool name to be used by SaMOG if the 'Framed-IPv6-Pool' AVP is unavailable in the Diameter AA-Answer message, or enable SaMOG to send unsolicited router advertisements (RA) to advertise or deprecate an IPv6 prefix for session with the EoGRE access type.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
ipv6 { address prefix-pool pool_name | unsolicited-router-advt { advertise
 | deprecate } { interval duration [ num-advts num_advts ] | num-advts num_advts
 [ interval duration } }
default ipv6 unsolicited-router-advt
no ipv6 { address prefix-pool pool_name | unsolicited-router-advt { advertise
 | deprecate } }
```

default

Configures this command to its default value.

no

If previously configured, removes the IP pool name or disables sending unsolicited router advertisements (RA) to advertise or deprecate an IPv6 prefix.

address prefix-pool *pool_name*

Specify the IPv6 pool name to be used by SaMOG if the 'Framed-IPv6-Pool' AVP is unavailable in the Diameter AA-Answer message.

pool_name must be an alphanumeric string from 1 to 31 characters.

unsolicited-router-advt { advertise | deprecate }

Configure to send unsolicited router advertisements (RA) to advertise or deprecate an IPv6 prefix for session with the EoGRE access type.

interval *duration*

Configure the interval between each unsolicited router advertisement.

duration must be an integer from 100 through 16000.

Default: 3000 milliseconds

num-advts *num_advts*

Configure the number of times unsolicited router advertisement must be sent.

num_advts must be an integer from 1 through 16.

Default: 3

Usage Guidelines

Use this command to :

- Configure the IPv6 pool name to be used by SaMOG if the 'Framed-IPv6-Pool' AVP is unavailable in the Diameter AA-Answer message. SaMOG uses the configured IPv6 prefix in the Gi context with this IPv6 pool name.
- Enable SaMOG to send unsolicited router advertisements (RA) to advertise or deprecate an IPv6 prefix for session with the EoGRE access type.

Example

The following command configures an IPv6 pool name *v6pool*:

```
ipv6 address prefix-pool v6pool
```

local-offload

Enables or disables the SaMOG Local Breakout (LBO) Enhanced, LBO Basic, or Flow-based LBO features.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

```
local-offload [ flow [ qci qci_value ] ]
 no local-offload [ flow [ qci ] ]
```

no

Disables Local Breakout for this APN profile.

flow

Enables flow-based Local Breakout for this APN profile.

Important This keyword is available when the Flow-based Local Breakout license is enabled.

qci *qci_value*

Specifies the QoS Class Identifier (QCI) value for flow-based Local Breakout (LBO).

qci_value must be an integer from 1 through 9, or 128 through 254.

For QCI range (*qci_value*) configured from 1 through 9, the DSCP configuration using the **qci** command under the QCI-QoS Mapping Table Configuration Mode mapped to this APN profile is used.

For QCI range (*qci_value*) configured from 128 through 254, the DSCP configuration using the **operator-defined-qci** command under the QCI-QoS Mapping Table Configuration Mode mapped to this APN profile is used.

Usage Guidelines

Use this command to enable or disable the SaMOG LBO Enhanced, LBO basic, or Flow-based LBO features. When enabled, LBO will be allowed for the UE connecting to the specified SSID, through which this APN profile is reached.

Important The SaMOG LBO features are license dependant. Contact your Cisco account representative for more information.

location-reporting

Configure location change reporting via ULI IE per APN for an S4-SGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

```
location-reporting access-type { gprs | umts }
remove location-reporting access-type { gprs | umts }
```

remove

Disables the location change reporting definition in the APN profile configuration.

access-type { gprs | umts }

Allows the operator to select location change reporting for the 2G and / or the 3G subscribers. Both access types can be identified in a single command or the command can be issued twice. Either way, two separate entries are created, one for each access type

Usage Guidelines

As with all APN profiles, to enable location change reporting, this APN profile must be associated with a call control profile.

Location change reporting for a Gn-SGSN is enabled with the **location reporting** command in the Call Control Profile configuration mode. That command can be used to configure the location change reporting function for the S4-SGSN, however that configuration would be over-ridden by an APN profile configuration. As well, using this APN profile **location reporting** command gives the operator greater control to apply location change reporting per APN.

Example

Enable location change reporting for 2G subscribers:

```
location-reporting access-type gprs
```

mobility-protocol

This command allows you to configure the default mobility protocol type to be used for setting up a call when the AAA server forwards an IP address directly.

Product

SaMOG

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

```
mobility-protocol { gtpv1 | gtpv2 | pmip }
no mobility-protocol
```

no

Removes the mobility protocol configuration for this APN profile.

Usage Guidelines

Use this command to configure the default mobility protocol type to be used for setting up a call when the AAA server forwards an IP address directly. If mobility protocol is also configured under the Call Control Profile Configuration Mode, the value configured here will override the configured value in the Call Control profile.

By default, all APN profiles will use the mobility protocol configured under the Call Control Profile Configuration Mode. To configure different mobility protocol values for different APN profiles, use the **mobility-protocol** command in this configuration mode.

Example

The following command configures mobility protocol to GTPv2:

```
mobility-protocol GTPv2
```

ntsr

This command configures QCI and ARP in the apn-profile for Network Triggered Service Restoration (NTSR).

Product

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
ntsr { all | qci number arp-priority-watermark number }
no ntsr all
no ntsr qci number arp-priority-watermark number
```

no

Removes the specified configuration parameters.

ntsr

Enables the network triggered service restoration configuration.

all

Specifies that the NTSR configuration is enabled for all bearers with any qci or arp for MME restoration.

qci

Specifies the Quality of Class Identifier for this NTSR configuration. Must be an integer from 1 to 255.

arp-priority-watermark

Specifies the ARP's prority level watermark value. Must be an integer from 1 to 15.

Usage Guidelines

This command configures qci and arp in the apn-profile for NTSR. The S-GW will decide to retain or release the bearer based on the configured qci/arp, after path failure is detected on ingress side of S-GW. The S-GW can configure a maximum of 2 qci and arp-priority-watermark per apn-profile. The apn-profile can also be configured to retain all bearers from that PDN.

Example

This example configures the apn-profile to retain all bearers from the PDN.

```
ntsr all
```

overcharge-protection

Enables overcharge protection for APNs controlled by this APN profile. Each overcharging protection option is a standalone configuration and it does not override the previous option set, if any.

Product

S-GW

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

overcharge-protection { abnormal-s1-release | ddn-failure | drop-limit *drop_limit_value* **{ packets | bytes } }**
[remove] overcharge-protection { abnormal-s1-release | ddn-failure | drop-limit }

remove

Removes the specified configuration.

abnormal-s1-release

(for future use) If overcharging protection is enabled for abnormal-s1-release, S-GW would send MBR to pause charging at P-GW if Abnormal Release of Radio Link signal occurs from MME.

Important Though the command is available in this release, this scenario is not possible.

ddn-failure

If overcharging protection is enabled for ddn-failure message, MBR would be sent to P-GW to pause charging upon receiving DDN failure from MME/S4-SGSN.

drop-limit *drop_limit_value* { packets | bytes }

Send MBR to pause charging at P-GW if specified number of packets/bytes is dropped for a PDN connection.

drop_limit_value is an integer from 1 through 99999.

- **packets:** Configures drop-limit in packets.
- **bytes:** Configures drop-limit in bytes.

Usage Guidelines

Use this command to specify P-GW to pause charging on abnormal-s1-release, DDN failure notification, or if the number of packets or bytes dropped exceeds the configured limit.

Example

Use the following command to signal P-GW to pause charging when the number of packets dropped exceeds 1000:

```
overcharge-protection drop-limit 1000 packets
```

pdp-data-inactivity

Configures the APN profile regarding PDP data inactivity. This command is specific to the SGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

pdp-data-inactivity { action { deactivate [all-pdp | linked-pdp] | detach-when { all-pdp-inactive | any-pdp-inactive } } | timeout minutes *minutes* }
default pdp-data-inactivity { action | timeout }
no pdp-data-inactivity timeout

default

Resets the APN Profile configuration to the default values for PDP data-inactivity.

no

Disables the timeout feature of the PDP data-inactivity configuration for this APN profile.

action

Defines the action to be taken if PDP data-inactivity occurs:

- **deactivate** - defines which PDP context should be deactivated:
  - **all-pdp** - deactivates all PDP contexts.
  - **linked-pdp** - deactivates only linked PDP contexts.
- **detach-when** - defines the condition that warrants a detach:
  - **all-pdp-inactive** - detach when all PDP contexts are inactive.
  - **any-pdp-inactive** - detach when any PDP context is inactive.

timeout minutes *minutes*

Specifies the inactivity timeout in minutes. *minutes:* is an integer from 1 through 1440. Note that even though the timeout is set for minutes, the configuration displays in seconds.

Usage Guidelines

Use this command to define how the SGSN will handle a situation where the PDP is not fully active. Repeat the command, as needed, to configure more than one keyword-controlled function.

Example

Use the following command to have the SGSN deactivate all PDP contexts associated with the APN when it detects the PDP is inactive:

pdp-data-inactivity action deactivate all-pdp

Use the following command to have the SGSN wait *2* minutes after detecting PDP data inactivity:

pdp-data-inactivity timeout minutes 2

pdp-type-ipv4v6-override

Configure the PDP type to use, per APN, if dual PDP type addressing is not supported by the network and the MS/UE requests the IPv4v6 PDP type.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

pdp-type-ipv4v6-overrride { ipv4 | ipv6 }
remove pdp-type-ipv4v6-overrride

remove

Deletes the override configuration and reverts to the default behavior so the SGSN ignores the IPv4v6 request and sends IPv4 to the GGSN.

ipv4

Configures IPv4 as the PDP type to send towards the GGSN when overriding the dual PDP type addressing requested by the MS/UE.

ipv6

Configures IPv6 as the PDP type to send towards the GGSN when overriding the dual PDP type addressing requested by the MS/UE.

Usage Guidelines

This command configures the SGSN to send either IPv4 or IPv6 towards the GGSN when the MS/UE requests PDP type as IPv4v6 but either the SGSN or the RNC is not configured to support dual PDP type.

Example

Use this command to configure the SGSN to always send IPv6, for the PDP type, to the GGSN when overriding a dual PDP type address request from the MS/UE:

pdp-type-ipv4v6-override ipv6

pdn-type

This command is used to configure the PDN type indicator in the APN profile.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

pdn-type { ip | non-ip { sgi | t6a [scef-id *scef_id* **[scef-realm** *realm_name* **]] } }**
remove pdn-type

remove

The keyword remove deletes the existing configuration.

ip

Use this keyword to configure the Cellular IoT PDN type as IP PDN.

non-ip

Use this keyword to configure the Cellular IoT PDN type as Non-IP PDN.

sgi

Use this keyword to configure the Cellular IoT Non-IP PDN delivery path type as SGi.

t6a

Use this keyword to configure the Cellular IoT Non-IP PDN delivery path type as T6a.

scef-id *scef_id*

The user can optionally specify the SCEF ID using this keyword. The SCEF identifier is a string of length 1 up to 63 characters.

scef-realm *realm_name*

Use this keyword to optionally specify the SCEF diameter realm name. The *realm_name* is string of length 1 up to 127 characters.

Usage Guidelines

Use this command to specify the Cellular IoT PDN type. With this command the user has an option to override the HSS provided APN subscription PDN type. This command is applicable during Attach and additional PDN connectivity only and not during Handover scenarios. This command is not enabled by default.

Use the following command to configure the PDN type as Non-IP and the delivery path type as SGi:

pdn-type non-ip sgi

Use the following command to specify the PDN type as Non-IP and the delivery path as T6a along with the SCEF identifier and realm name:

pdn-type non-ip t6a scef-id *sc1* **scef-realm** *xyz.com*

pgw-address

Configures the IPv4 and/or IPv6 address of the P-GW supporting the APN associated with this APN profile.

Product

ePDG

MME

SaMOG

SGSN

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

pgw-address *ip_address***smf-combined [s5-s8-protocol pmip]{ IP-ADDRESS** *ip_address***[primary collocated-node** *collocated_node_name* **| secondary | weight** *weight* **[primary | secondary ue-usage-type** *ue_usage_type_value* **]]| fqdn** *fqdn_var* **[primary | secondary] | plmn id mcc** *mcc_name* **mnc** *mnc_name*
no pgw-address *ip_address*

no

Disables the P-GW address configured in this APN profile.

ip_address

Specifies the IP address for the P-GW in IPv4 dotted-decimal or IPv6 colon-separated notation.

smf-combined

Configures SMF+PGW-IWK for the specified IPv4 or IPv6 address.

collocated-node

Configures the collocation name to select the collocated S/PGW node IP addresses for MME.

collocated_node_name must be a string of size 1 to 255.

s5-s8-protocol pmip

MME only. Configures the S5-S8 protocol for the gateway.

ue-usage-type

Configures the ue-usage-type for the gateway. *ue_usage_type_value* must be an integer between 1 through 255.

primary

Configures the primary PGW for s2b interface.

secondary

Configures the secondary PGW for s2b interface.

fqdn

Configures the FQDN to get the PGW IP address for s2b interface.

mcc *mcc_name*

Configures MCC part of PLMN ID for the selected APN.

mcc_name is a number, ranging from 200 to 999.

mnc *mnc_name*

Configures MNC part of PLMN ID for the selected APN.

mnc_name is a number, ranging from 00 to 999.

weight *weight*

Specifies the weight (preference) assigned to the addressed P-GW for load balancing. *weight* is an integer from 1 through 100 where 1 is the least preferred and 100 is the most preferred. If no weight is specified, the P-GW address is assigned a default weight of 1.

If a weight is assigned to an address, the weights of the P-GW(s) (that are operational) are totaled, and then a weighted round-robin selection is used to distribute new primary PDP contexts (for MME) or primary CPC requests (for SGSN) or new PDN connections (for ePDG) among the P-GW(s) according to their weights. As with all weighted round-robin algorithms, the distribution does not look at the current distribution, but simply uses the weights to distribute new requests. For example, two P-GWs assigned weights of 70 and 30 would distribute 70% of calls to one, and 30% to the other. The sum of all weights do not need to total 100.

Usage Guidelines

Use this command to define load balancing to be applied during P-GW selection. A maximum of 16 P-GW addresses can be configured for this APN profile.

On the S4-SGSN, use this command to configure a local P-GW address for operators wishing to bypass DNS resolution of APN FQDN.

Example

The following command configures the P-GW IP address for this APN profile as *10.2.3.4*:

```
pgw-address 10.2.3.4
```

qos allow-upgrade

Configure this command to allow upgrade of QoS from GGSN. The "Upgrade QoS Supported" flag is now set in "Create PDP Context" and "Update PDP Context" messages sent by SGSN. The SGSN signals the availability of this functionality by use of the "Upgrade QoS Supported" bit within the Common Flags IE. The SGSN sets the "Upgrade QoS Supported" bit within the Common Flags IE to "1" within the "Create PDP Context" and "Update PDP Context" procedures.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
qos allow-upgrade access-type { gprs | umts } [ prefer-as-cap-subscription
 ]
remove qos allow-upgrade access-type { gprs | umts }
```

remove

Removes the support for QoS upgrade from the configuration for this APN profile.

access-type { gprs | umts }

Allows the operator to choose the access type as either "gprs" or "umts" based on whether it is 2G or 3G network scenario.

prefer-as-cap-subscription

Enable this optional keyword to configure capping of QoS with Subscribed QoS (local/HLR). If this keyword is enabled, SGSN accepts a higher QoS in the Create/Update PDP Context Response than sent in Create/Update PDP Context Request, but negotiates and restricts the value within HLR/local subscribed QoS. If this keyword is disabled, the SGSN accepts the QoS in Create PDP Context Response and Update PDP Context Response as the Negotiated QoS (this QoS may be downgraded by the RNC in case of UMTS access).

Usage Guidelines

This command enables the QoS upgrade support feature. On configuring this command, the SGSN sets the "Upgrade QoS Supported" flag within the common flags IE in Tunnel management messages, Create PDP

Context Request and Update PDP Context Request messages. The SGSN accepts the QoS from GGSN in Create PDP Context Response, Update PDP Context Request/Response messages as the Negotiated QoS for the PDP session.

Example

Use the following command to configure QoS upgrade support in a UMTS scenario:

```
qos allow-upgrade access-type umts prefer-as-cap-subscription
```

qos apn-ambr

Configures the APN-AMBR (aggregate maximum bit rate) that will be stored in the Home Subscriber Server (HSS).

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

qos apn-ambr max-ul *mbr_up* **max-dl** *mbr_dwn*
remove qos apn-ambr

remove

Removes the APN-AMBR changes from the configuration for this APN profile.

max-ul *mbr_up* **max-dl** *mbr_dwn*

Defines the maximum bit rates for uplink (subscriber to network) and downlink (network to subscriber) traffic.

In StarOS 21.8 and later releases:

mbr_up must be an integer from 0 to 4000000000000 (4 Tbps).

mbr_dl must be an integer from 0 to 4000000000000 (4 Tbps).

In releases prior to 21.8:

mbr_up is an integer from 0 through 1410065408 (Kbps).

mbr_dwn is an integer from 0 through 1410065408 (Kbps).

Usage Guidelines

Use this command to define the MBR that will be enforced by the GGSN or P-GW for both uplink and downlink traffic shaping.

Example

```
qos apn-ambr max-ul 24234222 max-dl 23423423
```

qos class

Configures local values for the traffic class (TC) parameters for the quality of service (QoS) configured for this APN profile.

Important To enable any of the values/features configured with this command, the **qos prefer-as-cap** configuration (also in the APN profile configuration mode) must be set to either **local** or **both-hlr-and-local**.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

qos class { background | conversational | interactive | streaming } [*qualif_option* **]**
remove qos class { background | conversational | interactive | streaming } [*qualif_option* **]**

remove

Removes previously defined values for the specified option or for an entire class if a qualifying option is not included in the command.

background

Selects the background traffic class. This 'best-effort' class manages traffic that is handled as a background function, like email, where time to delivery is not a key factor. The selection of background traffic class can be refined with the addition of one of the following qualifying options:

- **all-values**
- **arp**
- **mbr-down**
- **mbr-map-down**
- **mbr-map-up**
- **mbr-up**
- **residual-bit-error-rate**
- **sdu**

All qualifying options are explained below.

conversational

Selects the 'real-time' conversational traffic class of service, which has the most stringent time requirements of the four classes and is typically reserved for voice traffic. The section of the conversational traffic class can be refined with the addition of one of the following qualifying options:

- **all-values**
- **arp**
- **gbr-down**
- **gbr-up**
- **mbr-down**
- **mbr-map-down**
- **mbr-map-up**
- **mbr-up**
- **min-transfer-delay**
- **residual-bit-error-rate**
- **sdu**

All qualifying options are explained below.

interactive

Selects interactive traffic class of service. This class is characterized by a request/response pattern (someone sends data and then waits for a response) which requires the preservation of the data but delivers on a 'best-effort' model. The section of the interactive traffic class can be refined with the addition of one of the following qualifying options:

- **all-values**
- **arp**
- **mbr-down**
- **mbr-map-down**
- **mbr-map-up**
- **mbr-up**
- **residual-bit-error-rate**
- **sdu**
- **thp**

All qualifying options are explained below.

streaming

Selects the streaming traffic class of service, which handles one-way, real-time data transmission - such as streaming video or audio. The section of the interactive traffic class can be refined with the addition of one of the following qualifying options:

- **all-values**
- **arp**
- **gbr-down**
- **gbr-up**
- **mbr-down**

- **mbr-map-down**
- **mbr-map-up**
- **mbr-up**
- **min-transfer-delay**
- **residual-bit-error-rate**
- **sdu**

All qualifying options are explained below.

qualif_option

Qualifying options are the QoS parameters and they include:

- **all-values** - This option will change the configuration to predefined values for *all* the relevant QoS parameters for the class. This keyword is not used if other options are to be defined. The predefined values are:

Table 12: Predefined QoS Parameters

QoS Parameter	Predefined Value
Traffic Class	**Background**
SDU delivery order	No
Delivery of Erroneous SDUs	No
Max Bit Rate Uplink	64 kbps
Max Bit Rate Downlink	64 kbps
Allocation/Retention Priority	3
SDU Max Size	1500 octets
SDU Error Ratio	3 (1 * 10 ^ -3)
Residual Bit Error Rate	4 (4 * 10 ^ -3)
Traffic Class	**Conversational**
SDU delivery order	No
Delivery of Erroneous SDUs	No
Max Bit Rate Uplink	16 kbps
Max Bit Rate Downlink	16 kbps
Allocation/Retention Priority	3
Guaranteed Bit Rate Uplink	16 kbps
Guaranteed Bit Rate downlink	16 kbps
SDU Max Size	1500 octets
Minimum Transfer Delay	100 milliseconds

QoS Parameter	Predefined Value
SDU Error Ratio	1 (1 * 10 ^ -2)
Residual Bit Error Rate	1 (5 * 10 ^ -2)
Traffic Class	**Interactive**
SDU delivery order	No
Delivery of Erroneous SDUs	No
Max Bit Rate Uplink	64 kbps
Max Bit Rate Downlink	64 kbps
Traffic Handling Priority	3
SDU Max Size	1500 octets
SDU Error Ratio	3 (1 * 10 ^ -3)
Residual Bit Error Rate	4 (4 * 10 ^ -3)
Traffic Class	**Streaming**
SDU delivery order	No
Delivery of Erroneous SDUs	No
Max Bit Rate Uplink	16 kbps
Max Bit Rate Downlink	16 kbps
Allocation/Retention Priority	3
Guaranteed Bit Rate Uplink	16 kbps
Guaranteed Bit Rate downlink	16 kbps
SDU Max Size	1500 octets
Minimum Transfer Delay	300 milliseconds
SDU Error Ratio	7 (1 * 10 ^ -3)
Residual Bit Error Rate	1 (5 * 10 ^ -2)

- **arp** - Sets the allocation/retention priority. Enter an integer from 1 to 3.
- **gbr-down** - Guaranteed Kbps rate for the downlink direction. Enter an integer from the range 1 to 256000.
- **gbr-up** - Guaranteed Kbps rate for the uplink direction. Enter an integer from 1 to 256000.
- **mbr-down** - Maximum Kbps rate for the downlink direction. Enter an integer from the range 1 to 256000.
- **mbr-map-down from** *from_kbps* **to** *to_kbps* - Map received HLR MBR (**from** value) to a locally configured downlink MBR value (**to** value):
  - *from_kbps* - Enter an integer from 1 to 25600.
  - *to_kbps* - Enter an integer from 1 to 25600.

- **mbr-map-up from** *from_kbps* **to** *to_kbps* - Map received HLR MBR (**from** value) to a locally configured uplink MBR value (**to** value):
  - *from_kbps* - Enter an integer from 1 to 25600.
  - *to_kbps* - Enter an integer from 1 to 25600.
- **mbr-up** - Maximum Kbps rate for the uplink direction. Enter an integer from 1 to 256000.
- **min-transfer-delay** - Minimum transfer delay in milliseconds. Enter an integer from 80 to 4000.
- **residual-bit-error-rate** -
  - Background TC residual-bit-error-rate range is from 4*10^-4 to 6*10^-8. Enter on of the following integers, where:
    - **4**: represents 4*10^-3
    - **7**: represents 10^-5
    - **9**: represents 6*10^-8
  - Conversational TC residual-bit-error-rate range is from 5*10^-2 to 10^-6. Enter one of the following integers, where:
    - **1**: represents 5*10^-2
    - **2**: represents 10^-2
    - **3**: represents 5*10^-3
    - **5**: represents 10^-3
    - **6**: represents 10^-4
    - **7**: represents 10^-5
    - **8**: represents 10^-6
  - Interactive TC residual-bit-error-rate range is from 4*10^-4 to 6*10^-8. Enter one of the following integers, where:
    - **4**: represents 4*10^-3
    - **7**: represents 10^-5
    - **9**: represents 6*10^-8
  - Streaming TC residual-bit-error-rate range is from 5*10^-2 to 10^-6. Enter one of the following integers, where:
    - **1**: represents 5*10-2
    - **2**: represents 10^-2
    - **3**: represents 5*10^-3
    - **5**: represents 10^-3
    - **6**: represents 10^-4
    - **7**: represents 10^-5
    - **8**: represents 10^-6
- **sdu** - Signalling data unit keyword, must include one of the following options:
  - **delivery-order**- Enter one of the two following options:
    - **no**- Without delivery order
    - **yes**- With delivery order

- **erroneous**- Enter one of the two following options:
  - **no**- Erroneous SDUs will not be delivered
  - **no-detect**- Erroneous SDUs are not detected ('-')
  - **yes**- Erroneous SDUs will be delivered
- **error-ratio**- The SDU error-ratio range is from 10^-3 to 10^-6. Enter an integer from 1 to 6, where:
  - **3**- Represents 10^-3
  - **4**- Represents 10^-4
  - **6**- Represents 10^-6
- **max-size**- Defines the maximum number of octets (size) of the SDU. Enter an integer from 10 to 1502.

- **thp** - Sets the traffic handling priority. Enter an integer from 1 to 3.

Usage Guidelines

This command defines the qualifying options (parameters) for each QoS traffic class defined for this APN profile.

Important Typically this command is only used to define QoS parameters when the APN record does not exist in the subscription record.

Repeat the command as often as needed with different options to define all required QoS criteria. For example, to configure the maximum bit rate (MBR) for the downlink and uplink directions for a traffic class, this command must be used twice, specifying **mbr-down** once and **mbr-up** once.

Advantage for local mapping of MBR: some HLRs cannot be configured with high MBR values. Using the **mbr-map-up** and the **mbr-map-down** parameters allows the SGSN to be configured to treat a specific HLR value as meaning the desired high MBR value. In a case where the HLR does not support HSPA+ bit rates, but the handsets and network do, this feature allows the operator to overcome limitations on the HLR and provide HSPA+ bit rates by overwriting the provisioned HLR-QoS MBR values with SGSN-configured values. When MBR mapping is configured, if QoS is preferred as the HLR value, then the subscription QoS MBR received from the HLR is compared with the "from" value in the table. If it matches, then it is converted to the value specified by the "to" value in the table. QoS negotiation happens based on the converted value.

Advantage for QoS capping with THP and ARP: Controlling THP and ARP via Operator Policy: This functionality can differentiate home vs. roaming subscribers, and prevent visiting subscribers from receiving a high-tiered service. For example, a service provider could offer service differentiation using Ultra/Super/Standard service levels based upon QoS; this could justify charging a corporate customer more to use the Internet APN than would be charged to a consumer. This could be accomplished by controlling the traffic handling priority (THP) over the air interface, i.e. THP 1 = Ultra, THP 2 = Super and THP 3 = Standard.

Example

Use the following command to configure the entire conversational traffic class with predefined QoS options:

```
qos class conversational all-values
```

Now change the background class ARP from 3 to 2:

```
qos class background arp 2
```

Invalidate the THP parameter, by removing all value from the parameter, for the interactive class:

```
remove qos class interactive thp
```

qos dedicated-bearer

Configures the quality of service maximum bit rate (MBR) parameters for the dedicated bearer. This command is specific to the MME.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

qos dedicated-bearer mbr max-ul *mbr_up* **max-dl** *mbr_dwn*
remove qos dedicated-bearer

remove

Removes the dedicated bearer maximum bit rate (MBR) changes from the configuration for this APN profile.

max-ul *mbr_up* max-dl *mbr_down*

Defines the maximum bit rates for uplink and downlink traffic.

In StarOS 21.8 and later releases:

mbr_up must be an integer from 0 to 4000000000000 (4 Tbps).

mbr_down must be an integer from 0 to 4000000000000 (4 Tbps).

In StarOS 21.7 and later releases:

mbr_up must be an integer from 0 to 1410065 (Kbps).

mbr_down must be an integer from 0 to 1410065 (Kbps).

In releases prior to 21.7: Defines the maximum bit rates for uplink and downlink traffic of MBR in bps.

mbr_up must be an integer from 0 to 1410065408.

mbr_down must be an integer from 0 to 1410065408.

Usage Guidelines

Use this command to define the MBRs that will be enforced by the P-GW for both uplink and downlink traffic shaping.

Example

```
qos dedicated-bearer mbr max-ul 24234222 max-dl 23423423
```

qos default-bearer

Configures the quality of service parameters for the default bearer. This command is specific to the MME.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

`qos default-bearer { arp` *`arp_value`* **`[ preemption-capability { may | shall-not } | vulnerability { not-preemptable | preemptable } ] | qci`** *`qci`* **`}`**
`remove qos default-bearer { arp | qci }`

remove

Removes the default bearer QoS configuration from this APN profile.

arp *arp_value*

Defines the address retention priority value. *arp_value* is an integer from 1 through 15.

preemption-capability { may | shall-not }

Specifies the preemption capability flag. Options are:

- **may**: Bearer may be preempted
- **shall-not**: Bearer shall not be preempted

vulnerability { not-preemptable | preemptable }

Specifies the vulnerability flag. Options are:

- **not-preemptable**: Bearer cannot be preempted.
- **preemptable**: Bearer can be preempted.

qci *qci*

Specifies the QoS Class Identifier for the default bearer profile. *qci* is an integer from 0 through 255.

Usage Guidelines

Use this command to set the QoS APR and QCI parameters for the default bearer configuration.

Example

```
qos default-bearer arp 2 preemption-capability may
```

qos pgw-upgrade

Configures the action to be taken when the MME receives a QoS upgrade from P-GW for default bearers/Non-Guaranteed Bit Rate (Non-GBR) bearers.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
qos pgw-upgrade non-gbr { accept | reject | locally-cap }
[ remove ] qos pgw-upgrade non-gbr
```

remove

Removes the configuration, returning the system to the default setting where the MME accepts the P-GW upgraded QoS values for Non-GBR (default) bearers.

non-gbr { accept | reject | locally-cap }

For Non-GBR (default) bearers, this keyword configures the action the MME takes when it receives a P-GW upgraded QoS value.

- **accept**: The MME will accept the P-GW upgraded QoS values.
- **reject**: The MME will reject the P-GW upgraded QoS values.
- **locally-cap**: The MME compares QCI, ARP and ARP-PVI provided by P-GW to the locally configured values of those parameters. If the values match, then accepts towards the P-GW and use locally configured values towards the UE/RAN for APN-AMBR and ARP-PCI. If the values do not match, the MME rejects the P-GW upgraded QoS values.

Usage Guidelines

Use this command to provide configurability at the APN Profile level for the MME to accept, reject, or locally-cap P-GW upgraded QoS values for default (non-GBR) bearers. This S11 Control is applied whenever QoS parameters are received on S11 interface. The relevant procedures for default bearers are Create Session Response (sent by P-GW during Attach, UE requested PDN connectivity) and Update Bearer Procedures (initiated by P-GW resulting from trigger QoS change or other in PCEF/PCRF, or from Modify Bearer Command or Bearer Resource Command sent by MME). **Note:** This configuration is supported only for Default bearers (i.e Non-GBR bearers) in a roaming scenario.

The MME will set the sum of the APN-AMBR of all active APNs up to the value of the subscribed UE-AMBR, subject to the UE-AMBR restriction.

In the case of an Attach Reject or PDN Connectivity Reject, the ESM failure cause "Operator determined barring" is used and the corresponding MME schema bulk statistic is incremented.

In the case of Update Bearer Request Reject, the EGTP cause "Request rejected" is used and the corresponding EGTP bulk statistic is incremented.

A session disconnect reason mme-qos-pgw-upgrade-reject(589) is incremented when QoS upgrade by P-GW is rejected by the MME during initial attach. The corresponding session disconnect reason statistics are incremented .

Refer to the **dedicated-bearers** command to configure QoS controls for dedicated bearers (GBR and Non-GBR).

Example

The following command configures the MME to reject the QOS upgrade from P-GW for non-GBR bearers:

```
qos pgw-upgrade non-gbr reject
```

qos prefer-as-cap

Specifies operational preferences for QoS parameters, specifically QoS bit rates. This command is specific to the SGSN in releases prior to 14.0.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
qos prefer-as-cap { both-hlr-and-local | both-hss-and-local {
local-when-subscription-not-available | minimum |
subscription-exceed-reject } | hlr-subscription | local }
remove qos prefer-as-cap
```

Important Command and keyword names have changed. **prefer** has become **prefer-as-cap** and **hlr** has become **hlr-subscription**. These changes will not impact configuration generated with earlier releases as the keywords are aliases for the previous names.

remove

Removes previous configuration changes and resets the default.

both-hlr-and-local

Instructs the SGSN to use, as the capping value during session establishment, the lower of either the locally configured QoS bit rate or the Home Location Register (HLR) subscription.

both-hss-and-local { local-when-subscription-not-available | minimum | subscription-exceed-reject }

For the MME only, specifies the QoS cap value to use.

- **local-when-subscription-not-available**: Use the locally configured values if the Home Subscriber Server (HSS) does not provide any values.
- **minimum**: Use the lower of either the locally configured QoS bit rate or the HSS-provided QoS bit rate.
- **subscription-exceed-reject**: If the requested QoS bit rate exceeds the locally configured value, reject the PDN connection.

There are three QoS parameters involved in this configuration that need to be considered: AMBR, QCI and ARP. With the above CLI, the QoS of the bearers established, can be restricted. The following configuration show how the above CLI options are controlled:

- **qos prefer-as-cap both-hss-and-local local-when-subscription-not-available** - Here, only the AMBR is controlled, not the QCI and ARP.
- **qos prefer-as-cap both-hss-and-local subscription-exceed-reject** - Here, only the AMBR is controlled, not the QCI and ARP.
- **qos prefer-as-cap both-hss-and-local minimum** - Here, the AMBR, QCI and ARP can be controlled.

hlr-subscription

Instructs the SGSN to take the QoS bit rates from the HLR configuration and use the HLR rate as the capping value for session establishment.

Default for SGSN.

local

Instructs the SGSN to take the QoS bit rate from the local configuration and use it for session establishment.

Usage Guidelines

Use this command to instruct the SGSN or MME to take QoS configuration as the bit rate for session establishment.

The MME has no default setting for this command.

Example

The following command specifies use of the bit rate in subscription at the HLR:

```
qos prefer-as-cap hlr-subscription
```

The following command instructs the SGSN to cap the bit rate with the lower rate of the two configurations, HLR or local:

```
qos prefer-as-cap
both-hlr-and-local
```

qos rate-limit direction

Configures the actions governing the subscriber traffic flow, if the flow violates or exceeds the configured or netogiated peak or committed data-rates.

This command can be entered multiple times to specify different combinations of traffic direction and class. The SGSN only performs traffic policing if **qos rate-limit direction** is configured.

Additional information on the QoS traffic policing functionality is located in the *System Administration Guide*.

Product

SGSN

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
qos rate-limit direction { downlink | uplink } [ burst-size { auto-readjust
 [ duration seconds ] | bytes } ] [ class { background | conversational |
interactive traffic_priority | streaming } ] [ exceed-action { drop |
lower-ip-precedence | transmit } ] [ gbr-qci [ committed-auto-readjust
durarion seconds ] ] [ non-gbr-qci [ committed-auto-readjust durarion
seconds ] ] [ violate-action { drop | lower-ip-precedence | transmit } ]
+
remove qos rate-limit direction { downlink | uplink } [ class { background
 | conversational | interactive traffic_priority | streaming } ]
```

remove

Removes the qos rate-limit direction entries from the configuration.

downlink | uplink

Apply the limits and actions configured with the other keywords to the selected link:

downlink - This is the direction from the GGSN or P-GW to the MS.

uplink - This is the direction from the MS to the GGSN or the P-GW.

burst-size { auto-readjust [duration *seconds*] | *bytes* }

Default: See the table of class default values in the *Usage* section below.

This keyword specifies the peak burst size allowed. System measurements for this value exclude the GTP and outer packet headers. Supported options include:

- **auto-readjust**: This keyword enables dynamic burst-size calculation using negotiated peak data-rate and negotiated committed data-rate.
- **duration** *seconds*: Must be an integer from 1 to 30; default is 1. This keyword sets the number of seconds that the dynamic burst-size calculation will last. This allows the traffic to be throttled at the negotiated rates.

- *bytes*: Must be an integer from 1 to 6000000. This value specifies the static burst size for traffic policing. This option is present for backward compatibility.

Important Use of dynamic burst size (**auto-readjust**) for traffic policing is recommended, rather than the static burst size.

class { background | conversational | interactive *traffic_priority* | streaming }

The **class** keyword configures the specified traffic policing actions per traffic class, or per traffic priority in the case of interactive traffic class. The following classes are supported:

- **background**: Specifies the traffic action for traffic patterns in which the data transfer is not time-critical (for example, email exchanges).
- **conversational** : Specifies the traffic policing action for traffic patterns in which there is a constant flow of packets in each direction, upstream and downstream.
- **interactive** *traffic_priority*: Specifies the traffic policing action for traffic patterns in which there is an intermittent flow of packets in each direction, upstream and downstream.

  traffic_priority is the 3GPP traffic handling priority and can be an integer 1,2 or 3.
- **streaming**: Specifies the traffic policing action for traffic patterns in which there is a constant flow of data in one direction, either upstream or downstream.

Important This is an SGSN-specific feature. If this keyword is omitted, the same values are used for all classes.

exceed-action { drop | lower-ip-precedence | transmit }

Default: See the table of class default values in the *Usage* section below.

The action to take on the packets that exceed the committed-data-rate but do not violate the peak-data-rate. The following actions are supported:

- **drop**: Drop the packet
- **lower-ip-precedence**: Transmit the packet after lowering the ip-precedence
- **transmit**: Transmit the packet

gbr-qci [committed-auto-readjust durarion *seconds*]

Applies the traffic policing policy to guaranteed bitrate bearers.

committed-auto-readjust duration *seconds*: Must be an integer from 1 to 30. This keyword sets the number of seconds that the committed burst-size calculation will last. This allows the traffic to be throttled to the negotiated rates.

Important This is an S-GW-specific feature.

non-gbr-qci [committed-auto-readjust durarion *seconds*]

Applies the traffic policing policy to non-guaranteed bitrate bearers.

committed-auto-readjust duration *seconds*: Must be an integer from 1 to 30. This keyword sets the number of seconds that the committed burst-size calculation will last. This allows the traffic to be throttled to the negotiated rates.

Important This is an S-GW-specific feature.

violate-action { drop | lower-ip-precedence | transmit }

Default: See the table of class default values in the *Usage* section below.

The action to take on the packets that exceed both the committed-data-rate and the peak-data-rate. The following actions are supported:

- **drop**: Drops the packet
- **lower-ip-precedence**: Transmits the packet after lowering the IP precedence
- **transmit**: Transmits the packet

+

This symbol indicates that the keywords can be entered multiple times within a single command.

Usage Guidelines

This command configures the APN's quality of service (QoS) traffic policing. Configured actions prevent subscriber flow exceeding or violating configured peak or negotiated peak or committed data rate limits.

Important If either **exceed action** or **violate action** is set to **lower-ip-precedence**, this command may override the configuration of the **ip qos-dscp** command in the APN profile.

Class: Background	
Downlink Traffic: Disabled Peak Data Rate (in bps): 16000000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop	Uplink Traffic: Disabled Peak Data Rate (in bps): 8640000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop
Class: Conversational	

Downlink Traffic: Disabled Peak Data Rate (in bps): 16000000 Committed Data Rate (in bps): 16000000 Burst Size (in bytes): 65535 Exceed Action: lower-ip-precedence Violate Action: drop	Uplink Traffic: Disabled Peak Data Rate (in bps): 8640000 Committed Data Rate (in bps): 8640000 Burst Size (in bytes): 65535 Exceed Action: lower-ip-precedence Violate Action: drop
Class: Interactive, Traffic Handling Priority: 1	
Downlink Traffic: Disabled Peak Data Rate (in bps): 16000000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop	Uplink Traffic: Disabled Peak Data Rate (in bps): 8640000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop
Class: Interactive, Traffic Handling Priority: 2	
Downlink Traffic: Disabled Peak Data Rate (in bps): 16000000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop	Uplink Traffic: Disabled Peak Data Rate (in bps): 8640000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop
Class: Interactive, Traffic Handling Priority: 3	
Downlink Traffic: Disabled Peak Data Rate (in bps): 16000000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop	Uplink Traffic: Disabled Peak Data Rate (in bps): 8640000 Committed Data Rate (in bps): n/a Burst Size (in bytes): 65535 Exceed Action: n/a Violate Action: drop
Class: Streaming	

Downlink Traffic: Disabled	Uplink Traffic: Disabled
Peak Data Rate (in bps): 16000000	Peak Data Rate (in bps): 8640000
Committed Data Rate (in bps): n/a	Committed Data Rate (in bps): n/a
Burst Size (in bytes): 65535	Burst Size (in bytes): 65535
Exceed Action: n/a	Exceed Action: n/a
Violate Action: drop	Violate Action: drop

Example

The following command lowers the IP precedence when the committed-data-rate and the peak-data-rate are violated in uplink direction:

```
qos rate-limit direction uplink violate-action lower-ip-precedence
```

The following command drops the excess user packets when the subscriber traffic violates both the configured peak and the committed data-rate in the uplink direction. Once either the peak or the committed data-rate for that subscriber goes below the configured/negotiated limit, it transmits them.

```
qos rate-limit direction uplink exceed-action drop
```

ranap allocation-retention-priority-ie

Configures the allocation/retention priority (ARP) IE for this APN profile. This command is specific to the SGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > **apn-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
ranap allocation-retention-priority-ie subscription-priority priority class
 { { background | conversational | interactive | streaming } {
not-pre-emptable | priority | queuing-not-allowed |
shall-not-trigger-pre-emptable } + }
```

Important All parameters not specifically configured will be included in the configuration with default values.

```
ranap allocation-retention-priority-ie subscription-priority priority class
 { { background | conversational | interactive  [thp thp_priority] | streaming
```

```
 } { not-pre-emptable |priority | queuing-not-allowed |
shall-not-trigger-pre-emptable } + }
```

default

Resets the configuration to the default values.

no

Disables the specified configuration

remove

Removes the specified configuration.

subscription-priority *priority*

This keyword sets the subscription priority. The lowest number has the highest priority.

priority must be an integer from 1 to 3.

class

Configure allocation/retention priority (ARP) for specific QoS traffic classes. Include one or more of the following class options:

- **background**: background class of service
- **conversational**: conversational class of service
- **interactive**: interactive class of service
- **streaming**: streaming class of service

Default values will be included in the configuration for any class configuration not specified.

thp *thp_priority*

This is an optional keyword is used to specify the Traffic Handling Priority (THP) for interactive traffic class. The thp_priority is an integer value with range "1" up to "3".

qualifying options

For each of the class options, the configuration must include one or more of the following qualifying options:

- **not-pre-emptable**
- **priority**: smallest number is the highest priority. Value must be an integer from 1 to 15
- **queuing-not-allowed**
- **shall-not-trigger-pre-emptable**

When entering more than one option, we recommend that you do it in the order in which they are listed.

+

This symbol indicates that the keywords can be entered multiple times within a single command.

Usage Guidelines

Use this command to configure values for the allocation/retention priority (ARP) IE in the radio access bearer (RAB) assignment request message for RANAP that occurs during RAB setup.

This command can be used multiple times to define multiple priorities, with different combinations of **subscription-priority** and **class**.

If the HLR returns a matching value for the subscribed ARP for the desired traffic class, the SGSN includes the configured qualifying options for the ARP IE in the RANAP message.

If there is no matching configuration, the SGSN includes the following default values for the traffic class within the ARP IE:

Table 13: Default ARP Values

Subscribed ARP	Traffic Class	RANAP Priority value	RANAP Preemption Capability	RANAP Preemption Vulnerability
1	Conversational	1	1 (may-trigger-pre-emption)	0 (not-pre-emptable)
2		2	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		3	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
1	Streaming	4	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
2		5	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		6	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
1	Interactive THP1	5	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
2		6	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		7	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
1	Interactive THP2	7	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
2		8	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		9	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
1	Interactive THP3	10	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
2		11	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		12	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
1	Background	13	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
2		14	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)
3		15	0 (shall-not-trigger-pre-emption)	1 (pre-emptable)

Example

The following series of commands define the highest priority for conversational traffic class with priority level 1-10 (Subscribed priority 0-3), PCI of shall-not-trigger-pre-emption, PVI of not-pre-emptable with queuing-not-allowed:

```
ranap allocation-retention-priority-ie subscription-priority 0 priority
class conversational not-pre-emptable priority 1
shall-not-trigger-pre-emptable
ranap allocation-retention-priority-ie subscription-priority 1 priority
class conversational not-pre-emptable priority 4
shall-not-trigger-pre-emptable
ranap allocation-retention-priority-ie subscription-priority 2 priority
class conversational not-pre-emptable priority 7
shall-not-trigger-pre-emptable
ranap allocation-retention-priority-ie subscription-priority 3 priority
class conversational not-pre-emptable priority 10
shall-not-trigger-pre-emptable
```

If the THP is not configured then the same priority will be applied to all the three THP instances. To illustrate this a sample show configuration output is listed below:

```
ranap allocation-retention-priority-ie subscription-priority 2 class
interactive thp 1 priority 12
ranap allocation-retention-priority-ie subscription-priority 2 class
interactive thp 2 priority 12
ranap allocation-retention-priority-ie subscription-priority 2 class
interactive thp 3 priority 12
```

restrict access-type

Configures the activation restrictions of PDP context on the basis of the access type and QoS class.

Product

SGSN

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

```
[ no ] restrict access-type { eps | { { gprs | umts } [ qos-class {
background | conversational | interactive | streaming } ] } }
default restrict access-type { eps | gprs | umts }
```

no

Remove the restriction rules for PDP context activation configured in this APN profile.

default

Resets the restriction rules for PDP context activation to the default values to allow all access types and with QoS class for GPRS and UMTS.

eps

Configures the APN profile to restrict the PDP context activation from EPS (Evolved Packet System) network access.

gprs

Configures the APN profile to restrict the PDP context activation from General Packet Radio Service (2.5G) network access.

umts

Configures the APN profile to restrict the PDP context activation from Universal Mobile Telecommunications Systems (3G) network access.

qos-class

Configures the APN profile to restrict the PDP context activation to a specific QoS traffic class. It is optional and can be configured after selecting the network access type. Possible traffic classes options are:

- **background**: Specifies the QoS class as background service session
- **conversational**: Specifies the QoS class as conversational service session
- **interactive**: Specifies the QoS class as interactive service session
- **streaming**: Specifies the QoS class as streaming service session

Usage Guidelines

Use this command to configure the restriction rules in an APN profile for activation of PDP context on the basis of the access type. It also provides the facility to restrict type of traffic QoS class.

Important From release 19.0 onwards this command is also supported for MME. In earlier releases this command was supported only on SGSN.

This command is used to configure the APN not supported in particular RAT and PLMN combinations. If this command is enabled, new PDP activations to an APN with which this APN profile is associated are rejected. During handovers PDPs/PDNs are deactivated if the APN name matches with this APN profile.

If the operator does not include the optional QoS-Class keyword option, then complete APN restriction is enabled. And QoS related restrictions have no impact, as QoS restriction is subset of a complete APN restriction.

Example

The following command configures the APN profile to restrict all traffic from a GPRS network service having a QoS class of interactive:

```
restrict access-type grps qos-class interactive
```

sgw-restoration

This command restores PDN connections on the MME after an S-GW failure.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

sgw-restoration session hold-timeout *max_restore_time*
[no | remove] sgw-restoration

no

This command disables S-GW restoration from the configured APN Profile.

remove

This keyword removes the S-GW Restoration configuration from the APN Profile configuration. In this case, the **hold-timeout** value configured at the MME Service level is used for restoration.

session

This keyword specifies the S-GW session having the disconnected PDN to be restored.

hold-timeout*max_restore_time*

This keyword specifies the maximum time available to restore the sessions at S-GW, that is, the number of PDN connections to be restored through the S-GW. *max_restore_time* specifies the time duration for S-GW Restoration in seconds, as integer from 1 to 3600.

Note If S-GW restoration is enabled at an MME Service level and at an APN Profile level, the **hold-timeout** value of the APN Profile configuration will take precedence over that of the MME Service level.

Usage Guidelines

The T-Release-PDN timer is configured as part of the S-GW restoration procedure. The MME restores as many PDN connections as it can through an alternative S-GW (in case of S-GW failure) or with the same S-GW (in case of S-GW restart), within the configured T-Release-PDN time. On expiry of the timer, MME detaches the remaining PDN connections of the affected S-GW.

PDN restorations are performed in a paced manner. The pacing rate can be configured using the **network-overload-protection mme-tx-msg-rate** command under the *Global Configuration Commands* mode. If the pacing rate is not configured, the internal default pacing rate of 100 restorations per session manager, per second is applied.

Example

The following command configures a maximum time of 500 seconds to restore the sessions at S-GW:

```
sgw-restoration session hold-timeout 500
```

sm t3396

The **sm** command includes a new keyword to set the SM T3396 back-off timer for an APN Profile.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

sm t3396 min *minimum_minutes* **max** *maximum_minutes* **cause** *code*
remove sm t3396

remove

Including this filter with the command removes the SM back-off timer definition from the APN Profile configuration.

min *minimum_minutes*

Enter an integer from 1 to 15 to identify the minimum number of minutes the timer should run; default is 15 minutes.

max *maximum_minutes*

Enter an integer from 1 to 30 to identify the maximum number of minutes the timer should run; default is 30 minutes.

cause *code*

Enter an integer from 1 to 255 to identify the appropriate rejection cause code. The default is 26. During congestion, the configured value is ignored and 26 is sent.

Usage Guidelines

- Under congestion, the SGSN can assign the T3396 back-off timers to the UEs and request the UEs not to access the network for a given (timer value) period of time.
- If a message is rejected due to congestion, then the T3396 value will be included in the reject message with cause code 26. The SM back-off timer value sent will be chosen randomly from within the configured T3396 timer value range.
- If T3396 timer value is configured in a APN Profile then it will override the back-off timer values defined for either the SGSN Service or GPRS Service configurations.

Example

Use a command similar to the following to define a T3396 with a timeout range of *2 to 15* minutes.

```
sm t3396 min 2 max 15
```

timeout bearer-inactivity

Supports a bearer inactivity timeout for GBR and non-GBR S-GW bearer type sessions.

Product

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-profile-profile_name)#
```

Syntax Description

[remove] timeout bearer-inactivity [gbr | non-gbr] *dur_seconds* **volume-threshold { total** *bytes* **| uplink** *bytes* **| downlink** *bytes***} | exclude-default-bearer**

remove

Removes the timeout bearer-inactivity setting.

timeout

Specifies that a session time out value will be configured for this APN profile.

bearer-inactivity

Specifies that a session time out value will be configured for this APN profile.

gbr *dur_seconds*

Specifies that the system will check for low activity on a GBR bearer. *dur_seconds* specifies the bearer inactivity timer in seconds. Valid entries are from 900 to 2592000 seconds (15 minutes to 720 hours).

non-gbr *dur_seconds*

Specifies that the system will check for low activity on a non-GBR bearer. *dur_seconds* specifies the bearer inactivity timer in seconds. Valid entries are from 900 to 2592000 seconds (15 minutes to 720 hours).

volume-threshold

Specifies that a threshold value of the data traffic for a bearer will be used for the inactivity timeout value.

total *bytes*

Specifies that the total of both uplink and downlink data will be used as a volume threshold. *bytes* must be a value from 1 to 4294967295.

uplink *bytes*

Specifies that an uplink data volume threshold will be used. *bytes* must be a value from 1 to 4294967295.

downlink *bytes*

Specifies that a downlink data volume threshold will be used. *bytes* must be a value from 1 to 4294967295.

exclude-default-bearer

Specifies that inactivity handling for the default bearer will be excluded.

Usage Guidelines

Use this command to support a bearer inactivity timeout for GBR and non-GBR S-GW bearer type sessions per Qos Class Identifier (QCI). This enables the deletion of bearers experiencing less data traffic than the configured threshold value. This allows for more efficient use of system resources. This feature is supported only for Pure S calls on the SAE-GW.

Example

The following example configures a 5 minute dedicated bearer timeout setting for GBR bearers on a downlink volume threshold of 100000 bytes.

```
timeout bearer-inactivity gbr 300 downlink 100000
```

timeout idle

Configures the subscriber's time-to-live (TTL) settings for the EPDG service.

Product

ePDG

Privilege

System Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Profile Config

configure > apn-profile *apn_profile_name*

The following prompt is displayed in the APN Profile Config mode:

```
[local]host_name(apn-profile-profname1)#
```

Syntax Description

timeout idle *sec* **{ micro-checkpoint-deemed-idle [** *dur* **] | micro-checkpoint-periodicity** *dur* **}**

no timeout idle

default timeout idle

no

Disables idle timeout configuration along with the idle seconds micro-checkpoint duration or deemed idle duration configuration.

default

Configures the default value for subscriber's time out settings. The idle timeout default value is 0. The default value of micro-checkpoint-deemed-idle would be 0 seconds and that for micro-checkpoint-periodicity is 10 seconds.

idle*sec*

Designates the maximum duration a session can remain idle, in seconds, before system automatically terminates the session. Must be followed by number of seconds between 0 and 2147483647. Zero indicates function is disabled.

micro-checkpoint-deemed-idledle*dur*

Configures micro-checkpoint duration when UE is deemed idle for this Subscriber. Default is "0" (disabled). dur is an integer between 10 and 1000.

micro-checkpoint-periodicity*dur*

Configures the micro-checkpoint-periodicity for this Subscriber. Default is "10". dur is the an integer between 10 and 10000.

Syntax Description

Use this command to configure the subscriber's time-to-live (TTL) settings for the EPDG service.

Example

The following command configures the idle timeout to *10* and micro-checkpoint-periodicity to *50* for the subscriber:

```
timeout idle 10 micro-checkpoint-periodicity 50
```

twan

Configures the APN profile with the default gateway address and mask to be sent in the DHCP offer and PBA messages. This command is specific to SaMOG.

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-profile-`*`profile_name`*`)#`

Syntax Description

`[ no ] twan default-gateway` *`ipv4/ipv6_address/mask`*

no

Removes the default gateway configuration from this APN profile.

ipv4/ipv6_address/mask

Specifies the IP address of the default gateway sent in the DHCP offer and PBA messages for a 3G session.

ipv4/ipv6_address must be an IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation. *mask* must be an integer value from 1 to 32 for IPv4 addresses, and 1 to 128 for IPv6 addresses (CIDR notation).

Usage Guidelines

Use this command to configure the APN profile with the default gateway address and mask to be sent in the DHCP offer and PBA messages. This configuration is required for GTPv1 support only. For 3G subscribers, if the configured default gateway is unavailable, or does not match with the subnet of the allocated IP from P-GW or GGSN, the call will be dropped.

A maximum of 16 IP addresses and subnet masks can be configured (in separate lines) for each APN profile.

Example

The following command configures the APN profile with the default gateway address and mask of *194.122.12.20/12*:

`twan default-gateway 194.122.12.20/12`

up-service-area-change

Configures action for User-Plane Service Area Change.

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

`up-service-area-change disconnect-pdn [ ue-usage-type ]`

up-service-area-change

Configures action for User-Plane Service Area Change.

disconnect-pdn

Enables the reselection of User Plane Node by PDN disconnection.

ue-usage-type

Configures UE usage type for disconnecting pdn for up service area change

Example

The following command configures action for User-Plane Service Area Change :

`up-service-area-change disconnect-pdn ue-usage-type`

virtual-mac

Configures or validates the virtual MAC address for this APN profile to use as the default gateway's MAC address for the user equipment (UE).

Product

SaMOG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Profile Configuration

configure > apn-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-profile-profile_name)#`

Syntax Description

`virtual-mac { `*`mac_address`***`| violation drop }`**
`no virtual-mac [ violation drop ]`

no

Removes the virtual MAC configuration from this APN profile.

mac_address

Specifies the media-specific access control layer address. *mac_address* must be specified as a 6-byte hexadecimal number with each byte separated by a colon or hyphen, for example., "AA:12:bb:34:f5:0E" or "AA-12-bb-34-f5-0E".

violation drop

Specifies SaMOG to validate if the destination MAC address in the packet received over the EoGRE tunnel matches with the configured virtual MAC, broadcast, or multicast address.

Usage Guidelines

Use this command to configure or validate the virtual MAC address for this APN profile to use as the default gateway's MAC address for the user equipment (UE).

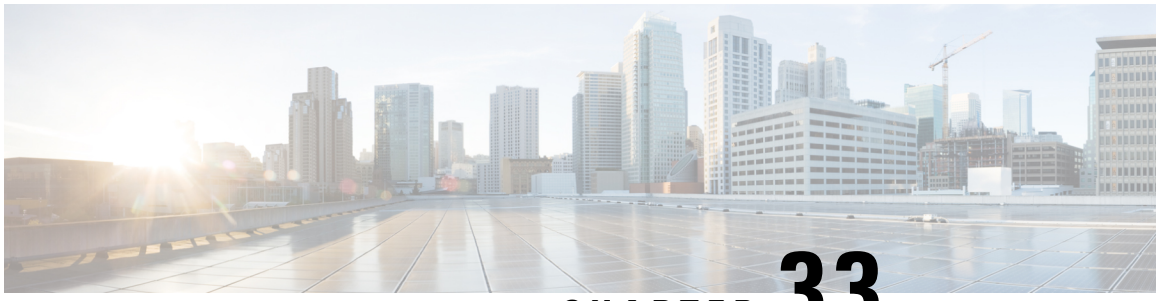
By default, virtual MAC is not configured. In the event where no virtual MAC is configured, SaMOG creates a virtual MAC by adding **fe:ff** to the start of the bind address of the CGW service.

Important Dynamic change in the virtual MAC address will only affect new sessions. Older sessions will continue to use the old virtual MAC address until the session exists.

Example

The following command configures a virtual mac with the IP address of AB:12:22:34:f5:0E for this APN profile:

```
virtual-mac AB:12:22:34:f5:0E
```



CHAPTER 33

APN Configuration Mode Commands

Command Modes

The Access Point Name (APN) Configuration Mode is used to create and configure APN profiles within the current system context of an UMTS/LTE service.

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

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aaa

This command configures Authentication, Authorization, and Accounting (AAA) functionality at the Access Point Name (APN) level.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
aaa { group aaa_group_name | secondary-group aaa_group_name }
default aaa { group | secondary-group aaa_group_name }
no aaa { group aaa_group_name  | secondary-group }
```

no aaa

Disables the specified AAA group for the specific APN.

no aaa { group | secondary-group }

- **group**: Uses the default AAA group.
- **secondary-group**: Removes the secondary AAA group from the APN's configuration.

default aaa { group | secondary-group }

Configures the default setting for the specified parameter.

- **group**: Uses the default AAA group—the one specified at the context level or in the APN template.
- **secondary-group**: Removes the secondary AAA group from the APN configuration.

aaa_group_name

Specifies the AAA server group for the APN.

aaa_group_name must be an alphanumeric string of 1 through 63 characters.

secondary-group *aaa_group_name*

Specifies the secondary AAA server group for the APN.

aaa_group_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure AAA functionality at the APN level.

Instead of having a single list of servers per context, this feature configures multiple server groups within a context and applies individual server group for APNs in that context. Each server group consists of a list of AAA servers for each AAA function (accounting, authentication, charging, etc.).

The AAA secondary server group supports the RADIUS Fire-and-Forget feature in conjunction with GGSN for secondary accounting (with different RADIUS accounting group configuration) to the RADIUS servers without expecting acknowledgment from the server, in addition to standard RADIUS accounting. This secondary accounting will be an exact copy of all the standard RADIUS accounting message (RADIUS Start / Interim / Stop) sent to the standard AAA RADIUS server.

If the same AAA group is configured with both the **aaa group** *aaa_group_name* and the **aaa secondary-group** *aaa_group_name* commands, then this configuration will have no effect and secondary accounting will not happen.

The AAA secondary server group configuration takes effect only when used with APN accounting-mode set to radius-diameter (or) with mediation-acct enabled. The RADIUS accounting triggers for both standard RADIUS accounting and secondary accounting will be taken from the AAA group configured with the **aaa**

group *aaa_group_name* command. On the fly change of this configuration is not supported. Any change to the configuration will have effect only for new calls.

Example

The following command applies the AAA server group *star1* to an APN within the specific context:

```
aaa group star1
```

access-link

Configures IP fragmentation processing over the Access-link (PPP, GTP etc.).

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ]access-link ip-fragmentation { df-fragment-and-icmp-notify |
df-ignore | normal }
default access-link ip-fragmentation
```

df-fragment-and-icmp-notify

Default: Disabled

Partially ignores the DF bit; fragments and forwards the packet, but also returns an ICMP error message to the source of the packet. The number of ICMP errors sent like this is rate-limited to one ICMP error packet per second per session.

no

Disables the access-link IP fragmentation at APN level to the mobile node if the link MTU is smaller than the packet length.

df-ignore

Default: Enabled

Ignores the DF (Don't Fragment) bit setting; fragments and forwards the packet over the access link. This is the default behavior.

normal

Default: Disabled

Drops the packet and sends an ICMP unreachable message to the source of packet.

Usage Guidelines

If the IP packet to be forwarded is larger than the access-link MTU and if the DF (Don't Fragment) bit is set for the packet, then the fragmentation behavior configured by this command is applied. Use this command to fragment packets even if they are larger than the access-link MTU.

Fragmentation may also occur for other reasons, regardless of whether or not fragmentation is performed because of one of the above reasons.

Payloads are encapsulated within IP/UDP/GTP before being sent to the SGSN. If that encapsulation causes the packet to exceed 1500 bytes, the inner IP payload is fragmented (even if it's not considered too-large by the above tests) into two payloads (if the DF bit is not set). If the DF bit is set (and access-link ip-fragmentation normal is configured), the system performs IP fragmentation of the entire packet (i.e., IP fragmentation in the outer IP header) rather than fragmenting the inner IP payload. Either way, the result is two packets, but in one case the MS would have to perform IP reassembly while in the other case the SGSN would have to perform reassembly.

Example

Set fragmentation so that the DF bit is ignored and the packet is forwarded anyway by entering the following command:

```
access-link ip-fragmentation df-ignore
```

accounting-mode

Configures the protocol to be used for PDP context accounting by this APN.

Product

eWAG

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

In 16.0 and earlier releases:

```
accounting-mode { gtpp | none | radius-diameter [ no-early-pdus ] [
no-interims ] }
default accounting-mode
```

In 17.0 and later releases:

```
accounting-mode { gtpp | none | radius [ no-early-pdus ] [ no-interims ]
 }
default accounting-mode
```

default

Restores the command to its default setting.

gtpp

Configures the APN to use GPRS Tunneling Protocol Prime for accounting purposes. If used, accounting will begin as soon as the PDP context is established. This is the default setting. Default: Enabled

Important The system's GTPP parameters must be configured prior to using this protocol for accounting. Refer to the **gtpp** commands in the *Context Configuration Mode Commands* chapter.

In 16.0 and earlier releases, the default value of "**accounting-mode gtpp**" was not displayed in the "**show configuration**" command. The value was only displayed in the output of "**show configuration verbose**" command.

In 17.0 and later releases, even for a default configuration of **accounting-mode** under APN, this will be indicated in "**show configuration**" both in verbose and non-verbose modes.

none

Disables accounting for PDP contexts using this APN.

When accounting mode is set to none, it indicates to the GTP stack at session manager to not generate the regular GTPP accounting triggers. Default: Disabled.

radius-diameter

Configures the APN to use RADIUS protocol for accounting purposes. Default: Disabled

Important The system's RADIUS accounting parameters must be configured prior to using either of the protocols for accounting. Refer to the **radius** commands in the *Context Configuration Mode Commands* and the *AAA Server Group Configuration Mode Commands* chapters.

Important The **accounting-mode** CLI command is used only for RADIUS and GTPP accounting. Hence, in 17.0 and later releases, the keyword option "**radius-diameter**" has been replaced with **radius** option, and is concealed to support backward compatibility.

no-early-pdus

Configures the GGSN to discard user traffic once the buffer is full until the RADIUS server has returned a response to the GGSN's accounting START request per 3GPP standards.

Configures the GGSN to delay PDUs from/to MS until the RADIUS server returns a response to the GGSN's accounting START request as per 3GPP standards. The GGSN buffers up to two PDUs per call. Additional PDUs disable the queuing. On receiving the Accounting response message, the GGSN forwards all the subsequent PDUs for that call.

Important For StarOS 10.0 and earlier releases, the system buffers up to four PDUs and queues or discards the remaining PDUs.

Important For StarOS 11.0 and later releases, the system is configured so that none of the PDUs are discarded.

no-interims

Disables the generation of RADIUS interims per APN.

When configured, RADIUS interim updates for this APN will not be sent, regardless of what is configured in the context that is used for RADIUS accounting.

Important Different CLI commands are used to disable RADIUS interims for RADIUS accounting and mediation accounting. To disable RADIUS interims for RADIUS accounting, use the following command: **accounting-mode radius no-interims**. To disable RADIUS interims for mediation accounting, use the following command: **mediation-device context-name** *context_name* **no-interims**.

Usage Guidelines

This command specifies which protocol, if any, will be used to provide accounting for PDP contexts accessing the APN profile.

When the GTPP protocol is used, accounting messages are sent to the charging gateways (CGs) over the Ga interface. The Ga interface and GTPP functionality are typically configured within the system's source context. As specified by the standards, a CDR is not generated when a session starts - CDRs are generated according to the interim triggers (configured using the **cc** command in the GGSN service configuration mode) and a CDR is generated when the session ends. For interim accounting, STOP/START pairs are sent based on configured triggers.

GTPP version 2 is always used. However, if version 2 is not supported by the CGF, the system reverts to using GTPP version 1. All subsequent CDRs are always fully-qualified partial CDRs. All CDR fields are R4.

If the **radius** option is used, RADIUS protocol is used as configured in the Context Configuration mode or the AAA Server Group Configuration mode.

If the RADIUS protocol is used, accounting messages can be sent over a AAA interface or the Gi to the RADIUS server. The AAA or Gi interface(s) and RADIUS functionality are typically configured with the system's destination context along with the APN. RADIUS accounting begins immediately after an IP address is allocated for the MS. Interim accounting can be configured using the **radius accounting interim interval**. The **radius accounting interim interval** command sends INTERIM-UPDATE messages at specific intervals.

Keywords to this command can be used in combination to each other, depending on configuration requirements.

Important If the accounting type in the APN is set to 'none' then G-CDRs will not be generated. If accounting type is left as default "GTPP" and "billing-records" are configured in the ACS Rulebase Configuration Mode, then both G-CDRs and eG-CDRs would be generated.

Example

The following command configures the APN to use the RADIUSr protocol for accounting:

```
accounting-mode radius
accounting-mode radius no-interims no-early-pdus
accounting-mode radius no-early-pdus no-interims
```

active-charging bandwidth-policy

Configures the bandwidth policy to be used for subscribers who use this APN.

Product

ACS

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

active-charging bandwidth-policy *bandwidth_policy_name*
{ default | no } active-charging bandwidth-policy [fallback-enabled]

default

Configures the default setting.

Default: The default bandwidth policy configured in the rulebase is used for subscribers who use this APN.

no

Disables bandwidth control for the APN.

bandwidth-policy *bandwidth_policy_name*

Specifies the bandwidth policy name. *bandwidth_policy_name* must be an alphanumeric string from 1 through 63 characters.

fallback-enabled

Determines whether policy under rulebase can be applied as a fallback value. Fallback is disabled by default.

Usage Guidelines

Use this command to configure bandwidth policy to be used for subscribers who use this APN.

Example

The following command configures a bandwidth policy named *standard* for the APN:

```
active-charging bandwidth-policy standard [ fallback-enabled ]
```

active-charging link-monitor tcp

Enables the TCP link monitoring feature on the Mobile Video Gateway. This command can be configured in either APN Configuration Mode or Subscriber Configuration Mode.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] active-charging link-monitor tcp [ log [ rtt [ histogram
 | time-series ] [ bitrate [ histogram | time-series ] ] | bitrate [
histogram | time-series ] [ rtt [ histogram | time-series ] ] ] ] [
-noconfirm ]
```

default

Sets TCP link monitoring to its default value, which is the same as **no**.

no

Deletes the TCP link monitoring settings and disables TCP link monitoring if previously configured.

link-monitor tcp

Enables the TCP link monitoring feature on the Mobile Video Gateway. Note that TCP link monitoring is not enabled by default. Also note that when this command is configured without the **log** option, TCP link monitoring

is enabled without logging, and the output from TCP link monitoring is only used by the dynamic translating feature.

log [rtt [histogram | time-series] [bitrate [histogram | time-series]] | bitrate [histogram | time-series] [rtt [histogram | time-series]]]

This option enables statistical logging for TCP link monitoring.

The **rtt** option can be used to enable either **histogram** or **time-series** logging for RTT.

Similarly, the **bitrate** option can be used to enable either **histogram** or **time-series** logging for bit rate.

When **rtt** and **bitrate** options are used without additional options, histogram and time-series logging are enabled for RTT and/or bit rate respectively.

-noconfirm

Specifies that the command must execute without prompting for confirmation.

Usage Guidelines

Use this command to enable TCP link monitoring on the Mobile Video Gateway.

Examples

The following command enables TCP link monitoring with statistical logging, with histogram and time-series logging enabled for both RTT and bit rate:

```
active-charging link-monitor tcp log
```

The following command enables TCP link monitoring with statistical logging, with histogram and time-series logging enabled for RTT:

```
active-charging link-monitor tcp log rtt
```

The following command enables TCP link monitoring with statistical logging, with histogram logging enabled for RTT:

```
active-charging link-monitor tcp log rtt histogram
```

The following command enables TCP link monitoring with statistical logging, with histogram logging enabled for RTT and time-series logging enabled for bit rate:

```
active-charging link-monitor tcp log rtt histogram bitrate time-series
```

active-charging radio-congestion

Enables the Congestion Management feature on the Mobile Video Gateway. This command can be configured in either APN Configuration Mode or Subscriber Configuration Mode.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > Subscriber Configuration

configure > context *context_name* **> subscriber { default | name** *subscriber_name* **}**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-subscriber)#
```

Syntax Description

active-charging radio-congestion policy *policy_name*
[default | no] active-charging radio-congestion policy

default

Sets congestion management to its default value, which is the same as **[no]**.

Default: Disabled

no

Deletes the settings and disables congestion management if previously configured.

active-charging radio-congestion policy *policy_name*

Enables the Congestion Management feature on the Mobile Video Gateway.

policy_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to enable or disable congestion management on the Mobile Video Gateway at either APN or subscriber. As congestion management makes use of the Link Monitoring feature, this must also be enabled along with the congestion monitoring feature.

Example

The following command enables radio congestion for a policy named *test123* for the subscriber:

```
active-charging radio-congestion policy test123
```

active-charging rulebase

Specifies the name of the Active Charging Service (ACS) rulebase to be used for subscribers who use this APN.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

ACS

eWAG

GGSN

MVG

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

active-charging rulebase *rulebase_name*
no active-charging rulebase

no

Removes the rulebase previously configured for this APN.

rulebase_name

Specifies the name of the ACS rulebase as an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the ACS rulebase to be used for subscribers who use the APN.

Example

The following command specifies the ACS rulebase named *rule1* for the APN:

active-charging rulebase rule1

active-charging rulebase-list

Specifies the name of the ACS rulebase list to be used for subscribers who use this APN.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

ACS

GGSN

MVG

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

active-charging rulebase-list *rulebase_list_name*
no active-charging rulebase-list

no

If previously configured, removes the rulebase list configured in the APN.

rulebase_list_name

Specifies the name of the ACS rulebase list.

rulebase_list_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to specify the ACS rulebase list to be used for subscribers who use the APN. The rulebase list is created and configured in the ACS Configuration Mode. For more information, see the **rulebase-list** command in the *ACS Configuration Mode Commands* chapter.

Example

The following command specifies the ACS rulebase list named *rblist* for the APN:

active-charging rulebase-list rblist

The following command removes the rulebase list named *rblist* from the APN:

no active-charging rulebase-list rblist

apn-ambr

Configures the Aggregated Maximum Bit Rate (AMBR) for all PDNs of a subscriber using this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

```
apn-ambr rate-limit direction { downlink | uplink } [ burst-size {
auto-readjust duration   milliseconds msecs | seconds 1:30bytes } |
violate-action { drop | lower-ip-precedence | shape [
transmit-when-buffer-full ] | transmit } ][ token-replenishment-interval
 msecs ]
[ default | no ] apn-ambr rate-limit direction { downlink | uplink }
```

default

Returns the selected command to it's default setting of no APN-AMBR.

no

Disables the selected command.

rate-limit direction { downlink | uplink }

Specifies that the rate limit is to be applied to either the downlink (network to subscriber) traffic or the uplink (subscriber to network) traffic.

downlink: Applies the AMBR parameters to the downlink direction.

uplink: Applies the AMBR parameters to the uplink direction.

burst-size { auto-readjust duration milliseconds *msecs| seconds 1:30 | bytes*}

This parameter is used by policing and shaping algorithms to permit short bursts of traffic in order to not exceed the allowed data rates. It is the maximum size of the token bucket.

auto-readjust duration *seconds*: The duration (in seconds) used in this burst size calculation: burst size = peak data rate/8 * auto-readjust duration

seconds must be an integer value from 1 to 30. Default is 1 second.

milliseconds must be an integer value from 100 to 900, in increments of 100 milliseconds. For example, 100, 200, or 300, and so on.

bytes: Specifies the burst size in bytes allowed by this APN for the associated PDNs. It must be an integer from 1 to 4294967295 (1 byte to 4 GB).

Important In 17.3 and later releases, the *bytes* option has been deprecated.

violate-action { drop | lower-ip-precedence | shape [transmit-when-buffer-full] | transmit }

The action that the P-GW will take when the data rate of the bearer context exceeds the AMBR.

drop: Drops violating packets.

lower-ip-precedence: Sets the DSCP value to zero ("best effort") for violating packets.

shape [transmit-when-buffer-full]: Places all violating packets into a buffer and, optionally, transmits the packets when the buffer is full.

Important The **shape** keyword and optional **transmit-when-buffer-full**option are available only in StarOS v12.0 and earlier releases, and StarOS v19.2 and later releases.

Important Traffic Shaping is a license-controlled feature. Contact your Cisco account or support representative for detailed licensing information.

transmit: Transmits violating packets. This is the default setting.

token-replenishment-interval

The token replenishment interval is used for both APN AMBR traffic policing and shaping. Operators have the option of using the default interval (100ms) or configuring a lower token replenishment interval of 10ms. Reducing the interval to 10ms helps reduce the queuing time required for the 100ms interval for a given packet size.

Valid entries are 10ms or 100ms.

The default is 100ms.

Important Traffic Shaping is a license-controlled feature. Contact your Cisco account or support representative for detailed licensing information.

Usage Guidelines Use this command to enforce the AMBR for the APN on bearers that do not have a Guaranteed Bit Rate (GBR).

Example

The following command sets the downlink burst rate to use an auto-readjust duration of 2 seconds and lowers the IP precedence of violating packets:

```
apn-ambr rate-limit direction downlink burst-size auto-readjust duration
 2 violate-action lower-ip-precedence
```

associate accounting-policy

Associates the APN with specific pre-configured policies configured in the same context.

Product P-GW

SAEGW

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`[ no ] associate accounting-policy` *`name`*

no

Removes the selected association from this APN.

name

Associates the P-GW APN with an accounting policy configured in the same context. *name* must be an existing accounting policy expressed as a string of 1 through 63 characters.

Accounting policies are configured through the **policy accounting** command in the Context Configuration mode.

Usage Guidelines

Use this command to associate the P-GW APN with an accounting policy configured in this context.

Example

The following command associates this P-GW APN with an accounting policy called *acct1*:

`associate accounting-policy acct1`

associate qci-qos-mapping

Associates a pre-configured QCI-QoS-Mapping table with this APN to support per APN DSCP marking.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`associate qci-qos-mapping` *`qci_qos_map_table_name`* **`rat-type { eutran | geran | utran }`**
`[ no ] associate qci-qos-mapping rat-type { eutran | geran | utran }`

no

Removes the selected association of QCI-QoS-Mapping table from this APN.

qci_qos_map_table_name

Specifies a pre-configured QCI-QoS-Mapping table from global configuration mode to this APN. *qci_qos_map_table_name* must be an existing QCI-QoS-mapping table expressed as a string of 1 through 63 characters.

QCI-QoS-Mapping tables are configured in QCI-QoS_Mapping Configuration mode.

rat-type { eutran | geran | utran }

This command selects the Radio Access Technology (RAT) type to implement DSCP marking on user traffic. Only one mapping table can be configured per RAT-type.

eutran: DSCP marking on RAT-Type for EUTRAN.

geran: DSCP marking on RAT-Type for GERAN.

utran: DSCP marking on RAT-Type for UTRAN.

Usage Guidelines

Use this command to associate a pre-configured QCI-QoS-Mapping table with an APN to provide per APN basis DSCP marking.

The GGSN/PGW supports configurable DSCP marking of the outer header of a GTP-U tunnel packet based on a QCI/THP table for the Gn/Gp and S5/S8 interfaces. This feature allows configuring DSCP marking table on a per APN basis.

From Release 21.6 onwards, RAT-Type based DSCP Marking is supported. The supported RAT-Types are: EUTRAN, GERAN and UTRAN.

Important In order to be backward compatible with old configuration, if a DSCP marking table is associated with GGSN service and not with the APN, then the one in GGSN service will be used. If table is associated in both GGSN service and APN, then the one on APN will take precedence.

Backward compatibility is maintained for existing DSCP marking and IPToS functionalities, with RAT-Type based DSCP marking.

Example

The following command associates a pre-configured QCI-QoS-Mapping table *dscp_mark_table1* with this APN.

```
associate qci-qos-mapping dscp_mark_table1
```

The following command configures DSCP marking for the RAT-Type EUTRAN

```
associate qci-qos-mapping dscp_mark_table rat-type eutran
```

authentication

Configures the APN's authentication parameters.

Product

GGSN

P-GW

PDG/TTG

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
authentication [ [ msid-auth | imsi-auth [ password-use-pco |
username-strip-apn | prefer-chap-pco ] | msisdn-auth [ password-use-pco |
username-strip-apn | username-append-apn | prefer-chap-pco ] | eap
initial-access-request [ authenticate-authorize | authenticate-only ] | [
allow-noauth [ pco-usernmae { chap | pap } ] ] [ chap preference [
convert-to-mschap ] ] [ mschap preference ] [ pap preference ] ]
default authentication
```

default

Sets the default authentication type for this APN. By default **allow-noauth** is the type for authentication for an APN.

msid-auth

Obsolete. Use **imsi-auth**.

imsi-auth

Default: Disabled.

Configures the APN to attempt to authenticate the subscriber based on their International Mobile Subscriber Identification (IMSI) number.

msisdn-auth

Default: Disabled.

Configures the APN to attempt to authenticate the subscriber based on their Mobile Station International Integrated Services Digital Network (MSISDN) number as described in the *Usage* section of this command.

username-strip-apn

Default: Disabled.

This keyword if enabled, either with **msisdn-auth** or **imsi-auth** strips the APN name from the user name *msisdn@apn* or *imsi@apn* received from AAA and makes the user name as *msisdn* or *imsi* respectively.

username-append-apn

Default: Disabled.

This keyword if enabled, works only with pap and chap options. If username-append-apn option enabled in authentication CLI, then apn name will be appended to the pco received username and same username will be used across all interfaces.

password-use-pco

Default: Disabled.

This keyword, if enabled, uses the password received through Protocol Configuration Options (PCO) from AAA for authentication.

prefer-chap-pco

Default: Disabled.

If this keyword along with msisdn-auth/imsi-auth is enabled, GGSN performs Challenge Handshake Authentication Protocol (CHAP) authentication, if CHAP parameters are received in Protocol Configuration Options (PCO). However, chap username would be constructed as *msisdn@apn* / *imsi@apn* and chap challenge, chap response parameters should be used as it is from CHAP parameters received in the PCO IE. If CHAP parameters are not received in the PCO IE of the CPC Request, GGSN does normal Password Authentication Protocol (PAP) authentication with PAP username as *msisdn@apn* / *imsi@apn* (ignoring any PAP username if received).

eap initial-access-request

Default: Enabled

Configures the type of initial access request to be used in Diameter EAP (Extensible Authentication Protocol) request. This feature is applicable to only Diameter-based AAA interface and not applicable to RADIUS or any other type of AAA interface.

authenticate-authorize

Default: Enabled

Configures the "authenticate and authorize" type of initial access request to be used in a Diameter EAP request.

authenticate-only

Default: Disabled

Configures the "authenticate only" type of initial access request to be used in a Diameter EAP request.

allow-noauth

Default: Enabled

Configures the APN to not perform authentication for PDP contexts as described in the *Usage* section.

pco-username

Default: Disabled

This option is used in conjunction with allow-noauth. It allows session to get established when PCO contains both pap and chap in authentication disabled case.

chap *preference*

Default: Disabled

Configures the APN to attempt to use CHAP to authenticate the subscriber as described in the *Usage* section of this command.

A *preference* must be specified in conjunction with this option. Priorities specify which authentication protocol should be attempted first, second, third and so on. It must be an integer from 1 through 1000. The lower the integer, the higher the preference.

convert-to-mschap

Default: Disabled

If enabled, the CHAP parameters received with the length of 49 bytes, the AAAmgr converts it to MSCHAP.

mschap *preference*

Default: Disabled

Configures the APN to attempt to use the Microsoft Challenge Handshake Authentication Protocol (MSCHAP) to authenticate the subscriber as described in the *Usage* section of this command.

A *preference* can be specified in conjunction with this option. Priorities specify which authentication protocol should be attempted first, second, third and so on. It must be an integer from 1 through 1000. The lower the integer, the higher the preference.

pap *preference*

Default: Disabled

Configures the APN to attempt to use PAP to authenticate the subscriber as described in the *Usage* section of this command.

A *preference* must be specified in conjunction with this option. Priorities specify which authentication protocol should be attempted first, second, third and so on. It must be an integer from 1 through 1000. The lower the integer, the higher the preference.

Usage Guidelines

Use this command to specify how the APN profile should handle PDP context authentication and what protocols to use (if any). The ability to configure this option is provided to accommodate the fact that not every MS will implement the same authentication protocols.

The authentication process varies depending on whether the PDP context is of type IP or PPP. Table given in this section describes these differences.

For IP PDP contexts, the authentication protocol and values will be passed from the SGSN as Protocol Configuration Options (PCOs) within the create PDP context PDU to the GGSN. The GGSN requires that the authentication protocol is specified by this command (with no regard to priority) and will use this information to authenticate the subscriber.

Table 14: Authentication Process Variances Between PDP Context Type

Authentication Mechanism	IP PDP Context Behavior	PPP PDP Context Behavior
allow-noauth	Allows the session even if the PCOs do not match any of the configured algorithms. If the there was no match and the **aaa constructed-nai authentication** parameter is enabled in the authentication context, the system attempts to determine a subscriber profile (via PAP with no password) using the subscriber's MSISDN as the username.	Allows the session with no authentication algorithm selected. If the **aaa constructed-nai authentication** parameter is enabled in the authentication context, the system attempts to determine a subscriber profile (via PAP with no password) using the subscriber's MSISDN as the username.
chap	If also specified in the PCOs, this protocol will be used to authenticate the subscriber.	Attempts this protocol according to its configured priority. If accepted by the remote end of the PPP connection, this protocol will be used to provide authentication.
mschap	If also specified in the PCOs, this protocol will be used to authenticate the subscriber.	Attempts this protocol according to its configured priority. If accepted by the remote end of the PPP connection, this protocol will be used to provide authentication.
pap	If also specified in the PCOs, this protocol will be used to authenticate the subscriber. If this protocol is used is specified and the **allow-noauth** parameter is disabled, the system will attempt to use the APN's default username/password specified by the **outbound** command for authentication via PAP.	Attempts this protocol according to its configured priority. If accepted by the remote end of the PPP connection, this protocol will be used to provide authentication.
msid-auth	Obsolete. Use **imsi-auth**.	Obsolete. Use **imsi-auth**.
imsi-auth	Values in the PCOs are ignored. The subscriber's IMSI is used as the username for PAP authentication. No password is used.	The subscriber's IMSI is used as the username for PAP authentication. No password is used.
msisdn-auth	Values in the PCOs are ignored. The subscriber's MSISDN is used as the username for PAP authentication. No password is used.	Option not available.

Example

The following command would configure the system to attempt subscriber authentication first using MSCHAP, then CHAP, and finally PAP. Since the **allow-noauth** command was also issued, if all

attempts to authenticate the subscriber using these protocols fail, then the subscriber would be still be allowed access.

```
authentication mschap 1 chap 2 pap 3 allow-noauth
```

To enable **imsi-auth** or **msisdn-auth**, the following command instances must be issued:

```
authentication imsi-auth
authentication msisdn-auth
```

authorize-with-hss

This command enables or disables subscriber session authorization per APN via a Home Subscriber Server (HSS) over an S6b Diameter interface. This feature is required to support the interworking of GGSN with P-GW and HA.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
authorize-with-hss [ egtp[gn-gp-enabled] [ s2b [gn-gp-enabled]  ][ s2a
[gn-gp-enabled] [ report-ipv6-addr ]  ][ s5-s8 [gn-gp-enabled |
gn-gp-enabled]] [ report-ipv6-addr ]| lma [ s6b-aaa-group aaa-group-name  |
 report-ipv6-addr ] | report-ipv6-addr ]
[ default | no ] authorize-with-hss
```

default | no

Disables the default authorization of subscriber over S6b interface. Resets the command to the default setting of "authorize locally" from an internal APN authorization configuration.

egtp

Enables S6b authorization for eGTP only.

gn-gp-disabled

Disables s6b authorization for 3G initial attach and GNGP handover.

gn-gp-enabled

Enables s6b authorization for 3G initial attach and GNGP handover.

s2b

Enables S6b authorization for eGTP S2b.

s2a

Enables S6b authorization for eGTP S2a.

s5-s8

Enables S6b authorization for eGTP S5S8.

lma [s6b-aaa-group *aaa-group-name*]

Enables S6b authorization for LMA only.

The keyword **s6b-aaa-group** *aaa-group-name* is used to enable the configuration of AAA group used for S6b authorization in PMIP P-GW.

Two AAA groups are defined within APN configuration, one for RADIUS and another one for Diameter. All the parameters required for RADIUS authentication and accounting will go under *radius_group*. Similarly, Diameter authentication parameters will go under *s6b_group*.

Important If the S6b AAA group is configured under both APN and P-GW service, the APN level configuration takes higher precedence.

report-ipv6-addr

Enables the IPv6 address reporting through Authorization-Authentication-Request (AAR) towards the S6b interface.

Usage Guidelines Use this command to enable/disable the authorization support per APN for subscriber over S6b interface, which is used between P-GW and the 3GPP AAA to exchange the information related to charging, GGSN discovery, etc.

bearer-control-mode

Enables or disables the bearer control mode for network controlled QoS (NCQoS) through this APN. It also controls the sending of an IE in GTP messages.

Product

GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
bearer-control-mode [ mixed | ms-only | none |
use-gx-avp-online-response-required[ prefer-local-value ] ]
default bearer-control-mode
```

default

Sets the bearer control mode to default mode of "none".

mixed

Default: Disabled.

This keyword indicates that the bearer will be controlled by User Equipment (UE) and network side (from GGSN) as well.

To enable network controlled QoS this option must be enabled.

ms-only

Default: Disabled.

This keyword indicates that the bearer will be controlled by the UE side.

none

Default: Enabled.

This keyword indicates that the system will not send any BCM mode information, BCM IE and BCM information in the protocol configuration option (PCO) IE within GTPC messages sent by the GGSN. This option is useful in networks where AGWs or firewalls do not support unknown optional IEs in GTP messages.

use-gx-avp-online-response-required

This keyword allows P-GW to function according to the behavior requested in Gx AVP OnlineResponseRequired or override-OnlineResponseRequired.

prefer-local-value

Default: Disabled.

This keyword indicates that the APN configured with "none" option for bearer control mode will not be overridden by any other interface (e.g. Gx interface towards PCRF). As a result it is ensured that BCM IE is never sent in GTP message.

Important When bearer control mode is set to "none" with the keyword set "prefer-local-value", even PCRF provided values will not override APN config and therefore sending of BCM mode IE and BCM in PCO IE in CPC Response is supressed.

Usage Guidelines

Use this command to enable the QoS through bearer control. This can be done either through the MS side or from both the GGSN and MS. To enable network requested QoS user need to enable "Mixed" mode for bearer control.

With this keyword the operator can control sending of BCM information in GTPC messages from the GGSN.

With MS-Only or Mixed options in this mode, the system sends the BCM information element in every Create PDP Context Response and Unknown PDP Context Request and Response message.

In some networks AGWs/Firewall drop/reject GTPC messages if there is an Unknown optional IE. To resolve this, the operator can use the "none" option to control sending of BCM IE and BCM information in the PCO IE within GTPC messages from the GGSN.

Example

The following command enables the bearer control from network and MS side for NCQoS.

```
bearer-control-mode mixed
```

backoff timer-value

Specifies a fixed value and a jitter to introduce randomness in the Backoff Timer value that is returned to the MME for different sessions. This helps prevent a session storm after the Backoff Timer expiry.

Important The APN Backoff Timer feature requires that the M2M license be enabled on the P-GW/SAEGW. Contact your Cisco account or support representative for licensing details.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

`[ no ] backoff timer-value` *`seconds`* **`[ jitter`** *`seconds`* **`]`**

no

Disables the backoff timer values.

backoff timer-value *seconds*

Specifies the backoff timer value, in seconds.

Valid entries are from 0 to 576000 seconds.

There is no default setting.

jitter *seconds*

Specifies the jitter value, in seconds.

Valid entries are from 0 to 1000 seconds.

There is no default setting.

Usage Guidelines

This command must be used with the **pdn-behavior lapi** command in *APN Configuration Mode*.

Example

The following command specifies a timer-value and jitter setting of 20 seconds:

```
backoff timer-value 20 jitter 20
```

bearer-duration-stats

Enables or disables per QCI call duration statistics for dedicated bearers.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] bearer-duration-stats qci { all |1|2|3|4|5|6|7|8|9 } +
```

no

Disables per QCI call duration statistics.

all

Configures QCI-based duration statistics for all QCI.

1|2|3|4|5|6|7|8|9|80|82|83

Configures bearer duration statistics for QCI .

+

More than one of the previous keywords can be entered within a single command.

Usage Guidelines Use this command to enable or disable per QCI call duration statistics for dedicated bearers.

Example

The following command enables QCI-based duration statistics for all QCI:

```
bearer-duration-stats qci all
```

cc-home

Configures the home subscriber charging characteristics (CC) used by the GGSN when those from the SGSN will not be accepted.

Product GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
cc-home { behavior bits | profile index }
default cc-home
```

default

Restores the cc-home parameter to its default setting of the following:

- **behavior bits:** 0x00
- **profile index:** 8

behavior *bits*

Specifies the behavior bit for the home subscriber charging characteristic. *bits* can be configured to any unique bit from 001H to FFFH (0001 to 1111 1111 1111 bin) where the least-significant bit corresponds to B1 and the most-significant bit corresponds to B12.

profile *index*

Specifies the profile index for the home subscriber charging characteristic. *index* can be configured to any integer value between 0 and 15. Default: 8

Important 3GPP standards suggest that profile index values of 1, 2, 4, and 8 be used for hot billing, flat rate billing, prepaid billing and normal billing, respectively. A single charging characteristics profile can contain multiple behavior settings.

Usage Guidelines When the GGSN is configured to reject the charging characteristics sent by the SGSN for "home" subscribers, it uses the profile index specified by this command to determine the appropriate CCs to use.

Multiple behavior bits can be configured for a single profile index by ORing the bit strings together and converting the result to hexadecimal.

The properties of the actual CC profile index are configured as part of the GGSN service using the **cc profile** command. Refer to the *GGSN Service Configuration Mode* chapter of this reference for additional information on this command.

Example

The following command configures a behavior bit of 2 (0000 0000 0010) and a profile index of *10* for home subscribers charging characteristics:

```
cc-home behavior 2 profile 10
```

The following command configures the behavior bits *3* (0000 0000 0100) and 5 (0000 0001 0000 bin) and a profile index of *14* for home subscriber charging characteristics:

```
cc-home behavior 14 profile 14
```

cc-profile

This command selectively enables or disables the Gy sessions based on the Charging Characteristics (CC) profile of the subscriber.

Product GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
cc-profile { cc_profile_index | any } { prepaid-prohibited |
credit-control-group cc_group_name }
no cc-profile cc_profile_index
```

no

This command allows you to specify a CC profile index value. Whatever the CC profile value that was set with **no** command will fall back to "**any**" CC profile behavior.

Note that this command will not have "any" option. The verbose configuration will display other valid CC profiles and an entry for "any".

cc_profile_index

Specifies the CC profile index.

cc_profile_index must be an integer from 0 through 15.

Note that one charging characteristic value can be mapped to only one credit-control-group/prepaid-prohibited configuration within one APN.

any

This keyword is applicable for any non-overridden cc-profile index. This keyword has the least priority over specific configuration for a CC profile value. So, configuring "any" CLI command will not override other specific configurations under APN.

prepaid-prohibited

Disables prepaid Gy session for the configured profile index.

cc_group_name

Specifies name of the credit control group as an alphanumeric string of 1 through 63 characters.

Creating different credit control groups enables applying different credit control configurations (DCCA dictionary, failure-handling, session-failover, Diameter endpoint selection, etc.) to different subscribers on the same system.

Usage Guidelines

Use this command to selectively enable or disable the Gy sessions towards OCS based on the Charging Characteristics (CC) profile of the subscriber. When the prepaid prohibited CLI command is configured, the Gy messages are not triggered for postpaid subscribers. This feature is enabled by default. If APN does not have a specific cc-profile configured, it will fall back to "any" CC profile behavior.

Important The existing **credit-control-group** command within APN configuration is obsolete in 17 and later releases. This functionality is available as part of the **cc-profile** command. Also, note that the backward compatibility support exists for the **credit-control-group** CLI command.

The Session controller stores/updates the APN configuration in the AAA manager. During the session setup, the session manager fills the CC value received in session authenticate request, and sends it to AAA manager. The AAA manager matches this against the locally stored APN configuration, and selects the desired credit-control-group/prepaid-prohibited configuration for the session. Then the session manager passes this credit-control-group/prepaid-prohibited information received from the AAA manager to ACS manager.

When the local authentication (session setup request) is done, the credit-control group with the matching charging-characteristic is selected and used. If there is no matching charging-characteristic configuration found for the credit-control group selection, then the default credit-control group for the APN is selected.

The CC based Gy Session Controlling feature is applicable only for the CC value received via GTP-Auth-Request, and during the session establishment. The CC value updated via AAA/PCRF after the session setup will not cause any change in already selected credit-control group. Once the credit-control group is selected after session setup, this feature is not applicable.

Example

The following command configures the CC value 2 as prepaid to disable Gy session:

```
cc-profile 2 prepaid-prohibited
```

cc-roaming

Configures the roaming subscriber charging characteristics (CC) used by the GGSN when those from the SGSN will not be accepted.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
cc-roaming { behavior bits | profile index }
default cc-roaming
```

default

Restores the cc-roaming parameter to its default setting of the following:

- **behavior bits:** 0x00
- **profile index:** 8

behavior *bits*

Specifies the behavior bit for the roaming subscriber charging characteristic. *bits* can be configured to any unique bit from 001H to FFFH (0001 to 1111 1111 1111 bin) where the least-significant bit corresponds to B1 and the most-significant bit corresponds to B12.

profile *index*

Specifies the profile index for the roaming subscriber charging characteristic. *index* can be configured to any integer value between 0 and 15. Default: 8

Important 3GPP standards suggest that profile index values of 1, 2, 4, and 8 be used for hot billing, flat rate billing, prepaid billing and normal billing, respectively. A single charging characteristics profile can contain multiple behavior settings.

Usage Guidelines

When the GGSN is configured to reject the charging characteristics sent by the SGSN for "roaming" subscribers, it uses the profile index specified by this command to determine the appropriate CCs to use.

Multiple behavior bits can be configured for a single profile index by ORing the bit strings together and convert the result to hexadecimal.

The properties of the actual CC profile index are configured as part of the GGSN service using the cc profile command. Refer to the GGSN Service Configuration Mode chapter of this reference for additional information on this command.

Example

The following command configures a behavior bit 10 (0010 0000 0000) and a profile index of *10* for roaming subscriber charging characteristics:

```
cc-roaming behavior 200 profile 10
```

The following command configures the behavior bits 9 (0001 0000 0000) and 6 (0000 0010 0000) and a profile index of *14* for roaming subscriber charging characteristics:

```
cc-roaming behavior 120 profile 14
```

cc-sgsn

Specifies the source for charging characteristics (CC) - those configured locally or those received from the SGSN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

cc-sgsn { **gx-returned** | **home-subscriber-use-GGSN** | **radius-returned** | **roaming-subscriber-use-GGSN** | **visiting-subscriber-use-GGSN** } +
cc-sgsn { **use-GGSN behavior** *bits* **profile** *index[0...15]* [**radius-returned** { **accept-invalid** | **replace-invalid** }] | [**gx-returned** { **accept-invalid** |

```
replace-invalid } ] }
default cc-sgsn
no cc-sgsn { { radius-returned | home-subscriber-use-GGSN |
roaming-subscriber-use-GGSN | visiting-subscriber-use-GGSN } + | [ use-GGSN
 ] [ radius-returned { accept-invalid | replace-invalid } ] | [ gx-returned
{ accept-invalid | replace-invalid } ] }
```

default cc-sgsn

Restores the cc-sgsn parameter to its default setting of the following:

- **home-subscriber-use-GGSN**: Disabled
- **roaming-subscriber-use-GGSN**: Disabled
- **visiting-subscriber-use-GGSN**: Disabled

no cc-sgsn

Causes the GGSN/P-GW to accept CCs from the SGSN(s) when the **no cc-sgsn** command is entered with all applicable keywords. Otherwise, **no cc-sgsn** can be used to turn off one or more of the GGSN/P-GW sources of CC.

- **roaming-subscriber-use-GGSN**
- **home-subscriber-use-GGSN**
- **roaming-subscriber-use-GGSN**
- **visiting-subscriber-use-GGSN**

Before entering **no cc-sgsn**, it is helpful to determine which CC sources have been configured. This can be done with either **show configuration** or **show apn name** in Exec Mode.

home-subscriber-use-GGSN

Configures the GGSN/P-GW to use the locally defined charging characteristics for home subscribers, as configured with the APN Configuration Mode **cc-home** command.

radius-returned

Configures the GGSN/P-GW to accept Gx returned charging characteristics for all subscribers for the APN.

gx-returned

Configures the GGSN/P-GW to accept charging characteristics returned from the RADIUS server for all subscribers for the APN.

accept-invalid

Configures the GGSN/P-GW to accept charging characteristics returned from PCRF for all subscribers for the APN. It always accepts CC with profile index zero.

replace-invalid

Configures GGSN/P-GW to accept charging characteristics returned from PCRF for all subscribers for the APN, except If CC profile index is zero, it will be replaced with default profile index. Default profile index is 8. This is the default behavior for gx-returned CC.

roaming-subscriber-use-GGSN

Configures the GGSN/P-GW to use the locally defined charging characteristics for roaming subscribers, as configured with the APN Configuration Mode **cc-roaming** command.

use-GGSN [behavior *bits*] profile *index[0...15]*

Configures the GGSN/P-GW to accept charging characteristics for all subscribers in the APN.

bits specifies the behavior bit for the charging characteristic. This variable can be configured to any unique bit from 001H to FFFH (0001 to 1111 1111 1111 bin) where the least-significant bit corresponds to B1 and the most-significant bit corresponds to B12.

index indicates which profile defined with **cc profile** in GGSN Service Configuration mode, the GGSN will use as a source for CCs. The index can be configured to an integer from 0 to 15.

The **use-GGSN** keyword can be entered alone or in conjunction with the **radius-returned** keyword. When entered, this keyword overrides the previous configuration using any of the home, roaming, and/or visiting keywords.

visiting-subscriber-use-GGSN

Configures the GGSN/P-GW to use the locally defined charging characteristics for visiting subscribers, as configured with the APN Configuration Mode **cc-visiting** command.

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

This command specifies whether or not CCs received from the SGSN will be accepted. If they are not accepted, the GGSN/P-GW will use those that have been configured locally.

The GGSN/P-GW's behavior can be configured for the following subscriber types:

- **Home:** Subscribers belonging to the same Public Land Mobile Network (PLMN) as the one on which the GGSN/P-GW is located.
- **Roaming:** Subscribers that are serviced by a an SGSN belonging to a different PLMN than the one on which the GGSN/P-GW is located.
- **Visiting:** Subscribers belonging to a different PLMN than the one on which the GGSN/P-GW is located.
- Any subscriber in the APN.

Example

The following command instructs the GGSN/P-GW to accept CCs for any subscriber in the APN based on local profile configurations of CCs.

```
cc-sgsn use-GGSN profile x
```

Assuming the CC source as defined with the previous command, the following command instructs the GGSN/P-GW to accept CCs supplied by the SGSN(s) and disables the acceptance of CCs supplied by the GGSN/P-GW for any subscriber within the APN:

no cc-sgsn use-GGSN

The following command instructs the GGSN/P-GW to accept CCs for any subscriber in the APN based on CC information returned from the RADIUS server. This command can be issued after the previous command to expand the possible sources.

cc-sgsn radius-returned

The following command disables the acceptance of CCs supplied by the GGSN/P-GW for visiting and roaming subscribers:

no cc-sgsn roaming-subscriber-use-GGSN visiting-subscriber-use-GGSN

cc-visiting

Configures the visiting subscriber charging characteristics (CC) used by the GGSN when those from the SGSN will not be accepted.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

cc-visiting behavior *bits* **profile** *index*
default cc-visiting

default

Restores the cc-visiting parameter to its default setting of the following:

- **behavior bits:** 0x00
- **profile index:** 8

behavior *bits*

Specifies the behavior bit for the visiting subscriber charging characteristic. *bits* can be configured to any unique bit from 001H to FFFH (0001 to 1111 1111 1111 bin) where the least-significant bit corresponds to B1 and the most-significant bit corresponds to B12.

profile *index*

Specifies the profile index for the visiting subscriber charging characteristic. *index* can be configured to any integer value between 0 and 15. Default: 8

Important 3GPP standards suggest that profile index values of 1, 2, 4, and 8 be used for hot billing, flat rate billing, prepaid billing and normal billing, respectively. A single charging characteristics profile can contain multiple behavior settings.

Usage Guidelines

When the GGSN is configured to reject the charging characteristics sent by the SGSN for "visiting" subscribers, it uses the profile index specified by this command to determine the appropriate CCs to use.

Multiple behavior bits can be configured for a single profile index by ORing the bit strings together and convert the result to hexadecimal.

The properties of the actual CC profile index are configured as part of the GGSN service using the cc profile command. Refer to the GGSN Service Configuration Mode chapter of this reference for additional information on this command.

Example

The following command configures a behavior bit 7 (0000 0100 0000) and a profile index of 10 for visiting subscriber charging characteristics:

```
cc-visiting behavior 40 profile 10
```

The following command configures the behavior bits 1 (0000 0000 0001) and 12 (1000 0000 0000) and a profile index of 14 for visiting subscriber charging characteristics:

```
cc-visiting behavior 801 profile 14
```

content-filtering category

Enables or disables the specified pre-configured Category Policy Identifier for Category-based Content Filtering support.

Product

CF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

content-filtering category policy-id*cf_policy_id*
no content-filtering category policy-id

no

Disables the previously configured category policy identifier for Content Filtering support to the APN. This is the default setting.

policy-id *cf_policy_id*

Applies the specified content filtering category policy ID, configured in the ACS Configuration Mode, to this APN.

cf_policy_id must be a category policy ID entered as an integer from 1 through 4294967295.

If the specified category policy ID is not configured in the ACS Configuration Mode, all packets will be passed regardless of the categories determined for such packets.

Important Category Policy ID configured through this mode overrides the Category Policy ID configured through **content-filtering category policy-id** command in the ACS Rulebase Configuration Mode.

Usage Guidelines

Use this command to enter the Content Filtering Policy Configuration Mode and to enable or disable the Content Filtering Category Policy ID for an APN.

Important If Content Filtering Category Policy ID is not specified here the similar command in the ACS Rulebase Configuration Mode determines the policy.

Up to 64 different policy IDs can be defined.

Example

The following command enters the Content Filtering Policy Configuration Mode and enables the Category Policy ID *101* for Content Filtering support:

```
content-filtering category policy-id 101
```

credit-control-client

Configures the credit-control client parameters for subscribers who use this APN.

Product

GGSN

HA

IPSG

PDSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

```
credit-control-client { event-based-charging | override session-mode {
per-sub-session | per-subscriber } }
no credit-control-client { event-based-charging | override session-mode
}
default credit-control-client event-based-charging
```

no

Disables the configured setting.

default

Resets the command to its default setting of disabled.

event-based-charging

Enables event-based charging.

override session-mode { per-sub-session | per-subscriber }

Overrides the session-mode configured through the CLI command "**require ecs credit-control session-mode per-subscriber**" in Global Configuration mode so that different APN can operate in different modes. For example, one APN can be configured to work in per-subscriber mode, while another in per-sub-session mode.

This keyword is used to switch between subscriber level Gy and sub-session level Gy.

Important This CLI can be changed on the fly. The modified values will be reflected only in the new subscriber session.

The **no** command removes the override CLI and makes the APN fall back to the configuration specified through the CLI command "**require ecs credit-control session-mode per-subscriber**".

Usage Guidelines

Use this command to configure the credit-control client parameters for this APN.

This configuration should be enabled to report UE's PLMN, time zone and ULI changes through Event-based-Gy session. In the event that both Gy Online charging and Gy event reporting are enabled, the P-GW shall send only CCR-Update requests to the OCS and shall not send CCR-Event requests.

With the inclusion of this keyword **override session-mode ...** in 14.1 release, it is possible to seamlessly change the configuration from bearer level to APN level and vice-versa without requiring a system reboot.

Example

The following command enables event-based Gy support for the current APN:

```
credit-control-client event-based-charging
```

credit-control-group

Configures the credit control group to be used for subscribers who use this APN.

Important This command is obsolete in 17 and later releases. The functionality of this command is available as part of the **cc-profile** command in the APN Configuration mode. Refer to the **cc-profile** command in this chapter.

Product

GGSN

ACS

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
credit-control-group cc_group_name [ cc-profile cc_profile_index ]
no credit-control-group [ cc_group_name cc-profile cc_profile_index ]
```

no

Removes the previously configured credit control group from the APN configuration.

cc_group_name

Specifies name of the credit control group as an alphanumeric string of 1 through 63 characters.

Important Release 16 onwards, a maximum of up to four credit-control-group - charging-profile configurations are possible within one APN.

cc-profile *cc_profile_index*

Specifies the charging-characteristic preference for the credit-control-group.

For example, 1 for Hot Billing, 2 (Flat Rate), and 8 (Post-Paid)

cc_profile_index must be an integer from 0 through 15.

Note that one charging-characteristic value can be mapped to only one credit-control-group inside one APN.

Important The CLI command "**cc-sgsn**" within APN configuration mode, should be used cautiously as this will cause the charging-chars to be altered/modified.

Usage Guidelines

Use this command to configure the credit control group for this APN.

Creating different credit control groups enables applying different credit control configurations (DCCA dictionary, failure-handling, session-failover, Diameter endpoint selection, etc.) to different subscribers on the same system.

Without credit control groups, only one credit control configuration is possible on a system. All the subscribers in the system will have to use the same configuration.

In releases prior to 16, only one credit-control-group can be specified inside an APN. In 16 and later releases, the APN configuration is extended to include the Charging-Characteristic (CC) preference for the credit-control-group. This APN configuration is also extended to allow configuring additional credit-control-groups for each of the CC values. With this enhancement, the OCS selection can be done based on the CC value received via GTP request.

When the local authentication (session-setup-request) is done, the credit-control-group with the matching charging-characteristic will be selected, and used. If there is no matching charging-characteristic configuration found for the credit-control-group selection, then the default credit-control-group for the APN will be selected.

The CC based OCS selection feature is applicable only for the Charging-Chars value received via GTP-Auth-Request, and during the session-establishment. The Charging-Chars value updated via AAA/PCRF after the session setup will not cause any change in already selected "credit-control-group". Once the credit-control-group is selected (after session setup), this feature is not applicable.

APN configuration information is stored in AAA manager. Credit control group information from the APN configuration is filled during the session-authentication time, by AAA manager. So, AAA manager should be informed of the Charging-Characteristic value received at the time of Session-Authentication, so that the desired credit-control-group can be selected.

Thus, the operator has the added flexibility to choose different OCS charging servers based on their business logic. This could help multi-national operators to choose correct OCS servers based on countries for roaming subscribers.

Example

The following command configures a credit control group named *testgroup12* for the current APN:

```
credit-control-group testgroup12
```

daf-pdp-type

By configuring this command P-GW/GGSN can set different behavior of assigning PDN Type and return cause code when request for ipv4v6 PDN with DAF bit False is received.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

daf-pdp-type { ipv4 | ipv6 } cause-code { network-preference | single-address-bearer-only }

daf-pdp-type

Configures PDP type for requested IPv4v6 PDN with Dual Address Flag zero. Default PDP type is IPv6.

ipv4

Configures PDP type for this APN to be IPv4.

ipv6

Configures PDP type for this APN to be IPv6

ipv6

Configures PDP type for this APN to be IPv6.

cause-code

Configures GTP cause code for requested IPv4v6 PDN with Dual Address Flag zero. Default GTP cause code is single-address-bearer-only.

network-preference

New PDP type due to network preference.

single-address-bearer-only

New PDP type due to single address bearer only.

Usage Guidelines

By configuring this command P-GW/GGSN can set different behavior of assigning PDN Type and return cause code when request for ipv4v6 PDN with DAF bit False is received. If this command is not configured P-GW/GGSN it uses the default option of assigning ipv6 pdn type with return cause of 'New PDN Type due to single address bearer only'.

Example

The following command configures PDP type and GTP cause code for requested IPv4v6 PDN due to network preference.

```
daf-pdp-type ipv4 cause-code network-preference
```

data-tunnel mtu

Configures the Maximum Transmission Unit (MTU) for data sent on the IPv6 tunnel between the P-GW and the mobile node.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

data-tunnel mtu*bytes*
default data-tunnel mtu

default

Returns the command to the default value of 1500.

bytes

Specifies the MTU for the IPv6 tunnel between the P-GW and the mobile node. *bytes* must be an integer between 1280 and 2000. Default: 1500

Usage Guidelines

Use this command to set the MTU for data traffic on the IPv6 tunnel between the P-GW and the mobile node.

Example

The following command sets the MTU for IPv6 data traffic to *1400* bytes:

data-tunnel mtu 1400

data-tunneling ignore df-bit

Controls the handling of the DF (Don't Fragment) bit present in the user IPv4/IPv6 packet for tunneling used for the Mobile IP data path.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[default | no] data-tunneling ignore df-bit

default

Restores the data-tunneling parameter to its default setting of disabled.

no

Disables this option. The DF bit in the tunneled IP packet header is not ignored during tunneling. This is the default setting.

ignore df-bit

Ignores the DF bit in the tunneled IP packet header during tunneling. This is the default setting.

Usage Guidelines

Use this command to configure a user so that during Mobile IP tunneling the DF bit is ignored and packets are fragmented.

If this feature is enabled, and fragmentation is required for the tunneled user IPv4/IPv6 packet, then the DF bit is ignored and the packet is fragmented. Also the DF bit is not copied to the outer header.

In the GGSN, this command also affects the other L3 tunneling options, IP-in-IP and GRE, but does not affect L2TP tunneling.

Example

To enable fragmentation of a subscribers packets over a MIP tunnel even when the DF bit is present, enter the following command:

```
data-tunneling ignore df-bit
```

dcca origin endpoint

This command is obsolete. To configure the Diameter Credit Control Origin Endpoint, in the Credit Control Configuration Mode, use the **diameter origin endpoint** command.

dcca peer-select

Specifies the Diameter credit control primary and secondary host for credit control.

Product

GGSN

ACS

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

dcca peer-select peer *host_name* [**realm** *realm_name*] [**secondary-peer** *host_name*]
no dcca peer-select

no

Removes the previously configured Diameter credit control peer selection.

host_name

Specifies a unique name for the peer as an alphanumeric string of 1 through 63 characters that allows punctuation marks.

realm ***realm_name***

Specifies the ream as an alphanumeric string of from 1 through 127 characters that allows punctuation marks. The realm may typically be a company or service name.

secondary-peer ***host_name***

Specifies a back-up host that is used for fail-over processing as an alphanumeric string of from 1 through 63 characters. When the route-table does not find an AVAILABLE route, the secondary host performs fail-over processing.

Usage Guidelines

Use this command to select a Diameter credit control peer and realm.

Important This configuration completely overrides all instances of **diameter peer-select** that have been configured within the Credit Control Configuration Mode for an Active Charging Service.

Example

The following command selects a Diameter credit control peer named test and a realm of *companyx*:

dcca peer-select test realm companyx

delay-tolerant-pdn

Configures Delay Tolerant behavior for PDN connection to support UE in Power Saving Mode.

Product

P-GW

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
delay-tolerant-pdn max-control-signal-buffer  1-4
no delay-tolerant-pdn
```

no

Removes and restores the configuration to its default value.

max-control-signal-buffer *1-4*

Configures maximum number of P-GW initiated control signaling messages to be buffered (range 1 to 4) when the UE is in Power Saving Mode (PSM).

Usage Guidelines

When the CLI is configured, it indicates that the PDN supports delay tolerant behavior. Also, the number of control signals that can be buffered is indicated by **max-control-signal-buffer**. When a new Rule is sent to update/create bearer, the number of transactions that will be buffered gets restricted to 4.

By default, the command is disabled and eDRX support is not applicable.

This CLI command takes effect during new call set-up or during handoff procedure to S5/S8 interface.

Example

The following command configures *3* P-GW initiated control signaling messages to be buffered when UE is in Power Saving mode.

```
delay-tolerant-pdn max-control-signal-buffer  3
```

description

Allows you to enter descriptive text for this configuration.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines

The description should provide useful information about this configuration.

dhcp context-name

Configures the name of the context on the system in which Dynamic Host Control Protocol (DHCP) functionality is configured.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] dhcp context-name name
```

no

Removes a previously configured context name.

name

Specifies the name of a context configured on the system in which one or more DHCP services are configured. *name* is an alphanumeric string of 1 through 79 characters that is case sensitive.

Usage Guidelines

If the APN is to support dynamic address assignment via DHCP (either the proxy or relay mode), this parameter must be configured to point the APN to the name of a pre-configured context on the chassis in which one or more DHCP services are configured.

The command can be used to identify a single DHCP service instance within the specified context to use to facilitate the address assignment.

Example

The following command configures the APN to look for DHCP services in a context called *dhcp-ctx:*

```
dhcp context-name dhcp-ctx
```

dhcp lease-expiration-policy

Configures the system's handling of PDP contexts whose DHCP assigned IP lease has expired.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
dhcp lease-expiration-policy { auto-renew | disconnect }
default dhcp lease-expiration-policy
```

default

Restores the dhcp lease-expiration-policy parameter to its default setting of auto-renew.

auto-renew

Configures the system to automatically renew an IP address' lease when it is about to expire for PDP contexts facilitated by the APN. Default: Enabled

disconnect

Configures the system to automatically release the PDP context when the lease for the IP address associated with that context expires. Default: Disabled

Usage Guidelines

Use this command to specify the action the system is to take when leases for IP addresses for PDP contexts that it are currently facilitated by the current APN are about to expire.

Example

The following command causes the system to release PDP contexts associated with the current APN when the lease for their DHCP-assigned IP address expires:

```
dhcp lease-expiration-policy disconnect
```

dhcp service-name

Configures the name of a specific DHCP service to use when dynamically assigning IP addresses to PDP contexts using the Dynamic Host Control Protocol.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] dhcp service-name service_name
```

no

Removes a previously configured DHCP service name.

service_name

Configures the name of the DHCP service instance that is to be used by the current APN for the dynamic assignment of IP addresses to PDP contexts. The name can be an alphanumeric string of 1 through 63 characters that is case sensitive.

Usage Guidelines

Use this command to specify a pre-configured DHCP service instance that is to be used by the APN for IP address assignment when the Dynamic Host Control Protocol is used.

The name of the context in which the desired DHCP service is configured must be specified by the **dhcp context-name** command.

Example

The following command instructs the APN to use a DHCP service called *dhcp1*:

```
dhcp service-name dhcp1
```

dhcpv6 context-name

Configures the name of the context on the system in which DHCPv6 functionality is configured. If a DHCPv6 service is configured in the APN, this DHCPv6 context name is used to get an address

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

dhcpv6 context-name *ctxt_name*
[no] dhcp context-name

no

Removes a previously configured context name.

ctxt_name

Specifies the name of a context configured on the system in which one or more DHCPv6 services are configured. *ctxt_name* is an alphanumeric string of 1 through 79 characters that is case sensitive.

Usage Guidelines

If the APN is to support dynamic address assignment via DHCPv6, this parameter must be configured to point the APN to the name of a pre-configured context on the chassis in which one or more DHCPv6 services are configured.

The command can be used to identify a single DHCPv6 service instance within the specified context to use to facilitate the address assignment.

Example

The following command configures the APN to look for DHCPv6 services in a context called *dhcpv6-ctx:*

dhcpv6 context-name dhcpv6-ctx

dhcpv6 service-name

Specifies which DHCPV6 service to use, if the alloc-type is configured as dhcpv6-client or dhcpv6-relay.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] dhcpv6 service-name service_name
```

no

Removes a previously configured DHCPv6 service name.

service_name

Configures the name of the DHCPv6 service instance that is to be used by the current APN for the dynamic assignment of IPv6 addresses to PDP contexts. The name can be an alphanumeric string of 1 through 63 characters that is case sensitive.

Usage Guidelines

Use this command to specify a pre-configured DHCPv6 service instance that is to be used by the APN for IPv6 address assignment when the Dynamic Host Control Protocol is used.

The name of the context in which the desired DHCP service is configured must be specified by the **dhcpv6 context-name** command.

Important Only one DHCPv6 service can be configured for an APN

Example

The following command instructs the APN to use a DHCPv6 service called *dhcpv6_svc*:

```
dhcp service-name dhcpv6_svc
```

dns

Configures the Domain Name Service (DNS) servers that will be used by the APN for PPP.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
dns { primary | secondary } { address }
no dns { primary | secondary } [ dns_address ]
```

no

Deletes a previously configured DNS server.

primary

Configures the primary DNS server for the APN.

secondary

Configures the secondary DNS server for the APN. Only one secondary DNS server can be configured.

address

Configures the IP address of the DNS server expressed in IPv4 dotted-decimal notation.

Default: primary = 0.0.0.0, secondary = 0.0.0.0

dns_address

Specifies the IP address of the DNS server to remove, expressed in IPv4 dotted-decimal notation.

Usage Guidelines

DNS servers are configured on a per-APN profile basis. This allows each APN profile to use specific servers in processing PDP contexts.

The configured DNS IP addresses are relayed to the subscriber within IPCP if the PDP type is PPP, or as PCOs (Protocol Configuration Options) if the PDP type is IP.

The DNS can be specified at the APN level in APN configuration as well as at the Context level in Context configuration mode with **ip name-servers** command, or it can be received from AAA server.

When DNS is requested in PCO configuration, the following preference will be followed for DNS value:

1. DNS Values received from LNS have the first preference.
2. DNS values received from RADIUS Server has the second preference.
3. DNS values locally configured with APN has the third preference.
4. DNS values configured at context level with **ip name-servers** command has the last preference.

Important The same preference would be applicable for the NBNS (NetBIOS Name Service) servers to be negotiated via ICPC (Initial Connection Protocol Control) with the LNS (L2TP Network Server).

Example

The following commands configure a primary DNS server address of *192.168.100.3* and a secondary DNS server address of *192.168.100.4*:

```
dns primary 192.168.100.3
dns secondary 192.168.100.4
```

egtp

Enables/disables the Overcharging Protection feature on an APN service.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

egtp overcharge-protection [drop-all | transmit-all]
{ default | no | remove } egtp overcharge-protection

default

Disables overcharging protection.

no

Disables overcharging protection.

remove

Removes overcharging protection configuration.

overcharge-protection [drop-all | transmit-all]

drop-all: Configures overcharging protection to drop all packets received in LORC.

transmit-all: Configures overcharging protection to send all packets received in LORC mode to S-GW.

Usage Guidelines

Use this command to enable/disable the Overcharging Protection feature on an APN service.

When Overcharging Protection feature is configured at both P-GW service and APN, configuration at APN takes priority.

Important Use of Overcharging Protection feature requires that a valid license key be installed. Contact your Cisco account representative for information on how to obtain a license.

Example

The following command configures overcharging protection to drop all packets received in LORC"

egtp overcharge-protection drop-all

egtpc-qci-stats

Enables/disables an APN candidate list for the **apn-expansion** bulkstats schema.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] egtpc-qci-stats { all | qci1 | qci2 | qci3 | qci4 | qci5 | qci6 |
 qci7 | qci8| qci80 | qci82 |qci83| qci9 } +
default egtpc-qci-stats
```

default

Disables an APN candidate list for the apn-expansion bulkstat schema.

no

Disables APN candidate list(s) for the apn-expansion bulkstat schema.

all

Configure apn-qci-egtpc statistics for all QCI.

qci1

Configure apn-qci-egtpc statistics for QCI 1.

qci2

Configure apn-qci-egtpc statistics for QCI 2.

qci3

Configure apn-qci-egtpc statistics for QCI 3.

qci4

Configure apn-qci-egtpc statistics for QCI 4.

qci5

Configure apn-qci-egtpc statistics for QCI 5.

qci6

Configure apn-qci-egtpc statistics for QCI 6.

qci7

Configure apn-qci-egtpc statistics for QCI 7.

qci8

Configure apn-qci-egtpc statistics for QCI 8.

qci80

Configure apn-qci-egtpc statistics for QCI 80.

qci82

Configure apn-qci-egtpc statistics for QCI 82.

qci83

Configure apn-qci-egtpc statistics for QCI 83.

qci9

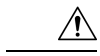
Configure apn-qci-egtpc statistics for QCI 9.

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

Use this command to enable/disable an APN candidate list for the APN Expansion bulkstats schema. You can enable which APN collects granular statistics using this configuration. In those granular statistics, it is possible to decide which particular statistics to collect.



Caution Supporting more granular statistics/bulkstats on APN (up to 12 APNs are supported) has an impact on system performance. Statistics need to be obtained at regular intervals for a few minutes. Each of these retrievals can lead to gigabytes of information being gathered and consolidated. Due to this issue, granular bulkstats collection is restricted/controlled.

See the *APN Expansion Schema Statistics* chapter in the *Statistics and Counters Reference* for detailed information on these bulkstats.

Example

The following command configures all QCI bulkstats in the apn-expansion schema.

```
egtpc-qci-stats all
```

ehrpd-access

Configures the P-GW to exclude IPv6 traffic from being delivered to UEs, accessing PDNs from the eHRPD network that do not have IPv6 capabilities.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

[default | no] ehrpd-access drop-ipv6-traffic

[default | no]

Resets this command to its default setting of disabled.

drop-ipv6-traffic

Excludes IPv6 traffic from being delivered to UEs, accessing PDNs from the eHRPD network that do not have IPv6 capabilities.

Usage Guidelines

Use this command to exclude IPv6 traffic from being delivered to UEs on the eHRPD network that do not have IPv6 capabilities.

emergency-apn

Configures this APN as an emergency APN for Voice over LTE (VoLTE) based E911 support.

Product

GGSN

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description `[ default | no ] emergency-apn`

[default | no]

Resets this command to its default setting of disabled.

Usage Guidelines Use this command to configure this APN as an emergency APN for VoLTE based E911 support. With this support, a UE is able to connect to an emergency PDN and make Enhanced 911 (E911) calls while providing the required location information to the Public Safety Access Point (PSAP).

E911 is a telecommunications-based system that is designed to link people who are experiencing an emergency with the public resources that can help. This feature supports E911-based calls across the LTE and IMS networks. In a voice over LTE scenario, the subscriber attaches to a dedicated packet data network (PDN) called EPDN (Emergency PDN) in order to establish a voice over IP connection to the PSAP. Both signaling and RTP media flow over a dedicated emergency bearer. Additionally, different than normal PDN attachment that relies on AAA and PCRF components for call establishment, the EPDN attributes are configured locally on the P-GW, which eliminates the potential for emergency call failure if either of these systems is not available.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `end`

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description `exit`

Usage Guidelines Use this command to return to the parent configuration mode.

firewall policy

Enables or disables Stateful Firewall support for the APN.

Product All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

firewall policy firewall-required
{ default | no } firewall policy

no

Disables Stateful Firewall support for this APN.

default

Configures the default setting for Stateful Firewall support.

Default: Disabled

Usage Guidelines

Use this command to enable or disable Stateful Firewall support for this APN.

Important This command is only available in StarOS 8.0. In StarOS 8.1 and later, this configuration is available in the ACS Rulebase Configuration Mode.

Important Unless Stateful Firewall support for this APN is enabled using this command, firewall processing for this APN is disabled.

Important If firewall is enabled, and the rulebase has no firewall configuration, Stateful Firewall will cause all packets to be discarded.

Example

The following command enables Stateful Firewall support for an APN:

firewall policy firewall-required

The following command disables Stateful Firewall support for an APN:

no firewall policy

fw-and-nat policy

Specifies the Firewall-and-NAT policy to be used for subscribers who use this APN.

Product

eWAG

PSF

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

fw-and-nat policy *fw_nat_policy*
{ default | no } fw-and-nat policy

default

Configures the default setting.

Default: The default Firewall-and-NAT policy configured in the rulebase is used for subscribers who use this APN.

no

Disables Firewall and NAT for the APN.

fw_nat_policy

Specifies the Firewall-and-NAT policy for the APN as an alphanumeric string of 1 through 63 characters. Note that this policy will override the **default Firewall-and-NAT policy** configured in the ACS rulebase.

Usage Guidelines

Use this command to configure the Firewall-and-NAT policy for the APN. Note that the policy configured in the subscriber mode will override the default policy configured in the ACS rulebase. If a policy is not configured in the subscriber mode, the default policy configured in the ACS rulebase will be used.

Important This command is customer-specific and is only available in StarOS 8.1.

Important This customer-specific command must be used to configure the Policy-based Firewall-and-NAT feature.

Example

The following command configures a Firewall-and-NAT policy named *standard* for the APN:

```
fw-and-nat policy standard
```

gsm-qos negotiate

Enables negotiation of the QoS Reliability Class attribute based on the configuration provided for Service Data Unit (SDU) Error Ratio and Residual Bit Error Ratio (BER) attributes in the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

gsm-qos negotiate sdu-error-ratio *sdu-error-ratio-code* [**residual-ber** *residual-ber-code*]
[**no**] **gsm-qos negotiate sdu-error-ratio** [*sdu-error-ratio-code* [**residual-ber** *residual-ber-code*]]

no

Disables negotiation of the QoS Reliability Class attribute.

sdu-error-ratio *sdu-error-ratio-code*

Enables the negotiation of the QoS Reliability Class attribute based on Service Data Unit (SDU) Error Ratio attributes. *sdu-error-ratio-code* corresponds to distinct SDU Error ratio values within an integer range of 1 to 7.

residual-ber *residual-ber-code*

Enables the optional configuration of negotiation of the QoS Reliability Class attribute based on Residual Bit Error Ratio (BER) attributes. *residual-ber-code* corresponds to distinct Residual Bit Error Ratio values within an integer range of 1 to 9.

Usage Guidelines

This command configures the QoS attribute Reliability Class to be negotiated based on the configuration provided for SDU Error Ratio and Residual BER attributes. The derived Reliability Class and the configured values for SDU Error Ratio and Residual BER are sent back in CPC and UPC response.

The mapping for *sdu-error-ratio-code* is as follows:

Code	Value
1	10-2
2	7*10-3
3	10-3

Code	Value
4	10-4
5	10-5
6	10-6
7	10-1

Residual BER needs to be specified when SDU Error Ratio is set to codes 1, 2, 3 or 7 (Or, SDU Error Ratio is intended to be set to a value greater than 5*10-4), for determining the Reliability Class QoS attribute. Otherwise, the Residual BER value received in the Create PDP context request QoS (or UPC request) would be used. The mapping for *residual-ber-code* is as follows:

Code	Value
1	5*10-2
2	10-2
3	5*10-3
4	4*10-3
5	10-3
6	10-4
7	10-5
8	10-6
9	6*10-8

Example

The following commands configures the negotiation of QoS attribute Reliability Class based on Service Data Unit (SDU) Error Ratio *3* attributes in the APN:

```
gsm-qos negotiate sdu-error-ratio 3
```

gtpp group

Enables a configured GTPP server group to an APN for CGF accounting functionality.

Important In releases prior to 11.0, only one GTPP group is allowed to be configured per APN. Releases 11.0 through 15.0, this CLI can be used to configure up to a maximum of 32 GTPP groups. In 16.0 and later releases, this CLI allows the user to configure only up to six GTPP groups.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
gtpp group group_name [ accounting-context ac_context_name ]
default gtpp group
no gtpp group group_name
```

no

Removes all the configured GTPP groups for the specific APN.

group_name

Specifies the name of server group that is used for authentication/accounting for specific APN. *group_name* must be an alphanumeric string of 1 to 63 characters. It must be identical to the one configured earlier within the same APN context.

Important In Release 11.0 and later, if you have mistakenly configured a GTPP group, you should remove the initially configured group and configure the new desired group. However, in Releases prior to 11.0, there is no need to remove the incorrect configuration; instead you can directly reconfigure the desired GTPP group.

Important If a GTPP group entry is invalid, this GTPP group will be ignored and the next valid GTPP group in the APN will be used. If no valid GTTP group exists, then the default GTPP group in the accounting context specified by the GGSN service will be used.

accounting-context *ac_context_name*

Specifies the name of an accounting context on the system that processes accounting for PDP contexts handled by this GGSN service for accounting to specific APN.

ac_context_name must be an alphanumeric string of 1 through 79 characters that is case sensitive.

Note that if an accounting context is not specified here, the system uses the GGSN service context or the context configured by the **accounting context** command in the GGSN Service Configuration mode.

Usage Guidelines

This feature provides the GTPP server configuration parameters under a GTPP group node. Instead of having a single list of servers per context, this feature configures multiple server groups within a context and applies

individual an GTPP server group for subscribers in that context. Each server group consists of a list of CGF (Charging Group Function) accounting servers.

In case no GTPP group is applied for the said APN or default APN template, then the default GTPP server group available at the context level is applicable for accounting of a specific APN.

Important When multiple GTPP groups are applied to the same APN, the load will be shared across these GTPP groups. Sessions for this APN will use all the configured GTPP groups in a round robin fashion.

Once a GTPP group is selected for a subscriber session, the GTPP group will never change under any circumstances. A request is initially sent to primary CGF server configured in that group. When the primary fails to respond, the request is sent to secondary CGF server.

The process of failover from primary to secondary is per the 3GPP standards. Multiple GTPP groups configuration is actually supported only for load sharing of sessions within an APN and not used for failover. When all CGFs are down in a GTPP group, the requests are archived either in hard disk or main memory depending on whether or not streaming is enabled.

The AAA proxy allocates a lot of memory on a per GTPP group basis statically regardless of the usage. So if the number of GTPP groups is reduced to around 3 then the issue with the AAA proxy going to warn memory state will not be observed.

In releases prior to 16.0, up to a maximum of 32 GTPP groups were allowed to be configured per APN. In 16.0 and later releases, there is a limit of configuring only up to six GTPP groups per APN. In case customers are using more than six GTPP groups, the AAAProxy will use more memory than is supported and will be in "warn" state of memory. With the reduction in the number of GTPP groups configured, there will no CDR loss due to AAA proxy kill as CDRs are archived in AAA manager when AAA proxy goes to warn state.

Example

The following command applies a previously configured GTPP server group named *star1* to an APN within the specific context:

```
gtpp group star1
```

The following command disables the applied GTPP server group for the specific APN:

```
no gtpp group star1
```

gtpp secondary-group

Enables or associates a pre-configured secondary GTPP server group to an APN for CGF (Charging Group Function) accounting functionality. By default it is disabled.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

gtpp secondary-group *group_name* [**accounting-context** *actt_ctxt_name*] [**default** | **no**] **gtpp secondary-group** *group_name*

default

Default: Enabled

Restores the default mode for secondary GTPP group for APN template.

no

Disables the configured/associated GTPP secondary group for specific APN.

group_name

Specifies the name of secondary GTPP server group that is used as an alternate for the primary GTPP group associated with a specific APN for storage of GTPP messages. *group_name* must be an alphanumeric string of 1 through 63 characters. It must be the same name as configured earlier within the same APN context.

accounting-context *actt_ctxt_name*

Specifies the name of an accounting context on the system that processes accounting for PDP contexts handled by this GGSN service for accounting to a specific APN.

actt_ctxt_name specifies the name of the context to be used for accounting as an alphanumeric string of 1 through 79 characters that is case sensitive.

Note that if an accounting context is not specified here, the system uses the GGSN service context or the context configured by the **accounting context** command in the GGSN Service Configuration mode.

Usage Guidelines

Use this feature to provide the secondary GTPP server group support for an APN.

When the secondary GTPP group is configured with this command, the GTPP messages will also be mirrored to the secondary servers.

This secondary group configuration is ignored, if the configured *group_name* is the same as the primary group. It will also be ignored, if the configured GTPP *group_name* and/or accounting context *ac_context_name* is invalid. In such cases, the call will be established successfully (unlike the primary group configuration where the call drops).

In the absence of a configured *ac_context_name* context, the GGSN service context is chosen by default.

The secondary group messages are low priority and thus are purged when there is no room for the new messages.

For more information on GTPP group, refer the description of the **gtpp group** command.

Example

The following command applies a previously configured GTPP server group named *star2* to as secondary GTPP group to an APN within the specific context:

```
gtpp secondary-group star2
```

The following command disables the applied secondary GTPP server group for the specific APN:

```
no gtpp secondary-group star2
```

idle-timeout-activity

Configures a session idle-timeout to be reset with uplink packets only, or with both uplink and downlink packets.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] idle-timeout-activity ignore-downlink
default idle-timeout-activity
```

default

Sets or restores the command to the default setting.

ignore-downlink

Sets the system to ignore the downlink traffic for consideration as activity for idle-timeout.

Usage Guidelines

If **idle-timeout-activity ignore-downlink** is configured, the downlink (network to subscriber) traffic will not be used to reset the idle-timeout. Only uplink (subscriber to network) packets will be able to reset the idle-timeout.

By default, **ignore-downlink** is negated by the **no** command so downlink traffic is also used to reset the idle-timeout.

Example

The following command causes both uplink and downlink traffic to reset a session idle-timeout:

default idle-timeout-activity

The following command causes the session idle-timeout to be reset with only uplink packets:

idle-timeout-activity ignore-downlink

ignore-alt-config

Configures preference to APN/AAA-defined behavior/parameters. If the parameters are not defined in APN/AAA, they will not be provisioned from any other source/configuration in the system, even if they are available there.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

[no] ignore-alt-config { no-dns | no-s6b }

no

Disables DNS server address preference or S6b authentication on a per-APN level.

no-dns

Gives preference to DNS server address configured in APN. If name server addresses is not found in APN configuration, it will not be provisioned from SGi context, even if it is configured there.

no-s6b

Enables/disables S6b authentication on a per-APN level.

Ignores alternate service-level configuration for S6b authorization when S6b authorization is disabled at APN.

Usage Guidelines

Use this command to enable/disable DNS server address preference or S6b authentication on a per-APN level.

Important Configuration in APN will take precedence over configuration in P-GW service configuration.

Example

The following command to give preference to DNS server address configured in APN:

ignore-alt-config no-dns

ikev2 tsr

Configures the Traffic Selector responder (TSr) negotiation behavior during IKEv2 Security Association (SA) establishment.

Product

PDG/TTG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`[ default ] ikev2 tsr { wildcard | user-specified }`

default

Specifies the default behavior, which is wildcard TSr negotiation.

wildcard

Specifies that during TSr negotiation, the PDG/TTG always returns an any-to-any IP address range, an any-to-any port range, and allows any protocol, irrespective of the traffic selector ranges received from the UE. This is the default behavior.

user-specified

Specifies that during TSr negotiation, the PDG/TTG responds to each UE request with the UE-specified IP address ranges. This enables split tunneling on the PDG/TTG, and enables the UE to tunnel only a specified traffic range to the PDG/TTG and send other traffic directly out the WLAN.

Usage Guidelines

Use this command to specify the TSr negotiation behavior on the PDG/TTG.

Example

The following command enables user-specified TSr negotiation on the PDG/TTG:

`ikev2 tsr user-specified`

ims-auth-service

Applies an IMS (IP Multimedia Subsystem) authorization service to a subscriber through APN for Gx interface support and functionality.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] ims-auth-service *auth_service_name*

no

Disables the applied IMS authorization service for a specific APN.

auth_service_name

Specifies the name of the IMS authorization service name that is used for Gx interface authentication for a specific APN. *auth_service_name* must be a alphanumeric string of 1 through 63 characters preconfigured within the same context as this APN.

Usage Guidelines

This feature provides the IMS authorization service configuration for Gx interface in IMS service node.

Example

The following command applies a previously configured IMS authorization service named *gx_interface1* to an APN within the specific context:

```
ims-auth-service gx_interface1
```

The following command disables the applied IMS authorization service *gx_interface1* for the specific APN:

```
no ims-auth-service gx_interface1
```

iot-rate-control

Configures APN Rate Control attributes for all PDNs of the APN.

Important The APN Rate Control for CIoT Devices is a license-controlled feature. Contact your Cisco Account Representative for more information.

Product

C-SGN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

iot-rate-control time-unit { unrestricted | mins | hours | days | week } downlink packet-count *dl_packet_count* **uplink packet-count** *ul_packet_count* **aer** *aer_value*

no iot-rate-control

no

Disables the APN rate control.

time-unit { unrestricted | mins | hours | days | week }

unrestricted: Applies the mode of time-unit as unrestricted.

mins: Applies the mode of time-unit in minutes.

hours: Applies the mode of time-unit in hours.

days: Applies the mode of time-unit in days.

week: Applies the mode of time-unit in weeks.

downlink

Applies the APN Rate Control in the downlink direction.

packet-count *dl_packet_count*

Specifies the allowed number of packets. The *dl_packet_count* must be an integer ranging from 0 through 16777215. Integer 0 disables rate control on downlink direction.

uplink

Applies the APN Rate Control in the uplink direction.

packet-count *ul_packet_count*

Specifies the allowed number of packets. The *ul_packet_count* must be an integer ranging from 0 through 16777215. Integer 0 disables rate control on uplink direction.

aer *aer_value*

Specifies the number of Additional Exception Reports (AER) in uplink direction. The *aer_value* must be an integer ranging from 1 through 65535.

Usage Guidelines

APN Rate Control allows Home Public Land Mobile Network (HPLMN) operators to control the amount of user data sent in Downlink (DL) and Uplink (UL). Use this command for policing the user data on a maximum number of user data packets per time-unit, and/or maximum number of user data octets per time-unit, for both DL and UL.

Example

The following command sets the mode of time-unit in minutes with the allowed downlink packet-count as 1200, uplink packet-count as 2500, and 4000 AER in uplink direction:

```
apn-rate-control time-unit 1 downlink packet-count 1200 uplink packet-count
 2500 aer 4000
```

ip access-group

Configures an IPv4/IPv6 access group for the current APN profile.

Product

ACS

eWAG

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

ip access-group *acl_group_name* **[in | out] [fallback-enabled]**
[no] ip access-group *acl_group_name* **[in | out]**

no

Removes a previously configured IPv4/IPv6 access group association.

acl_group_name

Specifies the name of the IPv4/IPv6 access group. *acl_group_name* is a previously configured ACL group expressed as an alphanumeric string of 1 to 79 characters.

in | out

Default: both (in and out)

Specifies the access-group as either inbound or outbound by the keywords **in** and **out**, respectively.

fallback-enabled

When invalid ACL is received from RADIUS during Context Activation, ACL in this APN will be applied so there is no loss of CDR or missing charging information.

By default, ACL fallback is disabled.

Usage Guidelines

Use this command to apply a single IPv4/IPv6 access control list to multiple subscribers via this APN for inbound or outbound IPv4/IPv6 traffic.

If no traffic direction is specified, the selected access control list will be applied to both directions.

Run command without **fallback-enabled** option to disable ACL fallback for a previously configured ACL applied to a particular APN.

Example

The following command associates the *sampleipv4Group* access group with the current APN profile for both inbound and outbound access.

```
ip access-group sampleipv4Group
```

The following command removes the outbound access group flag for *sampleipv4Group*.

```
no ip access-group sampleipv4Group out
```

ip address alloc-method

Configures the method by which this APN will obtain IP addresses for PDP contexts.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
ip address alloc-method { dhcp-proxy [ allow-deferred ] [ prefer-dhcp-options ] | dhcp-relay | local [ allow-deferred ] | no-dynamic [ allow-deferred ] } [ allow-user-specified ]
default ip address allocation-method
```

default

Restores the APN ip parameters to the following default settings.

dhcp-proxy

Default: Disabled

Configures the APN to assign an IP address received from a DHCP server.

Important If this option is used, the system's DHCP parameters must be configured.

dhcp-relay

Configures the APN to forward DHCP packets received from the MS to a DHCP server. Default: Disabled

Important If this option is used, the system's DHCP parameters must be configured.

local

Configures the APN to allocate IP addresses from a pool configured in the destination context on the system. Default: Enabled

Important If this option is used, the name of the IP address pool from which to allocate addresses must be configured using the **ip address pool-name** command. If no pool name is specified, the system will attempt to allocate an address from any public pool configured in the destination context.

Important In the case of IPv6 , if the pool name is configured in an APN, then the call is rejected even if a static address is sent by the UE.

no-dynamic

Disables the dynamic assignment of IP addresses to PDP contexts using this APN. Default: Disabled

If a PDP context needing an IP address is received by an APN with this option enabled, it will be rejected with a cause code of 220 (Unknown PDP address or PDP type).

prefer-dhcp-options

If this keyword is specified with **dhcp-proxy** for IP address allocation configuration, the GGSN will prefer DHCP-supplied parameters over values provided by AAA server or by local configuration. This keyword controls the following parameters:

- primary and secondary Domain Name Server (DNS) addresses
- primary and secondary NetBIOS Name Server (NBNS) addresses

These values will be sent out in the PCO IE of a GTP Create PDP Response Message whenever the MS Requests them in A Create PDP Request Message.

Default: Disabled

Important This keyword is available only with dhcp-proxy ip allocation method as this functionality is implemented only for GGSN acting as DHCP proxy.

By default, this functionality is disabled. Hence, DNS and NBNS values received from a DHCP server will not be considered by the GGSN.

allow-deferred

Enables support for P-GW deferred address allocation. Default: Disabled

allow-user-specified

Enables support for PDP contexts requesting the use of specific (static) addresses. Default: Enabled

Important If this option is not enabled, PDP contexts requesting the use of a static address will be rejected with a cause code of 220 (Unknown PDP address or PDP type).

Usage Guidelines

Use this command to configure the method by which the APN profile will assign IP addresses to PDP contexts.

When the PDP context is being established and the APN name is determined, the system will examine the APN's configuration profile. Part of that procedure is determining how to handle IP address allocation. The figure in the Example section below displays the process used by the system to determine how the address should be allocated.

Example

The following command configures the APN to dynamically assign an address from a DHCP server and reject PDP sessions with static IP addresses:

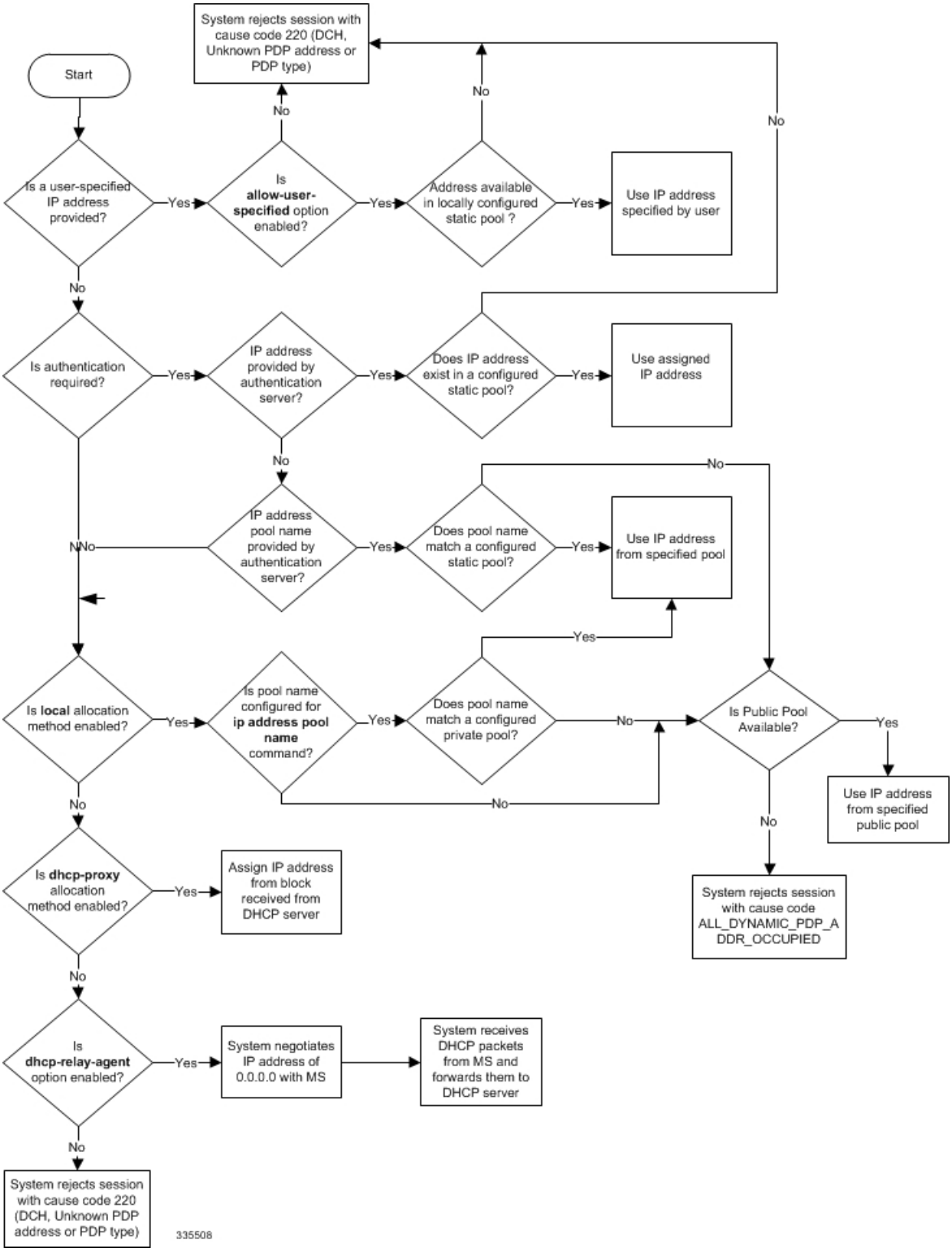
```
ip address alloc-method dhcp-proxy
```

The following command configures the APN to reject sessions requesting dynamically assigned addresses and only allow those with static addresses:

```
ip address alloc-method no-dynamic allow-user-specified
```

The following figure provides the IP address allocation process:

Figure 3: IP Address Allocation Process



ip address pool

Configures the name of an IP address pool configured on the system from which to assign an address for a PDP context.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#policy_name`

Syntax Description

`[ no ] ip address pool name pool_name`

no

Removes a previously configured pool name.

pool_name

Specifies the name of the pool configured on the system from which an IP address will be assigned. The name is expressed as an alphanumeric string of 1 through 31 characters that is case sensitive.

Usage Guidelines

If the **ip address alloc-method** command is configured to allow the assignment of IP addresses from a local pool configured on the system. It command instructs the system as to which pool should be used.

The pool specified by this command must be a pool configured in the destination context on the system. Please refer to the **ip pool** command in the *Context Configuration Mode Commands* chapter for information on configuring IP address pools.

Multiple APNs can use the same IP address pool if required. In addition, this command could be issued multiple times to allow a single APN to use different address pools.

Caution From 14.0 onward for configuration of multiple IP pool in an APN, GGSN expects Framed-IP-Address and Framed-Pool from RADIUS.

Caution In pre-release 14.0, the maximum number of IP pools in an APN is 16 for static and dynamic type of pool. From 14.0 onward this limit has been changed for static address allocation to 1 and out of the maximum 16 pools which can be configured under a particular APN, the first IP pool should be a static pool, which is the only working static pool from an APN.

Example

The following command configures the system to use a pool named *private_pool1* for address allocation:

```
ip address pool private_pool1
```

ip address pool-exhaust-action

Configures the behavior to accept/reject a call if the IPv4 address pool is exhausted.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

ip address pool-exhaust-action { **ipv6-accept** | **ipv6-reject** }

ipv6-accept

GGSN/P-GW will not reject the call; follows the standard behavior of allocating the available IP address.

ipv6-reject

Enables rejecting a call if GGSN/P-GW cannot allocate the IPv4 address for PDN type IPv4v6.

Usage Guidelines

As per the standard behavior, when a UE sends a Create Request to GGSN/P-GW with PDN type IPv4v6, it should allocate both IPv4 and IPv6 address to the UE. If GGSN/P-GW fails to allocate the IPv4 address due to IP pool exhaustion, then it allocates only IPv6 address and changes the PDN Type to IPv6 and the call continues. In order to control this behavior, this CLI has been introduced; when configured, the following behavioral scenarios will be in place:

- CLI executed with **ipv6-reject** option will reject a call if GGSN/P-GW cannot allocate the IPv4 address for PDN type IPv4v6.
- CLI executed with **ipv6-accept** option will not reject a call and follow the standard behavior.

Example

The following command will reject a call if IPv4 type address allocation is not possible by GGSN/P-GW:

```
ip address pool-exhaust-action ipv6-reject
```

ip context-name

Configures the name of the destination context to use for subscribers accessing this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] ip context-name *ctxt_name*

no

Removes a previously configured context name.

ctxt_name

Specifies the name of the context through which subscriber data traffic will be routed. *ctxt_name* must be an alphanumeric string from 1 to 79 characters.

Usage Guidelines

Use this command to specify the name of a destination context configured on the system through which to route all subscriber data traffic. This context will be used for subscribers accessing this APN. If no name is specified, the system will use the context in which the APN is configured as the destination context.

When the APN is used to support Mobile IP functionality, this command is used to indicate the context in which the FA (foreign Agent) service is configured. If no name is specified, the context in which the GGSN service facilitating the subscriber PDP context is used.

Example

The following command configures the system to route subscriber traffic for the APN through a context called isp1:

```
ip context-name isp1
```

ip header-compression

Configures IP packet header compression parameters for this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

```
ip header-compression vj
default ip header-compression
no ip header-compression
```

default

Disables Van-Jacobson header compression.

no

Disables Van-Jacobson header compression.

vj

Enables Van-Jacobson header compression for IP packets. Default: Enabled

Usage Guidelines

IP header compression reduces packet header overhead resulting in more efficient utilization of available bandwidth.

Example

The following command disables packet header compression for the APN:

```
no ip header-compression
```

ip hide-service-address

Renders the IP address of the GGSN unreachable from mobile stations (MSs) using this APN. This command is configured on a per-APN basis.

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Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] ip hide-service-address
```

default

Sets the default behavior of this command. By default this function is disabled.

no

Disables this functionality. This is the default setting.

Usage Guidelines

This hides the GGSN IP address from the mobile station for security purposes.

Example

The following command enables this functionality. Does not allow the GGSN's IP address to be viewed by the mobile station:

```
ip-hide-service-address
```

ip local-address

Configures the local-side IP address of the subscriber's point-to-point connection.

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Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
ip local-address ip_address
no ip local-address
```

no

Removes a previously configured IP local-address.

ip_address

Specifies an IP address configured in a destination context on the system through which a packet data network can be accessed. *ip_address* must be expressed in IPv4 dotted-decimal notation.

Usage Guidelines

This parameter specifies the IP address on the system that the MS uses as the remote-end of the PPP connection. If no local address is configured, the system uses an unnumbered scheme for local-side addresses.

Example

The following command configures a local address of 192.168.1.23 for the MS:

```
ip local-address 192.168.1.23
```

ip multicast discard

Configures the IP multicast discard packet behavior.

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Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] ip multicast discard
```

default

Restores the APN IP parameters to the default multicast settings, which is to discard PDUs.

no

Removes a previously configured IP multicast discard.

Usage Guidelines

This command specifies if IP multicast discard is enabled or disabled.

Example

The following command enables IP multicast discard for an APN:

```
ip multicast discard
```

ip-pool-mgmt-policy

Configures the IP Pool management policy.

Product CUPS

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description **ip-pool-mgmt-policy** *policy_name*

policy_name

Specifies the IP Pool Management Policy name and must be a string of size 1-32.

Usage Guidelines For more information, see the *DNS Based UP Selection* chapter.

ip qos-dscp

Configures the quality of service (QoS) differentiated service code point (DSCP) used when sending data packets of a particular 3GPP QoS class over the Gi interface.

Product GGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

```
ip qos-dscp { qci { 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 } { dscp } } +
default ip qos-dscp
no ip qos-dscp { qci { 1 | 2 | 3 | 4 | 5 { allocation-retention-priority
 { 1..3 } } | 6 { allocation-retention-priority { 1..3 } } | 7 {
allocation-retention-priority { 1..3 } } | 8 {
allocation-retention-priority { 1..3 } } | 9 } } } +
```

default

Restores the APN IP parameters to the default setting *conversational ef streaming af11 interactive af21 background be*.

no

Restores the QoS parameter to its default setting.

allocation-retention-priority

Specifies the DSCP for interactive class if the allocation priority is present in the QoS profile.

allocation-retention-priority can be the integers 1, 2, or 3.

DSCP values use the following matrix to map based on traffic handling priority and Alloc/Retention priority if the allocation priority is present in the QoS profile.

Following table shows the DSCP value matrix for *allocation-retention-priority*.

Table 15: Default DSCP Value Matrix

Allocation Priority	1	2	3
Traffic Handling Priority			
1	ef	ef	ef
2	ef	ef	ef
3	af21	af21	af21
4	af21	af21	af21

Important If you only configure DCSP marking for interactive traffic classes without specifying ARP, it may not properly take effect. The CLI allows this scenario for backward compatibility. However, it is recommended that you configure all three values.

qci

Configures the QoS Class Identifier (QCI) attribute of QoS. Here the *qci_val* is the QCI for which the negotiate limit is being set; it ranges from 1 to 9.

dscp

Specifies the DSCP for the specified traffic pattern. *dscp* can be configured to any one of the following:

- **af11:** Assured Forwarding 11 per-hop-behavior (PHB)
- **af12:** Assured Forwarding 12 PHB
- **af13:** Assured Forwarding 13 PHB
- **af21:** Assured Forwarding 21 PHB
- **af22:** Assured Forwarding 22 PHB
- **af23:** Assured Forwarding 23 PHB
- **af33:** Assured Forwarding 33 PHB
- **af41:** Assured Forwarding 41 PHB
- **af42:** Assured Forwarding 42 PHB
- **af43:** Assured Forwarding 43 PHB
- **be:** Best effort forwarding PHB
- **ef:** Expedited forwarding PHB

- **af31:** Assured Forwarding 31 PHB
- **pt:** Pass through (ToS of user packet is not modified)
- **af32:** Assured Forwarding 32 PHB

Default: QCI:

- 1: ef
- 2: ef
- 3: af11
- 4: af11
- 5: ef
- 6: ef
- 7: af21
- 8: af21
- 9: be

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

DSCP levels can be assigned to specific traffic patterns in order to ensure that data packets are delivered according to the precedence with which they're tagged. The diffserv markings are applied to the IP header of every subscriber data packet transmitted over the Gi interface(s).

The traffic patterns are defined by QCI (1 to 9). Data packets falling under the category of each of the traffic patterns are tagged with a DSCP that further indicate their precedence as shown in following tables respectively:

Table 16: Class structure for assured forwarding (af) levels

Drop Precedence	Class			
	Class 1	**Class 2**	**Class 3**	**Class 4**
Low	af11	af21	af31	af41
Medium	af12	af22	af32	af41
High	af13	af23	af33	af43

Precedence (low to high)	DSCP
1	Best Effort (be)
2	Class 1
3	Class 2

Precedence (low to high)	DSCP
4	Class 3
5	Class 4
6	Express Forwarding (ef)

The DSCP level can be configured for multiple traffic patterns within a single instance of this command.

Important If a GGSN service is associated with a P-GW service, then the GGSN service will use the QCI-QoS mapping tables specified in the **qci-qos-mapping** command and assigned to its associated P-GW service.

Example

The following command configures the DSCP level for QCI to be Expedited Forwarding,**ef**:

```
ip qos-dscp qci 1 ef
```

ip source-violation

Enables or disables packet source validation for the current APN.

Product

tr

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
ip source-violation { ignore | check [ drop-limit limit ] [
exclude-from-accounting ]
[ drop-count-timeout time-interval ]  } [ traffic-type { ipv4 | ipv6 } ]
default ip source-violation
```

default

Enables the checking of source addresses received from subscribers for violations, with a drop limit of 10 invalid packets that can be received from a subscriber prior to their session being deleted.

ignore

Default: Disabled

Disables source address checking for the APN.

check [drop-limit *limit*]

Default: Enabled, limit = 10

Enables the checking of source addresses received from subscribers for violations.

A **drop-limit** can be configured to set a limit on the number of invalid packets that can be received from a subscriber prior to their session being deleted.

limit can be configured to any integer value between 0 and 10000. A value of 0 indicates that all invalid packets will be discarded, but the session will never be deleted by the system.

exclude-from-accounting

Default: Disabled

Excludes the packets identified with IP source violation from the statistics generated for accounting records.

check [drop-count-timeout time-interval]

Default: Default value is 120 seconds (2 minutes)

The drop-count-timeout is used to configure the value for time interval violation drop-count update timer. You must specify the time interval in seconds.

check [traffic-type { ipv4 | ipv6 }]

Default: Configurations is common for both IPv4 and IPv6.

This configuration specifies the packet traffic type as IPv4/v6.

Note The violation count increments even if the drop limit and timer values are zero. The session does not get deleted whereas, the violated packets are dropped. If the 'drop-count-timeout' is enabled then 'traffic-type' must be specified.

Usage Guidelines

Source validation is useful if packet spoofing is suspected or for verifying packet routing and labeling within the network.

Source validation requires the source address of received packets to match the IP address assigned to the subscriber (either statically or dynamically) during the session.

Example

The following command enables source address validation for the APN and configures a drop-limit of *15*:

```
ip source-violation check drop-limit 15
```

Example

The source violation behaviour for IPv4 and Ipv6 IP packets are as explained below:

```
ip source-violation check drop-limit 5 exclude-from-accounting
drop-count-timeout 120 traffic-type ipv4
```

```
ip source-violation check drop-limit 8 exclude-from-accounting
drop-count-timeout 60 traffic-type ipv6
```

IPv4 or IPv6: When a source violated packet is received, a timer is started. The packet drop counter increments for each packet violation. P-GW waits for [(N+1) * time-interval] minutes, then starts decreasing (divide by 2) the source violated packet drop counter until it reaches zero. When the drop counter reaches zero, the timer stops. The timer starts again when P-GW receives a new source violated packet.

ip user-datagram-tos copy

Controls the copying of the IP ToS octet value from user IPv4/IPv6 datagrams into the IP header of GTP tunnel encapsulations.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] ip user-datagram-tos copy
```

default

Sets the default behavior of this command. By default this function is disabled.

no

Removes the preconfigured parameter for this command.

Usage Guidelines

This command enables or disables the copying of the ToS byte from the inner IP header to the outer IP header for an RP connection.

When this function is enabled, the SGSN can detect the special ToS marking in the outer IP header of GTP tunnel packets and identify certain packets as control messages.

ipv6 access-group

Configures the IPv6 access group for the current APN profile which applies a single Access Control List (ACL) to multiple subscribers via the APN for IPv6 traffic.

Product

GGSN

ACS

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

ipv6 access-group *group_name* **[in | out] [fallback-enabled]**
[no] ipv6 access-group *group_name* **[in | out]**

no

Removes a previously configured IPv6 ACL applied to a particular APN for IPv6 traffic. If at least one of the two **{ in | out }** options is not selected for the ACL that will be removed, the ACL will be removed for both directions.

group_name

Specifies the name of the IPv6 access group as an alphanumeric string of 1 through 79 characters.

in | out

Default: both (in and out)

Specifies the access-group as either inbound or outbound by the keywords **in** and **out**, respectively.

If no direction is supplied in the base command, the specified IPv6 access control list will be applied to both directions.

fallback-enabled

When invalid ACL is received from RADIUS during Context Activation, ACL in this APN will be applied so there is no loss of CDR or missing charging information.

By default, ACL fallback is disabled.

Usage Guidelines

Use this command to apply a single IPv6 access control list to multiple subscribers via an APN for inbound or outbound IPv6 traffic.

If no traffic direction is specified, the selected access control list will be applied to both traffic directions.

Run command without **fallback-enabled** option to disable ACL fallback for a previously configured ACL applied to a particular APN.

Example

The following command associates the *sampleipv6Group* access group with the current APN profile for both inbound and outbound access:

```
ipv6 access-group sampleipv6Group
```

The following removes the outbound access group flag for *sampleipv6Group*:

```
no ipv6 access-group sampleipv6Group out
```

ipv6 address alloc-method

Controls the IPv6 address allocation method for a particular APN.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
ipv6 address alloc-method { dhcpv6-proxy [allow-prefix-delegation] | local
 | no-dynamic } [ allow-user-specified ]
[ default ] ipv6 address alloc-method
```

default

Configures the default address allocation method which is "local".

dhcpv6-proxy

Configures the IPv6 address from DHCP server for the APN.

allow-prefix-delegation

Configures the APN to allow DHCPv6 prefix-delegation.

local

Configures the IPv6 address from the local pool configured.

no-dynamic

Configures the IPv6 address as indicated by the authentication server.

allow-user-specified

When any of the above three options is specified with **allow-user-specified**, the static IP address proviced by UE takes priority and allocated/configured.

Usage Guidelines

With the support of DHCPv6 and dual PDP IPv4v6, the separate allocation methods are required for IPv4 and IPv6. Earlier the IPv6 address was allocated through locap pool or RADIUS Returned, but with the new options: local, no-dynamic, and DHCPv6-proxy, the IPv6 address allocation can be done for a particular APN. The static address allocation can be enabled by the use of **allow-user-specified** keyword with the above three options.

From 15.0 onward the support of prefix delegation for DHSCv6 is added to assign a network address prefix to a user site, configuring the user's router with the prefix to be used for each interface it is attached to. This is one of the methods for delegating IPv6 address prefixes to an IPv6 subscriber's network.

Example

The following command provides an example of allocating the IP address from DHCP server:

```
ipv6 address alloc-method dhcpv6-proxy allow-user-specified
```

The following commands configures the prefix-delegation for DHCPv6 with 52 bit length:

```
ipv6 address alloc-method dhcpv6-proxy allow-prefix-delegation
ipv6 address prefix-delegation-len 52
```

ipv6 address delegate-prefix-pool

Configures the private pool name to be used for delegate prefix allocation.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

ipv6 address delegate-prefix-pool *pool_name*
[no] ipv6 address delegate-prefix-pool

delegate-prefix-pool:

Configures a pool of IPv6 address delegated prefix.

pool_name:

Name of the pool with IPv6 address delegated prefix.

no

Disables the pool of IPv6 address delegated prefix.

Usage Guidelines With this command, configure the IPv6 private pool name to enable the prefix delegation from the local pool.

Example

The following command provides an example of creating a pool of IPv6 address delegated prefix:

```
ipv6 address delegate-prefix-pool pool1
```

ipv6 address prefix-delegation-len

Configures the supported prefix length to 48/52/56 bit length per-APN for DHCPv6 prefix-delegation support.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
[ no ] ipv6 address prefix-delegation-len {48 | 52 | 56}
```

no

Removes the configured prefix-delegation length to allow DHCPv6 prefix delegation.

Usage Guidelines Use this command to configure the length of prefix (48/52/56) to allow with DHCPv6 prefix delegation.

Example

The following command sets the allowed prefix length to 52 bit for DHCPv6 prefix delegation support:

```
ipv6 address prefix-delegation-len 52
```

ipv6 address pool-exhaust-action

Configures the behavior to accept/reject a call if the IPv6 address pool is exhausted.

Product GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

ipv6 address pool-exhaust-action { **ipv4-accept** | **ipv4-reject** }

ipv4-accept

GGSN/P-GW will not reject the call; follows the standard behavior of allocating the available IP address.

ipv4-reject

Enables rejecting a call if GGSN/P-GW cannot allocate the IPv6 address for PDN type IPv4v6.

Usage Guidelines

As per the standard behavior, when a UE sends a Create Request to GGSN/P-GW with PDN type IPv4v6, it should allocate both IPv4 and IPv6 address to the UE. If GGSN/P-GW fails to allocate the IPv6 address due to IP pool exhaustion, then it allocates only IPv4 address and changes the PDN Type to IPv4 and the call continues. In order to control this behavior, this CLI has been introduced; when configured, the following behavioral scenarios will be in place:

- CLI executed with **ipv4-reject** option will reject a call if GGSN/P-GW cannot allocate the IPv6 address for PDN type IPv4v6.
- CLI executed with **ipv4-accept** option will not reject a call and follow the standard behavior.

Example

The following command will reject a call if IPv6 type address allocation is not possible by GGSN/P-GW:

ipv6 address pool-exhaust-action ipv4-reject

ipv6 dns

Configures primary and secondary IPv6 Domain Name Service (DNS) servers.

Product

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Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[**no**] **ipv6 dns** { **primary** | **secondary** } { *ipv6_dns_address* }

no

Deletes a previously configured DNS server.

primary

Configures the IPv6 address of primary DNS server for the APN.

secondary

Configures IPv6 address of the secondary DNS server for the APN. Only one secondary DNS server can be configured.

ipv6_dns_address

The IP address of the DNS server entered using IPv6 colon-separated-hexadecimal notation.

Usage Guidelines

DNS servers are configured on a per-APN profile basis. This allows each APN profile to use specific servers in processing PDP contexts.

The DNS can be specified at the APN level in APN configuration as well as at the Context level in Context configuration mode with **ip name-servers** command, or it can be received from AAA server.

When DNS is requested in PCO configuration, the following preference will be followed for DNS value:

1. DNS Values received from LNS have the first preference
2. DNS values received from RADIUS Server has the second preference
3. DNS values locally configured with APN has the third preference
4. DNS values configured at context level with **ip name-servers** command has the last preference.

Important The same preference would be applicable for the NBNS (NetBIOS Name Service) servers to be negotiated via ICPC (Initial Connection Protocol Control) with the LNS (L2TP Network Server).

Example

The following command provides an example of setting the primary DNS server:

```
ipv6 dns primary fe80::c0a8:a04
```

ipv6 egress-address-filtering

Enables or disable IIPv6 egress address filtering. This function filters out packets not meant for the mobile interface ID. The GGSN records the source interface ID of all the packets received from the mobile node. When packets sent to the mobile node are received, the destination interface ID is compared against the list of recorded interface IDs and with the local interface-ID assigned to the MS during IPv6CP. If no match is found, the packet is dropped.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

[no] ipv6 egress-address-filtering

no

Disables IPv6 egress address filtering.

Usage Guidelines

Used to filter packets that arrive from the internet to a particular site.

Example

The following command provides an example disabling egress address filtering:

no ipv6 egress-address-filtering

ipv6 initial-router-advt

Creates an IPv6 initial router advertisement interval for the current APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

ipv6 initial-router-advt { interval *int_value* **| num-advts** *num_value* **| option mtu | value }**
[default] ipv6 initial-router-advt { interval | num-advts| option mtu | value }
no ipv6 initial-router-advt option mtu

default

Resets interval or num-advts to their default setting.

interval *int_value*

Specifies the time interval (in milliseconds) when the initial IPv6 router advertisement is sent to the mobile node as an integer from 100 through 16000. Default: 3000ms

num-advts value *num_value*

Specifies the number of initial IPv6 router advertisements sent to the mobile node as an integer from 1 through 16. Default: 3

Usage Guidelines

This command is used to set the advertisement interval and the number of advertisements. Using a smaller advertisement interval increases the likelihood of router being discovered more quickly when it first becomes available.

option mtu

Enables the gateway to send the IPv6 MTU option in RAs for IPv6 and IPv4v6 PDN types towards the UE. As a result, the UE can send uplink data packets based on the configured MTU and perform fragmentation at the source, if required.

option mtu value

Specifies that the configured value is sent in the RA packet rather than the data tunnel MTU. The configured value must be in *octets -integer 1280-2000*. This value is used only for advertisement in RA packet and the gateway need not enforce this value.

The default setting is enabled.

The **no** keyword disables this feature. The IPv6 MTU option in RAs for IPv6 and IPv4v6 PDN types will not be sent towards the UE.

Example

The following command specifies the initial ipv6 router interval to be 2000ms:

```
ipv6 initial-router-advt interval 2000
```

l3-to-l2-tunnel address-policy

Configures the address allocation/validation policy, when subscriber L3 (IPv4/IPv6) sessions are tunneled using an L2 tunneling protocol, such as L2TP.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

l3-to-l2-tunnel address-policy { **alloc-only** | **alloc-validate** | **no-alloc-validate** }
default l3-to-l2-tunnel address-policy

default

Restores the layer 3-to-layer 2 tunnel address policy parameter to the default setting of validation with no allocation.

alloc-only

Specifies that the system locally allocates and validates subscriber addresses. Default: Disabled

alloc-validate

Specifies that the system allocates addresses when IP addresses are dynamically assigned. The system does not validate the address specified by the subscriber. Default: Disabled

no-alloc-validate

Specifies that the system does not allocate or validate subscriber addresses locally for such sessions; it passes the address between remote tunnel terminator to the mobile node. Default: Enabled

Usage Guidelines

This command can be useful for MIP HA sessions tunneled from the system using L2TP tunnels, or GGSN PDP contexts of type IP tunneled using L2TP to a remote LNS.

Example

The following command configures the system to locally allocate and validate subscriber addresses:

```
l3-to-l2-tunnel address-policy alloc-only
```

loadbalance-tunnel-peers

Configures how tunnel-peers are selected for this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`loadbalance-tunnel-peers { balanced | prioritized | random }`
`default loadbalance-tunnel-peers`

default

Restores the loadbalance-tunnel-peers parameter to the default setting of random.

balanced

Tunnel-peer selection is made without regard to prioritization, but in a sequential order that balances the load across the total number of peer nodes available. Default: Disabled

prioritized

Tunnel-peer selection is made based on the priority configured for the peer. Default: Disabled

random

Tunnel-peer selection is random in order. Default: Enabled

Usage Guidelines

Use this command to configure the load-balancing algorithm that defines how the tunnel-peers are selected by the APN when multiple peers are configured in the APN.

Example

The following command sets the APN to connect to tunnel-peers in a sequential order:

`load-balancing balanced`

long-duration-action detection

Sets the detection of a session that exceeds the long duration timer and sends notification.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`long-duration-action detection`
`default long-duration-action`

default

Restores the long-duration-action parameter to its default setting of detection.

long-duration-action detection

Detects long duration sessions and sends SNMP TRAP and CORBA notification. This is the default behavior.
Default: Enabled

Usage Guidelines

Use this command to detect a session that exceeds the limit set by the long duration timer.

Refer to the **timeout idle** and **timeout long-duration** commands for information on setting the long duration timer.

Example

Use the following command to enable detecting the session that exceeds the long duration timer:

```
long-duration-action detection
```

long-duration-action disconnection

Specifies what action is taken when the long duration timer expires.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

long-duration-action disconnection [**suppress-notification**] [**dormant-only**] +

long-duration-action disconnection

Detects a long duration session and disconnects the session after sending SNMP TRAP and CORBA notification.
Default: Disabled

suppress-notifiaction

Suppress the SNMP TRAP and CORBA notification after detecting and disconnecting a long duration session.
Default: Disabled

dormant only

Disconnects the dormant sessions after long duration timer and inactivity time with idle time-out duration expires. It sends the SNMP TRAP and CORBA notification after disconnecting a long duration session. Default: Disabled

Usage Guidelines

Use this command to determine what action is taken when a session exceeds the limit set by the long duration timer.

Refer to the **timeout idle** and **timeout long-duration** command for information on setting the long duration timer.

Example

Use the following command to enable disconnecting sessions that exceed the long duration timer:

```
long-duration-action disconnection
```

Use the following command to disconnect the session that exceed the long duration timer without sending SNMP TRAP and CORBA notification:

```
long-duration-action disconnection suppress-notification
```

Use the following command to disconnect the session that exceed the long duration timer and also inactivity timer for idle time-out duration and send SNMP TRAP and CORBA notification:

```
long-duration-action disconnection dormant-only
```

Use the following command to disconnect the session that exceed the long duration timer and also inactivity timer for idle time-out duration without sending any SNMP TRAP and CORBA notification. If the session is idle and the session-idle-time >= inactivity time the session gets disconnected. Even if session is idle when the long-duration timed-out and session-idle time < inactivity time the timer value is reset to idle-timeout time.

```
long-duration-action disconnection dormant-only suppress-notification
```

lte-s2bgtp-first-uplink

Configures LTE to Wi-Fi (S2bGTP) handover timer .

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

lte-s2bgtp-first-uplink *timeout*
{ default | no } lte-s2bgtp-first-uplink

default

Enables the LTE to Wi-Fi handover completion to occur when the Create Session Response is sent on the Wi-Fi tunnel.

no

Disables the feature and handover completion occurs on Create Session Response.

lte-s2bgtp-first-uplink *timeout*

Configures LTE to Wi-Fi (S2bGTP) handover completion timeout in multiple of 100 milliseconds. The valid range is from 100 to 3000. The recommended configuration is 1000 milliseconds.

Usage Guidelines

By default, the LTE to Wi-Fi handover completion happens when Create Session Response is sent on the Wi-Fi tunnel. However, after handover timeout is configured, the handover is delayed until timeout or on receipt of uplink data on Wi-Fi tunnel.

Example

The following command configures the LTE to Wi-Fi (S2bGTP) handover completion timeout in *1000* milliseconds:

```
lte-s2bgtp-first-uplink 1000
```

mbms bmsc-profile

Applies a configured Broadcast-Multicast Service Center (BM-SC) profile to subscribers through APN for Multimedia Broadcast Multicast Service (MBMS) support and functionality.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

mbms bmsc-profile name *bmsc_profile_name*
[default | no] mbms bmsc-profile

default

Applies the default BMSC profile to the subscribers through the APN.

no

Deletes a previously associated BM-SC profile with this APN.

name *bmsc_profile_name*

Specifies a name for the BM-SC profile already configured in BMSC configuration mode. *bmsc_profile_name* is an alphanumeric string of 1 through 79 characters that may contain dots (.) and/or dashes (-).

Usage Guidelines

Use this command to associate a configured BM-SC profile to use for MBMS contexts with this APN for MBMS feature support.

For more information on BM-SC profile configuration, refer to the *BMSC Profile Configuration Mode Commands* chapter.

This command also configures the specific BM-SC profile to use for Internet Group Management Protocol (IGMP) JOIN requests received from PDP contexts with this APN.

Example

Following command applies a previously configured BM-SC profile named *bm_sc_1* to an APN within the specific context.

```
mbms bmsc-profile name bm_sc_1
```

mbms bearer timeout

Configures the session timeout values for the Multimedia Broadcast Multicast Service (MBMS) bearer contexts with this MBMS APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

mbms bearer timeout { absolute | idle } *time*
[default | no] mbms bearer timeout { absolute | idle }

default

Sets the default value for the followed option for MBMS bearer context timeout.

no

Returns the timeout parameter to its default setting. If neither the absolute or idle keywords are used in conjunction with this keyword, both timeout options will be returned to their default settings.

absolute

Configures the absolute maximum time (in seconds) an MBMS bearer context may exist in any state (active or idle). Default: Disabled

idle

Default: Disabled

Configures the maximum amount of time (in seconds) an MBMS bearer context may be idle.

time

time can be any integer value between 0 and 4294967295. A time of 0 disables timeouts for this APN. Default: 0

Usage Guidelines

Use this command to limit the amount of time that an MBMS bearer context session can remain connected.

Example

The following commands enables an absolute time timeout of *60000* seconds for MBMS bearer context:

```
mbms bearer timeout absolute 60000
```

mbms ue timeout

Configures the session timeout values for the Multimedia Broadcast Multicast Service (MBMS) user equipment (UE) contexts with this MBMS APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

mbms ue timeout absolute *time*
[default | no] mbms ue timeout absolute

default

Set the default value for the followed option for MBMS UE context timeout.

no

Returns the timeout parameter to its default setting. If neither the absolute or idle keywords are used in conjunction with this keyword, both timeout options will be returned to their default settings.

absolute *time*

Configures the absolute maximum time (in seconds) an MBMS UE context may exist in any state (active or idle). *time* can be any integer value between 0 and 4294967295. A time of 0 disables timeouts for this APN. Default: 0

Usage Guidelines

Use this command to limit the amount of time that an MBMS UE context session can remain connected.

Example

The following commands enables an absolute time timeout of *60000* seconds for MBMS UE context:

```
mbms bearer timeout absolute 60000
```

mbr

Configures token replenishment interval for MBR enforcement at the APN level.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ no ] mbr rate-limit token-replenishment-interval { 10ms [
multiplication-factor < 2..100 > ] }
```

no

Disables token replenishment interval at the APN level.

mbr

Configures MBR attributes for all PDNs of the APN.

rate-limit

Configures rate-limit parameters.

token-replenishment-interval

Configures token-replenishment-interval. The available values range from 10 ms to 1000 ms (1 sec).

multiplication-factor

Configures multiplication factor of 10 ms as token replenishment interval. Multiplication-factor is configurable only if token replenishment interval is 10 ms.

Usage Guidelines

Use this command to configure token replenishment interval for MBR enforcement at the APN level. By default, this CLI is disabled.

Example

The following commands generates peak-data-rate in Bytes of token every 1 sec (1000 ms).

```
mbr rate-limit token-replenishment-interval 10ms multiple-factor 100
```

mediation-device

Enables the use of a mediation device and specifies the system context to use for communicating with the device.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
mediation-device [ context-name context_name ] [ delay-GTP-response ] [
no-early-PDUs ] [ no interims ] +
[ default | no ] mediation-device
```

+

Indicates that more than one of the options can be specified with a single execution of the command.

default

Changes the mediation device to no context-name configured and restores the mediation device's default properties.

no

Deletes the mediation-device configuration.

context-name *context_name*

Configures the mediation VPN context for this APN as an alphanumeric string of 1 through 79 characters that is case sensitive. If not specified, the mediation context is the same as the destination context of the subscriber. Default: The subscribers destination context.

delay-GTP-response

When enabled, delays the CPC response until an Accounting Start response is received from the mediation device. Default: Disabled

no-early-pdus

Specifies that the system delays PDUs from the MS until a response to the GGSN accounting start request is received from the mediation device. The PDUs are queued, not discarded. Default: Disabled

If "no-early-PDUs" is enabled, the chassis does not send uplink/downlink data from/to a MS until it receives the Acct-Rsp Start for the same from the mediation device. On receiving the Acct-Rsp, pending PDUs are forwarded. The chassis buffers up to two PDUs per call. As soon as the third PDU comes, the buffering is disabled and all the PDUs are forwarded for that call.

Configures the system to queue up to two PDUs until the mediation device returns a response to the system's accounting START request per 3GPP standards. On receiving the Accounting response message, the system forwards the subsequent PDUs without discarding any of the packets.

Important For StarOS 10.0 and earlier releases, the system buffers up to four PDUs and queues or discards the remaining PDUs.

Important For StarOS 11.0 and later releases, the system is configured so that none of the PDUs are discarded.

no-interims

Disables sending interims to the mediation server. Default: Disabled

Important Different commands are used to disable RADIUS interims for RADIUS accounting and mediation accounting. To disable RADIUS interims for mediation accounting, use the following command: **mediation-device context-name** *context_name* **no-interims**. To disable RADIUS interims for RADIUS accounting, use the following command: **accounting-mode radius-diameter no-interims**.

Usage Guidelines

This command enables mediation device support for the APN. Mediation devices can be either deep-packet inspection servers or transaction control servers.

Keywords to this command can be used in combination to each other, depending on configuration requirements.

Example

The following command enables mediation device support for the APN and uses the protocol configuration located in an system context called *ggsn1*:

```
mediation-device context-name ggsn1
mediation-device context-name ggsn1 no-interims no-early-pdus
mediation-device no-early-pdus no-interims
mediation-device no-interims no-early-pdus
```

The following command enables mediation device support for the APN and uses the protocol configuration located in the subscribers destination context:

```
mediation-device
```

mobile-ip home-agent

Configures the IP address of the home agent (HA) used by the current APN to facilitate subscriber Mobile IP sessions.

Product

GGSN

FA

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
mobile-ip home-agent ip_address [ alternate ]
no mobile-ip home-agent ip_address alternate
default mobile ip home-agent
```

default

Restores the APN mobile-ip parameters to the default setting, no HA address defined.

no

Removes a previously configured HA address.

ip_address

Specifies the IP address of the HA expressed in IPv4 dotted-decimal notation.

alternate

Designates this Mobile IP HA as the alternate that will be used in the event of a fail-over.

Usage Guidelines

If the APN is configured to support Mobile IP for all PDP contexts it is facilitating, this command specifies the IP address of the HA that is to be used.

Example

The following command configures an HA IP address of 192.168.1.15:

```
mobile-ip home-agent 192.168.1.15
```

mobile-ip min-reg-lifetime-override

Specifies the minimum registration timer to override the platform-wide default on an enterprise basis. This feature is associated with 4G LTE scenarios employing Network Mobility (NEMO) routing.

Product

P-GW

HA

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
mobile-ip min-reg-lifetime-override { seconds | infinite }
default mobile-ip min-reg-lifetime-override
no mobile-ip min-reg-lifetime-override
```

default

Sets the minimum registration time to 600 seconds.

no

Deletes the registration interval entered via this command.

seconds

Specifies the minimum registration interval in seconds as an integer from 1 through 65534. Default = 600

infinite

Sets the minimum registration interval as "infinite" (forever) for this subscriber.

Usage Guidelines

Specify the minimum registration timer to override the platform-wide default on an enterprise basis. With this command, NEMO traffic could be re-routed symmetrically to an alternate carrier within the specified number of seconds following a failure on the primary communication path.

Example

The following command sets the minimum registration override interval to 900 seconds:

```
mobile-ip min-regreg-lifetime-override 900
```

mobile-ip mn-aaa-removal-indication

Configures the system to remove various information elements when relaying Registration Request messages to the HA.

Product

GGSN

FA

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] mobile-ip mn-aaa-removal-indication
```

default

Sets the default setting for mobile IP MN-AAA-Removal-Indication.

no

Disables this functionality. This is the default setting.

Usage Guidelines

When this functionality is enabled, the MN-FA challenge and MN-AAA authentication extensions are removed when relaying a Registration Request (RRQ) to the HA.

mobile-ip mn-ha-hash-algorithm

Designates the encryption algorithm to use for Hash-based Message Authentication Code (HMAC).

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

mobile-ip mn-ha-hash-algorithm { hmac-md5 | md5 | rfc2002-md5 }
default mobile-ip mn-ha-hash-algorithm

default

Designates the default encryption algorithm to use.

hmac-md5 | md5 | rfc-2002-md5

Default: hmac-md5

The encryption algorithms that may be used.

Usage Guidelines

Provides security by encrypting the data.

Example

The following command sets encryption for md5:

mobile-ip mn-ha-hash-algorithm md5

mobile-ip mn-ha-shared-key

Configures the subscriber MobileNode-Home Agent (MN-HA) shared key.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

mobile-ip mn-ha-shared-key *key*
no mobile-ip mn-ha-shared-key

no

Disables this functionality. This is the default setting.

key

Specifies the subscriber MN-HA shared key as either an alphanumeric string or a hexadecimal number sequence beginning with "0x". The string or sequence consists of 16 to 127 characters.

Usage Guidelines

Configures a shared key for the APN.

Example

The following command configures a shared key as the alphanumeric string *sfd23408imi9yn*:

mobile-ip mn-ha-shared-key sfd23408imi9yn

mobile-ip mn-ha-spi

Configures the Mobile IP Security Parameter Index (SPI).

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

mobile-ip mn-ha-spi *spi_number*
no mobile-ip mn-ha-spi

no

Disables this functionality. This is the default setting.

spi_number

Specifies the SPI as an integer from 256 through 4294967295.

Usage Guidelines

Configures an SPI for the APN.

Example

The following command configures an SPI of *151111111111111111111111111111111*:

```
mobile-ip mn-ha-spi 151111111111111111111111111111111
```

mobile-ip required

Enables support for Mobile IP functionality for all PDP contexts facilitated by the current APN.

Product

GGSN

FA

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] mobile-ip required
```

default

Applies the default setting for mobile-ip for the APN. Default is disabled.

no

Disables mobile-ip for the APN.

Usage Guidelines

Mobile IP functionality for IP PDP contexts is only supported at the APN-level. This command enables or disables Mobile IP support for the APN.

When Mobile IP is performed, the system authenticates the subscriber and the Mobile IP FA.

If this option is enabled, the system deletes all PDP contexts attempting to access the APN for which a Mobile IP session can not be established.

mobile-ip reverse-tunnel

Configures the system to support reverse-tunneling for Mobile IP sessions facilitated by the current APN.

Product

GGSN

FA

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`[ default | no ] mobile-ip reverse-tunnel`

default

Designates the default reverse tunnel for the APN. The default is enabled.

no

Disables this functionality.

Usage Guidelines

Use this command to enable support for Mobile IP reverse tunneling for the APN. Reverse tunneling is enabled by default.

nai-construction

Configures the Network Access Identifier (NAI) construction parameters on a per-APN basis only, rather than by per-aaa-group when constructed NAI authentication is enabled.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

nai-construction { imsi | msisdn } [override-null-username] [encrypted password *encrypt_password* **| use-shared-secret-password | password** *password* **]**
no nai-construction

no

Disables the NAI construction at the APN level.

imsi

Enables NAI construction using IMSI for authentication for a user. GGSN constructs NAI using IMSI when no user-name is received. This is the default setting. Default: Enabled

msisdn

Enables NAI construction using Mobile Station International ISDN Number (MSISDN) for authentication for a user. GGSN constructs NAI using MSISDN when no user-name is received.

override-null-username

Enables NAI construction using IMSI/MSISDN for authentication for a user or when empty user name is received.

encrypted password

Specifies an encrypted password is to be used for this NAI-constructed user. *string* is an alphanumeric string of 0 through 63 characters.

password

Configures the authentication user-password for this NAI-constructed user. *password* is an alphanumeric string of 0 through 63 characters.

use-shared-secret-password

Specifies use of the RADIUS authentication shared secret password for this NAI-constructed user.

Usage Guidelines

NAI-construction defines the behavior for construction at the APN level. If defined for a particular APN, this command works independently and overwrites the behavior of aaa constructed-nai defined at the context level for calls involving this APN.

Note that NAI construction using IMSI or MSISDN, where either no user name is received or a blank user name is received for authentication, is applicable only when NAI constructed authentication is enabled using the **aaa nai-construction authentication** command in Context Configuration Mode.

Example

The following command enables NAI-construction using IMSI as the authentication type with an encrypted password:

```
nai-construction imsi encrypted password s1289sf980333jwwdo97342
```

nbns

Configures and enables use of NetBios Name Service (NBNS) for the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

`[ no ] nbns { primary | secondary }` *`IP_address`*

no

Removes/disables use of a previously configured NetBios Name Service.

primary

Designates primary NBNS server. Must be followed with an IPv4 address in dotted-decimal notation.

secondary

Designates secondary/failover NBNS server. Must be followed with an IPv4 address in dotted-decimal notation.

IP_address

Specifies the IP address in IPv4 dotted-decimal notation.

Usage Guidelines

This command specifies NBNS parameters. The NBNS option is present for both pdp type IP and pdp type PPP for GGSN.

The system can be configured to use NetBios Name Service for the APN.

Example

The following command configures the APN's NetBios Name Service to primary IP 192.168.1.15.

```
nbns primary 192.168.1.15
```

netloc-s2b-ue-ip-udp-port-always

Renders the "uELocalIPAddress" and "uDPSourcePort" always in Gy messages and CDR for dedicated bearer. This option is disabled by default.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

[no] netloc-s2b-ue-ip-udp-port-always

no

Disables the feature and its the default configuration.

Usage Guidelines

When this CLI is configured and P-GW receives UDP-Source-Port or UE-Local-IP-Address in CBRsp/UBRsp/DBRsp messages for WiFi calls, the P-GW will always generate CDR with "uELocalIPAddress" and "uDPSourcePort" for dedicated bearer, even if values of these IEs are unchanged. For changes in UE IP and/or UDP port, the behavior remains the same as existing behavior without the CLI configured.

network-behind-mobile

Allows enabling/disabling the Network Behind Mobile Station (NBMS) for the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

network-behind-mobile { max-addresses-behind-mobile *max_addrs* **| max-subnets** *max_subnets* **}**
[default | no] network-behind-mobile

default

Enables the default settings for this function. It enables NBMS with max-subnets as 10 and max-addresses-behind-mobile as 16,777,214 default values.

no

Disables the network behind mobile station functionality on the APN.

max-addresses-behind-mobile *max_addrs*

Configures the maximum number of addresses that are allowed in a single Network/subnet Behind MS.

max_addrs must be an integer from 1 through 16,777,214.

Default: 16,777,214

max-subnets *max_subnets*

Specifies the maximum number of subnets that can be enabled for a call in the APN.

max_subnets must be an integer from1 through 16.

Default: 10

Usage Guidelines

Use this command to enable or disable NBMS for the APN.

Example

The following command enables NBMS and allows a maximum of 16 routes to be installed on the APN wherein maximum 268,435,454 host addresses are allowed in each network:

```
network-behind-mobile max-subnets 16
```

nexthop-forwarding-address

Configures the next hop forwarding address for the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

nexthop-forwarding-address *ipv4_address*
no nexthop-forwarding-address

no

Disables this function. This is the default setting.

ipv4_address

Specifies the next hop forwarding address for the APN. Must be an IPv4 address in dotted-decimal notation.

Ensure the route is available for this next hop address and its directly connected host. Use of an arbitrary address can cause a routing loop within the host and lead to dropped packets.

Usage Guidelines

Use this command to configure the next hop forwarding address for the APN.

Example

The following command configures the next hop forwarding address to 10.1.1.1:

nexthop-forwarding-address 10.1.1.1

npu qos

Configures an NPU QoS priority queue for packets facilitated by the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator\

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

npu qos traffic priority { best-effort | bronze | derive-from-packet-dscp | gold | silver }
default npu qos traffic priority

default

Configures the default NPU QoS traffic priority.

traffic priority { best-effort | bronze | derive-from-packet-dscp | gold | silver }

best-effort: Assigns the best-effort queue priority. This is the lowest priority.

bronze: Assigns the bronze queue priority. This is the third-highest priority.

derive-from-packet-dscp: Specifies that the priority is to be determined from the DSCP (Differentiated Services Code Point) field in the packet's TOS octet. Default: Enabled

gold: Assigns the gold queue priority. This is the highest priority.

silver: Assigns the silver queue priority. This is the second-highest priority.

Usage Guidelines

This command is used in conjunction with the Network Processing Unit (NPU) Quality of Service (QoS) functionality.

The system can be configured to determine the priority of a subscriber packet either based on the configuration of the APN, or from the differentiated service (DS) field in the packet's TOS octet (representing the differentiated service code point (DSCP) value).

Refer to the *GGSN Administration Guide* for additional information on NPU QoS functionality.

Example

The following command configures the APN's priority queue to be *gold*:

```
npu qos traffic priority gold
```

outbound

Configures the APN host username and password.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
outbound { [ encrypted ] password pwd | username name }
no outbound password | username
```

no

Removes previously configured outbound information for the APN.

encrypted

The **encrypted** keyword is intended only for use by the chassis while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **password**

keyword is the encrypted version of the plain text password. Only the encrypted password is saved as part of the configuration file.

password *pwd*

Specifies the password to use for session authentication as an alphanumeric string of 1 through 127 characters and are case sensitive.

username *name*

Specifies the username to use for session authentication as an alphanumeric string of 1 through 127 characters and are case sensitive.

Usage Guidelines

This command can be used to provide a username and password for authentication when the subscriber does not supply one in accordance with 3GPP standards. In addition, it can be used to create a PPP session when using L2TP to tunnel IP PDP contexts.

If only a username is specified using this command, the password is determined based on the setting of the **aaa constructed-nai** command in the Context Configuration mode. That command is also used to determine the password if an outbound username and password are configured for the APN when the imsi-auth keyword is specified for the **authentication** command in this mode.

Example

The following commands configures an APN username of *isp1* and a password of *secRet123*.

```
outbound username isp1
outbound password secRet123
```

paging-policy-differentiation

Controls Paging Policy Differentiation (PPD) functionality on the P-GW.

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[default | no] paging-policy-differentiation

default

Restores the PPD functionality to its default setting of disabled.

no

Disables this option. This is the default setting.

paging-policy-differentiation

User-datagram packet DSCP value is unaltered by P-GW for downlink data. The PPD feature is supported only for S5/S8 interface. For all Handoff scenarios from other interface to S5/S8 interface, the PPD feature will get enabled if APN had it during its call setup time at that interface.

If PPD feature is enabled for the call and handoff happens from S5/S8 interface to any other interface, PPD feature should get disabled. Now, if handoff happens and this call will come back to S5/S8 interface, PPD feature should become enabled.

To support PPD feature in SAEGW, both S-GW and P-GW configuration is required.

Usage Guidelines

Use this command to enable/disable PPD functionality on P-GW.

Important P-GW and S-GW should apply the PPD feature for both Default and Dedicated bearers. As per the specifications, P-GW transparently passes the user-datagram packet towards S-GW. This means, if PPD feature is enabled, operator can't apply different behavior for Default and Dedicated bearers.

Once the PPD feature is enabled, it is applicable for new calls.

Important For the PPD feature to work, it must be enabled for P-GW and S-GW.

Both P-GW and S-GW services apply PPD configuration independently. Therefore, for any downlink data packet from an APN, there could be a case where P-GW does not have PPD configuration but S-GW has PPD configuration. To avoid such a conflict, you must configure the PPD functionality on both P-GW (APN level granularity) and S-GW (service level granularity).

See the *Paging Policy Differentiation* chapter in the *P-GW Administration Guide* for detailed information on PPD functionality.

Example

To enable PPD functionality on P-GW, enter the following command:

```
paging-policy-differentiation
```

p-cscf

Enables use of locally configured Proxy Call Session Control Function (P-CSCF) addresses or a Fully Qualified Domain Name (FQDN).

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

In StarOS V14.x and earlier:

p-cscf { fqdn *fqdn* **| primary [ip** *IPv4_address* **| ipv6** *IPv6_address* **] | secondary [ip** *IPv4_address* **| ipv6** *IPv6_address* **] }**
no p-cscf { fqdn | primary [ip | ipv6] | secondary [ip | ipv6] }

In StarOS V15.0 and later:

p-cscf { fqdn *fqdn* **| priority** *address_ priority* **[ip** *IPv4_address* **| ipv6** *IPv6_address* **] }**
no p-cscf { fqdn *fqdn* **| priority** *address_ priority* **[ip | ipv6] }**

no

Disables use of previously configured P-CSCF addresses or FQDN.

fqdn *fqdn*

Configures the P-CSCF FQDN server name for the APN as an alphanumeric string of 1 through 256 characters.

primary [ip*IPv4_address* | ipv6 *IPv6_address*]

Specifies the primary P-CSCF address for the APN.

IPv4_address must be expressed in IPv4 dotted-decimal notation.

IPv6_address must be expressed in IPv6 colon-separated-hexadecimal notation.

secondary [ip *IPv4_address* | ipv6 *IPv6_address*]

Specifies the secondary P-CSCF address for the APN.

IPv4_address must be expressed in IPv4 dotted-decimal notation.

IPv6_address must be expressed in IPv6 colon-separated-hexadecimal notation.

priority *address_ priority* [ip *IPv4_address* | ipv6 *IPv6_address*]

Specifies the priority for P-CSCF address for the APN.

address_ priority is an integer from 1 to 3. 1 is the highest priority.

IPv4_address must be expressed in IPv4 dotted-decimal notation.

IPv6_address must be expressed in IPv6 colon-separated-hexadecimal notation.

Usage Guidelines

Use this command to specify the P-CSCF addresses or FQDN server name associated with this APN.

Example

The following command enables a P-CSCF with the primary IPv4 address *10.2.3.4* for the APN:

```
p-cscf primary ip 10.2.3.4
```

The following command enables a P-CSCF with FQDN server name *pcscfalias1.ind.pun.cisco.com* for the APN:

```
p-cscf fqdn pcscfalias1.ind.pun.cisco.com
```

The following command enables a P-CSCF with the IPv4 address *10.2.3.4* at the highest priority of 1 for the APN:

```
p-cscf priority 1 ip 10.2.3.4
```

pco-options

The following commands are explained below:

- pco-options custom1
- pco-options custom2
- pco-options custom3
- pco-options custom4
- pco-options custom5

pco-options custom1

In releases prior to 21.1.V0 (N5.1):

This command controls the sending of customized PCO (Protocol Configuration Options) options in the network to MS GTP messages and configures APN to include link MTU in PCO IE.

In release 21.1.V0 (N5.1) and later:

Configures APN to include protocol configuration options in PCO/APCO/EPCO IE as applicable.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

pco-options { custom1 [ue-requested] | link-mtu *bytes* **[non-ip** *bytes* **] }**epdg fqdn *domain_name*
{ default | no } pco-options [custom1 | link-mtu [non-ip]]

custom1

Enable sending of customized PCO options in the network to MS messages; send customized PCO options to all UEs regardless of support.

ue-requested

Enable sending of customized PCO options in the network to MS messages for "UE-Requested" mode; send PCO to only UEs that request customized PCO options.

link-mtu *bytes*

In releases prior to 21.1.V0 (N5.1):

Configures APN to include link MTU in PCO IE, if it is requested by UE.

In release 21.1.V0 (N5.1) and later:

Configures APN to include Link MTU in PCO/APCO/EPCO IE of IP and Non-IP PDN connection response, if it is requested by UE.

When UE sends IPv4 Link MTU Size PCO request during Initial attach/ Standalone PDN connection, then the S-GW/SGSN/HSGW sends the same transparently in Create Session Request, Create/Update PDP Context Request, or PBU to P-GW, GGSN, or PMIP-PGW. Create Session Response, Create/ Update PDP Context Response/ PBA will be sent with latest configured MTU size PCO value in APN. If UE is in outbound roaming, then default value (1500) will be provided in the MTU size PCO.

bytes must be an integer from 1280 to 2000.

Default: 1500

non-ip *bytes*

Link MTU for Non-IP PDN. *bytes* must be an integer from 128 to 2000. Default is 1358.

epdg

Enables operator specific epdg selection in the PCO. By default it is disabled.

fqdn

Specifies fully qualified domain name. Based on this, IP addresses would be queried from the DNS.

default

Disable sending of customized PCO options in the network to MS messagesand/ or sets the link MTU PCO to 1500 bytes.

no

Do not send customized PCO options to any UEs and/ or sets the link MTU PCO to 1500 bytes.

Usage Guidelines

Use this command to enable or disable sending of customized PCO options in the network to MS GTP messages and configure link MTU size PCO value.

Important Configure custom PCO values in **pco-custom1** command in *ACS Charging Action Configuration Mode*.

Example

The following command enables sending customized PCO options to all UEs regardless of support:

```
pco-options custom1
```

The following command disables sending of customized PCO options in the network to MS messagesand sets the link MTU PCO to 1500 bytes:

```
default pco-options
```

The following command configures epdg.com

```
pco-options epdg fqdn epdg.com
```

pco-options custom2

This command controls the sending of customized PCO (Protocol Configuration Options) options in the network to MS GTP messages and configures APN to include in PCO IE.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] pco-options { custom2 [ue-requested] value *custom_value* **| value** *custom_value* **}**

no

Removes PCO configuration at APN configuration mode

custom2

Enable sending of customized PCO options in the network to MS messages; send customized PCO options to all UEs regardless of support.

ue-requested

Enable sending of customized PCO options in the network to MS messages for "UE-Requested" mode; send PCO to only UEs that request customized PCO options.

Usage Guidelines

Use this command to enable or disable sending of customized PCO options in the network to MS GTP messages and configure link MTU size PCO value.

Example

The following command enables sending customized PCO options to all UEs regardless of support:

```
pco-options custom2
```

pco-options custom3

This command controls the sending of customized PCO (Protocol Configuration Options) options in the network to MS GTP messages and configures APN to include in PCO IE.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] pco-options { custom3 [ue-requested] value *custom_value* **| value** *custom_value* **}**

no

Removes PCO configuration at APN configuration mode

custom3

Enable sending of customized PCO options in the network to MS messages; send customized PCO options to all UEs regardless of support.

ue-requested

Enable sending of customized PCO options in the network to MS messages for "UE-Requested" mode; send PCO to only UEs that request customized PCO options.

Usage Guidelines

Use this command to enable or disable sending of customized PCO options in the network to MS GTP messages and configure link MTU size PCO value.

Example

The following command enables sending customized PCO options to all UEs regardless of support:

```
pco-options custom3
```

pco-options custom4

This command controls the sending of customized PCO (Protocol Configuration Options) options in the network to MS GTP messages and configures APN to include in PCO IE.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] pco-options { custom4 [ue-requested] value *custom_value* **| value** *custom_value* **}**

no

Removes PCO configuration at APN configuration mode

custom4

Enable sending of customized PCO options in the network to MS messages; send customized PCO options to all UEs regardless of support.

ue-requested

Enable sending of customized PCO options in the network to MS messages for "UE-Requested" mode; send PCO to only UEs that request customized PCO options.

Usage Guidelines

Use this command to enable or disable sending of customized PCO options in the network to MS GTP messages and configure link MTU size PCO value.

Example

The following command enables sending customized PCO options to all UEs regardless of support:

```
pco-options custom4
```

pco-options custom5

This command controls the sending of customized PCO (Protocol Configuration Options) options in the network to MS GTP messages and configures APN to include in PCO IE.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

`[ no ] pco-options { custom5 [ ue-requested ] value` *`custom_value`* **`| value`** *`custom_value`* **`}`**

no

Removes PCO configuration at APN configuration mode

custom5

Enable sending of customized PCO options in the network to MS messages; send customized PCO options to all UEs regardless of support.

ue-requested

Enable sending of customized PCO options in the network to MS messages for "UE-Requested" mode; send PCO to only UEs that request customized PCO options.

Usage Guidelines

Use this command to enable or disable sending of customized PCO options in the network to MS GTP messages and configure link MTU size PCO value.

Example

The following command enables sending customized PCO options to all UEs regardless of support:

```
pco-options custom5
```

pdn-behavior

Configures specific PDN behavior.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

```
pdn-behavior  { custom1 | ims | lapi }
[ default | no ] pdn-behavior
```

default | no

Configures APN as "Normal".

custom1

Configures APN as a Custom1 (well-known) APN. Re-auth Requested reason code returned for PDN disconnect.

ims

Configures APN as an IMS APN. Re-auth Requested reason code returned for PDN disconnect.

lapi

Configures the APN as a Low Access Priority Indicator (LAPI) APN. Use this command in conjunction with the **backoff-timer value** command in *APN Configuration Mode*. Together, they configure the node's behavior for the APN Backoff Timer feature.

Caution Do not configure the emergency APN and **pdn-behavior lapi** settings in the same APN, as these two settings are mutually exclusive. If both settings are configured in the same APN, the **pdn-behavior lapi** configuration takes priority. As a result, if both settings are configured and the system is overloaded, the call will be rejected. To determine if both settings are configured in the same APN, execute the **show configuration error verbose** command in Exec Mode. The command output contains a warning if both settings are configured in the same APN.

Important The APN Backoff Timer feature requires that the M2M license be enabled on the P-GW/SAEGW. Contact your Cisco account or support representative for licensing details.

Usage Guidelines

Use this command to configure specific PDN behavior.

Example

The following command configures APN as an IMS APN which returns reason code Re-auth Requested for PDN disconnect:

```
pdn-behavior ims
```

pdn validate-post-switchover

Enables or disables the dynamic rule check for the auto correction of the VoLTE session. This feature should be configured only for the VoLTE/IMS APNs for which auto recovery is required.

Product

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`[no] pdn validate-post-switchover`

no

Disables the dynamic rule check for the auto correction of the VoLTE session.

pdn validate-post-switchover

Validates the dynamic rules for automatic recovery after a switchover.

pdp-type

Configures the type of PDP contexts that are supported by this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`pdp-type { ipv4 [ ipv6 ] | ipv6 [ ipv4 ] | ppp | non-ip }`
`default pdp-type`

default

Configures the default PDP type, IPv4, for the APN.

ipv4 [ipv6]

Enables support for IPv4 PDP contexts. Also enables support for IPv6 if the IPv6 optional keyword is entered in this command. Default: Enabled

Important Entering both IPv4 and IPv6 in either order enables support for both.

ipv6 [ipv4]

Enables support for IPv6 PDP contexts. Also enables support for IPv4 if the IPv6 optional keyword is entered in this command. Default: Disabled

Important Entering both IPv4 and IPv6 in either order enables support for both.

ppp

Enables support for PPP PDP contexts. Default: Disabled

non-ip

Enables support for Non-IP PDP Type for the APN.

Usage Guidelines

IP PDP context types are those in which the MS is communicating with a PDN such as the Internet or an intranet using IP. PPP PDP contexts are those in which PPP or PPP Network Control Protocol (NCP) frames from the MS are either terminated at, or forwarded by the GGSN.

If a session specifies a PDP type that is not supported by the APN, the system rejects the session with a cause code of 220 (DCH, Unknown PDP address or PDP type).

Caution For the IPv6 calls to work, the destination context must have at least one IPv6 interface configured.

Example

The following command configures the APN to support PPP context types:

```
pdp-type ppp
```

permission

Enables or disables the ability to use authorized services for the current APN.

Product

P-GW

SAEGW

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

`[ no ] permission { nemo | pmipv6-interception }`
`default permission`

no | default

Disables the usage of the specified service.

nemo

Enables the ability to use NEMO functionality.

Important Use of the **nemo** keyword requires that a valid license key be installed. Contact your local Sales or Support representative for information on how to obtain a license.

pmipv6-interception

Allows APN to access the external Local Mobility Anchor (LMA) over Proxy Mobile IPv6 (PMIPV6).

Usage Guidelines

Use this command to enable support for NEMO or PMIPv6 functionality on the APN. These options are disabled by default.

Example

The following command enables NEMO functionality:

`permission nemo`

The following command disables NEMO functionality:

`no permission nemo`

pgw fqdn

Configures both the primary and the secondary FQDN string in the configuration.

Product

HSGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
pgw fqdn primary  primary-fqdn-name secondary secondary-fqdn-name
default pgw fqdn
no pgw fqdn
```

default

Resets the command to its default setting of disabled.

no

Disables the previously configured pgw fqdn configuration.

primary *primary_fqdn_name*

Configures the primary static fqdn string for the HSGW to select the P-GW.

secondary *secondary_fqdn_name*

Configures the secondary static fqdn string. The primary fqdn will be tried before trying the secondary fqdn.

Usage Guidelines

Use this command to configure both the primary and the secondary FQDN string in the configuration.

With with command, DNS resolution is triggered simultaneously for both the primary and secondary P-GW FQDN. Therefore, it is possible for both DNS resolutions to be successful. The focus is on the primary FQDN. However in the case of primary FQDN resolution failure, P-GW selection happens based on the secondary FQDN.

Important If the above CLI command is not configured then, the HSGW uses DNS to select the serving P-GW. The HSGW receives a list of all the P-GWs that serve the given APN. Then, the HSGW compares a list of P-GWs with the locally configured FQDN and selects the best matching P-GW.

Example

The following command enables the primary FQDN string in the configuration.

```
pgw fqdn primary  primary-fqdn-name
```

policy

Configures the Mobile IPv6 policy to set the action to be taken when IPv4/IPv6 subscriber packets need to be tunneled and the encapsulated packets exceed the tunnel maximum transmission unit (MTU).

Product

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

policy ipv6 tunnel mtu exceed { fragment [inner] | notify-sender } [default | no] policy ipv6 tunnel mtu exceed

default

IPv6: System will do a Path MTU (PMTU) discovery and send "ICMPv6 Packet Too Big" to the original sender if the subscriber packet exceeds MTU after encapsulation.

IPv4: System will do an outer IPv6 fragmentation if the packet exceeds MTU after encapsulation.

no

Disables this functionality.

ipv6 tunnel mtu exceed { fragment [inner] | notify-sender }

fragment: System will do an outer IPv6 fragmentation if the subscriber packet exceeds MTU after encapsulation.

inner:

Important

When **policy ipv6 tunnel mtu exceed fragment inner** CLI command is configured, the ASR 5500 (without VPP) fragments the IPv6 fragments if the packet size is greater than the MTU that is configured under APN. If the packet is already fragmented, it results in two fragment headers for the IPv6 packet. This scenario can be avoided by either retaining the default settings of the configuration or by ensuring the MTU on P-GW matches the one configured on the peer.

For example, if MTU is set to 1500 between a SIP server and P-GW, and APN is configured with **data tunnel mtu 1300**:

- The SIP server sends a packet (say, SIP Invite) towards the UE with the size of 3000. As MTU is 1500, the packet is fragmented and received as two packets at P-GW with size of 1500 each.
- As P-GW is configured with MTU of 1300, it fragments these packets once again. As a result, there are four packets: 1300 + 200 + 1300 +200

As per IPv6 specifications, these double-fragmented packets cannot be reassembled and generates a reassembly-timeout message at the endpoint.

Note that this is a simplified example. In actual scenarios, when the GGSN/P-GW/SAEGW is configured with **data tunnel mtu 1300**, a smaller MTU is used that is based on tunnel overhead.

For more details, refer the *P-GW Administration Guide*.

IPv6: System will do a PMTU discovery and send "ICMPv6 Packet Too Big" to the original sender if the subscriber packet exceeds MTU after encapsulation.

IPv4: If packet will exceed tunnel MTU after encapsulation, based on DF bit and ignore-df config, the original IPv4 packet will be fragmented and then encapsulated so that it will not exceed MTU, or ICMP Error will be sent if IPv4 packet fragmentation is not allowed.

notify-sender:

IPv6: System will do a PMTU discovery and send "ICMPv6 Packet Too Big" to the original sender if subscriber packet exceeds MTU after encapsulation.

IPv4: System will do an outer IPv6 fragmentation if packet exceeds MTU after encapsulation.

Usage Guidelines

This command sets the Mobile IPv6 policy for the action to be taken when IPv4/IPv6 subscriber packets need to be tunneled and the encapsulated packets exceed tunnel MTU size.

Example

The following command causes the system to do outer IPv6 fragmentation if the subscriber packet exceeds MTU after encapsulation:

```
policy ipv6 tunnel mtu exceed fragment
```

ppp

Configures the Point-to-Point Protocol (PPP) options for the current APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
ppp { data-compression { protocols protocols | mode modes } | keepalive seconds
| min-compression-size min_octets | mtu max_octets | l2tp allow-auth-without-pco
 }
default ppp { data-compression protocols | keepalive | min-compression-size
 | mtu | l2tp allow-auth-without-pco  }
no ppp { data-compression protocols | keepalive seconds | mtu | l2tp
allow-auth-without-pco }
```

default

Configures the default PPP parameters for the specified APN.

no

Resets the option specified to its default setting.

data-compression { mode *modes* | protocols *protocols*}

Configures the data compression or the compression protocol to use for the APN. Default: all protocols enabled

mode *modes*: Sets the compression mode to one of the following:

- **normal**: Packets are compressed using the packet history for automatic adjustment and for best compression.
- **stateless**: Each packet is compressed individually.

protocols *protocols*: Sets the compression protocol to one of the following:

- **deflate**: DEFLATE algorithm
- **mppc**: Microsoft Point-to-Point Compression
- **stac**: STAC LZS algorithm

keepalive *seconds*

Specifies the frequency of sending the Link Control Protocol (LCP) keep alive messages. *seconds* must be either 0 or an integer from 5 through 14400. The special value 0 disables the keep alive messages entirely. Default: 30

min-compression-size *min_octets*

Specifies the smallest packet to which compression may be applied as an integer from 0 through 2000. Default: 128

mtu *max_octets*

Specifies the maximum transmission unit (MTU) for packets accessing the APN as an integer from 100 through 2000. Default: 1500

Important The MTU refers to the PPP payload which excludes the two PPP octets. Therefore, an MTU of 1500 corresponds to the 3GPP standard MTU of 1502 for GTP packets with PPP payloads.

l2tp

Configures PPP L2TP specific parameters

allow-auth-without-pco

Allows P-GW PPP authentication for a L2TP call to be successful when PCO IE is not received in Create Session Request.

Usage Guidelines

Adjust packet sizes and compression to improve bandwidth utilization. Each network may have unique characteristics such that determining the best packet size and compression options may require system monitoring over an extended period of time.

Example

The following command configures the ppp data-compression mode for the APN to be *stateless*:

```
ppp data-compression mode stateless
```

The following command configures an MTU of *500* for the APN:

```
ppp mtu 500
```

Example

The following command configures PPP L2TP specific parameters and allows P-GW PPP authentication for a L2TP call to be successful when PCO IE is not received in Create Session Request:

```
ppp l2tp allow-auth-without-pco
```

proxy-mip

Configures support for Proxy Mobile IP functionality for the APN.

Product

GGSN

FA

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
[ default | no ] proxy-mip { required | null-username static-homeaddr }
```

default

Configures the default proxy MIP setting for the specified APN

no

Disables this functionality.

required

Default: Disabled.

Enables proxy-mip for all subscribers using this APN.

null-username static-homeaddr

Configures handling of RRQ to enable the acceptance without an NAI extension in this APN. Default: Disabled

Usage Guidelines

This command requires that Proxy Mobile IP functionality be performed for all PDP contexts facilitated by the APN.

When Proxy Mobile IP is performed, the system performs subscriber authentication but not Mobile IP FA authentication. It can be configured to handling of RRQ without NAI extension in an APN.

More information about Proxy Mobile IP support for the GGSN can be found in the *GGSN Administration Guide*.

Example

The following command causes the system to support Proxy Mobile IP for all PDP contexts facilitated by the APN:

```
proxy-mip required
```

The following command will enables the accepting of RRQ without NAI extensions in this APN.

```
proxy-mip null-username static-homeaddr
```

qci

Specifies the QoS Class Index (QCI) value to be used to mark bearers classified as IMS media for preferential treatment during session recovery and ICSR switchover.

Product

GGSN

P-GW

S-GW

SAE-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

qci *value_bytes* **ims-media**
no qci *value_bytes* **ims-media**

no

Disables this IMS QCI feature.

ims-media

Marks bearers classified as IMS media for preferential treatment during session recovery and ICSR switchover.

value_bytes

Specifies the QCI value an integer from 1 through 254.

Usage Guidelines

Use this command to specify the QCI value to be used to mark bearers classified as IMS media for preferential treatment during session recovery and ICSR switchover.

The following prerequisites apply to the implementation of this feature:

- A dedicated APN must be reserved for VoLTE traffic.
- A call connected to this APN will not be classified as Active VoLTE unless there is a dedicated bearer matching the VoLTE-configured QCI.
- Preferential treatment would be given to only those calls which are active VoLTE.
- A GGSN call connected to this APN will not be classified as Active VoLTE unless there is network initiated bearer matching the VoLTE-configured QCI.
- VoLTE marking is preserved across a Gn-Gp handoff.

When this feature is enabled via a CLI command, the actions are taken:

- During bearer creation
  - New bearer QCI is matched against APN configuration.
  - If the QCI matches an APN configuration, the bearer is marked for preferential treatment.
  - Flow_entries are modified with this information (if this is first VoLTE bearer).
  - Egtpu_session is updated with the VoLTE tag during a rx_setup request.
  - An indication message informs ECS about the VoLTE tagging.
- During bearer deletion
  - Flow_entry is updated with VoLTE information if this is the last VoLTE bearer.
  - ECS is informed of the deletion via an indication message.

Example

The following command enables preferential treatment for IMS bearers with a QCI of 9:

```
qci 9 ims-media
```

qos negotiate-limit

Cconfigures the QoS profile to provide the peak and committed data rate limits that the GGSN assigns to the APN. The GGSN sends the QoS profile to the SGSNs in response to GTP Create/Update PDP Context requests for traffic shaping and policing functionality.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
qos negotiate-limit direction { downlink | uplink } [ qci qci_val ] [
peak-data-rate bps [ committed-data-rate bps ] | committed-data-rate [
peak-data-rate bps ] ]
no qos negotiate-limit direction { downlink | uplink } [ qci qci_val ] }
```

no

Disables the QoS Profile for the APN.

direction { downlink | uplink }

downlink: Apply the specified limits and actions to the downlink (to-Gn direction).

uplink: Apply the specified limits and actions to the uplink (to-Gi direction).

qci *qci_val*

qci_val is the QoS Class Identifier (QCI) for which the negotiate limit is being set. QCI ranges from 1 to 9. If no qci-val is configured, it will be handled as an undefined-qci (same as undefined-qos class).

committed-data-rate *bps*

Default: See the *Usage* section for this command

The committed data rate (guaranteed-data-rate) in bps (bits per second).

bps must be an integer from 1 through 16000000 for the downlink direction or 1 through 8640000 for the uplink direction. The value must also correspond to one of the permitted values identified the tables below. If a non-permitted value is entered for this parameter, the system rounds the value to the nearest lower supported value, except in the case where value is less than 1,000 bps. In this case, the system rounds the value to 1,000 bps. In addition, if the configured committed rate is lower than the value configured for the peak-data-rate, the system uses the configured peak rate for this parameter.

Important System measurements for this value exclude the GTP and outer packet headers. In addition, some traffic classes have both a committed rate and a peak rate, while other traffic classes have just a peak rate. If a committed rate is not applicable (such as, the traffic class is **background** or **interactive**), an error occurs if this option is configured. If the committed-rate is applicable (such as, the traffic class is **conversational** or **streaming**), the values supplied by the SGSN are used if this option is not configured.

peak-data-rate *bps*

Default: See the *Usage* section for this command

Specifies the peak data-rate for the subscriber in bps (bits per second).

bps must be an integer from 1 through 16000000 for the downlink direction or 1 through 8640000 for the uplink direction. The value must also correspond to one of the permitted values identified in the tables below. If a non-permitted value is entered for this parameter, the system rounds the value to the nearest lower supported value, except in the case where value is less than 1,000 bps. In this case, the system rounds the value to 1,000 bps.

Usage Guidelines

This command configures the APN quality of service (QoS) profile. This feature enables configuring and enforcing bandwidth limitations on individual PDP contexts of a particular traffic class. Traffic classes are defined in 3GPP TS 23.107 and are negotiated during PDP context activation. Bandwidth enforcement is configured and enforced independently for the downlink and the uplink directions.

The profile information is sent to the SGSN(s) in response to GTP Create/Update PDP Context Request messages. If the QoS profile requested by the SGSN is lower than the configured QoS profile configured, the profile requested by the SGSN is used. If the QoS profile requested by the SGSN is higher, the configured rates are used.

Note that the values for the uplink/downlink committed-data-rate and peak-data-rate parameters are exchanged in the GTP messages between the GGSN and the SGSN. Therefore, the values used may be lower than the configured values. When negotiating the rate with the SGSN(s), the system convert this to a value that is permitted by GTP as shown in the tables below.

Table 17: Permitted Values for Committed and Peak Data Rates in GTP Messages

Value (bps)	Increment Granularity (bps)
From 1000 to 63,000	1,000 (e.g 1000, 2000, 3000, ... 63000)
From 64,000 to 568,000	8,000 (e.g. 64000, 72000, 80000, ... 568000)
From 57,6000 to 8,640,000	64,000 (e.g. 576000, 640000, 704000, ... 86400000)
From 8,700,000 to 16,000,000	100,000 bps (e.g. 8700000, 8800000, 8900000, ... 16000000)

The command can be entered multiple times to specify different combinations of direction and class. If this command is not configured at all, the GGSN does not perform traffic policing or QoS negotiation with the SGSN.

Additional information on the QoS traffic shaping functionality is located in the *System Administration Guide*.

Default Values:

Example

The following command sets an uplink peak data rate of 128000 bps for QoS negotiation limit:

```
qos negotiate-limit direction uplink peak-data-rate 128000
```

qos rate-limit

Configures the action on a subscriber traffic flow that violates or exceeds the peak/committed data rate under traffic policing functionality.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
qos rate-limit direction { downlink | uplink } [ qci qci_val ] [ burst-size
 { bytes | auto-readjust [ duration dur ] } ] [ exceed-action { drop |
lower-ip-precedence | transmit } [ violate-action { drop |
lower-ip-precedence | shape [ transmit-when-buffer-full ] | transmit } ]
 ] | [ violate-action { drop | lower-ip-precedence | shape [
transmit-when-buffer-full ] | transmit } [ exceed-action { drop |
lower-ip-precedence | transmit } ] ] +
no qos rate-limit direction { downlink | uplink } [ qci qci_val ]
```

no

Disables the QoS data rate limit configuration for the APN.

Important When no Qos Profile is configured, the system defaults to using the information provided by the SGSN.

qos rate-limit direction { downlink | uplink }

downlink: Apply the specified limits and actions to the downlink (the Gn direction).

uplink: Apply the specified limits and actions to the uplink (the Gi direction).

qci *qci_val*

qci_val is the QoS Class Identifier (QCI) for which the negotiate limit is being set. QCI ranges from 1 to 9 or 80, 82 and 83.

If no qci-val is configured, it will be handled as an undefined-qci (same as undefined-qos class).

burst-size { *bytes* | auto-readjust [duration *dur*] }

Default: See *Usage* section for this command.

The burst size allowed, in bytes for peak data rate and committed data rate.

bytes must be an integer from 1 through 6000000.

Important It is recommended that the minimum value of this parameter be configured to the greater of the following two values: 1) three times greater than packet MTU for the subscriber connection, OR 2) 3 seconds worth of token accumulation within the "bucket" for the configured peak-data-rate. In addition, if the committed-data-rate parameter is specified, the burst-size is applied to both the committed and peak rates.

auto-readjust [duration *dur* **]** keyword provides the option to calculate the Burst size dynamically while configuring the rate-limit. Whenever this keyword is enabled to calculate burst size, the GGSN QoS negotiated rate is enforced for this calculation.

Whenever there is a change in the rates (due to a QoS update), the burst sizes will be updated accordingly.

This keyword also provides two different burst sizes. One burst size for peak rate and another for committed rate.

By default this keyword is disabled.

duration *dur* describes the duration of burst in seconds. If duration is not specified this keyword will use 1 second as default value.

dur must be an integer between 1 through 30.

exceed-action { drop | lower-ip-precedence | transmit }

The action to take on the packets that exceed the committed-data-rate but do not violate the peak-data-rate. The following actions are supported:

- **drop**: Drop the packet.
- **lower-ip-precedence**: Transmit the packet after lowering the ip-precedence.
- **transmit**: Transmit the packet.

violate-action { drop | lower-ip-precedence | shape [transmit-when-buffer-full] | transmit }

The action to take on the packets that exceed both the committed-data-rate and the peak-data-rate. The following actions are supported:

- **drop**: Drop the packet.
- **lower-ip-precedence**: Transmit the packet after lowering the IP precedence.
- **shape [transmit-when-buffer-full]**: This keyword is not supported in this release.

Important Traffic Shaping is not supported on the GGSN, P-GW, or SAEGW.

- **transmit**: Transmit the packet.

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

This command configures APN quality of service (QoS) through traffic policing. This command enables the actions on subscriber flows exceeding or violating the allowed peak/committed data rate.

Important This command is not intended for bearer level policing

Important If the exceed/violate action is set to "lower-ip-precedence", this command may override the configuration of the **ip qos-dscp** command in the GGSN Service Configuration mode for packets from the GGSN to the SGSN. In addition, the GGSN service **ip qos-dscp** command configuration can override the APN setting for packets from the GGSN to the Internet. Therefore, it is recommended that this command not be used in conjunction with this action.

The command can be entered multiple times to specify different combinations of direction and class. If this command is not configured at all, the GGSN does not perform traffic policing or QoS negotiation with the SGSN. (It accepts all of the SGSN-provided values for the PDP context.)

To calculate the burst size dynamically, an optional keyword **auto-readjust** [**duration** *dur*] is provided with the **burst-size** keyword. By default, the burst size is fixed if defined in bytes with this command. Regardless of the rate being enforced, burst-size is fixed as set by the **burst-size** *bytes* parameter.

The **auto-readjust** [**duration** *dur*] keyword enables variable burst size depending on the rate being enforced. The system calculates burst size using a per token bucket algorithm calculation as T=B/R, where T is the time interval, B is the burst size and R is the Rate being enforced. It also provides different burst size for Peak and Committed data rate-limiting.

If the **auto-readjust** keyword is not used, a fixed burst size must be defined which will be applicable for peak data rate and committed data rate regardless of the rate being enforced.

If the **auto-readjust** keyword is provided without specifying the duration, a default duration of 1 second will be used for burst size calculation.

Example

The following command lowers the IP precedence when the committed-data-rate and the peak-data-rate are violated in uplink direction:

```
qos rate-limit direction uplink violate-action lower-ip-precedence
```

qos-renegotiate

This command is obsolete.

qos traffic-police

This command is obsolete. This functionality is now supported through **qos negotiate-limit** and **qos rate-limit** commands.

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

radius

This command is obsolete.

radius group

This command is obsolete.

radius returned-framed-ip-address

Sets the policy whether or not to reject a call when the RADIUS server supplies 255.255.255.255 as the framed IP address and the MS does not supply an address.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
radius returned-framed-ip-address 255.255.255.255-policy {
accept-call-when-ms-ip-not-supplied | reject-call-when-ms-ip-not-supplied
 }
default radius returned-framed-ip-address 255.255.255.255-policy
```

default

Set the policy to its default of rejecting calls when the RADIUS server supplies framed IP address as 255.255.255.255 and the MS does not supply an address.

{ accept-call-when-ms-ip-not-supplied | reject-call-when-ms-ip-not-supplied }

accept-call-when-ms-ip-not-supplied: Accept calls when the RADIUS server supplies framed IP address as 255.255.255.255 and the MS does not supply an address.

reject-call-when-ms-ip-not-supplied: Reject calls when the RADIUS server supplies framed IP address as 255.255.255.255 and the MS does not supply an address.

Usage Guidelines

Use this command to set the behavior in the APN when the RADIUS server supplies 255.255.255.255 as the framed IP address and the MS does not supply an address.

Example

Use the following command to set the APN to reject calls when the RADIUS server supplies framed IP address as 255.255.255.255 and the MS does not supply an address:

```
radius returned-framed-ip-address 255.255.255.255-policy
reject-call-when-ms-ip-not-supplied
```

radius returned-username

Configures the username that is returned in accounting messages. If the username is not available in the Protocol Configuration Options (PCO), the RADIUS returned username is preferred to the constructed username (imsi@apn, msisdn@apn, or outbound username).

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
radius returned-username { override-constructed-username |
prefer-constructed-username }
default radius returned-username
```

default

The default value for the RADIUS returned-username is prefer-constructed-username. The constructed username (imsi@apn, msisdn@apn) will be used.

Important If the username is available in the PCO, that username will be used regardless of the setting for this command (radius returned-username).

override-constructed-username

If the RADIUS server returns a username in the Access-Accept message and that username is not available in the Protocol Configuration Options (PCO), the new username from the RADIUS server will be used.

prefer-constructed-username

If the username is not available in the PCO, a constructed username (imsi@apn, msisdn@apn) will be used regardless of the username from the RADIUS server. This is the default.

Usage Guidelines Use this command to configure the username that is returned in accounting messages

Example

Following command sets the default value for the RADIUS returned-username is prefer-constructed-username [constructed username (imsi@apn, msisdn@apn)]:

```
default radius returned-username
```

radius rulebase-format

This command enables/disables the Rulebase Concatenation feature at APN level. This feature is used to merge the prepaid attribute and SN1-Rulebase as a new rulebase and then apply the new rulebase to the session. If the Rulebase Concatenation feature is not enabled, the last received rulebase is applied to the session.

Important This command is license dependent. For more information, contact your Cisco account representative.

Product

GGSN

PDSN

P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
radius rulebase-format { custom1 | standard }
default radius rulebase-format standard
```

default

Disables the Rulebase Concatenation feature. The default setting is **standard**.

custom1

Specifies the rulebase as a custom value derived from multiple RADIUS attributes in the RADIUS Access-Accept response message.

standard

Specifies the rulebase as a single attribute value as obtained in RADIUS Access-Accept response message. This is the default setting.

Usage Guidelines

Currently, the Wireless Mobile Private Network (MPN) configures a dedicated rulebase per service. The Enterprise that utilizes this service has the rulebase per subscriber in 3G or signaled from AAA server with SN1-Rulebase attribute. In the case of a prepaid service, the rulebase name will be the customer-specific prepaid policy attribute received from the AAA server.

When both the RADIUS attributes are received, the last received attribute is considered and applied to the subscriber session. This CLI command is used to merge prepaid attribute and SN1-Rulebase as a new rulebase and then apply the new rulebase to the session on the gateway.

Important Rulebase Concatenation is a customer-specific feature and it requires a valid license to enable the feature. For more information, contact your Cisco account representative.

In 18 and earlier releases, rulebase was a single attribute value as obtained in the RADIUS Access-Accept response message. That is, only one rulebase can be applied with either SN1-Rulebase AVP or customer-specific prepaid policy AVP, whichever comes last.

In 19 and later releases, when both the attributes are received, the rulebase name will be a concatenation of the attributes as received in the Access-Accept response message. If only one of the attributes is received, the current behavior is applicable i.e. the last received attribute will be selected as the rulebase and it will be applied to the session.

If the concatenated rulesbase is not matching with the rulebase configured on the gateway, and/or if both the attributes are present more than once, then the session is rejected.

This feature implementation helps the MPN to customize the rulebase and combine prepaid service with additional services like Service Based Access (SBA).

Example

The following command merges the RADIUS attributes and installs the new concatenated rulebase.

```
radius rulebase-format custom1
```

reporting-action

Enables the reporting of APN-related events to a log. By default, reporting events to a log is disabled.

Product P-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description **`[ default | no ] reporting-action event-record`**

default

Disables reporting of events to a log. By default, reporting is disabled.

no

Disables reporting of events to a log if reporting has been enabled.

Usage Guidelines Use this command to enable the reporting of APN-related events to a log. By default, reporting is disabled.

Example

The following command enables reporting of events to a log:

`reporting-action event-record`

restriction-value

Configures the level of restriction to ensure controlled co-existence of the Primary PDP Contexts.

Product GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description **`restriction-value`** *`value`*
`[ default | no ] restriction-value`

default | no

Default: no restriction-value

Entering either **default** or **no restriction-value** sets the internal value to zero (0) so that connection to any APN is allowed.

value

Specifies a unique number that identifies the type of network supported for primary PDP contexts facilitated by this APN. The following values are supported:

- *1*: Value used for Wireless Application Protocol (WAP) or Multimedia Messaging Service (MMS) type of networks. This corresponds to APN type public-1.
- *2*: Value used for Internet or Packet-Switched Public Data Network (PSPDN) type of networks. This corresponds to APN type public-2.
- *3*: Value used for corporate customers who use MMS. This corresponds to APN type private-1.
- *4*: Value used for corporate who do not use MMS. This corresponds to APN type private-2.

Usage Guidelines

Restricts the ability to have connections to public access and certain private APNs as required by the APN configuration. Also allows co-existence of the Primary PDP Contexts in a controlled manner.

It does not restrict the total number of Primary PDP Contexts for the user. It also configures a method for preventing hackers in the public domain from using the UE as a router.

Access is provided based on the following rules:

- If *value* = 1, then PDP contexts with restriction values of 0, 1, 2, and/or 3 are allowed
- If *value* = 2, then PDP contexts with restriction values of 0, 1 and/or 2 are allowed
- If *value* = 3, then PDP contexts with restriction values of 0 and/or 1 are allowed
- If *value* = 4, then PDP contexts with no restriction values are allowed
- If **default** or **no** syntax is entered, then no PDP contexts have restriction

In the event that a Maximum APN Restriction value is received from the SGSN as part of a PDP Context Create (CPCR) or Update (UPCR) message, the GGSN allows the request based on the following matrix:

- If maximum = 0, then allow connection to any APN
- If maximum = 1, then allow APN Restriction values of 0, 1, 2, and/or 3
- If maximum = 2, then allow APN Restriction values of 0, 1 and/or 2
- If maximum = 3, the allow APN Restriction values of 0 and/or 1
- If maximum = 4, then always reject
- If maximum = anything else, then allow all APN Restriction values (1, 2, 3, and/or 4)

Refer to 3GPP 23.060 version 6.9.0 for more information.

Example

The following command sets the restriction value of the APN to *2*:

```
restriction-value 2
```

secondary ip pool

This command specifies a secondary IP pool to be used as backup pool for Network Address Translation (NAT).

Important This command is license dependent. For more information please contact your Cisco account representative.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

secondary ip pool *pool_name*
no secondary ip pool

no

Removes the previous secondary IP pool configuration.

pool_name

Specifies the secondary IP pool name.

pool_name must be an alphanumeric string of 1 through 31 characters.

Usage Guidelines

Use this command to configure a secondary IP pool for NAT subscribers, which is not overwritten by the RADIUS supplied list. The secondary pool configured will be appended to the RADIUS supplied IP pool list / APN provided IP pool list whichever is applicable during call setup.

Example

The following command configures a secondary IP pool named *test123*:

```
secondary ip pool test123
```

selection-mode

Configures the level of verification that will be used to ensure a mobile station's subscription to use this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

selection-mode { chosen-by-sgsn | sent-by-ms | subscribed } +
default selection-mode

default

Sets the default selection mode as "subscribed".

chosen-by-sgsn

Default: Disabled

The MS's subscription will not be verified and the APN will be provided by the SGSN.

sent-by-ms

Default: Disabled

The MS's subscription will not be verified and the APN will be provided by the MS.

subscribed

Default: Enabled

The MS's subscription will be verified by the SGSN.

+

More than one of the above keywords can be entered within a single command.

Usage Guidelines

Use this command to specify the level of verification that will be used to ensure a MS's subscription to use this APN. This setting must mach the corresponding setting on the SGSN. If the two settings are not identical, the GGSN rejects the session with a cause code of 201 (D1H, User authentication failed).

Example

The following command specifies that the MS's subscription will not be verified and that the APN name will be supplied by the SGSN:

```
selection-mode chosen-by-sgsn
```

stats-profile

Associates a statistics profile with a configured APN to support the Per QCI Packet Drop Counters and ARP Granularity for QCI Level Counters feature.

Important ARP Granularity for QCI Level Counters is a license-controlled feature. Per QCI Packet Drop Counters functionality does not require a license. Contact your Cisco account or support representative for licensing details.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator\

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] stats-profile *stats_profile_name*

no

disassociates the statistics profile with the specified APN.

stats-profile *stats_profile_name*

Specifies the existing statistics profile to associate with this APN. Statistics profiles are configured in *Global Configuration Mode* with the **stats-profile** command.

Usage Guidelines

Statistics profiles enable operators to monitor QoS statistics that identify multiple services running with the Statistics profiles enable operators to monitor QoS statistics that identify multiple services running with the same QCI value. In addition, packet drop counters have been introduced to provide the specific reason the Enhanced Charging Service (ECS) dropped a packet. The packet drop counters provide output on a per ARP basis. This provides additional information that operators can use to troubleshoot and identify network issues that may be affecting service.

For detailed information on this feature, refer to the *Per QCI Packet Drop Counters and ARP Granularity for QCI Level Counters* chapter in the *P-GW Administration Guide* or the *SAEGW Administration Guide*.

Example

The following command associates the stats-profile STATS with the APN:

stats-profile *STATS*

timeout

Configures the session timeout values for this APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

timeout { absolute | qos-renegotiate } *time* **[del-cause { none | reactiv-req }]**
[default | no] timeout [absolute | qos-renegotiate] [del-cause]

default

Set the default value for the followed option.

no

Returns the timeout parameter to its default setting. If neither the absolute or idle keywords are used in conjunction with this keyword, both timeout options will be returned to their default settings.

absolute

Configures the absolute maximum time a session may exist in any state (active or idle).

qos-renegotiate

This keyword is obsolete.

time

Default:

- absolute = 0 (Disabled)
- qos-renegotiation = 300

Measured in seconds, the time can be configured to any integer value between 0 and 4294967295.

A time of 0 disables timeouts for this APN.

del-cause { none | reactiv-req }

When subscribers are deleted due to APN timeouts, the GGSN/P-GW/SAEGW may include "Cause-IE" in the resulting Delete Bearer/Delete PDP Context Requests generated for default bearer.

none: Omit GTP "Cause-IE" in DBR/DPC when timeout occurs on default bearer.

reactiv-req: The DBR/DPC will include "Cause-IE" with GTP cause code "Reactivation Requested".

This behavior is applicable only if Delete Bearer Request is sent for default bearer, or Delete PDP Context is sent to delete the PDN connection or its last PDP context.

The behavior for "Cause-IE" specified in this CLI shall override the cause-code set by existing features.

By default, the **del-cause** option is not defined and existing behavior is retained.

Important This option is only valid when Cause IE Enhancement for Delete Bearer Request license is enabled. Contact your Cisco account representative for more information.

Usage Guidelines Use this command to limit the amount of time that a subscriber session can remain connected or as a QoS renegotiation dampening timer.

Example

The following commands enables an absolute time timeout of *60000* seconds:

```
timeout absolute 60000
```

timeout bearer-inactivity

This command configures the bearer inactivity timer and the threshold value of the traffic through an APN. The bearer inactivity timer can also be configured to exclude default bearer/primary bearer from monitoring bearer inactivity.

Product GGSN

P-GW

SAEGW

SGW

Privilege Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

In StarOS 15.0 and later releases:

```
timeout bearer-inactivity [ gbr | non-gbr ] dur_seconds volume-threshold {
 downlink | total | uplink } bytes
timeout bearer-inactivity del-cause { none | reactiv-req }
timeout bearer-inactivity exclude-default-bearer
[ default | no ] timeout bearer-inactivity [ del-cause |
exclude-default-bearer | gbr | non-gbr ]
```

In StarOS 14.x and earlier releases:

```
timeout bearer-inactivity dur_seconds volume-threshold total bytes
[ default | no ] timeout bearer-inactivity
```

default

Sets the bearer inactivity timer to disabled mode.

no

Removes the configured bearer inactivity timer values and traffic threshold limit.

timeout

Specifies that a bearer time out value will be configured for this APN.

gbr

Specifies that the GGSN/GW will check for low activity on a GBR bearer.

non-gbr

Specifies that the GGSN/GW will check for low activity on a non-GBR bearer.

Important P-GW only supports non-GBR bearer type sessions.

dur_seconds

Specifies the timeout duration in seconds to check inactivity on the bearer.

In StarOS 16.0 and later releases:

dur_seconds must be an integer value from 300 to 2592000 (5 minutes to 720 hours). The minimum configurable value of bearer inactivity timer was reduced from 900 seconds to 300 seconds.

In StarOS 15.0 releases:

dur_seconds must be an integer value from 900 to 2592000 (15 minutes to 720 hours). The minimum configurable value of bearer inactivity timer was reduced from 3600 seconds to 900 seconds.

In StarOS 14.x and earlier releases:

dur_seconds must be an integer value from 3600 through 2592000.

volume-threshold

This keyword sets the volume threshold in bytes to check the low activity on the bearer.

downlink

Threshold value of the downlink data traffic in a bearer.

total

Specifies that the total of both uplink and downlink data will be used as a volume threshold.

uplink

Threshold value of the uplink data traffic in a bearer.

bytes

bytes must be an integer value from 1 through 4294967295.

del-cause { none | reactiv-req }

When subscribers are deleted due to APN timeouts, the GGSN/P-GW/SAEGW may include "Cause-IE" in the resulting Delete Bearer/Delete PDP Context Requests generated for default bearer.

none: Omit GTP "Cause-IE" in DBR/DPC when timeout occurs on default bearer.

reactiv-req: The DBR/DPC will include "Cause-IE" with GTP cause code "Reactivation Requested".

This behavior is applicable only if Delete Bearer Request is sent for default bearer, or Delete PDP Context is sent to delete the PDN connection or its last PDP context.

The behavior for "Cause-IE" specified in this CLI shall override the cause-code set by existing features.

By default, the **del-cause** option is not defined and existing behavior is retained.

Important This option is only valid when Cause IE Enhancement for Delete Bearer Request license is enabled. Contact your Cisco account representative for more information.

exclude-default-bearer

Ignore bearer inactivity handling for default/primary bearer.

Usage Guidelines

Use this command to configure the bearer inactivity timer and the threshold value of the traffic through an APN. This enables the deletion of bearers experiencing less data traffic than the configured threshold value. Bearer inactivity timer is started only when time and volume threshold is configured.

Important Only one threshold is allowed to be configured per APN which is to monitor total, uplink, or downlink traffic.

The bearer inactivity timer can also be configured to exclude default bearer/primary bearer from monitoring bearer inactivity.

Example

The following command enables the inactivity time on the bearer with a timeout duration of *7200* seconds and the total traffic volume of *256000* bytes in uplink and downlink directions as thresholds:

```
timeout bearer-inactivity 7200 volume-threshold total 25600
```

timeout emergency-inactivity

Configures the emergency session inactivity-timeout for this APN. The APN must be configured as an emergency APN for Voice over LTE (VoLTE) E911 support.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
timeout emergency-inactivity seconds
[ default | no ] timeout emergency-inactivity
```

default | no

Indicates the timeout specified is to be returned to its default behavior. If no specific timeout is specified, then all are set to their default behavior.

seconds

Default: 0 (disabled)

Specifies the timeout duration, in seconds, to check inactivity on the emergency session.

seconds must be an integer value from 1 through 3600.

Usage Guidelines

Use this command to set the emergency session inactivity-timeout for this APN.

At reception of an IP CAN Session Modification Request triggered by the Policy and Charging Rules Function (PCRF) for an IP-CAN (IP Connectivity Access Network) session serving an IMS emergency session that removes all PCC rules with a QCI other than the default bearer QCI and the QCI used for IMS signalling, the Policy and Charging Enforcement Function (PCEF) shall start a configurable inactivity timer (to enable PSAP

Callback session). When the configured period of time expires, the PCEF shall initiate an IP-CAN Session Termination Request for the IP-CAN session serving the IMS Emergency session.

If a PCRF-Initiated IP-CAN Session Modification Request provides new PCC rule(s) with a QCI other than the default bearer QCI and the QCI used for IMS signalling, the PCEF shall cancel the inactivity timer.

Refer to the **emergency-apn** command in this chapter for additional information.

Example

The following command sets the emergency inactivity timeout duration to *450* seconds.

```
timeout emergency-inactivity 450
```

timeout idle

Configures the idle timeout duration for the long duration timer associated with a subscriber session.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

timeout idle *idle_dur* **[del-cause { none | reactiv-req }]**
[default | no] timeout idle [del-cause]

default | no

Indicates the timeout specified is to be returned to its default behavior. If no specific timeout is specified, then all are set to their default behavior.

idle_dur

Default: 0

Designates the maximum duration of the session (in seconds). After expiry the system considers the session as dormant or idle and terminates the session.

idle_dur must be an integer value in the range from 0 through 4294967295.

The special value 0 disables the timeout specified.

del-cause { none | reactiv-req }

When subscribers are deleted due to APN timeouts, the GGSN/P-GW/SAEGW may include "Cause-IE" in the resulting Delete Bearer/Delete PDP Context Requests generated for default bearer.

none: Omit GTP "Cause-IE" in DBR/DPC when timeout occurs on default bearer.

reactiv-req: The DBR/DPC will include "Cause-IE" with GTP cause code "Reactivation Requested".

This behavior is applicable only if Delete Bearer Request is sent for default bearer, or Delete PDP Context is sent to delete the PDN connection or its last PDP context.

The behavior for "Cause-IE" specified in this CLI shall override the cause-code set by existing features.

By default, the **del-cause** option is not defined and existing behavior is retained.

Important This option is only valid when Cause IE Enhancement for Delete Bearer Request license is enabled. Contact your Cisco account representative for more information.

Usage Guidelines Use this command to set the idle time duration for subscriber session to determine the dormant session.

Refer to the **long-duration-action detection** and **long-duration-action disconnection** command in this chapter for additional information.

Example

Following command sets the idle timeout duration to *450* seconds.

```
timeout idle 450
```

timeout idle micro-checkpoint-deemed-idle

Sends an event-based idlesec micro-checkpoint from an Active to a Standby chassis when the session state changes from active to idle or from idle to active.

Product All

Privilege Administrator, Security Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax

```
timeout idle idle_dur [  micro-checkpoint-deemed-idle time_in_seconds  ]
{ default | no } timeout idle
```

default

Indicates the timeout specified is to be returned to its default behavior.

no

Disables the timeout idle functionality.

timeout idle *idle_dur*

Designates the maximum duration of the session (in seconds). After expiry, the system considers the session as dormant or idle and terminates the session.

idle_dur must be an integer value in the range from 0 through 4294967295.

Default: 0

The special value 0 disables the timeout specified.

micro-checkpoint-deemed-idle *time_in_seconds*

Specifies the time duration, in seconds, after which a session state is deemed to have changed from active to idle or idle to active, and a micro-checkpoint is then sent from the active to the standby chassis.

time_in_seconds must be an integer from 10 to 1000.

Default: 180

Important The **micro-checkpoint-deemed-idle** value should be less than the **timeout idle** value.

Usage Guidelines

Use **micro-checkpoint-deemed-idle** to send an idlesec micro-checkpoint from an active to standby chassis when the session state changes from active to idle or from idle to active. The micro-checkpoint carries information about the time when the session became active or idle. Upon receipt of the micro-checkpoint, the standby chassis updates the active/idle time. This process enables the active and standby chassis to be synchronized with respect to when a particular session became active or idle. Since this feature is event-based, it enables the chassis to send micro-checkpoints only when an event occurs, as opposed to sending micro-checkpoints based on a configured time duration, which sends the micro-checkpoints regardless of whether a session state change occurred or not.

Using **micro-checkpoint-deemed-idle** results in a more efficient event-based sending of micro-checkpoints to the standby chassis and also increases SRP bandwidth.

Important Either the **micro-checkpoint-deemed-idle** or **micro-checkpoint-periodicity** value can be configured for idle time duration. Any change from **micro-checkpoint-deemed-idle** to **micro-checkpoint-periodicity**, or vice versa, requires removing the first configuration before adding the new configuration.

Example

This command sets the **timeout idle** value to 300 seconds and the **micro-checkpoint-deemed-idle** setting to 180 seconds.

```
timeout idle 300 micro-checkpoint-deemed-idle 180
```

timeout idle micro-checkpoint-periodicity

Enables configuration of periodic idle seconds micro checkpoint timer on a per-APN basis.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

timeout idle *idle_dur* **[micro-checkpoint-periodicity** *time_in_seconds* **]**
{ default | no } timeout idle

default

Indicates the timeout specified is to be returned to its default behavior.

no

Disables the timeout idle functionality.

idle_dur

Designates the maximum duration of the session (in seconds). After expiry, the system considers the session as dormant or idle and terminates the session.

idle_dur must be an integer value in the range from 0 through 4294967295.

Default: 0

The special value 0 disables the timeout specified.

micro-checkpoint-periodicity time_in_seconds

Configures periodic idle seconds micro-checkpoint timer on a per-APN basis.

Idle seconds micro-checkpoints are sent at the configured regular intervals to the standby chassis; otherwise, they are sent at intervals of 10 seconds, which is the default value.

time_in_seconds must be an integer value in the range from 0 through 4294967295.

Default: 10

Important

- The **micro-checkpoint-periodicity** value should be less than **idle timeout** value.
- When the **micro-checkpoint-periodicity** value is configured, the idle timeout timer starts *after* the micro checkpoint periodicity times out. If the **micro-checkpoint-periodicity** value is not configured, the session drops after the defined *idle_dur*.

Usage Guidelines

Use this command to set the idle time duration and micro-checkpoint-periodicity timer for subscriber session to determine the dormant session. Operators can configure this setting to a large value to suit their need to reduce the number of micro-checkpoints on the SRP link. When this CLI command is configured, idleseconds

micro-checkpoints are sent at configured regular intervals to the standby chassis. If not configured, micro-checkpoints are sent at intervals of 10 seconds, which is the default.

Important Either the **micro-checkpoint-deemed-idle** or **micro-checkpoint-periodicity** value can be configured for idle time duration. Any change from **micro-checkpoint-deemed-idle** to **micro-checkpoint-periodicity**, or vice versa, requires removing the first configuration before adding the new configuration.

Example

Following command sets the idle timeout duration to 10 seconds and micro-checkpoint-periodicity to 15 seconds.

```
timeout idle 10 micro-checkpoint-periodicity 15
```

timeout long-duration

Configures the long duration timeout and inactivity duration for subscriber sessions.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
timeout long-duration ldt_timeout [ inactivity-time inact_timeout ]
no timeout long-duration
```

no

Indicates the timeout specified is to be returned to its default behavior. If no specific timeout is specified then all timeouts are set to their default behavior.

ldt_timeout

Default: 0

Designates the maximum duration of the session (in seconds) before the system automatically reports/terminates the session.

Specifies the maximum amount of time (in seconds) before the specified timeout action is initiated.

ldt_timeout must be an integer value in the range from 0 through 4294967295.

The special value 0 disables the timeout specified.

inactivity-time *inact_timeout*

Specifies the maximum amount of time (in seconds) before the specified session is marked as dormant.

inact_timeout must be an integer value in the range from 0 through 4294967295.

The special value 0 disables the inactivity time specified.

Usage Guidelines

Use this command to set the long duration timeout period and inactivity timer for subscriber sessions. Reduce the idle timeout to free session resources faster for use by new requests.

Refer to the **long-duration-action detection** and **long-duration-action disconnection** commands in this chapter for additional information.

Example

The following command sets the long duration timeout duration to *300* seconds and the inactivity timer for subscriber session to *45* seconds.

```
timeout long-duration 300 inactivity-time 45
```

tpo policy

The Traffic Performance Optimization (TPO) in-line service is not supported in this release.

tunnel address-policy

This command specifies the address allocation/validation policy for all tunneled calls (IP-IP, IP-GRE) except L2TP calls. This means that GGSN IP address validation could be disabled for specified incoming calls.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

```
tunnel address-policy { alloc-only | alloc-validate | no-alloc-validate
}
default tunnel address-policy
```

default

Resets the tunnel address-policy to alloc-validate.

alloc-only

IP addresses are allocated locally and no validation is done.

alloc-validate

Default.

The VPN Manager allocates and validates all incoming IP addresses from a static pool of IP addresses.

no-alloc-validate

No IP address assignment or validation is done for calls arriving via L3 tunnels. Incoming static IP addresses are passed. This allows for the greatest flexibility.

Usage Guidelines

This command supports scalable solutions for Corporate APN deployment as many corporations handle their own IP address assignments. In some cases this is done to relieve the customer or the mobile operators from the necessity of reconfiguring the range of IP addresses for the IP pools at the GGSN.

For calls coming through L2TP tunnels, the command **l3-to-l2-tunnel address policy** as defined in the APN Configuration mode, will be in effect.

Example

Use the following command to reset the IP address validation policy to validate against a static pool of address:

```
default tunnel address-policy
```

Use the following command to disable all IP address validation for calls coming through tunnels:

```
tunnel address-policy no-alloc-validate
```

tunnel gre

Configures Generic Routing Encapsulation (GRE) tunnel parameters between the GGSN and an external gateway for the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

tunnel gre peer-address *peer_address* **local-address** *local_addr* **[preference** *num* **]**
no tunnel gre peer-address *peer_address*

no

Disables GRE tunneling for the APN.

peer-address *peer_address*

Specifies the IP address of the external gateway terminating the GRE tunnel.

peer_address must be expressed in dotted decimal notation.

local-address *local_addr*

Specifies the IP address of the interface in the destination context of the GGSN originating the GRE tunnel.

local_addr must be expressed in IPv4 dotted-decimal notation.

preference *num*

Default: 1

This option can be used to assign a preference to the tunnel.

preference can be configured to any integer value from 1 to 128.

Important Only one GRE tunnel per APN is supported. Therefore, the preference should always be set to "1".

Usage Guidelines

Subscriber IP payloads are encapsulated with IP/GRE headers and tunneled by the GGSN to an external gateway.

Example

The following command configures the system to encapsulate subscriber traffic using GRE and tunnel it from a local address of *192.168.1.100* to a gateway with an IP address of *192.168.1.225*:

```
tunnel gre peer-address 192.168.1.225 local-address 192.168.1.100
preference 1
```

tunnel ipip

Configures IP-in-IP tunnelling parameters between the GGSN and an external gateway for the APN.

Product

GGSN

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

tunnel ipip peer-address *peer_address* **local-address** *local_addr* **[preference** *num* **]**
no tunnel ipip

no

Disables IP-in-IP tunneling for the APN.

peer-address *peer_address*

Specifies the IP address of the external gateway terminating the IP-in-IP tunnel.

peer_address must be expressed in IPv4 dotted-decimal notation.

local-address *local_addr*

Specifies the IP address of the interface in the destination context of the GGSN originating the IP-in-IP tunnel.

local_addr must be expressed in IPv4 dotted-decimal notation.

preference *num*

Default: 1

If multiple tunnels will be configured, this option can be used to assign a preference to the tunnel.

preference can be configured to any integer value from 1 to 128.

Usage Guidelines

Subscriber IP payloads are encapsulated with IP-in-IP headers and tunneled by the GGSN to an external gateway.

Example

The following command configures the system to encapsulate subscriber traffic using IP-in-IP and tunnel it from a local address of *192.168.1.100* to a gateway with an IP address of *192.168.1.225*:

```
tunnel ipip peer-address 192.168.1.225 local-address 192.168.1.100
preference 1
```

tunnel ipsec

This command configures sessions for the current APN to use an Internet Protocol Security (IPSec) tunnel based on the IP pool corresponding to the subscribers assigned IP address.

Product GGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description **[no] tunnel ipsec use-policy-matching-ip-pool**

no

Disables the use of the IPSec policy that matches the IP pool that the assigned IP address relates to.

Usage Guidelines Use this command to set the APN to use an IPSec policy that is assigned to the IP pool that the subscribers assigned IP address relates to.

Example

The following command enables the use of the policy that matches the IP pool address:

tunnel ipsec use-policy-matching-ip-pool

tunnel l2tp

Configures Layer 2 Tunnelling Protocol (L2TP) parameters between the GGSN and an external gateway for the APN.

Product GGSN

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-apn)#`

Syntax Description

tunnel l2tp [peer-address *lns-address* **[[encrypted] secret** *l2tp_secret* **] [preference** *num* **] [tunnel-context** *name* **] [local-address** *ip-address* **] [crypto-map** *map_name* **{ [encrypted] isakmp-secret** *crypto_secret* **}] [local-hostname** *hostname* **]**
no tunnel [peer-address *lns-address***]**

no

Disables L2TP, or secure L2TP tunneling for the APN if a specific peer-address is not specified, or, if a peer-address is specified, this keyword removes the peer-address configuration from the APN.

peer-address *lns-address*

Specifies the IP address of the LNS node that the LAC service connects to.

lns-address must be expressed in IPv4 dotted-decimal notation.

Important A maximum of four LNS peers can be configured per APN.

encrypted

This keyword is intended only for use by the system while saving configuration scripts. The system displays the encrypted keyword in the configuration file as a flag that the variable following the secret keyword is the encrypted version of the plain text secret. Only the encrypted secret is saved as part of the configuration file.

secret *l2tp_secret*

Specifies the shared secret (password) between the L2TP Access Concentrator (LAC) service (configured on the system) and the LNS node.

l2tp_secret must be an alphanumeric string of 1 through 127 characters and is case sensitive.

preference *num*

Default: 1

Specifies the preference of the tunnel if the LAC service communicates with multiple LNS nodes.

preference can be configured to any integer value from 1 to 128.

tunnel-context *name*

Specifies the name of the destination context on the system in which the LAC service(s) is configured.

name must be an alphanumeric string of 1 through 79 characters and is case sensitive.

Important If this option is not configured, the system will attempt to determine the name of the destination context from the **ip context-name** parameter configured for the APN.

local-address *ip-address*

Specifies the IP address of an interface that is bound to a LAC service. This is a mechanism to dictate which LAC service to use to facilitate the subscriber's L2TP session.

address is the IP address of the interface in IPv4 dotted-decimal notation.

Important If the address configured does not exist or is not bound to a LAC service, the system will automatically choose a LAC service to use.

local-hostname *hostname*

This keyword configures LAC-Hostname to be used for the communication with the LNS peer for this APN.

When Tunnel parameters are not received from the RADIUS server, Tunnel parameters configured in APN are considered for the LNS peer selection. When APN Configuration is selected, local-hostname configured with the "tunnel l2tp" command in the APN for the LNS peer will be used as a LAC Hostname.

Important For this configuration to take effect **allow aaa-assigned-hostname** command, which is used to configure LAC-Hostname based on the "Tunnel-Client-Auth-ID" attribute received from the RADIUS server, needs to be configured in the LAC Service Configuration mode.

hostname is name of the local host for the LNS peer and must be an alphanumeric string of 1 through 127 characters.

When Tunnel parameters are not received from the RADIUS Server, Tunnel parameters configured in APN will be considered for the LNS peer selection. When APN Configuration is selected, the local hostname *hostname* configured with this command in the APN for the LNS peer will be used as a LAC Hostname.

crypto-map *map_name* { [encrypted] secret *crypto_secret* }

Configures the IPSec crypto-map policy that is to be associated with this L2TP tunnel configuration for secure L2TP.

map_name is the name of a crypto-map policy configured on the system expressed as an alphanumeric string of 1 through 127 characters and is case sensitive.

encrypted is intended only for use by the system while saving configuration scripts. The system displays the encrypted keyword in the configuration file as a flag that the variable following the secret keyword is the encrypted version of the plain text secret. Only the encrypted secret is saved as part of the configuration file.

secret specifies the secret associated with the crypto-map policy. *crypto_secret* can be from 0 to 255 bytes.

Usage Guidelines

This command can be used to configure the GGSN to tunnel subscriber traffic to one or more peer LNSs using L2TP or L2TP with IPSec.

When using L2TP, the system functions as a L2TP access Concentrator (LAC) and tunnels traffic to a peer L2TP Network Server (LNS). LAC functionality is supported through the configuration of LAC Services defined in destination contexts configured on the system.

When using crypt-map policies, the system functions in the same fashion as with L2TP, with the exception that the encapsulated L2TP traffic is further encrypted using IPSec. IPSec functionality is supported through the definition of crypto maps configured in the same destination context as the LAC services.

A maximum of four LNS peers can be configured per APN. If no peer is specified, the system will use the LAC Service(s) configured in the same destination context as the APN.

Example

The following command configures L2TP support for the APN. It configures the APN to tunnel traffic to an LNS with an IP address of 192.168.1.50 through a LAC service bound to an interface with an IP address 192.168.1.201 configured in a destination context on the system called pdn1. The shared secret between the system and the LNS is 5496secRet. This will be the only LNS configured so the default preference of 1 will not be changed.

```
tunnel l2tp peer-address 192.168.1.50 secret 5496secRet tunnel-context
pdn1 local-address 192.168.1.201
```

tunnel udpip

Configures UDP-IPv4 or UDP-IPv6 tunneling parameters between the P-GW and an external application server for the APN.

Product

P-GW

S-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

tunnel udpip peer-address *peer_address* **peer-port** *peer_udp_port* **[local-port** *local_udp_port* **]**
no tunnel udpip

no

Disables UDP-IPv4 or UDP-IPv6 tunneling for the APN.

peer-address *peer_address*

Specifies the Peer address for the tunnel.

peer_address must be expressed in dotted-decimal notation.

peer-port *peer_udp_port*

Specifies the port number of the peer for the tunnel.

peer_udp_port must be expressed in dotted-decimal notation.

local-port *local_udp_port*

Specifies the local UDP port number.

Default: 49152

Usage Guidelines

For local and peer UDP port number, it is recommended to use unregistered port number with IANA.

This CLI command takes effect during new subscriber call creation on S5/S8 interface to the APN.

Example

The following command configures the system to encapsulate subscriber traffic using UDP-IPv4 and tunnel it from a locally assigned IP address with port number *49152* to an external application server with an IP address of *192.168.1.100* on peer UDP port *11220*:

```
tunnel udpip peer-address 192.168.1.100 peer-port 11220 local-port 49152
```

user-plane-group

Configures a User Plane group for the APN.

Product

CUPS

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

[no] user-plane-group *group_name*

no

Disables User Plane group for the APN.

Usage Guidelines

Use this command to configure a User Plane group for the APN.

virtual-apn gdcr

This command defines which APN (Gn or virtual) should be used in charging records.

Product

eWAG

GGSN

IPSG

P-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > APN Configuration

configure > context *context_name* **> apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description

virtual-apn { gcdr apn-name-to-be-included { gn | virtual }| truncate-s6b-vapn delimiter { dot [hyphen] | hyphen [dot] } }

default virtual-apn gcdr apn-name-to-be-included

no virtual-apn truncate-s6b-vapn delimiter [dot [hyphen] | hyphen [dot]]

default

Returns the CDR related parameters to the default values.

gcdr apn-name-to-be-included { *gn* | *virtual* }

Defines which APN is to be sent in charging records (CDR).

- **gn**: Use the Gn APN name received in the Create PDP Context Request message from SGSN or the S5 APN name received in the PDN Connectivity Request from MME.
- **virtual**: Use the virtual APN selected by the GGSN/P-GW. This is the default.

truncate-s6b-vapn delimiter { dot [hyphen] | hyphen [dot] }

Truncates virtual APN received from S6b at the configured character delimiter.

- **dot**: Configures the delimiter to dot (.) for truncation of S6b-VAPN
- **hyphen**: Configures the delimiter to hyphen (-) for truncation of S6b-VAPN

Both dot and hyphen delimiters can be configured in the same line or a new line. If the separator character is not present in the received S6b virtual APN name, then the whole virtual APN name will be considered for configuration look-up.

If AAA server returns both hyphen and dot delimiters or the same delimiter twice or more as a virtual-apn, then the first delimiter will be considered as a separator. For example, if the AAA server returns the virtual-apn as xyz-cisco.com, then hyphen is the separator.

This CLI command takes effect only when S6b server returns virtual APN name in Authentication Authorization Accept (AAA) message. By default this feature will be disabled and no delimiter will be configured.

For more information on the Virtual APN Truncation feature for Rf Records, see the administration guide for the product that you are deploying.

no

Disables the truncation of virtual APN name. If a particular delimiter needs to disabled, it should be done explicitly.

Usage Guidelines Defines which APN is to be sent in charging records (CDR), either the APN received in the Create PDP Context Request from the SGSN, or the APN received in the PDN Connectivity Request from the MME.

Example

The following command configures the gateway to use the APN supplied by the SGSN or MME.

```
virtual-apn gcdr apn-name-to-be-included gn
```

virtual-apn preference

Defines one or more criteria used to redirect a call received on a particular APN to another APN.

Product

GGSN

eWAG

IPSG

P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > APN Configuration

configure > **context** *context_name* > **apn** *apn_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-apn)#
```

Syntax Description In StarOS 20.2 and later releases:

```
virtual-apn preference priority dcnrapn apn_name [ IPv4 { ip_address |
ipv4_address/mask } ] [ IPv6 ipv6_address | ipv6_address/mask } ] [
bearer-access-service service_name ] [ cc-behavior cc_behavior_value ] [
cc-profile cc_profile_index [ pre-rel-9.1-cc-behavior cc_behavior_value ] ] [
domain domain_name ] [ mcc mcc_number mnc mnc_number [ msin-range from
msin_range_from to msin_range_to ] ] [ msisdn-range from msisdn_start_range to
msisdn_to_range ] [ pdp-type { ipv4 | ipv6 | ipv4v6 } ] [ rat-type { eutran
 | gan | geran | hspa | utran | wlan } ] [ roaming-mode { home | roaming
 | visiting } ] [ tracking-area-code-range tac_range ][ serv-gw-plmnid
mccmcc_number mnc mnc_number ] +
no virtual-apn preference priority
```

In StarOS 20.1 and earlier releases:

```
virtual-apn preference priority apn apn_name  rat-type lte-m [ IPv4 { ip_address
 | ipv4_address/mask } ] [ IPv6 ipv6_address | ipv6_address/mask } ] [
bearer-access-service service_name ] [ cc-behavior cc_behavior_value [ rat-type
 { eutran | gan | geran | hspa | utran | wlan } ] ][ cc-profile
```

cc_profile_index **[pre-rel-9.1-cc-behavior** *cc_behavior_value* **] [rat-type { eutran | gan | geran | hspa | utran | wlan }]][domain** *domain_name* **] [mcc** *mcc_number* **mnc** *mnc_number* **[cc-behavior** *cc_behavior_value* **| cc-profile** *cc_profile_index* **[pre-rel-9.1-cc-behavior** *cc_behavior_value* **] | msin-range from** *msin_range_from* **to** *msin_range_to* **| rat-type { eutran | gan | geran | hspa | utran | wlan }] [msisdn-range from** *msisdn_start_range* **to** *msisdn_to_range* **[rat-type { eutran | gan | geran | hspa | utran | wlan }] [pdp-type { ipv4 | ipv6 | ipv4v6 } [roaming-mode roaming]] [rat-type { eutran | gan | geran | hspa | utran | wlan }] [roaming-mode { home | roaming | visiting }] [uut-profile** *profile_name* **]**
no virtual-apn preference *priority*

no

Removes a previously configured "virtual" APN.

preference *priority*

Specifies the order in which the referenced APNs are compared by the system.

priority specifies the order and can be configured to any integer value from 1 (highest priority) to 1000 (lowest priority).

apn *apn_name*

Specifies the name of an alternative APN configured on the system that is to be used for PDP contexts or PDN connections with matching properties.

apn_name is the name of the alternative APN expressed as an alphanumeric string of 1 through 62 alphanumeric characters and is case insensitive. It may also contain dots (.) and/or dashes (-).

dcnr

associates the DCNR profile with APN in CUPS.

rat-type lte-m

Enables LTE-M as an additional RAT-type.

IPv4 { *ipv4_address* | *ipv4_address/mask* }

Configures subnet range for subscriber IP.

ipv4_address must be an IPv4 address in dotted-decimal notation.

ipv4_address/mask must be an IPv4 address in dotted-decimal notation with network-host mask separation.

IPv6 { *ipv6_address* | *ipv6_address/mask* }

Configures subnet range for subscriber IP.

ipv6_address must be an IPv6 address in colon-separated-hexadecimal notation.

ipv6_address/mask must be an IPv6 address in colon-separated-hexadecimal notation with network-host mask separation.

access-gw-address { *ip_address* | *ip_address/mask* }

Specifies the Access Gateway (SGSN/S-GW/Other) IP address (or network) for this virtual APN.

ip_address must be an IPv4 address in dotted-decimal or an IPv6 address in colon-separated-hexadecimal notation.

ip_address/mask must be an IPv4 address in dotted-decimal or an IPv6 address in colon-separated-hexadecimal notation with network-host mask separation.

bearer-access-service *service_name*

Specifies the Bearer Access Service (GGSN/P-GW/Other) name. This service name is unique across the context.

service_name must be an alphanumeric string of 1 through 63 characters.

Important For eWAG and IPSG, this option is not supported in this release.

cc-behavior *cc_behavior_value*

Specifies the behavior charging characteristics bits in 16 bit format, post 3GPP release 9.1. For example, if cc-behavior is configured as 0x3412, then 0x34 corresponds to B15-B8 [MSB] and 0x12 corresponds to B7-B0 [LSB] of charging char)

cc_behavior_value must be a hex value in the range 0x0000 to 0xFFFF.

Important This option is supported only on GGSN, P-GW, and SAEGW in this release.

cc-profile *cc_profile_index*

Specifies the charging characteristics (CC)-profile index.

cc_profile_index must be an integer from 1 to 15.

Important For eWAG and IPSG, this option is not supported in this release.

domain *domain_name*

Specifies the domain name (realm). This is compared with the domain name portion of subscriber's username (user@domain).

domain_name must be an alphanumeric string of 1 through 79 characters, is case sensitive and can contain all special characters.

Important For eWAG and IPSG, this option is not supported in this release.

mcc *mcc_number* mnc *mnc_number*

mcc : Specifies the mobile country code (MCC) portion of the PLMN's identifier.

mcc_number is the PLMN MCC identifier and can be configured to any 3-digit integer value between 100 and 999.

mnc : Specifies the mobile network code (MNC) portion of the PLMN's identifier.

mnc_number is the PLMN MNC identifier and can be configured to any 2- or 3-digit integer value between 00 and 999.

Important For eWAG and IPSG, this option is not supported in this release.

msin-range from *msin_range_from* to *msin_range_to*

Important This option is supported only for the GGSN.

Specifies the IMSI MSIN range.

msin_range_from is the start prefix of the IMSI MSIN range and can be configured between 0 and 9999999999.

msin_range_to is the end prefix of the IMSI MSIN range and can be configured as a string of size 1 to 10 digits between 0 and 9999999999.

msin-range should obey the following rules:

- Start prefix (such as *msin_range_from*) and end prefix (such as *msin_range_from*) must be of the same length.
- Total length of mcc + mnc + msin-range <= 15 digits.

msisdn-range from *msisdn_start_range* to *msisdn_to_range*

Specifies the MSISDN range.

msisdn_start_range is the starting MSISDN number which a string of size 2 to 15 and its value ranges between 00 and 999999999999999.

msisdn_to_range is the ending MSISDN number which is also a string of size 2 to 15 and its value ranges between 00 and 999999999999999.

Important For eWAG, this option is not supported in this release.

pre-rel-9.1-cc-behavior *cc_behavior_value*

Specifies the behavior charging characteristics bits in 12 bit format, post 3GPP release 9.1. For example, if cc-behavior is configured as 0x341, then 0x34 corresponds to B12-B5 [MSB] and 0x1 corresponds to B4-B1 [Least significant nibble] of CC behavior).

cc_behavior_value must be a hex value in the range 0x0000 to 0xFFFF.

Important This option is supported only on GGSN, P-GW, and SAEGW in this release.

pdp-type { ipv4 | ipv4v6 | ipv6n }

Configures pdp-type rule.

The available options include:

- **ipv4**: Configures VAPN Rule for IPv4.
- **ipv4v6**: Configures VAPN Rule for IPv4v6.
- **ipv6**: Configures VAPN Rule for IPv6.

rat-type { eutran | gan | geran | hspa | utran | wlan }

The type of the Radio Access Technology (RAT).

The available options include:

- **eutran**
- **gan**
- **geran**
- **hspa**
- **utran**
- **wlan**

Important For eWAG, the rat-type keyword is not supported in this release.

roaming-mode { home | roaming | visiting }

Supports separate PDP context or PDN connection processing for roaming, visiting, and home subscribers.

Important For eWAG and IPSG, this option is not supported in this release.

serv-gw-plmnid

Specifies the Serving Gateway PLMN ID.

+

Keywords can be repeated or combined as needed in a single virtual-apn preference rule.

If the same option is provided multiple times in the same rule, then later option value will be considered for selection.

tracking-area-code-range *tac_range*

Configures APN for Tracking Area Code range. The *tac_range* is an integer value ranging from 0 to 65535.

uut-profile *profile_name*

Associates UE Usage Type (UUT) profile with APN. The *profile_name* is an integer value ranging from 1 to 65535.

Usage Guidelines

This command simplifies the configuration process for mobile operators allowing them to provide subscribers with access to a large number of packet data networks, characterized by APN templates, while only having to configure a small number of APNs on the HLR.

Each "virtual" APN is a reference, or a link, to an alternate APN configured on the system. Each reference is configured with a rule that subscriber PDP contexts or PDN connections are compared against and a priority that dictates the comparison order.

A maximum of 2048 virtual APN rules can be added across all APNs.

Important To modify an existing virtual APN rule, the current rule should be removed and a new rule with appropriate options added.

GGSN

The references works as follows:

1. A Create PDP Context Request message is received by the GGSN. The message specifies an APN configured in the HLR.

2. The GGSN determines whether its own matching APN configuration contains "virtual" APN references.

3. The system determines the priority of the references and compares the associated information pertaining to the PDP context against the configured rules.

4. If the rule matches, the parameters in the APN specified by the reference are applied to the PDP context. If not, the rules in the reference with the next highest priority are compared against the PDP context. This occurs until a match is found. If none of the references match, then the parameters within the current APN are applied to the PDP context.

The GGSN supports a maximum of 1023 Virtual APN mapping configurations in a system. A single Gn APN can be configured with up to 1000 mapping rules. Multiple Gn APNs are supported - each requiring Virtual APN mapping configurations. The limit imposed is that the total virtual APN mappings across all Gn APNs should not exceed 1023.

The functionality provided by this command can also be used to restrict access to particular APNs. To restrict access based on a particular criteria (domain name, mcc/mnc, etc.), the "virtual" APN reference should refer to an APN that is not configured on the system and contains the desired rule. All calls matching the configured rule would then be denied with a reason code of 219 (DBH), Missing or Unknown APN.

eWAG

For eWAG, in this release only the **access-gw-address** Virtual APN configuration option is supported.

For information on how virtual APN configuration can be used in eWAG deployments, refer to the *Enhanced Wireless Access Gateway Administration Guide*.

IPSG

For IPSG, in this release only the following Virtual APN configuration options are supported:

- **access-gw-address** (RADIUS client in the case of IPSG)

- **msisdn-range from** *msisdn_start_range* **to** *msisdn_to_range*
- **rat-type**

All these attributes are sent in access-request in Auth-Proxy mode or Acct-Start in other modes to trigger Virtual APN selection.

The functionality provided by this command can also be used to restrict access to particular APNs. To restrict access based on a particular criteria (domain name, mcc/mnc, etc.), the "virtual" APN reference should refer to an APN that is not configured on the system and contains the desired rule. All calls matching the configured rule would then be denied with a reason code of 219 (DBH), Missing or Unknown APN.

P-GW/SAEGW

The Virtual APN feature allows a carrier to use a single APN to configure differentiated services. The APN that is supplied by the MME is evaluated by the P-GW in conjunction with multiple configurable parameters. Then, the P-GW selects an APN configuration based on the supplied APN and those configurable parameters.

APN configuration dictates all aspects of a session at the P-GW. Different policies imply different APNs. After basic APN selection, however, internal re-selection can occur based on the following parameters:

- S-GW address: **access-gw-address**
- Service name: **bearer-access-service**
- Call control profile index: **cc-profile**
- Domain name part of username (user@domain): **domain**
- MCC-MNC of IMSI: **mcc** *mcc_number* **mnc** *mnc_number*
- MSISDN range: **msisdn-range from** *msisdn_start_range* **to** *msisdn_to_range*
- Subscriber type: **rat-type**

Important In StarOS v12.x and earlier, the P-GW supports a maximum of 1024 Virtual APNs in a system. In StarOS v14.0 and later, the P-GW supports a maximum of 2048 Virtual APNs in a system.

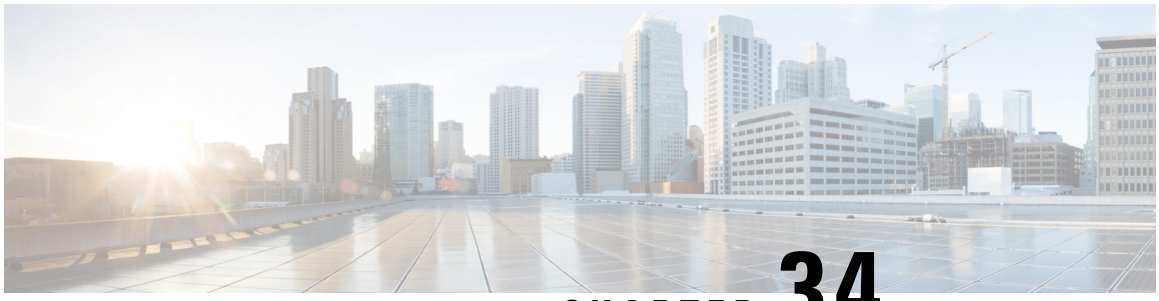
The functionality provided by this command can also be used to restrict access to particular APNs. To restrict access based on a particular criteria (domain name, mcc/mnc, etc.), the "virtual" APN reference should refer to an APN that is not configured on the system and contains the desired rule. All PDN connections matching the configured rule would then be denied with a reason code of 219 (DBH), Missing or Unknown APN.

Example

The following commands configure two "virtual" APNs. Priority 1 references the *bigco* APN with a domain rule of *bigco.com*. Priority 2 references the *bigtown* APN with a mobile country code rule of *100* and a mobile network code rule of *50*.

```
virtual-apn preference 1 apn bigco domain bigco.com
virtual-apn preference 2 apn bigtown mcc 100 mnc 50 msin-range from
4000000000 to 4999999999
virtual-apn preference 3 apn bigco.com access-gateway-address 192.168.62.2
```

```
virtual-apn preference 4 apn bigco.co.kr access-gateway-address
192.168.60.2/24
```



CHAPTER 34

APN Remap Table Configuration Mode

Important Beginning with Release 16 for SGSN only, an APN Remap Table associated with an IMEI profile overrides a remap table associated with an operator policy. This means activation will be rejected if a local default APN configured, in an APN Remap Table associated with an IMEI profile, cannot be used. This will occur even if a valid local default APN is available in an APN Remap Table associated with an operator policy.

A maximum of 1,000 APN remap tables are supported, and each APN remap table supports a maximum of 100 APN remap entries. Multiple tables can be defined and stored but an operator policy and/or IMEI profile each only support association with a single (one) table per policy/profile configuration. The APN remap table associated with an IMEI profile will be used in IMEI override scenarios.

Command Modes

APN Remap Table Configuration mode provides the commands to configure parameters for multiple features related to Access Point Name (APN) handling, such as: Default APN, APN Remap, and Wildcard APN. APN remap table is a key element of the Operator Policy feature and a table is not usable (valid) until it has been associated with an operator policy (see the *Operator Policy Configuration Mode Commands*) or an IMEI profile (see the *IMEI Profile Configuration Mode Commands*).

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-remap-`*`table_name`*`)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- apn-remap network-identifier, on page 1288
- apn-remap non3gpp-char-apn, on page 1290
- apn-remap operator-identifier, on page 1291
- apn-selection-default, on page 1293
- blank-apn, on page 1297
- cc, on page 1298
- description, on page 1299
- end, on page 1300

• exit, on page 1300
• wildcard-apn, on page 1300

apn-remap network-identifier

Creates an entry in the APN remap table and provides the ability to override the network identifier part of the APN requested by the UE.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-remap-table_name)#`

Syntax Description

apn-remap network-identifier *apn_net_id* **{ new-ni** *new_apn_net_id* **subscription-failure reject [orig-apn] | operator-identifier** *apn_op_id* **{ new-ni** *new_apn_net_id* **| value-for-ni-wc** *new_apn_net_id* **{ new-oi** *new_apn_op_id* **| value-for-oi-mcc** *mcc* **| value-for-oi-mnc** *mnc* **} [orig-apn] + } | value-for-ni-wc** *new_apn_net_id* **[orig-apn] }**
no apn-remap network-identifier *apn_net_id*

no

Deletes the specified APN remap entry from the APN remap table.

network-identifier *apn_net_id*

Identifies the "old" APN network identifier that is being mapped for replacement.

apn_net_id is a string of 1 to 62 characters, including digits, letters, dots (.) and dashes (-). Additionally, one wildcard character (*) can be included anywhere within the string.

subscription-failure

Subscription failure for requested APN.

reject

Specifies the rejection with cause code Unknown or Missing APN.

new-ni *new_apn_net_id*

Identifies the new (target) network identifier to use when no wildcard character is included in the "old" APN network identifier.

new_apn_net_id is a string of 1 to 62 characters, including digits, letters, dots (.) and dashes (-).

orig-apn

Enables MME to send the original APN (UE requested APN) in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then remapped APN is sent back to UE.

value-for-ni-wc *new_apn_net_id*

Identifies the information to replace the wildcard in the new APN network identifier when a wildcard character is included in the "old" APN network identifier.

new_apn_net_id is an alphanumeric string of characters, including dots (.) and dashes (-). This string replaces the wildcard (*) specified in the *apn_net_id*. The two strings together must not exceed 62 characters.

operator-identifier *apn_op_id* { new-ni *new_apn_net_id* | value-for-ni-wc *new_apn_net_id* { new-oi *new_apn_op_id* | value-for-oi-mcc *mcc* | value-for-oi-mnc *mnc* } [orig-apn] + }

Identifies the "old" APN operator identifier that is being mapped for replacement.

apn_op_id is a string of 1 to 18 characters including digits, letters, and dots (.). The entry must be in the following format, where # represents a digit: MNC###.MCC###.GPRS.

Optionally, either one or two wildcard characters (*) can be entered. Wildcard characters can be used in place of one # or three # -- for example MNC12*.MCC*.GPRS.

The following options can be configured:

- **new-oi** *new_apn_op_id*: Identifies the new (target) operator identifier to use when no wildcard character is included in the "old" APN operator identifier. *new_apn_op_id* is a string of 1 to 18 characters including digits, letters, and dots (.). The entry must be in the following format, where # represents a digit: MNC###.MCC###.GPRS.
- **value-for-oi-mcc** *mcc*: Identifies the information to replace the wildcard in the new APN operator identifier when a wildcard character is included in the MCC portion of the "old" APN operator identifier; for example MNC###.MCC*.GPRS.
- **value-for-oi-mnc** *mnc*: Identifies the information to replace the wildcard in the new APN operator identifier when a wildcard character is included in the MNC portion of the "old" APN operator identifier; for example MNC*.MCC###.GPRS.

Usage Guidelines

Important Entries in the APN remap table are only valid if the table is associated with an operator policy. The same table can then be associated with an IMEI profile as IMEI-specific remap entries are not supported.

This command defines mapping entries in the APN remap table which supports a range of APN overrides. Mapping can be done one-to-one:

- a "new" APN network identifier (NI) can be mapped to override an "old" APN network identifier (NI) or an "old" APN operator identifier (OI)
- a "new" APN operator identifier (OI) can be mapped to override an "old" APN network identifier (NI) or an "old" APN operator identifier (OI)

Mapping can also be done with wildcards in the "old" APN entry mapped to wildcard replacements to dynamically create "new" APN network/operator identifiers.

Related Commands: APN override can also be based on charging characteristics. This type of override mapping is defined with the **cc** command, also part of this configuration mode.

Example

A one-to-one APN NI remap entry is illustrated by:

```
apn-remap network-identifier 123abc.com new-ni 333CBC.com
```

Create an entry with a wildcard so that part of an incoming APN NI will be replaced - for example, incoming *xyzabcpqr.com* becomes *xyzinternet2pqr.com*.

```
apn-remap network-identifier xyz*pqr.com value-for-ni-wc internet2
```

Replace any incoming APN NI with a new APN NI.

```
apn-remap network-identifier * value-for-ni-wc newnet.com
```

apn-remap non3gpp-char-apn

This command enables MME to remap the UE requested APN, containing non-3GPP characters, to an operator defined APN.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-remap-table_name)#
```

Syntax Description

```
apn-remap non3gpp-char-apn new-ni new_apn_net_id [ orig-apn ]
no apn-remap non3gpp-char-apn
```

no

Disables remapping of UE requested APN with non-3GPP standard characters.

new-ni *new_apn_net_id*

Identifies the new (target) network identifier to use when non-3GPP characters are included in the UE requested APN.

new_apn_net_id is a string of 1 to 62 characters, including digits, letters, dots (.) and dashes (-).

orig-apn

Enables MME to send the original APN (UE requested APN) in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then remapped APN is sent back to UE.

Usage Guidelines

Important Entries in the APN remap table are only valid if the table is associated with an operator policy. The same table can then be associated with an IMEI profile as IMEI-specific remap entries are not supported.

This command enables MME to remap all UE requested APNs containing non-3GPP characters to the configured new-ni APN.

This CLI is applied only if the UE sessions are not rejected by the new configuration options **policy attach reject-non3gpp-char-apn** and **policy pdn-connect reject-non3gpp-char-apn** under the mme-service. If the UE requested APN contains non-3GPP characters and the **apn-remap non3gpp-char-apn new-ni** CLI command is configured, then this CLI takes precedence over any other matching criterion for APN remapping.

Related Commands: APN override can also be based on charging characteristics. This type of override mapping is defined with the **cc** command, also part of this configuration mode.

Example

The following command enables remapping of UE requested APN with non-3GPP standard characters to 333CBC.com:

```
apn-remap non3gpp-char-apn new-ni 333CBC.com
```

apn-remap operator-identifier

Creates an entry in the APN remap table and provides the ability to override the operator part of APN requested by the UE.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-remap-table_name)#
```

Syntax Description

apn-remap operator-identifier *apn_op_id* **{ new-oi** *new_apn_op_id* **| value-for-oi-mcc** *mcc* **[value-for-oi-mnc** *mnc* **] | value-for-oi-mnc** *mnc* **[**

```
value-for-oi-mcc  mcc ] }
no apn-remap operator-identifier apn_op_id
```

no

Deletes the specified APN remap entry from the APN remap table.

operator-identifier *apn_op_id* { new-oi *new_apn_op_id* | value-for-oi-mcc *mcc* [value-for-oi-mnc *mnc*] | value-for-oi-mnc *mnc* [value-for-oi-mcc *mcc*] }

Identifies the "old" APN operator identifier that is being mapped for replacement.

apn_op_id is a string of 1 to 18 characters including digits, letters, and dots (.). The entry must be in the following format, where # represents a digit: MNC###.MCC###.GPRS.

Optionally, either one or two wildcard characters (*) can be entered. Wildcard characters can be used in place of one # or three # -- for example MNC12*.MCC*.GPRS.

The following options can be configured:

- **new-oi** *new_apn_op_id*: Identifies the new (target) operator identifier to use when no wildcard character is included in the "old" APN operator identifier. *new_apn_op_id* is a string of 1 to 18 characters including digits, letters, and dots (.). The entry must be in the following format, where # represents a digit: MNC###.MCC###.GPRS.
- **value-for-oi-mcc** *mcc*: Identifies the information to replace the wildcard in the new APN operator identifier when a wildcard character is included in the MCC portion of the "old" APN operator identifier; for example MNC###.MCC*.GPRS.
- **value-for-oi-mnc** *mnc*: Identifies the information to replace the wildcard in the new APN operator identifier when a wildcard character is included in the MNC portion of the "old" APN operator identifier; for example MNC*.MCC###.GPRS.

NOTES:

The first **apn-remap** command above remaps "company.com.apn.epc.mnc456.mcc123.3gppnetwork.org" to "starent.com.apn.epc.mnc987.mcc654.3gppnetwork.org".

The second **apn-remap** command above remaps "starent.com.apn.epc.mnc456.mcc123.3gppnetwork.org" to "starent.com.apn.epc.mnc234.mcc543.3gppnetwork.org".

Wildcards characters (*) can be used in the existing operator identifier.

Usage Guidelines

Important Entries in the APN remap table are only valid if the table is associated with an operator policy. The same table can then be associated with an IMEI profile as IMEI-specific remap entries are not supported.

This command defines mapping entries in the APN remap table which supports a range of APN overrides. Mapping can be done one-to-one:

- a "new" APN network identifier (NI) can be mapped to override an "old" APN network identifier (NI) or an "old" APN operator identifier (OI)

- a "new" APN operator identifier (OI) can be mapped to override an "old" APN network identifier (NI) or an "old" APN operator identifier (OI)

Mapping can also be done with wildcards in the "old" APN entry mapped to wildcard replacements to dynamically create "new" APN network/operator identifiers.

Related Commands: APN override can also be based on charging characteristics. This type of override mapping is defined with the **cc** command, also part of this configuration mode.

Example

A one-to-one APN OI remap entry is illustrated by:

```
apn-remap operator-identifier MNC423.MCC222.GPRS new-oi MNC123.MCC456.GPRS
```

Replace any incoming APN OI with a new APN OI *MNC123.MCC456.GPRS*:

```
apn-remap operator-identifier MNC*.MCC*.GPRS value-for-oi-mnc 123
value-for-oi-mcc 456
```

apn-selection-default

Enables and configures or disables the Default APN feature for use when the normal APN selection process fails.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-remap-table_name)#
```

Syntax Description

```
apn-selection-default { context-id context_id_value |first-in-subscription[
 orig-apn ] | lowest-context-id  [ orig-apn ] | network-identifier apn_net_id
 [ fallback-apn network-identifier apn_net_id |
fallback-to-first-in-subscription | prefer-single-subscription |
reject-blank-apn | require-dns-fail-wildcard [ orig-apn ] |
require-subscription-apn ] + }
no apn-selection-default { context-id context_id_value |
first-in-subscription | lowest-context-id | network-identifier apn_net_id
}
```

no

Delete the configuration statement and disable the default APN feature.

context-id *context_id_value*

Specifies the usage of APN in subscription record with context ID matching the PDN type if normal APN selection fails. context_id_value must be an integer between 1 and 15.

first-in-subscription [orig-apn]

Specifies that the first APN in the subscription record matching the requested PDN type is used as the default APN. This applies when normal APN selection fails and if the UE APN is absent and the defined default APN is not a match.

For the SGSN, "first-in-subscription" means the first record from the list of records sent from the HLR (in the same order) with PDP type matching the requested PDP type. With this configuration, if the first record is a wildcard APN it is expected that the wildcard APN be configured. If not, the activation will be rejected.

For MME, if the default APN in the subscription data matches the requested pdn-type, then the default APN is used. Otherwise, the first record from the list of records (apn-list) sent from the HSS with PDP type matching the UE-requested PDP type is selected. The apn-list is sorted according to apn-name.

orig-apn: Enables MME to send the original APN (UE requested APN) in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then re-mapped APN is sent back to UE.

lowest-context-id [orig-apn]

Specifies that the subscription APN with the lowest context-ID in the subscription record matching the PDN type is used as the default APN when normal APN selection fails.

With this configuration, if the record with the lowest context-ID is a wildcard APN, then it is expected that the wildcard APN has already been configured. If not, the activation will be rejected.

If both **apn-selection-default lowest-context-id** and **apn-selection-default first-in-subscription** options are configured, whichever command was executed (configured) first will be the behavior used.

Starting with Release 14.0, MME also supports use of this keyword.

orig-apn: Enables MME to send the original APN (UE requested APN) in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then remapped APN is sent back to UE.

network-identifier *apn_net_id*

Specifies the network identifier will be used as the default APN name. *apn_net_id* is a string of 1 through 62 characters, including digits, letters, dots (.) and dashes (-).

In 21.4 and later releases, this keyword is enhanced to support S4-SGSN.

Any of the following optional keywords can be used with **network-identifier** as qualifications.

fallback-apn network-identifier *apn_net_id*

SGSN only.

Specifies a dummy APN to be used when the default APN is not present in the subscription so that the activation does not fail. With this keyword configured, the context is activated with a dummy APN and the GGSN displays a static page for this APN, instructing the subscriber to subscribe for appropriate services.

apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

fallback-to-first-in-subscription

SGSN only.

Uses the APN from the first subscription record when the configured default APN is not available.

prefer-single-subscription

SGSN only.

Uses the APN from the subscription record if it is the only record available and normal APN selection fails.

reject-blank-apn

SGSN only.

Disables use of the default APN if a blank APN is received.

require-dns-fail-wildcard [orig-apn]

MME only.

Enables the default APN to be used if the DNS query fails with the requested APN.

orig-apn: Enables MME to send the original APN (UE requested APN) in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then remapped APN is sent back to UE.

In 18.2 and later releases: The **require-dns-fail-wildcard** keyword is also supported by the MME.

In releases prior to 21.4: The **require-dns-fail-wildcard** keyword is not supported for S4-SGSN.

In 21.4 and later releases: The **require-dns-fail-wildcard** keyword is supported for S4-SGSN.

require-subscription-apn network-identifier *apn_net_id*

SGSN only.

If defined, this APN name must also be included in the subscription data for the default APN feature to function.

apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

Usage Guidelines

The default APN feature will be used in error situations when the MME or the SGSN cannot select a valid APN via the normal APN selection process. Within an operator policy, an APN remap table with a default APN can be configured for the MME/SGSN to:

- override a requested APN when the HSS/HLR does not have the requested APN in the subscription profile.
- provide a viable APN if APN selection fails because there was no "requested APN" and wildcard subscription was not an option.

The default APN feature can also be used in the event of a DNS query failure with the selected APN, if:

- the **wildcard-apn** command is configured, (requirement only for SGSN)

- a wildcard subscription is present,
- the **require-dns-fail-wildcard** keyword is included with the **apn-selection-default** command then the configured default APN will be used when the DNS query is retried.

In all of the instances outlined above, the MME/SGSN can provide the default APN as an alternate behavior to ensure that PDP context activation is successful.

Important For SGSN ONLY - Beginning with Release 16, customers already using an APN remap table that is associated with an IMEI profile **will have to change the existing configuration** to enable the default APN remapping associated with an operator policy rather than the one associated with an IMEI profile. For example, if an existing configuration forced all matching IMEI in a defined IMEI range to use xxx.net APN, the configuration needs to be changed to an APN remap table configuration similar to what is shown below:

Old APN remap table associated with an IMEI profile:

```
apn-selection-default network-identifier xxx.net
```

For a configuration to accomplish the same remapping function, change the APN remap table **associated with an IMEI profile** to the following:

```
apn-remap network-identifier * new-ni xxx.net
```

Important For SGSN ONLY - With Release 16, an APN remap table associated with an IMEI profile overrides a remap table associated with an operator policy. This means activation will be rejected if a local default APN configured, in an APN remap table associated with **an IMEI profile**, cannot be used. This will occur even if a valid local default APN is available in an APN remap table associated with **an operator policy**.

For SGSN ONLY - Beginning with Release 16, the following *sample* configuration will enable the operator to bypass APN remapping for a specific IMEI range:

```
config
   operator-policy name OpPol1
      associate call-control-profile OpPol1CCprof1
      associate apn-remap-table RemapOpPol1
      imei-range first start_imei last ending_imei [ sv IMEI_sv ] imei-profile
 name IMEIprof1
      exit
   imei-profile name IMEIprof1
      associate apn-remap-table remapIMEIprof1
      exit
   apn-remap-table  remapIMEIprof1
      exit
   apn-remap-table  RemapOpPol1
      apn-selection-default network-identifier NewAPN.net
      end
```

Example

The following command enables the default APN feature for APN *HomeNet1* in an APN remap table associated with an operator policy:

apn-selection-default network-identifier HomeNet1

For SGSN only - Beginning with Release 16, if the APN remap table is associated with an IMEI profile, for a configuration to accomplish the same remapping function as noted in the sample above, then use syntax similar to the following:

apn-remap network-identifier * new-ni *xxx.net*

The following command, in an APN remap table associated with an operator policy, enables use of a default APN selected on the basis of lowest context-ID if the APN is not contained within the subscription:

apn-selection-default lowest-context-id

The following command enables use of a default APN if the DNS query fails:

apn-selection-default network-identifier HomeNet1 require-dns-fail-wildcard

blank-apn

Enables the Blank APN feature and defines the APN that will be used when no APN is requested. This command is specific to SGSN.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(apn-remap-`*`table_name`*`)#`

Syntax Description

blank-apn network-identifier *apn_net_id*
no blank-apn

no

Removes the APN NI from the APN remap table configuration and disables the Default APN feature.

network-identifier *apn_net_id*

Identifies the APN network identifier (NI) that will be used when no APN is requested.

apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

Usage Guidelines

Use this command to enable the Blank APN feature.

Example

The following command creates an entry that supplies the *starnet.com* as the APN network identifier whenever a request does not include an APN:

```
blank-apn network-identifier starnet.com
```

cc

This command maps an APN override based on charging characteristics.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-remap-table_name)#
```

Syntax Description

cc behavior *bit_value* **profile** *index_bit* **apn-remap network-identifier** *apn_net_id* **new-ni** *new_apn_net_id* **[orig-apn]**
no cc behavior *bit_value* **profile** *index_bit* **apn-remap network-identifier** *apn_net_id*

no

Disables the configured cc-based remapping behavior.

behavior *bit_value*

Specifies the value for the charging characteristic behavior bit.

bit_value is a hex value from 0x0 to 0xFFF.

profile *index_bit*

Specifies the index for the charging characteristic profile.

index_bit is an integer from 1 through 15.

Some of the index values are predefined according to 3GPP standards:

- **1** for hot billing
- **2** for flat billing
- **4** for prepaid billing
- **8** for normal billing

apn-remap network-identifier *apn_net_id*

Identifies the "old" APN network identifier that is being mapped for replacement.

apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

new-ni *new_apn_net_id*

Identifies the "new" APN network identifier that is being mapped to.

new_apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

orig-apn

Enables MME to send the original APN (UE requested APN) in the ACTIVATE_DEFAULT_BEARER_REQUEST message to the UE. This is an optional keyword.

If this keyword is not configured, then remapped APN is sent back to UE.

Usage Guidelines

Use this command to enable APN remapping only when the charging characteristic value in the subscription record associated with the requested APN matches the value configured for the **new-ni**.

The new APN NI must be part of the subscription data so that the charging characteristic associated with the new APN NI will be used for activating the context. If there is not one associated, then the general charging characteristic will be used.

Example

The following command associates a new APN NI *locals1* with a set of charging characteristics:

```
cc behavior 0xF profile 4 apn-remap network-identifier homer1 new-ni
locals1
```

description

Defines a string that describes this APN remap table.

Product

MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(apn-remap-table_name)#
```

Syntax Description

description *description*
no description

no

Removes the description configuration from this APN Remap Table configuration.

description

Specifies descriptive text to be associated with the APN remap table as an alphanumeric string of 1 through 100 characters. The string may include spaces, punctuation, and case-sensitive letters if the string is enclosed in double quotation marks (").

Usage Guidelines Define information that identifies this particularly APN remap table.

Example

```
description "APN_remap1 replaces all MNC1## Ids."
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

wildcard-apn

Enables or disables the Wildcard APN feature and define the default APN to be used whenever a wildcard APN is included in the subscriber record.

Product MME

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > APN Remap Table Configuration

configure > apn-remap-table *table_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(apn-remap-table_name)#`

Syntax Description

wildcard-apn pdp-type { dual-ipv4v6 | ipv4 | ipv6 | ppp } network-identifier *apn_net_id*
no wildcard-apn pdp-type { dual-ipv4v6 | ipv4 | ipv6 | ppp }

no

Disables the wildcard-apn definition from the configuration.

pdp-type {dual-ipv4v6 | ipv4 | ipv6 | ppp }

Specifies the PDP type.

- **dual-ipv4v6**- for a dual PDP context association with one IPv4 address and one IPv6 address/prefix (SGSN only)
- **ipv4** - for an IPv4 context
- **ipv6** - for an IPv6 context
- **ppp** - for a PPP context

network-identifier*apn_net_id*

Identifies one of the APN network identifiers specified via the **apn** command in the Operator Policy configuration mode.

apn_net_id is a string of 1 to 62 characters, including letters, digits, dots (.) and dashes (-).

Usage Guidelines

This command is used to define a wildcard APN with the type of PDP context and the APN's network identifier (NI). This wildcard APN would be used when an APN is not identified.

The command should be repeated per PDP type, as needed, to enable wildcard APN for two or more of the PDP types.

The wildcard APN configured with the dual PDP IPv4v6 context will be used in the following scenarios:

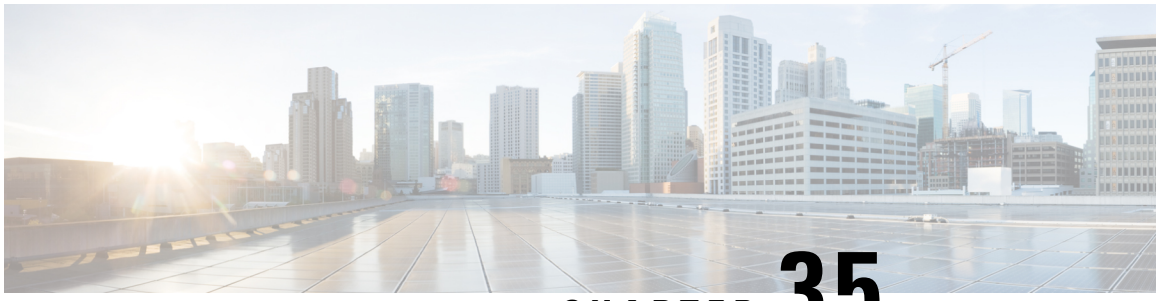
- the UE requested a PDP type of IPv4v6
- the UE did not request any specific APN
- the subscription includes wildcard APN with PDP type as IPv4v6.

Important Wildcard APN feature configuration is only valid if the APN remap table is associated with at least one operator policy. The same table can then be associated with an IMEI profile as IMEI-specific Wildcard APN is not supported.

Example

Use this command to enable an APN wildcard for PDP type IPv4 and NI *homer1*:

```
wildcard-apn pdp-type ipv4 network-identifier homer1
```



CHAPTER 35

ARP-RP Mapping Profile Configuration Mode

The SGSN uses the ARP to RP mapping for a variety of reasons, such as choosing a preferred radio priority according to the ARP values sent by the GGSN and HLR. These mappings will be used by corresponding 2G and/or 3G services to choose the radio priority value sent in downlink messages towards the MS/UE:

- Activate PDP Accept.
- Modify PDP Request during network-initiated PDP modification procedure.
- Modify PDP Accept during MS-initiated PDP modification procedure provided the ARP has been changed by the network.

Command Modes

The commands in this mode configure the various parameters of the ARP-RP Mapping Profile.

Exec > Global Configuration > SGSN Global Configuration > ARP-RP Mapping Profile Configuration

configure > sgsn-global > qos-arp-rp-map-profile *arp-rp_prof_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-arp-rp-map-profile-`*`arp-rp_prof_name`*`)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- arp, on page 1303
- end, on page 1304
- exit, on page 1305

arp

This command modifies the ARP (allocation retention priority) to RP (radio priority) mapping in the ARP-RP Mapping Profile.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > SGSN Global Configuration > ARP-RP Mapping Profile Configuration

configure > sgsn-global > qos-arp-rp-map-profile *arp-rp_prof_name*

Entering the above command sequence results in the following prompt:

`[local]host_name(config-arp-rp-map-profile-arp-rp_prof_name)#`

Syntax Description **arp** *arp_value* **radio-priority** *rp_value*

arp

Defines the allocation retention priority.

arp_value: Enter an integer from 1 to 3.

radio-priority

Defines the radio priority.

rp_value: Enter an integer from 1 to 4.

Usage Guidelines When the ARP-RP Mapping Profile is created it includes default ARP-RP mapping:

- ARP1 RP4
- ARP2 RP4
- ARP3 RP4

The commands in this mode can be issued as needed to modify the mapping.

Use the **show sgsn-mode** command to display the ARP-RP profile and configuration.

Use the **radio-priority** keyword of the **sm** command in either the GPRS Service configuration mode or the SGSN Service configuration mode to associate the ARP-RP Mapping Profile with either of the service types.

Example

To change the radio priority from 4 to 2 for the allocation retention priority of 1, use the following command.

```
arp 1 rp 2
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

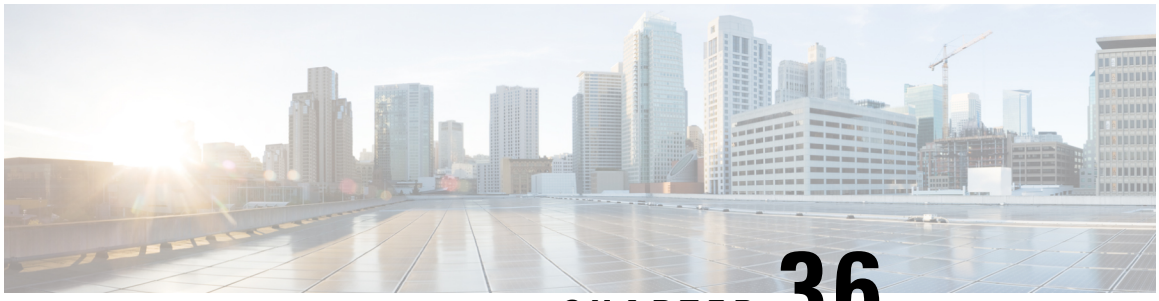
Syntax Description

`exit`

Usage Guidelines

Use this command to return to the parent configuration mode.

exit



CHAPTER 36

Bearer Control Profile Configuration Mode Commands

The Bearer Control Profile configuration mode provides the commands to define the MME's bearer-level QoS control parameters. Bearer-level parameters such as ARP, MBR, GBR, QCI remap value can be configured independently for either or both default/dedicated bearers along with the capping action, such as prefer-as-cap or pgw-upgrade, in bearer control profile. The bearer control profile can be applied for a specific QCI or a range of QCIs.

The bearer control profile becomes valid after it is associated with an MME QoS profile.

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(bearer-control-profile-`*`bc_profile_name`*`)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- dedicated-bearer, on page 1307
- default-bearer, on page 1311
- description, on page 1314
- end, on page 1315
- exit, on page 1315
- pre-rel8-qos-mapping, on page 1315

dedicated-bearer

Use this command to define the operator-provided values for ARP-PL, ARP-PCI, ARP-PVI, MBR, GBR, and QCI, as well as pgw-upgrade capping.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

dedicated-bearer { arp { preemption-capability | preemption-vulnerability | priority-level } pgw-upgrade { local | minimum | rej-if-exceed } | gbr gbr-up *gbr_up_value* **gbr-down** *gbr_down_value* **pgw-upgrade { local | minimum | rej-if-exceed } | mbr mbr-up** *mbr_up_value* **mbr-down** *mbr_down_value* **pgw-upgrade| qci { remap | pgw-upgrade { local | minimum | rej-if-exceed } } }**
remove dedicated-bearer { arp | gbr | mbr | qci }

remove

Including this command prefix causes the MME to delete the dedicated-bearer configuration for the named bearer control profile.

arp

This keyword configures the allocation and retention priority parameters:

- **preemption-capability** - Enter an integer, either **0** (may) to specify that this bearer may pre-empt other lower priority bearers if required, or **1** (shall-not) to specify that this bearer shall not pre-empt other lower priority bearers.
- **preemption-vulnerability** - Enter an integer, either **0** (pre-emptible) to specify that this bearer is preemptible by other high priority bearers, or **1** (not-pre-emptible) to specify that this bearer is not pre-emptible by other high priority bearers.
- **priority-level** - Enter an integer 1 through 15, with 1 as the highest priority, to specify the allocation/retention priority level.

gbr

The **gbr** keyword configures the Guaranteed Bit Rate values. This keyword is only used for the dedicated-bearer configuration.

- **gbr-up** - Enter an integer from 1 though 256000 to identify the desired uplink data rate in kbps.
- For 21.10 and later releases

  gbr-up *gbr_up*: Defines the guaranteed bit rate for uplink traffic. *gbr_up* must be an integer from 1 to 4000000000000 (4 Tbps).

- **gbr-down** - Enter an integer from 1 though 256000 to identify the desired downlink data rate in kbps.
- For 21.10 and later releases

  gbr-down *gbr_down*: Defines the guaranteed bit rate for downlink traffic. *gbr_down* must be an integer from 1 to 4000000000000 (4 Tbps).

mbr

The **mbr** keyword configures the Maximum Bit Rate values. This keyword is only used for the dedicated-bearer configuration.

- **mbr-up** - Enter an integer from 1 though 256000 to identify the desired uplink data rate in kbps.

- For 21.10 and later releases

  mbr-up *mbr_up*: Defines the maximum bit rate for uplink traffic. *mbr_up* must be an integer from 1 to 4000000000000 (4 Tbps).

- **mbr-down** - Enter an integer from 1 though 256000 to identify the desired downlink data rate in kbps.
- For 21.10 and later releases

  mbr-down *mbr_down*: Defines the maximum bit rate for downlink traffic. *mbr_down* must be an integer from 1 to 4000000000000 (4 Tbps).

qci remap

The **qci remap** keyword sets the locally configured QCI. Enter an integer from 1 through 9. You can enter the new standardized QCI values 65, 66, 67, 69 and 70. The QCI remap mechanism maps an incoming QCI or a range of QCI to the configured QCI or range of QCI. QCI remap is the first configuration that is applied, from the bearer control profile configuration, and it is applicable only during Create Session Request and Create Bearer Request procedures. The Bearer Control profile associated to the remapped QCI value is used for capping the remaining QoS parameters.

pgw-upgrade

The **pgw-upgrade** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the PGW and the options include:

- **local** - Instructs the MME to select locally configured values for QoS capping.
- **minimum** - Instructs the MME to select the lower value, of the two values locally configured or received value, to use as the QoS capping value.
- **rej-if-exceed** - Instructs the MME to reject the call if the received value exceeds the locally configured value.

Usage Guidelines

Repeat the **dedicated-bearer** command as needed to configure all parameters of interest.

QoS Computation - The following explains how the resultant QoS values are derived for the **minimum** and **reject-if-exceed** actions configured under **pgw-upgrade**.

- **QCI**
  - Every standard GBR/non-GBR QCI is associated with a priority level as per 3GPP TS 23.203 v12.10.0, Table 6.1.7.

QCI	Resource Type	Priority
1	GBR	2
2	GBR	4
3	GBR	3
4	GBR	5
5	non-GBR	1
6	non-GBR	6
7	non-GBR	7
8	non-GBR	8

QCI	Resource Type	Priority
9	non-GBR	9

- Priority Level 1 has the highest priority and in case of congestion lowest priority level traffic would be the first to be discarded.
- **minimum**: The QCI with lower priority level will be used.
- **rej-if-exceed**: If the received QCI has higher priority level than the configured local QCI, then the procedure will be rejected.

- **ARP Priority Level**
  - ARP Priority level decreases on increasing value (1 to 15). ARP Priority level 1 has the highest priority value.
  - **minimum**: The lower ARP Priority level (i.e. higher value) will be used.
  - **rej-if-exceed**: If the received ARP Priority level is higher (i.e. value is lesser) than the CLI configured local ARP Priority level, then the procedure will be rejected.
- **ARP-PCI**
  - Preemption capability indicator can have either of the following two values, where may (0) > shall-not (1)
    - *may* - specifies that this bearer may preempt other lower priority bearers, if required
    - *shall-not* - specifies that this bearer shall-not pre-empt other lower priority bearers.
  - Following table indicates the resultant pre-emption capability for the *minimum* pgw-upgrade

Received value	Configured local value	Resultant value to be used
may	may	may
may	shall-not	shall-not
shall-not	may	shall-not
shall-not	shall-not	shall-not

  - *rej-if-exceed*: If the received ARP-PCI value is *may* and the configured local value is *shall-not*, then the procedure will be rejected.
  - Default value set by MME if not provided by HSS/PGW : *shall-not*
- **ARP-PVI**
  - Preemption vulnerability indicator can have either of the following two values, where *not-pre-emptible* (1) > *pre-emptible* (0)
    - *pre-emptible* - specifies that this bearer is pre-emptible by other high priority bearers
    - *not-pre-emptible* - specifies that this bearer is NOT pre-emptible by other high priority bearers
  - Following table indicates the resultant pre-emption vulnerability for the *minimum* pgw-upgrade:

Received value	Configured local value	Resultant value to be used
pre-emptible	pre-emptible	pre-emptible

Received value	Configured local value	Resultant value to be used
pre-emptible	not-pre-emptible	pre-emptible
not-pre-emptible	pre-emptible	pre-emptible
not-pre-emptible	not-pre-emptible	not-pre-emptible

- *rej-if-exceed*: If the received ARP-PVI value is *not-pre-emptible* and the configured local value is *pre-emptible*, then the procedure will be rejected.
- Default value set by the MME if not provided by the HSS/PGW : *pre-emptible*

- **MBR / GBR**
  - *minimum*:
    - Uplink - The lower of the values, comparing the received values and the configured local value, will be used for APN-AMBR/MBR/GBR.
    - Downlink - The lower value of the received value and configured local value will be used for APN-AMBR/MBR/GBR.
  - *rej-if-exceed*: If the received Uplink value is greater than the configured local Uplink value or the received Downlink value is greater than the configured local Downlink value, then the procedure will be rejected.

Example

The following is a sample command to configure ARP capping for dedicated bearers:

```
dedicated-bearer arp priority 1 pgw-upgrade local
```

The following is a sample command to configure MBR capping for dedicated bearers:

```
dedicated-bearer mbr max-ul 20000 max-dl 20000  pgw-upgrade minimum
```

default-bearer

Use this command to configure the operator-provided values for the ARP and QCI QoS control parameters, as well as the prefer-as-cap and pgw-upgrade capping.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

```
default-bearer { arp { { preemption-capability | preemption-vulnerability
 | priority-level } { pgw-upgrade | prefer-as-cap } { local | minimum |
rej-if-exceed } } | qci { remap | pgw-upgrade { local | minimum |
rej-if-exceed } } }
remove default-bearer { arp | qci }
```

remove

Including this command prefix instructs the MME to delete the default-bearer configuration.

arp

This keyword configures the allocation and retention priority parameters:

- **preemption-capability** - Enter an integer, either **0** (may) to specify that this bearer may pre-empt other lower priority bearers if required, or **1** (shall-not) to specify that this bearer shall not pre-empt other lower priority bearers.
- **preemption-vulnerability** - Enter an integer, either **0** (pre-emptible) to specify that this bearer is preemptible by other high priority bearers, or **1** (not-pre-emptible) to specify that this bearer is not pre-emptible by other high priority bearers.
- **priority-level** - Enter an integer 1 through 15, with 1 as the highest priority, to specify the allocation/retention priority level.

pgw-upgrade

The **pgw-upgrade** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the PGW and the options include:

- **local** - Instructs the MME to select locally configured values for QoS capping.
- **minimum** - Instructs the MME to select the lower value, of the two values locally configured or received value, to use as the QoS capping value.
- **rej-if-exceed** - Instructs the MME to reject the call if the received value exceeds the locally configured value.

prefer-as-cap

The **prefer-as-cap** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the HSS or from the peer-MME/S4-SGSN:

- **local** - The configured local value will be used.
- **minimum** - The minimum (lowest) value of the configured local value or the HSS-provided value will be used.
- **reject-if-exceed** - The request/procedure is rejected if the HSS-provided value exceeds the configured local value.

qci remap

The **qci remap** keyword sets the locally configured QCI. Enter an integer from 1 through 9. You can enter the new standardized QCI values 69 and 70. The QCI remap mechanism maps an incoming QCI or a range of QCI to the configured QCI or range of QCI. QCI remap is the first configuration that is applied, from the bearer control profile configuration, and it is applicable only during Create Session Request and Create Bearer Request procedures. The Bearer Control profile associated to the remapped QCI value is used for capping the remaining QoS parameters.

Usage Guidelines

Repeat the **default-bearer** command as needed to configure all parameters of interest.

QoS Computation - The following explains how the resultant QoS values are derived for the **minimum** and **reject-if-exceed** actions configured under **prefer-as-cap** or **pgw-upgrade**.

- **QCI**
  - Every standard GBR/non-GBR QCI is associated with a priority level as per 3GPP TS 23.203 v12.10.0, Table 6.1.7.

QCI	Resource Type	Priority
1	GBR	2
2	GBR	4
3	GBR	3
4	GBR	5
5	non-GBR	1
6	non-GBR	6
7	non-GBR	7
8	non-GBR	8
9	non-GBR	9
65	GBR	0.7
66	GBR	2
67	GBR	1.5
69	Non-GBR	0.5
70	Non-GBR	5.5

  - Priority Level 1 has the highest priority and in case of congestion lowest priority level traffic would be the first to be discarded.
  - **minimum**: The QCI with lower priority level will be used.
  - **rej-if-exceed**: If the received QCI has higher priority level than the configured local QCI, then the procedure will be rejected.
- **ARP Priority Level**
  - ARP Priority level decreases on increasing value (1 to 15). ARP Priority level 1 has the highest priority value.
  - **minimum**: The lower ARP Priority level (i.e. higher value) will be used.
  - **rej-if-exceed**: If the received ARP Priority level is higher (i.e. value is lesser) than the CLI configured local ARP Priority level, then the procedure will be rejected.
- **ARP-PCI**
  - Preemption capability indicator can have either of the following two values, where may (0) > shall-not (1)
    - *may* - specifies that this bearer may preempt other lower priority bearers, if required

- *shall-not* - specifies that this bearer shall-not pre-empt other lower priority bearers.

- Following table indicates the resultant pre-emption capability for the *minimum* prefer-as-cap or pgw-upgrade

Received value	Configured local value	Resultant value to be used
may	may	may
may	shall-not	shall-not
shall-not	may	shall-not
shall-not	shall-not	shall-not

- *rej-if-exceed*: If the received ARP-PCI value is *may* and the configured local value is *shall-not*, then the procedure will be rejected.
- Default value set by MME if not provided by HSS/PGW: *shall-not*

- **ARP-PVI**
  - Preemption vulnerability indicator can have either of the following two values, where *not-pre-emptible* (1) > *pre-emptible* (0)
    - *pre-emptible* - specifies that this bearer is pre-emptible by other high priority bearers
    - *not-pre-emptible* - specifies that this bearer is NOT pre-emptible by other high priority bearers
  - Following table indicates the resultant pre-emption vulnerability for the *minimum* prefer-as-cap or pgw-upgrade:

Received value	Configured local value	Resultant value to be used
pre-emptible	pre-emptible	pre-emptible
pre-emptible	not-pre-emptible	pre-emptible
not-pre-emptible	pre-emptible	pre-emptible
not-pre-emptible	not-pre-emptible	not-pre-emptible

  - *rej-if-exceed*: If the received ARP-PVI value is *not-pre-emptible* and the configured local value is *pre-emptible*, then the procedure will be rejected.
  - Default value set by the MME if not provided by the HSS/PGW : *pre-emptible*

Example

The following is an example of a command to configure QCI mapping for the default bearer:

```
default-bearer qci remap 6
```

description

Allows you to enter descriptive text for this configuration.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

pre-rel8-qos-mapping

This command defines mapping of EPC QOS (non-standard QCIs) to 3GPP PreRelease8 QoS parameters in the MME.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

[remove] { pre-rel8-qos-mapping { { class { background | conversational | interactive | streaming } } { thp *thp_value* **} { sig-ind** *indicator_value* **} { src-stat-desc** *value* **} { min-transfer-delay** *value* **} { sdu error-ratio** *value* **} } | qci** *value* **}**

remove

Including this command prefix causes the MME to delete the PreRelease8QoS parameter configuration for the named bearer control profile.

qci

qci indicates the QoS class. Its value ranges from 1 to 9. When QCI is configured, the corresponding mapping takes place based on 3GPP TS 23.401.

class

Indicates the UMTS traffic classified into the following categories:

- **background**
- **conversational**
- **interactive**
- **streaming**

thp

Traffic handling priority specifies the relative importance of handling all SDUs that belong to the UMTS bearer compared to the SDUs of other bearers. The priority value ranges from 1 to 3, where the value 1 holds the highest priority.

sig-ind

The **sig-ind** keyword toggles the state of the signal. The values are either 0 or 1.

src-stat-desc

The **src-stat-desc** (Source Statistics Descriptor) keyword toggles the state of the signal. The values are either 0 or 1.

sdu error-ratio

The Service Data Unit (SDU) Error ratio indicates the fraction of SDUs lost or detected as error packets. SDU error ratio is defined only for conforming traffic.

min-transfer-delay

The **min-transfer-delay** defines the maximum delay for 95th percentile of the delay distributed for all delivered SDUs during the lifetime of a bearer service. The delay value ranges from 10 to 40,000 milliseconds.

Usage Guidelines

An operator specific QCI can be remapped to another QCI using the Bearer Control Profile Configuration mode. Bearer level parameters such as ARP, MBR, GBR values can be configured independently for default/dedicated bearer along with actions such as **prefer-as-cap** or **pgw-upgrade** in the Bearer Control Profile Configuration mode.

The operator specific QCIs from 128 to 254 has the lowest priority. These priority values are considered while deriving resultant QoS values for the **minimum** and **reject-if-exceed** actions configured under **prefer-as-cap** or **pgw-upgrade**.

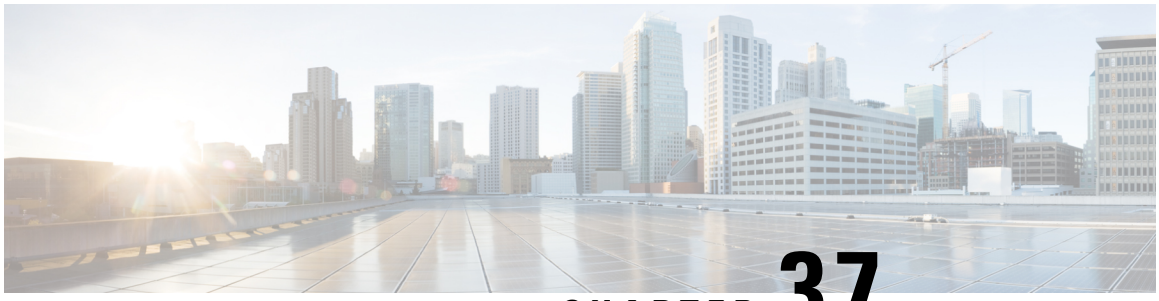
Example

The following is a sample command to configure PreRelease8QoS parameter for the conversational class:

```
pre-rel8-qos-mapping class conversational thp 1 sig-ind 0 src-stat-desc
1 min-transfer-delay 100 sdu error-ratio 4
```

The following is a sample command to configure PreRelease8QoS parameter for the conversational class:

```
pre-rel8-qos-mapping class interactive thp 2 sig-ind 0 src-stat-desc 1
min-transfer-delay 300 sdu error-ratio 4
```



CHAPTER 37

BFD Configuration Mode Commands

BFD provides a low-overhead, short duration method of detecting failures in the forwarding path between two BGP or OSPF adjacent routers, including the interfaces, data links, and forwarding plane. BFD must be enabled on both routers. The ASR 5500 supports BFD on Layer 3 clients only in asynchronous mode with optional Echo functionality.

Command Modes

The BFD Configuration Mode manages the protocol settings for Bidirectional Forwarding Detection (BFD).

Exec > Global Configuration > Context Configuration > BFD Configuration

configure > context *context_name* **> bfd-protocol**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bfd)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- bfd linkagg-peer, on page 1319
- bfd multihop-peer, on page 1321
- bfd nbr-group-name, on page 1323
- echo, on page 1324
- end, on page 1324
- exit, on page 1325
- slow-timers, on page 1325

bfd linkagg-peer

Enables member-link based BFD and configures the BFD link aggregation (linkagg) session values. Member-link based BFD detects individual link failures faster than LACP and reduces the overall session/traffic down period as a result of single member link failure.

Product ASR 5500, All products

Privilege Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BFD Configuration

configure > context *context_name* **> bfd-protocol**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bfd)#
```

Syntax Description

```
bfd linkagg-peer linkagg_group_id local-endpt-addr local_endpt_ipaddress
remote-endpt-addr remote_endpt_ipaddress interval tx_interval min_rx rx_interval
multiplier multiplier_value [ slot slot_number ]
no bfd linkagg-peer linkagg_group_id [ slot slot_number ]
```

no

Disables this member-link BFD configuration.

linkagg_group_id

Specifies the LAG number as an integer from 1 through 255.

local-endpt-addr *local_endpt_ipaddress*

Specifies the source address of the multihop BFD session in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal format.

remote-endpt-addr *remote_endpt_ipaddress*

Specifies the remote address of the Multihop BFD session in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal format.

interval *tx_interval*

Specifies the transmit interval of control packets in milliseconds as an integer from 50 through 10000.

min_rx *rx_interval*

Specifies the minimum receive interval for control packets in milliseconds as an integer from 50 through 10000.

multiplier *multiplier_value*

Specifies the value used to compute hold-down time as an integer from 3 through 50.

slot *slot_number*

For a redundant active-standbylinkagg configuration, this option specifies the card for which this configuration is intended.

Usage Guidelines

Use this command to enables member-link based BFD and configures the BFD link aggregation session values (RFC 7130). Member-link based BFD detects individual link failures faster than LACP and reduces the overall session traffic down period as a result of single member link failure.

This command configures BFD interactions with the linkagg task. Once a session is configured, BFD creates per member link BFD sessions and starts sending packets on each of the linkagg member links. If a member link BFD session fails, StarOS notifies failures to the linkagg task.

If you define a linkagg-peer using a slot number, you may configure a linkagg-peer for the redundant slot which must also specify a slot. Likewise, if you configure a linkagg-peer without a slot, you must delete it before configuring a peer with a slot specified.

Important Only one IPv4 or IPv6 BFD session-based configuration is allowed per link-agg interface for compliance with RFC 7130.

Example

The following command configures linkage group 50 with IPv4 endpoints, a 50ms transmission interval, a 50ms interval for receiving control packets, and a compute hold-down time multiplier of 3.

```
bfd linkagg-peer 50 local-endpt-addr 2.2.2.1 remote-endpt-addr 2.2.2.2
interval 50 min_rx 50 multiplier 3
```

bfd multihop-peer

Configures parameters for any multihop-BFD sessions with the same destination address. If these parameters are not configured using this command, MH-BFD sessions with the same destination address are found in the Admin-down state.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BFD Configuration

configure > context *context_name* **> bfd-protocol**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bfd)#
```

Syntax Description

bfd multihop-peer *dst-ip-address* **{ authentication { md5 | meticulous-md5 | meticulous-sha1 plain-text | sha1 } { encrypted** *password-string* **| password** *password-string* **} | interval** *tx_interval* **min_rx** *rx_interval* **multiplier** *value* **}**
no bfd multihop-peer *dst-ip-address* **authentication**

no

Removes all the parameters for the MH-BFD destination address. If there are any sessions with the same destination address, those sessions go to Admin-down state.

dst-ip-address

Specifies the destination address of the BFD enabled peer in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation. This destination address must have been previously configured via the **ip route static bfd** or **ipv6 route static bfd** command in the Context Configuration mode.

authentication { md5 | meticulous-md5 | meticulous-sha1 plain-text | sha1 }

Specifies the method for authenticating all multihop BFD sessions to the specified peer. By default, authentication for Multihop-BFD sessions to a destination address is disabled. The authentication type options include:

- **md5** – Message Digest 5
- **meticulous-md5** – MD5 using a secret key and sequence numbers that are updated for every packet
- **meticulous-sha1** – SHA1 with sequence numbers that are updated for every packet
- **plain-text** – plain text (unencrypted)
- **sha1** – Secured Hash Algorithm 1

encrypted *password-string* | password *password-string*

Specifies the password for authentication of BFD sessions. The password must be the same between the peer neighbors for the BFD sessions to work. If the authentication password is configured incorrectly between the peers, the BFD sessions to the destination address will not come to the UP. If the password is configured for BFD sessions that are already UP, the BFD neighbors are reset.

- **encrypted** *password-string*: Specifies the use of an encrypted password for authentication of BFD sessions as an alphanumeric string of up to 523 characters.
- **password** *password-string*: Specifies the use of a plain text password for authentication of BFD sessions as an alphanumeric string of 1 to 19 characters.

Important The destination address and its transmit or receive intervals must be configured before the password is applied to any MH-BFD sessions at a destination address.

interval *tx_interval* min_rx *rx_interval* multiplier *value*

interval *tx_interval*: Specifies the transmit interval (in milliseconds) between BFD packets as an integer from 50 to 999. Default: 50

min_rx *rx_interval*: Specifies the receive interval (in milliseconds) between BFD packets as an integer from 50 to 999. Default: 50

multiplier *value*: Specifies the multiplier value used to compute hold down as an integer from 3 to 50. Default: 3

Usage Guidelines

Use this command to configure the basic operating parameters between the BFD enabled peers.

Important The VPC-DI CF switchover and SF migration events can cause multihop BFD sessions to go down if the session detect time exceeds the card fault detect/BFD recovery time (approximately 5 to 6 seconds). This does not pertain to a single hop BFD.

Example

The following are example command strings for configuring BFD multihop sessions:

```
bfd multihop-peer 10.2.3.4 authentication md5 encrypted 5-klm7783
bfd multihop-peer 10.2.3.4 interval 100 min_rx 100 multiplier 5
```

bfd nbr-group-name

Configures BFD neighbor groups.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BFD Configuration

configure > context *context_name* **> bfd-protocol**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bfd)#
```

Syntax Description

[no] bfd nbr-group-name *neighbor_group* **{ active-if-name** *if_name* **| passive-if-name** *if_name* **}** *gw_ip_address*
no bfd nbr-group-name *neighbor_group*

no

Removes all the parameters for the BFD neighbor group.

neighbor_group

Specifies an identifier for a BFD neighbor group as an alphanumeric string of 1 through 19 characters.

active-if-name *if_name* | passive-if-name *if-name*

Specifies the logical/physical interface associated with this BFD group.

active-if-name *if_name*: Specifies an active interface that notifies all passive interfaces in this group. There should be only one active interface in a group. *if_name* is a logical or physical interface specified as an alphanumeric string of 1 through 79 characters.

passive-if-name *if_name*: Specifies a passive interface that receives BFD notifications from the active interface in this group. *if_name* is a logical or physical interface specified as an alphanumeric string of 1 through 79 characters.

gw_ip_address

Specifies the gateway address of the BFD neighbor in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation (optional CIDR notation).

Usage Guidelines Allow scaling of BFD sessions when a large number of logical interfaces are configured on a physical interface. A failure on the physical interface or a logical interface can be propagated to all passive interfaces in this group.

Example

The following command configures BFD group *bgpgroup132*:

```
bfd nbr-group-name bgpgroup132 active-if-name bgpif02
```

echo

Enables or disables BFD echo mode functionality. The Echo function tests the forwarding path on the remote system. Echo is only used for single hop BFD sessions.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BFD Configuration

configure > context *context_name* **> bfd-protocol**

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bfd)#
```

Syntax Description **[no] echo**

no echo

Disables BFD echo functionality.

Usage Guidelines Use this function to send a stream of Echo packets that the other endpoint then sends back via its forwarding plane. Echo tests the forwarding path on the remote system.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

slow-timers

Specifies the asynchronous mode control packet interval when Echo mode is enabled. In BFD asynchronous mode, BFD-enabled peers periodically send BFD Control packets to one another. If a number of those packets in a row are not received within the specified interval by the other peer, the session is declared to be down.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BFD Configuration

configure > **context** *context_name* > **bfd-protocol**

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bfd)#`

Syntax Description **slow-timers** *timer_value*
no slow-timers

no

Disables previously specified BFD slow timers.

timer_value

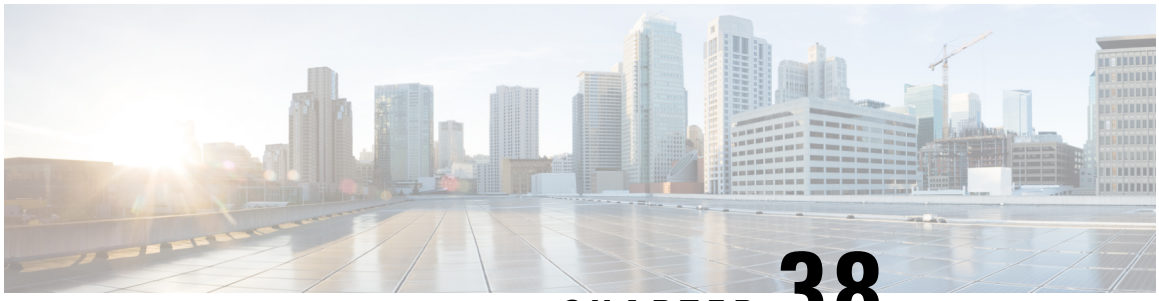
Specifies the BFD control packet interval (in milliseconds) for Echo mode as an integer from 1000 through 300000. Default: 2000

Usage Guidelines Use this command to configure the interval between BFD control packets sent between peers in Echo mode.

Example

The following example command configures an asynchronous mode control packet interval of 10000ms (10 seconds):

slow-timers 10000



CHAPTER 38

BGP Address-Family (IPv4/IPv6) Configuration Mode Commands

The Border Gateway Protocol (BGP) Address-Family (IPv4/IPv6) Configuration Mode is used to configure the IPv4 and IPv6 address family information.

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > context *context_name* **> router bgp** *as_number* **> address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp-af-v6)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1327
- exit, on page 1328
- maximum-paths, on page 1328
- neighbor, on page 1329
- network, on page 1333
- redistribute, on page 1334
- timers bgp, on page 1335

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

maximum-paths

Controls the maximum number of parallel external BGP (eBGP) or internal BGP (iBGP) routes that can be installed in a routing table.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description

```
[ no ] maximum-paths { ebgp num_paths | ibgp num_paths }
no maximum-paths { ebgp | ibgp }
```

no

Disables maximum paths for the specified route type command.

maximum-paths ebgp *num_paths*

Specifies the maximum number of parallel External Border Gateway Protocol routes as an integer from 1 through 10.

maximum-paths ibgp *num_paths*

Specifies the maximum number of parallel Internal Border Gateway Protocol routes as an integer from 1 through 10.

Important If configured under the router-bgp-mode, multipath is enabled only for the prefixes learnt in the default-vrf. There is no support for vpnv4 prefixes even though multipath is turned on for the default-vrf.

If configured under the address-family-vrf-mode, multipath is enabled only for prefixes learnt in the vrf.

Usage Guidelines Use this command to forward packets over multiple paths. User can control the maximum number of parallel eBGP routes that can be installed in a routing table. Enabling multipath does not affect the best path selection in BGP. If multipath is enabled, all the paths with the same weight, local-preference, as-path length, origin, and multi-exit discriminator (MED) as the best path are added to the routing table.

Example

The following command disables forward of packets over multiple paths:

```
no maximum-paths ebgp
```

neighbor

Configures the IPv4/IPv6 Address Family for BGP routers that interconnect to non-broadcast networks.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description

```
[ no ] neighbor ip_address { activate | advertisement-interval adv_time |
capability graceful-restart | default-originate [ route-map map_name ] |
distribute-list dist_list { in | out } | ebgp-multihop [ max-hop number ]
encrypted password encryp_password fall-over bfd multihop | filter-list
filt_list { in | out } | max-prefix max_num [ threshold thresh_percent ] [
warning-only ] next-hop-self | password password | remote-as AS_num |
remove-private-AS | restart-time rest_time | route-map map_name { in | out}
| send-community { both | extended | standard } | shutdown |
srp-activated-soft-clear | timers { connect-interval connect_interval [
keepalive-interval keepalive_interval  holdtime-interval holdtime_interval [
min-peer-holdtime-interval min_peer_hold_interval ] ] | keepalive-interval
keepalive_interval holdtime-interval holdtime_interval { connect-interval
connect_interval | min-peer-holdtime-interval min_peer_hold_interval [
connect-interval connect_interval  ] } } | update-source ip_address | weight
value }
```

no

Delete the specified parameter from the router configuration.

neighbor *ip_address*

Specifies the IP address of a BGP neighbor. *ip_address* must be in IPv4 dotted-decimal or IPV6 colon-separated-hexadecimal notation.

activate

Enables the exchange of routes with this neighbor.

advertisement-interval *adv_time*

Specifies the minimum interval (in seconds) between sending BGP routing updates.

adv_time must be an integer from 0 through 600. Default: 30

capability graceful-restart

Configures graceful re-start attributes.

default-originate [route-map *map_name*]

Specifies the default originate routes to this neighbor

route-map *map_name*: Specifies the route-map that contains the criteria to originate default routes. *map_name* must be the name of an existing route-map in the current context.

distribute-list *dist_list* { in | out }

Filters updates to and from this neighbor based on a route access list. Default: No filtering is performed. *dist_list* is the name or number of an existing route-access-list.

in: Indicates that incoming advertised routes should be filtered.

out: Indicates that outgoing advertised routes should be filtered.

ebgp-multihop [max-hop *number*]

Allows eBGP neighbors that are not on directly connected networks.

max-hop *number*: Specifies the maximum number of hops allowed to reach a neighbor as an integer from 1 through 255. Default hop count: 255

encrypted password *encryp_password*

Specifies the encrypted password that is used only inside configuration files. This is an alphanumeric string of 1 through 24 characters.

fall-over bfd multihop

Supports Bidirectional Forwarding Detection (BFD) multihop for fallover.

filter-list *filt_list* { in | out }

Establishes BGP filters based on an autonomous system (AS) path access list. *filt_list* is name of an existing AS path access list.

in: Indicates that incoming advertised routes will be filtered.

out: Indicates that outgoing advertised routes will be filtered.

max-prefix *max_num* [threshold *thresh_percent*] [warning-only]

Specifies the maximum number of prefixes accepted from this peer. When the maximum is exceeded the neighbor connection is reset. *max_num* is an integer from 1 through 4294967295. Default: No maximum prefix limit.

threshold *thresh_percent*: Specifies a percentage value of when the BGP table is full. When this value is reached peer warnings are sent to the neighbor. *thresh_percent* must be an integer from 1 through 100.

warning-only: Specifies that only a warning message is sent when the limit is exceeded. The neighbor connection is not reset

next-hop-self *ip_address*

Disables the next hop calculation for this neighbor.

password *password*

Sets a *password* expressed as an alphanumeric string of 1 through 24 characters.

remote-as *AS_num*

Specify the AS number of the BGP neighbor as an integer from 1 through 4294967295.

remove-private-AS

Removes the private AS number from outbound updates. Default: Do not remove the private AS number.

restart-time *rest_time*

Specifies the maximum time (in seconds) required to for neighbor to restart as an integer from 1 through 3600.

route-map *map_name* { in | out }

Applies a route map to the neighbor. *map_name* must be the name of an existing route-map in the current context.

in: Indicates that the route map applies to incoming advertisements.

out: Indicates that the route map applies to outgoing advertisements.

send-community { both | extended | standard }

Sends the community attributes to a peer router (neighbor).

both:Sends standard and extended community attributes

extended:Sends extended community attributes.

standard:Sends standard community attributes.

shutdown

Administratively shuts down this neighbor. This disables exchanging routes or configuring parameters for this neighbor.

srp-activated-soft-clear

Enables BGP updates when SRP-enabled resources are modified.

timers { [connect-interval *connect_interval*] | [keepalive-interval *keepalive_interval* holdtime-interval *holdtime_interval*] }

Sets BGP timers for the specified neighbor.

connect-interval *connect_interval*: Specifies the connect timer (in seconds) as an integer from 0 through 65535. The default is 60 seconds.

keepalive-interval *keepalive_interval*: Specifies the frequency (in seconds) at which the current BGP router sends keepalive messages to its neighbor. *keep_time* must be an integer from 0 through 65535. The default is 30 seconds.

holdtime-interval *holdtime_interval*: Specifies the interval (in seconds) the router waits for a keepalive message before declaring a neighbor dead. *hold_time* must be an integer from 0 through 65535. The default is 90 seconds.

min-peer-holdtime-interval *min_peer_hold_interval*: Specifies the minimum acceptable hold time (in seconds) from peer for a keepalive message before declaring a neighbor dead. *min_peer_hold_interval* must be an integer from 0 through 65535. The default is 90 seconds.

update-source *ip_address*

Binds the specified IP address to the BGP socket that is used to communicate to the peer. *ip_address* is an IPv4 address in dotted-decimal notation.

In most cases you should set the update-source address to the address of the loopback interface in the current context. By doing this, the TCP connection does not go down until there is no route for the loopback address in the peering router.

weight *value*

Sets the default weight for routes from this neighbor as an integer from 0 through 65535. Default: 0

Usage Guidelines

Use this command to set parameters for communication with a specified neighbor. The chassis supports a maximum of 64 peers per context.

Important A remote AS number must be specified for a neighbor before other parameters can be configured.

Example

The following command specifies that the neighbor at the IP address *192.168.100.25* has an AS number of *2000*:

```
neighbor 192.168.100.25 remote-as 2000
```

The following command allows BGP neighbors that are a maximum of *27* hops away:

```
neighbor 192.168.100.25 ebgp-multihop max-hop 27
```

The following command sets the minimum interval between sending routing updates to 3 minutes (180 seconds):

```
neighbor 192.168.100.25 advertisement-interval 180
```

The following command sets the default weight for all routes from the specified neighbor to *100*:

```
neighbor 192.168.100.25 weight 100
```

network

Configures and specifies a network to announce via BGP.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > context *context_name* **> router bgp** *as_number* **> address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description

`[ no ] network` *`ip_address/mask`* **`[ route-map`** *`map_name`* **`]`**

no

Delete the specified network from the configuration for the BGP router.

network *ip_address/mask*

Specifies the IP address and netmask bits for the network to announce via BGP. *ip_address* is a network IP address in IPV4 dotted-decimal notation and *mask* is the number of subnet bits, representing a subnet mask in CIDR. These must be entered in the IPv4 dotted-decimal notation/subnet bits format.

route-map *map_name*

Filter routes through the specified route map before announcing the network. *map_name* specifies the name of the route-map to use as an alphanumeric string of 1 through 79 characters.

Usage Guidelines Use this command to specify a network to announce via BGP.

Example

The following command announces the network *192.168.0.0* with a netmask of *16* via BGP:

```
network 192.168.0.0/16
```

The following command removes the network from the BGP router configuration:

```
no network 192.168.0.0/16
```

redistribute

Redistributes routes into BGP from another protocol as BGP neighbors.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description **[no] redistribute { connected | ospf | rip | static } [route-map** *map_name* **]**

no

Remove the specified redistribution parameters from the BGP router configuration.

redistribute connected

Specifies that connected routes will be redistributed.

redistribute ospf

Specifies that Open Shortest Path First (OSPF) routes will be redistributed.

redistribute rip

Specifies that Routing Information Protocol (RIP) routes will be redistributed. (RIP is not supported at this time.)

redistribute static

Specifies that static routes will be redistributed.

route-map *map_name*

Filters routes through the specified route map before redistribution. *map_name* specifies the name of the route-map to use as an alphanumeric string of 1 through 79 characters.

Usage Guidelines

Use this command to specify what routes this BGP router should redistribute into BGP.

Example

The following command redistributes OSPF routes after filtering them through the route map named *Map1*:

```
redistribute ospf route-map Map1
```

The following command removes the redistribution of OSPF routes from the router's configuration:

```
no redistribute ospf route-map Map1
```

timers bgp

Enables or disables an aggressive minimum BGP route advertisement interval (MinRtAdvInterval) for ICSR configurations.

Product

All products that support ICSR

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description

[no] timers bgp icsr-aggr-advertisement-interval *seconds*

no

Disables this aggressive ICSR BGP advertisement interval.

seconds

Sets the number of seconds as an integer from 0 to 30. Default: 0.

Usage Guidelines

Use this command to configure an aggressive ICSR BGP advertisement interval (MinRtAdvInterval). The default value is 0. If set as 0, the aggressive advertisement interval is disabled.

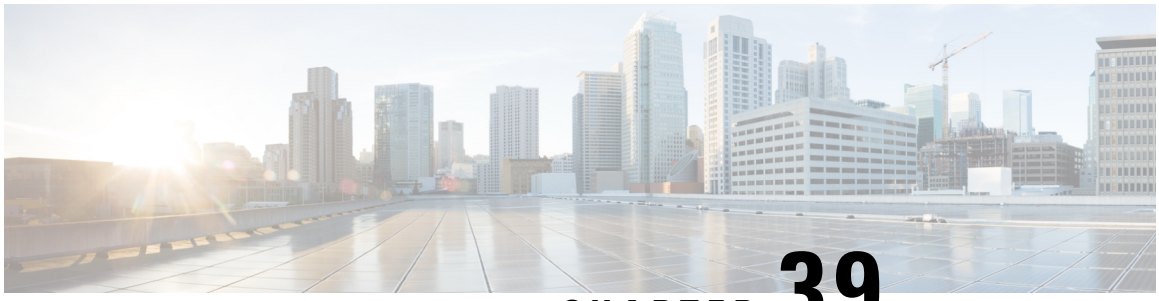
The MinRtAdvInterval can be uniquely set for each address family.

After ICSR switchover, BGP will set the advertisement-interval for each AFI/SAFI (Address Family Identifier/Subsequent Address Family Identifier) supported by the peer to the configured value. BGP updates will be advertised to the peer based on this interval.

Example

The following command sets the MinRtAdvInterval for this address family to 1 second:

```
timers bgp icsr-aggr-advertisement-interval 1
```



CHAPTER 39

BGP Address-Family (VPNv4/VPNv6) Configuration Mode Commands

The Border Gateway Protocol (BGP) Address-Family (VPNv4/VPNv6) Configuration Mode is used to configure the VPNv4 or VPNv6 address family information.

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > context *context_name* **> router bgp** *as_number* **> address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp-af-v4)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1337
- exit, on page 1338
- neighbor, on page 1338
- timers bgp, on page 1339

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

exit

Usage Guidelines

Use this command to return to the parent configuration mode.

neighbor

Configures the VPNv4 or VPNv6 address family on BGP routers that interconnects to non-broadcast networks and enables the exchange of routing information with a peer router (neighbor).

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v4)#
```

Syntax Description

[no] neighbor *ip_address* **{ activate | advertisement-interval** *interval_seconds*| **route-map** *map_name* **{ in | out } | send-community { both | extended | standard } }**

no

Delete the specified parameter from the router configuration.

neighbor *ip_address*

Specifies the IP address of the peer router (neighbor) in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

activate

Enables the exchange of routing information with this neighbor.

advertisement-interval *interval_seconds*

Specifies the minimum interval in seconds between sending BGP routing updates as an integer from 0 through 600.

route-map *map_name* { in | out }

Apply a route map to the neighbor.

map_name must be the name of an existing route-map in the current context.

- **in**: Indicates that the route map applies to incoming advertisements.
- **out**: Indicates that the route map applies to outgoing advertisements.

send-community { both | extended | standard }

Sends the community attributes to a peer router (neighbor).

both: Sends standard and extended community attributes.

extended: Sends extended community attributes.

standard: Sends standard community attributes.

Usage Guidelines

Use this command to enable the exchange of routing information with a peer router. The chassis supports a maximum of 64 peers per context.

Example

The following command enables the exchange of routing information with the neighbor at IP address *192.168.100.25*:

```
neighbor 192.168.100.25 activate
```

timers bgp

Enables or disables an aggressive minimum BGP route advertisement interval (MinRtAdvInterval) for ICSR configurations.

Product

All products that support ICSR

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-v6)#
```

Syntax Description

`[ no ] timers bgp icsr-aggr-advertisement-interval` *`seconds`*

no

Disables this aggressive ICSR BGP advertisement interval.

seconds

Sets the number of seconds as an integer from 0 to 30. Default: 0.

Usage Guidelines

Use this command to configure an aggressive ICSR BGP advertisement interval (MinRtAdvInterval). The default value is 0. If set as 0, the aggressive advertisement interval is disabled.

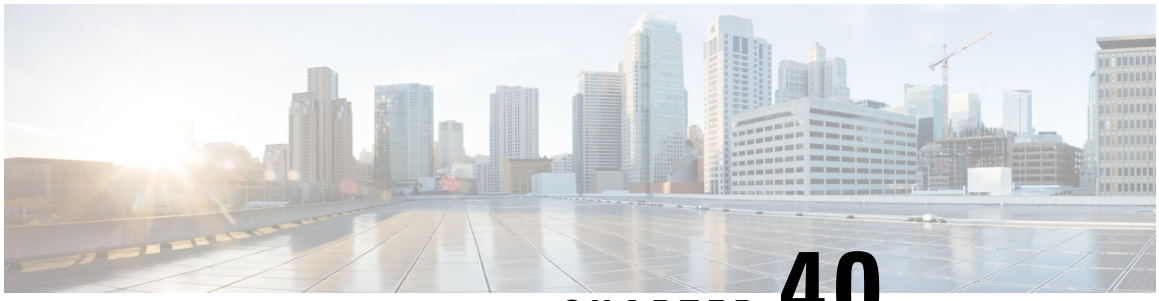
The MinRtAdvInterval can be uniquely set for each address family.

After ICSR switchover, BGP will set the advertisement-interval for each AFI/SAFI (Address Family Identifier/Subsequent Address Family Identifier) supported by the peer to the configured value. BGP updates will be advertised to the peer based on this interval.

Example

The following command sets the MinRtAdvInterval for this address family to 1 second:

```
timers bgp icsr-aggr-advertisement-interval 1
```



CHAPTER 40

BGP Address-Family (VRF) Configuration Mode Commands

The Border Gateway Protocol (BGP) Address-Family (VRF) Configuration Mode is used to configure the Virtual Routing and Forwarding address family information.

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > context *context_name* **> router bgp** *as_number* **> address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp-af-vpnv4)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1341
- exit, on page 1342
- neighbor, on page 1342
- redistribute, on page 1345

end

Exits the current configuration mode and returns to the Exec mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

end

Usage Guidelines

Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

neighbor

Configures the Virtual Routing and Forwarding (VRF) address family peers for BGP routers that interconnect to non-broadcast networks.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-vpnv4)#
```

Syntax Description **[no] neighbor** *ip_address* **{ activate | advertisement-interval** *adv_time* **| default-originate [route-map** *map_name* **] | distribute-list** *dist_list* **{ in | out } | ebgp-multihop [max-hop** *number* **] | filter-list** *filt_list* **{ in | out } | max-prefix** *max_num* **[threshold** *thresh_percent* **] [warning-only] | remote-as** *AS_num* **| remove-private-AS | route-map** *map_name* **{ in | out } | shutdown | srp-activated-soft-clear | timers { [connect-interval** *conn_time* **] | [keepalive-interval** *keep_time* **holdtime-interval** *hold_time* **] } | update-source** *ip_address* **| weight** *value* **}**

no

Delete the specified parameter from the router configuration.

neighbor *ip_address*

Specifies the IP address of the peer router (neighbor) in IPv4 dotted-decimal notation.

activate

Enables the exchange of routes with this neighbor.

advertisement-interval *adv_time*

The minimum interval (in seconds) between sending BGP routing updates.

adv_time must be an integer from 0 through 600.

Default: 30

default-originate [route-map *map_name*]

Originate default routes to this neighbor

route-map *map_name*: Specifies the route-map that contains the criteria to originate default routes. *map_name* must be the name of an existing route-map in the current context.

distribute-list *dist_list* { in | out }

Filter updates to and from this neighbor based on a route access list.

Default: No filtering is performed.

dist_list: The name or number of an existing route-access-list.

in: Indicates that incoming advertised routes should be filtered.

out: Indicates that outgoing advertised routes should be filtered.

ebgp-multihop [max-hop *number*]

Allow external BGP (eBGP) neighbors not on directly connected networks.

max-hop *number*: The maximum number of hops allowed to reach a neighbor. *number* must be an integer from 1 through 255.

Default hop count: 255

filter-list *filt_list* { in | out }

Establish BGP filters based on an AS path access list

filt_list: The name of an existing AS path access list.

in: Indicates that incoming advertised routes will be filtered.

out: Indicates that outgoing advertised routes will be filtered.

max-prefix *max_num* [threshold *thresh_percent*] [warning-only]

The maximum number of prefixes accepted from this peer. When the maximum is exceeded the neighbor connection is reset.

max_num: Specifies the maximum number of prefixes permitted. This must be an integer from 1 through 4294967295.

Default: No maximum prefix limit.

threshold *thresh_percent*: A percentage value which specifies that when the BGP table is the specified percentage full from this peer warnings are sent to the neighbor. *thresh_percent* must be an integer from 1 through 100.

warning-only: This keyword specifies that only a warning message is sent when the limit is exceeded. The neighbor connection is not reset

remote-as *AS_num*

Specify the AS number of the BGP neighbor.

AS_num: The neighbor's autonomous system number. must be an integer from 1 through 65535.

remove-private-AS

Remove the private AS number from outbound updates.

Default: Do not remove the private AS number.

route-map *map_name* { in | out }

Apply a route map to the neighbor.

map_name: Specifies the route-map apply. *map_name* must be the name of an existing route-map in the current context.

in: Indicates that the route map applies to incoming advertisements.

out: Indicates that the route map applies to outgoing advertisements.

shutdown

Administratively shut down this neighbor. This disables exchanging routes or configuring parameters for this neighbor.

srp-activated-soft-clear

Enables BGP updates when SRP-enabled resources are modified.

timers { [connect-interval *conn_time*] | [keepalive-interval *keep_time* holdtime-interval *hold_time*] }

BGP timers for the specified neighbor.

connect-interval *conn_time*: Specifies the connect timer in seconds. *conn_time* must be an integer from 0 through 65535. The default is 60 seconds.

keepalive-interval *keep_time*: The frequency (in seconds) at which the current BGP router sends keepalive messages to its neighbor. *keep_time* must be an integer from 0 through 65535. The default is 30 seconds.

holdtime-interval *hold_time*: The interval (in seconds) the router waits for a keepalive message before declaring a neighbor dead. *hold_time* must be an integer from 0 through 65535. The default is 90 seconds.

update-source *ip_address*

use this keyword to bind the specified IP address to the BGP socket that is used to communicate to the peer. *ip_address* is an IPv4 address in dotted-decimal notation.

In most cases you should set the update-source address to the address of the loopback interface in the current context. By doing this, the TCP connection does not go down until there is no route for the loopback address in the peering router.

weight *value*

This command sets the default weight for routes from this neighbor.

value: This must be an integer from 0 through 65535.

Default: 0

Usage Guidelines

Use this command to set parameters for communication with a specified neighbor. The chassis supports a maximum of 64 peers per context.

Important A remote AS number must be specified for a neighbor before other parameters can be configured.

Example

The following command specifies that the neighbor at the IP address *192.168.100.25* has an AS number of *2000*:

```
neighbor 192.168.100.25 remote-as 2000
```

The following command allows BGP neighbors that are a maximum of *27* hops away:

```
neighbor 192.168.100.25 ebgp-multihop max-hop 27
```

The following command sets the minimum interval between sending routing updates to 3 minutes (180 seconds):

```
neighbor 192.168.100.25 advertisement-interval 180
```

The following command sets the default weight for all routes from the specified neighbor to *100*:

```
neighbor 192.168.100.25 weight 100
```

redistribute

Redistributes routes into BGP. This means that any routes from another protocol are redistributed to BGP neighbors using the BGP protocol.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP Address-Family Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **address-family** *address_family_type*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-af-vpnv4)#
```

Syntax Description

[no] redistribute { connected | ospf | rip | static } [route-map *map_name* **]**

no

Remove the specified redistribution parameters from the BGP router configuration.

connected

Specifies that connected routes will be redistributed.

ospf

Specifies that Open Shortest Path First (OSPF) routes will be redistributed.

rip

Specifies that Routing Information Protocol (RIP) routes will be redistributed. (RIP is not supported at this time.)

static

Specifies that static routes will be redistributed.

route-map *map_name*

Filter routes through the specified route map before redistribution.

map_name specifies the name of the route-map to use and must be specified as an alphanumeric string of 1 through 79 characters.

Usage Guidelines

Use this command to specify what routes this BGP router should redistribute into BGP.

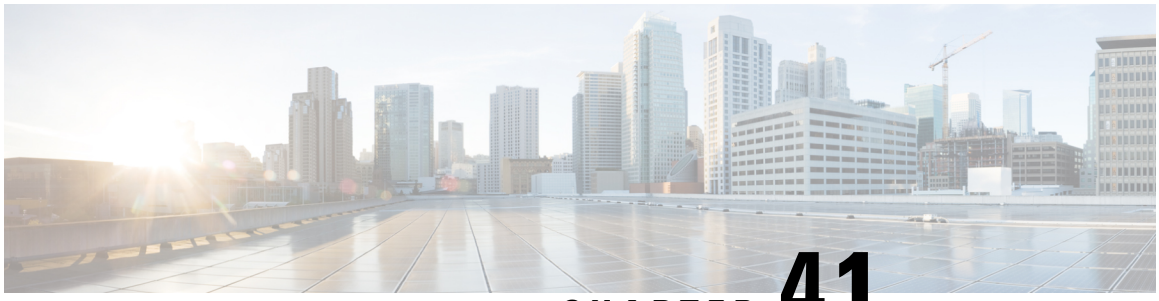
Example

The following command redistributes OSPF routes after filtering them through the route map named *Map1*:

```
redistribute ospf route-map Map1
```

The following command removes the redistribution of OSPF routes from the router's configuration:

```
no redistribute ospf route-map Map1
```



CHAPTER 41

BGP Configuration Mode Commands

The Border Gateway Protocol (BGP) Configuration Mode is used to configure properties for BGP-4 routing.

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- accept-zero-as-rd, on page 1348
- address-family ipv4, on page 1348
- address-family ipv6, on page 1349
- address-family vpnv4, on page 1350
- address-family vpnv6, on page 1351
- bgp, on page 1352
- description, on page 1352
- distance, on page 1353
- end, on page 1354
- enforce-first-as, on page 1354
- exit, on page 1355
- ip vrf, on page 1355
- maximum-paths , on page 1356
- neighbor, on page 1357
- network, on page 1361
- redistribute, on page 1362
- router-id, on page 1363
- scan-time, on page 1364
- timers, on page 1365

accept-zero-as-rd

Configures to accept VPN prefixes with Router Distinguisher (RD) value having Administrator Subfield, which is an Autonomous System number 0.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp)#`

Syntax Description **`[ no ] accept-zero-as-rd`**

no

Removes the configured VPN prefixes with RD value having AS number 0.

Usage Guidelines Use this command to configure VPN prefixes with RD value having Administrator Subfield, which is an Autonomous System number 0.

By default the existing behavior of ASR 5500 will be preserved.

Example

Following command configures to accept VPN prefixes with RD value having AS number 0:

`accept-zero-as-rd`

address-family ipv4

Enters the IPv4 Address Family configuration mode. Optionally, it also enables the Virtual Routing and Forwarding (VRF) routing configuraiton, if specified.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp)#`

Syntax Description **`[ no ] address-family ipv4 [ vrf`** *`vrf_name`* **`]`**

no

Removes the configured IPv4 address family VRF mode.

address-family ipv4

Enters the BGP Address-Family IPv4 mode to allow entry of IPv4 BGP parameters.

Important The route distinguisher ID must be configured for the VRF name via the **route-distinguisher** command in BGP VRF Configuration mode, before using this keyword.

vrf *vrf_name*

Enables the exchange of VRF routing information. When this keyword is specified with this command, the address family mode changes to VRF address family mode. *vrf_name* is the name of an existing VFR expressed as an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the IPv4 BGP address family configuration parameters and optionally enables the exchange of VRF routing information.

Use of the **address-family ipv4** command switches the command mode to BGP Address Family Configuration Mode; the CLI prompt changes to:

```
[context_name>]host_name(config-bgp-af-v4)#
```

Use of **address-family ipv4 vrf** *vrf_name* command switches the command mode to BGP Address Family Configuration Mode; the CLI prompt changes to:

```
[context_name>]host_name(config-bgp-af-vrf)#
```

Example

Use the following command to enter the IPv4 BGP Address-Family configuration mode:

```
address-family ipv4
```

Use following command to enter the IPv4 VRF BGP Address-Family configuration mode for exchange of VRF routing information from VRF *route_vrf1*:

```
address-family ipv4 vrf route_vrf1
```

address-family ipv6

Enters the IPv6 Address Family configuration mode. Optionally, it also enables the Virtual Routing and Forwarding (VRF) routing configuration mode, if specified.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

[no] address-family ipv6 [vrf *vrf_name* **]**

no

Removes the configured IPv6 address family VRF mode.

address-family ipv6

Enters the BGP Address-Family IPv6 mode to allow entry of IPv6 BGP parameters.

vrf *vrf_name*

Enables the exchange of VRF routing information. When this keyword is specified with this command, the address family mode changes to VRF address family mode. *vrf_name* is the name of an existing VFR expressed as an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to configure the IPv6 BGP address family configuration parameters for BGP router.

Use of the **address-family ipv6** command switches the command mode to BGP Address Family Configuration Mode and changes the CLI prompt to:

```
[context_name>]host_name(config-bgp-af-v6)#
```

Example

Use the following command to enter the IPv6 BGP Address-Family configuration mode:

```
address-family ipv6
```

address-family vpnv4

Enters the IPv4 VPN Address Family configuraiton mode.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

address-family vpnv4

address-family vpnv4

Enters the BGP Address-Family IPv4 VPN mode to allow entry of VPN BGP parameters.

Usage Guidelines

Use this command to configure the VPNv4 address family configuration parameters for BGP router. This command is also used to switch the command mode to enter the BGP Address Family Configuration Mode.

Use of the **address-family vpnv4** command switches the command mode to BGP Address Family Configuration Mode; the CLI prompt changes to:

```
[context_name>]host_name(config-bgp-af-vpnv4)#
```

Example

Use the following command to enter the BGP Address-Family configuration mode for IPv4 VPN address parameters:

```
address-family vpnv4
```

address-family vpnv6

Enters the IPv6 VPN Address Family configuraiton mode.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

```
address-family vpnv6
```

address-family vpnv6

Enters the BGP Address-Family IPv6 VPN mode to allow entry of VPN BGP parameters.

Usage Guidelines

Use this command to configure the IPv6 VPN address family configuration parameters for BGP router. This command is also used to switch the command mode to enter the BGP Address Family Configuration Mode.

Use of the **address-family vpnv6** command switches the command mode to BGP Address Family Configuration Mode; the CLI prompt changes to:

```
[context_name>]host_name(config-bgp-af-vpnv6)#
```

Example

Use the following command to enter the BGP Address-Family configuration mode for IPv6 VPN address parameters:

```
address-family vpnv6
```

bgp

Defines the BGP-specific parameters regarding graceful restarts.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

bgp graceful-restart { restart-time *rest_time* **| stalepath-time** *stale_time* **| update-delay** *delay* **}**

graceful-restart restart-time *rest_time*

Specifies the maximum time (in seconds) required for neighbor(s) to gracefully restart. *rest_time* must be an integer from 1 through 3600.

graceful-restart stalepath-time *stale_time*

Specifies the maximum time (in seconds) to retain stale paths from restarting neighbor(s). *stale_time* must be an integer from 1 through 3600.

graceful-restart update-delay *rest_time*

Specifies the maximum time (in seconds) to defer initial route-selection. *update-delay* must be an integer from 1 through 3600.

Usage Guidelines

Use this command to set BGP-specific parameters regarding graceful restarts.

Example

Use the following command to retain stale paths from restarting neighbor(s) for *100* seconds:

```
bgp graceful-restart stalepath-time 100
```

description

Allows you to enter descriptive text for this configuration.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines

The description should provide useful information about this configuration.

distance

Defines the administrative distance for routes. The administrative distance is the default priority for a specific route or type route.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

```
distance { admin distance prefix prefix_addr [ route-access-list list_name ] |
bgp external ebgp_dist internal ibgp_dist local local_dist }
no distance { admin distance prefix prefix_addr [ route-access-list list_name ]
 | bgp [ external ebgp_dist internal ibgp_dist local local_dist ] }
```

no

Removes the specified administrative distance for the specific route.

distance admin *distance* prefix *prefix_addr* [route-access-list *list_name*]

Sets the administrative distance to a specified value for routes with a specific IP prefix. If you also specify a route access list, the IP prefix must match the rules of that access list.

admin *distance*: Specifies the administrative distance that you want to apply to the IP prefix. *distance* must be an integer from 1 through 254.

prefix *prefix_addr*: Specifies the IP prefix of routes that should have the admin distance applied. *prefix_addr* must be an IPv4 address in dotted-decimal notation and the number of subnet bits, representing the subnet mask in CIDR shorthand (for example, 209.165.200.225/24).

route-access-list *list_name*: Defines the name of a route access list that defines for which routes the administrative distance should be set.

distance bgp external ***ebgp_dist*** **internal** ***ibgp_dist*** **local** ***local_dist***

Sets the administrative distance for external (eBGP), internal (iBGP) and local routes.

external *ebgp_dist*: Sets the administrative distance for eBGP routes. *ebgp_dist* must be an integer from 1 through 254.

internal *ibgp_dist*: Sets the administrative distance for iBGP routes. *ibgp_dist* must be an integer from 1 through 254.

local *local_dist*: Sets the administrative distance for local routes. *local_dist* must be an integer from 1 through 254.

Usage Guidelines Use this command to set the administrative distance for specific routes to values that you specify. These values are only applied to the current router.

Example

Use the following command to set the administrative distance to *100* for all routes that have an IP prefix of *192.168.0.0* with a netmask of *16* and are specified in a remote access list named *racl1*:

```
distance admin 100 prefix 192.168.0.0/16 route-access-list rac11
```

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

enforce-first-as

Enforces the first Autonomous System (AS) for Exterior Border Gateway Protocol (eBGP) routes. An AS is a connected group of one or more Internet Protocol prefixes run by one or more network operators which has a single and clearly defined routing policy (RFC 1930).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description **`[ no ] enforce-first-as`**

no

Disables the enforcement of the first AS for Exterior Border Gateway Protocol (eBGP) routes.

enforce-first-as

Enables the enforcement of the first AS for Exterior Border Gateway Protocol (eBGP) routes.

Usage Guidelines Use this command to enforce the use of the first AS for EBGP routes.

Example

Use the following command to enable this functionality:

`enforce-first-as`

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **`exit`**

Usage Guidelines Use this command to return to the parent configuration mode.

ip vrf

Adds a preconfigured IP VRF context instance to the BGP ASN and configures the BGP attributes and related parameters to the VRF. This command also switches the command mode to BGP VRF Configuration mode.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

[no] ip vrf *vrf_name*

no

Removes an associated IP VRF from specified BGP AS number and other configured parameters.

vrf_name

Specifies the IP VRF context configured in the Context configuration mode and to be associated with a BGP AS number. *vrf_name* must be an alphanumeric string of 1 through 79 characters identifying an existing instance.

Usage Guidelines

Use this command to associate the specified IP VRF context instance to the BGP AS number and configures the BGP attributes and related parameters to the VRF. This command also switches the command mode to BGP VRF Configuration mode.

This command switches the command mode to BGP IP VRF Configuration Mode; the CLI prompt changes to:

```
[context_name>]host_name(config-bgp-vrf)#
```

Example

The following command associates the pre-defined VRF context instance *router_mpls* to this BGP AS number:

```
ip vrf router_mpls
```

maximum-paths

Enables forwarding packets over multiple paths and specifies the maximum number of external BGP (eBGP) or internal BGP (iBGP) paths between neighbors.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

maximum-paths { ebgp *max_num* **| ibgp** *max_num* **}**
[no] maximum-paths { ebgp | ibgp }

no

Disables forwarding packets over multiple eBGP or iBGP paths between neighbors.

ebgp ***max_num***

Enables forwarding packets over multiple eBGP paths between neighbors and specifies the maximum number of eBGP paths. *max_num* must be an integer from 1 through 10, or 1 through 32 (VPC-DI only), or 1 through 64 (VPC-DI only, Release 21.4+).

ibgp ***max_num***

Enables forwarding packets over multiple iBGP paths between neighbors and specifies the maximum number of iBGP paths. *max_num* must be an integer from 1 through 10, or 1 through 32 (*VPC-DI only*), or 1 through 64 (*VPC-DI only, Release 21.4+*).

Usage Guidelines

Use this command to enable or disable forwarding packets over multiple paths between neighbors and specify the maximum number of EBGP or IBGP paths.

Example

To enable forwarding packets over multiple paths and set the maximum number of EBGP paths to *10*, enter the following command:

```
maximum-paths ebgp 10
```

To disable forwarding packets over multiple EBGP paths, enter the following command:

```
no maximum-paths ebgp
```

neighbor

Configures BGP routers that interconnect to non-broadcast networks. Note that a remote AS number must be specified for a neighbor before other parameters can be configured.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

[no] neighbor *ip_address* **{ activate | advertisement-interval** *adv_time* **| capability graceful-restart | default-originate [route-map** *map_name* **] | distribute-list** *dist_list* **{ in | out } | ebgp-multihop [max-hop** *number* **] | encrypted password** *encrypted password* **| fall-over bfd [multihop] [associate] | filter-list** *filt_list* **{ in | out } | max-prefix** *max_num* **[threshold** *thresh_percent* **] [warning-only] | next-hop-self | password** *password* **| remote-as** *AS_num* **| remove-private-AS | restart-time** *rest_time* **| route-map** *map_name* **{ in | out } | send-community { both | extended | standard } | shutdown | srp-activated-soft-clear | timers { [connect-interval** *conn_time*

] | [keepalive-interval *keep_time* **holdtime-interval** *hold_time* **] } | update-source** *ip_address* **| weight** *value* **}**

no

Delete the specified parameter from the router configuration.

neighbor *ip_address*

Specifies the IP address of a BGP neighbor. *ip_address* must be in IPv4 dotted-decimal or IPv6 colon-separated-hexadecimal notation.

activate

Enable the exchange of routes with this neighbor.

advertisement-interval *adv_time*

The minimum interval (in seconds) between sending BGP routing updates. *adv_time* must be an integer from 0 through 600. Default: 30

Note The advertisement-interval must be explicitly configured for an address-family so that it can take effect for that address-family. By default it will be applicable only for the IPv4 address-family. Specify the address family via the **address-family** command. You can then set the neighbor advertisement-interval in the address family configuration mode.

capability graceful-restart

Configures BGP graceful restart attributes.

default-originate [route-map *map_name*]

Enables the origination of default routes to this neighbor

route-map *map_name*: Specifies the route-map that contains the criteria to originate default routes. *map_name* must be the name of an existing route-map in the current context.

distribute-list *dist_list* { in | out }

Filters updates to and from this neighbor based on a route access list. *dist_list*: The name or number of an existing route-access-list. Default: No filtering is performed.

in: Indicates that incoming advertised routes should be filtered.

out: Indicates that outgoing advertised routes should be filtered.

ebgp-multihop [max-hop *number*]

Allows EBGP neighbors that are not on directly connected networks.

[max-hop] *number*: Specifies the maximum number of hops allowed to reach a neighbor. *number* must be an integer from 1 through 255. Default hop count: 255

encrypted password *encrypted password*

Specifies an encrypted password that is used only inside configuration files. This should be an alphanumeric string of 1 through 523 characters.

fall-over bfd [multihop] [associate]

Enables Bidirectional Fowarding Detection (BFD) multihop support for fallover.

This command adds or modifies a session in BFD for the BGP peer. If there is an existing session in BFD (same source-address/destination address), BGP or OSPF protocol will be added to the list of clients for the BFD session. BGP or OSPF will then be notified when there is a change in the BFD session state.

If there is no such BFD session, a new session is added in BFD. For MH-BFD, the session inherits the parameters including min-tx, min-rx, multiplier and authentication from the multihop-peer configuration in BFD by matching the destination address. If the parameters (interval) are not configured in BFD, then the BFD session will be in Admin-down state.

BGP adds a session in BFD only when the BGP peer is Established state. If there is a state transition in bgp where the peer is no longer in established state, then the bfd session is deleted. It will be added again, once the peer comes back to Established state.

When used, the **associate** keyword associates BGP and BFD neighbors. BGP peers come up only when the BFD session is up.

filter-list *filt_list* { in | out }

Establishes BGP filters based on an AS path access list. **filt_list** is the name of an existing AS path access list.

in: Indicates that incoming advertised routes will be filtered.

out: Indicates that outgoing advertised routes will be filtered.

max-prefix *max_num* [threshold *thresh_percent*] [warning-only]

The maximum number of prefixes accepted from this peer. When the maximum is exceeded the neighbor connection is reset.

Default: No maximum prefix limit.

max_num: Specifies the maximum number of prefixes permitted. This must be an integer from 1 through 4294967295.

[threshold *thresh_percent* **]**: Specifies a percentage value of when the BGP table is full. When this value is reached, peer warnings are sent to the neighbor and the neighbor connection is reset. *thresh_percent* must be an integer from 1 through 100.

[warning-only]: Specifies that only a warning message is sent when the limit is exceeded. The neighbor connection is not reset

next-hop-self

Disables the next hop calculation for this neighbor.

password *password*

Specifies a password that is only used inside configuration files. This should be an alphanumeric string of 1 through 24 characters.

remote-as *AS_num*

Specify the AS number of the BGP neighbor.

AS_num: Specifies the neighbor's AS number as an integer from 1 through 65535.

remove-private-AS

Removes the private AS number from outbound updates. Default: Do not remove the private AS number.

restart-time *rest_time*

Specifies the maximum time (in seconds) required for a neighbor to restart. *rest_time* must be an integer between 1 and 3600.

route-map *map_name* { in | out }

Applies a route map to the neighbor. *map_name*i s the name of an existing route-map in the current context.

in: Indicates that the route map applies to incoming advertisements.

out: Indicates that the route map applies to outgoing advertisements.

send-community { both | extended | standard }

Sends the community attributes to a peer router (neighbor).

both: Sends extended and standard community attributes.

extended: Sends extended community attributes.

standard: Sends standard community attributes.

shutdown

Administratively shuts down this neighbor. This disables exchanging routes or configuring parameters for this neighbor.

srp-activated-soft-clear

Enables BGP updates when Service Redundancy Protocol SRP-enabled resources are modified.

timers { [connect-interval *conn_time*] | [keepalive-interval *keep_time* holdtime-interval *hold_time*] }

Specifies BGP timers for this neighbor.

connect-interval *conn_time*: Specifies the connect timer in seconds. *conn_time* must be an integer from 0 through 65535. The default is 60 seconds.

keepalive-interval *keep_time*: The frequency (in seconds) at which the current BGP router sends keepalive messages to its neighbor. *keep_time* must be an integer from 0 through 65535. The default is 30 seconds.

Holdtime-interval *hold_time*: The interval (in seconds) the router waits for a keepalive message before declaring a neighbor dead. *hold_time* must be an integer from 0 through 65535. The default is 90 seconds.

update-source *ip_address*

Binds the specified IP address to the BGP socket that is used to communicate to the peer. *ip_address* is an IPv4 address in dotted-decimal notation.

In most cases you should set the update-source address to the address of the loopback interface in the current context. By doing this, the TCP connection does not go down until there is no route for the loopback address in the peering router.

weight *value*

Sets the default weight for routes from this neighbor. *value* must be an integer from 0 through 65535. Default: 0

Usage Guidelines

Use this command to set parameters for communication with a specified neighbor. The chassis supports a maximum of 64 peers per context.

Example

The following command specifies that the neighbor at the IP address *192.168.100.25* has an AS number of *2000*:

```
neighbor 192.168.100.25 remote-as 2000
```

The following command allows BGP neighbors that are a maximum of *27* hops away:

```
neighbor 192.168.100.25 ebgp-multihop max-hop 27
```

The following command sets the minimum interval between sending routing updates to 3 minutes (180 seconds):

```
neighbor 192.168.100.25 advertisement-interval 180
```

The following command sets the default weight for all routes from the specified neighbor to *100*:

```
neighbor 192.168.100.25 weight 100
```

network

Specifies a network to announce via BGP.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description **[no] network** *ip_address*/*mask* **[route-map** *map_name* **]**

no

Delete the specified network from the configuration for the BGP router.

ip_address*/*mask

Specifies the IP address and netmask bits for the network to announce via BGP. *ip_address* is a network IPv4 address in dotted-decimal notation and *mask* is the number of subnet bits, representing a subnet mask in CIDR shorthand. These must be entered in the dotted-decimal notation/subnet bits format (for example, 209.165.200.234/24).

[route-map *map_name*]

Filter routes through the specified route map before announcing the network. *map_name* is the name of the route-map to use specified as an alphanumeric string of 1 through 79 characters.

Usage Guidelines Use this command to specify a network to announce via BGP.

Example

The following command announces the network *192.168.0.0* with a netmask of *16* via BGP:

```
network 192.168.0.0/16
```

The following command removes the network from the BGP router configuration:

```
no network 192.168.0.0/16
```

redistribute

Redistributes routes via BGP from another protocol to BGP neighbors.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description **[no] redistribute { connected | ospf | rip | static } [route-map** *map_name* **]**

no

Remove the specified redistribution parameters from the BGP router configuration.

redistribute connected

Specifies that connected routes will be redistributed.

redistribute ospf

Specifies that Open Shortest Path First (OSPF) routes will be redistributed

redistribute rip

Specifies that Routing Information Protocol (RIP) routes will be redistributed. (RIP is not supported at this time.)

redistribute static

Specifies that static routes will be redistributed.

[route-map *map_name*]

Filter routes through the specified route map before redistribution. map_name specifies the name of the route-map to use and must be specified as an alphanumeric string of 1 through 79 characters.

Usage Guidelines

Use this command to specify what routes this BGP router should redistribute into BGP.

Example

The following command redistributes OSPF routes after filtering them through the route map named *Map1*:

```
redistribute ospf route-map Map1
```

The following command removes the redistribution of OSPF routes from the router's configuration:

```
no redistribute ospf route-map map1
```

router-id

Overrides the configured router identifier and causes BGP peers to reset.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > context *context_name* **> router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

```
router-id ip_address
no router-id [ ip_address ]
```

no

Remove the specified router ID from the router's configuration and use the default router ID.

router-id *ip_address*

Specifies the IP address to use as the BGP router ID as an IPv4 address in dotted-decimal notation.

Usage Guidelines Use this command to configure a specific router ID that overrides the default.

Example

The following command sets the router ID to *192.168.100.25*:

```
router-id 192.168.100.25
```

scan-time

Configures the BGP background scanner interval. BGP monitors the next hop of the installed routes to verify next-hop reachability and to select, install, and validate the BGP best path. By default, the BGP scanner polls the Routing Information Base (RIB) for this information every 60 seconds. During the 60-second time period between scan cycles, Interior Gateway Protocol (IGP) instabilities or other network failures can cause temporarily black holes and routing loops.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description **[no] scan-time** *time*

no

Remove the user specified scan time from the router's configuration. The scan time is reset to the default value.

scan-time *time*

Specifies the amount of time (in seconds) to wait between background scans to determine next-hop validity. *time* must be an integer from 5 through 60. Default: 60

Usage Guidelines Use this command to set the background scanner interval for the BGP router.

Example

The following command sets the background scanner interval to *30* seconds:

```
scan-time 30
```

timers

Configures BGP routing timers.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration

configure > **context** *context_name* > **router bgp** *as_number*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp)#
```

Syntax Description

timers bgp keepalive-interval *interval* **holdtime-interval** *time* **[min-peer-holdtime-interval** *time* **]**

no

Remove the user specified timer values from the router's configuration. The timer values are reset to the default values.

timers bgp keepalive-interval *interval* holdtime-interval *time*

keepalive-interval *interval*: Specifies the interval (in seconds) to wait between sending keepalive packets as an integer from 0 through 65535. Default: 30

holdtime-interval *time*: Specifies the interval (in seconds) after which the neighbor is considered dead if keepalive messages are not received as an integer from 0 through 65535.

[min-peer-holdtime-interval *time*]

Specifies the interval (in seconds) that is the minimum acceptable hold time from a neighbor as an integer from 0 through 65535. The default is 0 so that there is no restriction on the hold time received in an OPEN message from the peer.

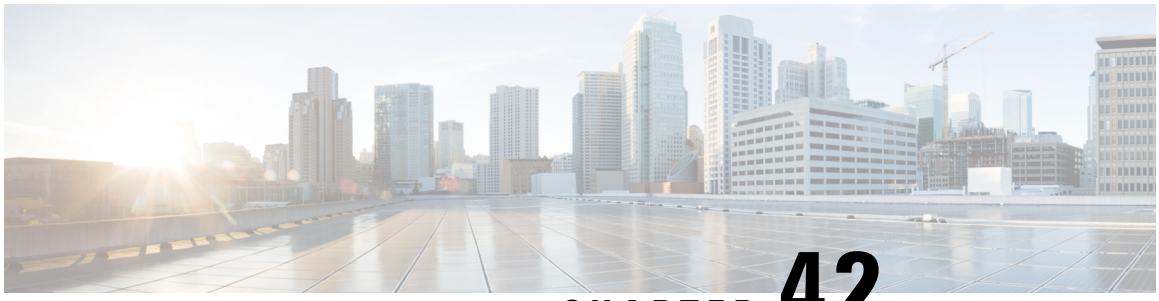
Usage Guidelines

Use this command to configure the how long to wait between sending keepalive packets and how long to wait for a keepalive before considering a a neighbor dead.

Example

The following command sets the keepalive interval to 2 minutes (120 seconds) and the holdtime interval to 3 minutes (180 seconds):

```
timers bgp keepalive-interval 120 holdtime-interval 180
min-peer-holdtime-interval 0
```



CHAPTER 42

BGP IP VRF Configuration Mode Commands

The Border Gateway Protocol (BGP) IP VRF (Virtual Routing and Forwarding) Configuration Mode is used to configure properties for BGP-4 routing.

Important The VRF must have been preconfigured using the **ip vrf** command in the Context Configuration mode before you can enter this configuration mode.

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP-IP VRF Configuration

configure > context *context_name* **> router bgp** *as_number* **> ip vrf** *vrf_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-bgp-vrf)#`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1367
- exit, on page 1368
- route-distinguisher, on page 1368
- route-target , on page 1369

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

route-distinguisher

Assigns a route distinguisher (RD) for the VRF that helps identify a virtual routing domain in a provider's network and allows for overlapping IP space. The route distinguisher must be a unique value on the router for each VRF.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BGP Configuration > BGP-IP VRF Configuration

configure > **context** *context_name* > **router bgp** *as_number* > **ip vrf** *vrf_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-vrf)#
```

Syntax Description

```
route-distinguisher { as_number | ip_address } rd_identifier
```

route-distinguisher *as_number rd_value*

Identifies the target VRF by an autonomous system (AS) number. *ASN value* is a 16-bit ASN expressed as an integer from 0 through 65535.

route-distinguisher *ip_address rd_value*

Identifies the target VRF by its IP address. *ip_address* is entered using IPv4 dotted-decimal notation.

rd_identifier

rd_identifier is a unique route distinguisher identifier and must be an integer from 0 through 4294967295.

Usage Guidelines Use this command to assign a router distinguisher (RD) for the IP VRF. The combination of AS number or IP address and RD value must be unique for every VRF configured. The RD is added to the beginning of the pool addresses to change them into globally unique VPN-IPv4 prefixes.

If the RD is not configured for a VRF, user cannot enter into the BGP Address-Family mode for that VRF to configure the neighbors or other related BGP commands.

An RD assigned to a VRF cannot be changed until the existing VRF is deleted or removed and reconfigured.

Example

The following command assigns a router distinguisher *12345* to VRF with AS number *300*:

```
route-distingusher 300 12345
```

The following command assigns a router distinguisher *12345* to VRF with IP address *10.5.3.4*:

```
route-distingusher 10.5.3.4 12345
```

route-target

Adds an export and/or import list of extended route target communities to the VRF. BGP uses an extended-community attribute, the route target, to filter appropriate VPN routes into the correct VRFs. You configure the export list on the VRF to specify export route targets. When BGP advertises a route from this VRF's forwarding table, it associates the list of export route targets with the route and includes this attribute in the update message that advertises the route. You also configure a route-target import list on each VRF to specify import route targets.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BGP Configuration > BGP-IP VRF Configuration

configure > context *context_name* **> router bgp** *as_number* **> ip vrf** *vrf_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bgp-vrf)#
```

Syntax Description

route-target { both | import | export } { *as_value* **|** *ip_address* **}** *rt_value*

route-target both

Creates a list of import and export route targets for the VRF with the same parameters. The list contains an AS number or IP address along with a route target (RT) value.

route-target import

Creates a list of import RTs for the VRF with the same parameters. The list contains an AS number or IP address along with an RT value.

route-target export

Creates a list of export RTs for the VRF with the same parameters. The list contains an AS number or IP address along with an RT value.

as_value

Specifies a 16-bit autonomous-system (AS) number expressed as an integer from 0 through 65535.

ip_address

Specifies an IP address in IPv4 dotted-decimal notation.

rt_value

Specifies a unique RT identifier as an integer from 0 through 4294967295.

Usage Guidelines

Use this command to create the list of export and/or import route target extended communities for VRF.

A maximum of 5 route targets can be defined with this command up to release 9.0.

A maximum of 10 route targets can be defined with this command from release 10.0 onward.

Important This command must be executed for each route target extended community.

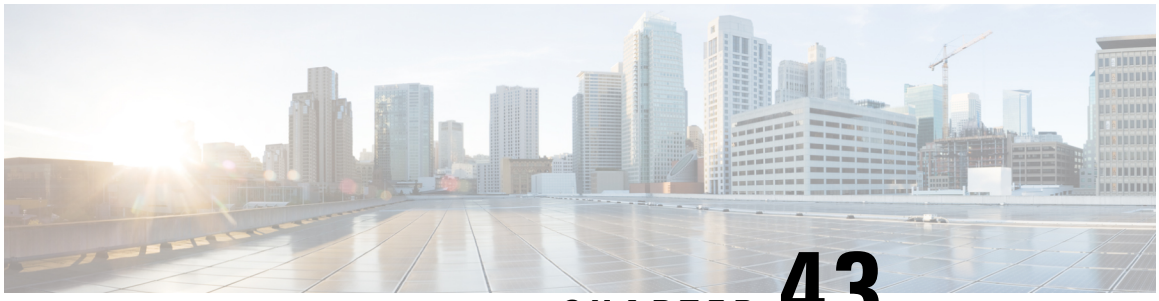
Example

The following command creates an export list of route target extended community *12345* for VRF with AS number *300*:

```
route-target export 300 12345
```

The following command creates an export list of route target extended community *12345* for VRF with IP address *192.168.1.2*:

```
route-target export 192.168.1.2 12345
```



CHAPTER 43

BMSC Profile Configuration Mode Commands

Command Modes

The BMSC Profile Configuration Mode is used to configure Broadcast Multicast Service Center profiles for Multimedia Broadcast Multicast Service (MBMS) applications. The mode is accessed by entering the **bmsc-profile** command from the Context Configuration Mode.

Exec > Global Configuration > Context Configuration > BMSC Profile Configuration

configure > context *context_name* **> bmsc-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bmsc-profile)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1371
- exit, on page 1372
- gmb diameter dictionary, on page 1372
- gmb diameter endpoint, on page 1373
- gmb diameter peer-select, on page 1374
- gmb user-data, on page 1375

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

gmb diameter dictionary

This command specifies the Diameter dictionary for the Gmb interface in the BMSC profile of an MBMS user service.

Product GGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BMSC Profile Configuration

configure > context *context_name* **> bmsc-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bmsc-profile)#
```

Syntax Description

```
gmb diameter dictionary { custom1 | custom10 | custom2 | custom3 | custom4
 | custom5 | custom6 | custom7 | custom8 | custom9 | standard }
default gmb diameter dictionary
```

custom1 ... custom10

Custom-defined Diameter dictionary. Specific to customer requirement.

standard

Default: Enabled

Specifies the standard Gmb Diameter dictionary conforming to 3GPP TS 29.061 (Rel. 7).

default

Sets the Diameter dictionary to standard.

Usage Guidelines Use this command to select the Gmb Diameter dictionary in BM-SC profile of MBMS user service.

Example

The following command sets the Gmb Diameter dictionary to TS 29.061 (Rel. 7) specific:

```
gmb diameter dictionary standard
```

gmb diameter endpoint

This command specifies the Diameter endpoint name for the Gmb interface in the BMSC profile of an MBMS user service.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BMSC Profile Configuration

configure > context *context_name* **> bmsc-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bmsc-profile)#
```

Syntax Description

gmb diameter endpoint *endpoint_name*
no gmb diameter endpoint

no

Removes the previously configured Diameter endpoint name for the Gmb interface in the BMSC profile of an MBMS user service.

endpoint_name

Specifies the Diameter endpoint name for Gmb interface. This must be present in all Diameter messages and is the endpoint that originates the Diameter message.

endpoint_name must be an alphanumeric string of 1 through 63 characters.

Usage Guidelines

Use this command to create a Gmb Diameter endpoint for a BMSC profile.

Example

The following command creates a Diameter endpoint named *test1* in the BMSC profile of an MBMS user service:

```
gmb diameter endpoint test1
```

gmb diameter peer-select

This command specifies the peer ids of BM-C Diameter primary and secondary host in the BMSC profile for an MBMS user service.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > BMSC Profile Configuration

configure > context *context_name* **> bmsc-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bmsc-profile)#
```

Syntax Description

gmb diameter peer-select peer *peer_name* **[realm** *realm_name* **] [secondary-peer** *sec_peer_name* **[realm** *sec_realm_name* **]]**
gmb diameter peer-select

no

Removes the previously configured BM-C Diameter peer ids configured in the BMSC profile of an MBMS user service.

peer *peer_name*

Specifies the primary diameter host id for BMSC in this BMSC profile for MBMS user service. This is a unique name that is specified for the primary peer.

peer_name must be an alphanumeric string of 1 through 127 characters including punctuation marks.

realm *realm_name*

Specifies the realm or domain for the Gmb Diameter peer. The realm may typically be a company or service name.

realm_name must be an alphanumeric string of 1 to 127 characters including punctuation marks.

secondary-peer *sec_peer_name*

Specifies a back-up host that is used for fail-over processing. When the route-table does not find an AVAILABLE route, the secondary host performs fail-over processing.

sec_peer_name must be an alphanumeric string of 1 through 127 characters including punctuation marks.

realm *sec_realm_name*

Specifies the realm or domain for the Gmb Diameter secondary host. The realm may typically be a company or service name.

sec_realm_name must be an alphanumeric string of 1 through 127 characters including punctuation marks.

Usage Guidelines Use this command to select a BMSC Diameter peer and realm in this BMSC profile for MBMS user service.

Example

The following command selects a Gmb Diameter peer named *test1* and a realm of *companyx*:

```
gmb diameter peer-select peer test1 realm companyx
```

gmb user-data

This command configures the parameters in this BMSC profile for user data for MBMS user service.

Product GGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Context Configuration > BMSC Profile Configuration

configure > context *context_name* **> bmsc-profile** *profile_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-bmsc-profile)#
```

Syntax Description

```
gmb user-data { mode-preference { multicast | unicast } |
unicast-self-address self_ip_address }
default gmb user-data mode-preference
no gmb user-data unicast-self-address
```

no

Removes the configured self address of GGSN for unicast in the BMSC profile for user data of MBMS user service.

defualt

Sets the user data mode to unicast in the BMSC profile for user data of MBMS user service.

mode-preference { multicast | unicast }

Default: unicast

Specifies the preferred mode of GGSN for receiving MBMS user service data.

multicast: specifies the preferred mode as multicast for MBMS user service.

Important Note that this **multicast** keyword is not supported in this release.

unicast: specifies the preferred mode as unicast for MBMS user service.

unicast-self-address *self_ip_address*

Specifies the GGSN's IP address for BMSC to use as the outer destination address for the IP-in-IP tunnel to send multicast data, if the configured preferred data mode is unicast.

self_ip_address must be the IPv4 address in dotted-decimal notation.

This command must be configured if GGSN's user-data mode-preference is Unicast.

Usage Guidelines

Use this command to configure user data mode and other parameters in the BMSC profile for user data of MBMS user service.

GGSN can receive multicast data from BMSC in one of two modes - Multicast or Unicast. In Unicast mode, BM-SC tunnels the multicast data to the GGSN in an IP-in-IP tunnel instead of direct multicast. This command with the **mode-preference** keyword configures the GGSN's preferred mode for receiving multicast data.

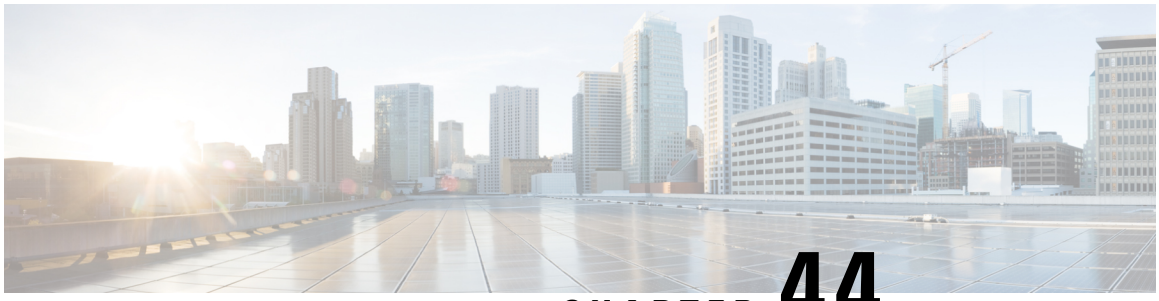
Important Both GGSN and BMSC must support the Unicast mode of multicast data transfer. If any GGSN or BMSC does not support Multicast mode, BMSC will transfer multicast data using Unicast mode only.

Use the **unicast-self-address** keyword to configure the GGSN's IP address which the BMSC should use as the outer destination address for the IP-in-IP tunnel to send multicast data, if the selected user data mode to receive multicast data is Unicast.

Example

The following command sets the MBMS data transfer mode to unicast:

```
default gmb user-data mode-preference
```



CHAPTER 44

BSSGP Cause Code Group Configuration Mode

Commands in this mode enable the operator to define multiple cause codes for the 2G service.

Command Modes

Exec > Global Configuration > LTE Policy Configuration > BSSGP Cause Code Configuration

configure > lte-policy > cause-code-group *group_name* **protocol bssgp**

Entering the above command sequence results in the following prompt:

`[local] host_name(bssgp-cause-code)`

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

- end, on page 1377
- exit, on page 1377
- radio-cause, on page 1378

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **end**

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description **exit**

Usage Guidelines Use this command to return to the parent configuration mode.

radio-cause

Enables the operator to specify one or more cause codes for the 2G service.

Product SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > LTE Policy Configuration > BSSGP Cause Code Configuration

configure > lte-policy > cause-code-group *group_name* **protocol bssgp**

Entering the above command sequence results in the following prompt:

```
[local]host_name(bssgp-cause-code)#
```

Syntax Description **radio-cause** *cause_code*
no radio-cause *cause_code*

no

When included with the command, the specified cause code is deleted from the group. If all cause codes are deleted from the group then the group is automatically deleted.

cause_code

Enter an integer from 0 to 255 to identify a BSSGP protocol radio cause code, as defined in the *Radio Cause* section of the 3GPP TS 48.028 specification.

Important The SGSN does not support Enhanced Radio Status functionality; therefore, the SGSN treats cause code values 0x03 and 0x04 as "Radio contact lost with MS". Therefore, the valid configurable cause codes values are 0, 1, and 2.

Usage Guidelines The command can be repeated to define up to 16 BSSGP cause codes. This means that that under each cause code group the maximum number of cause codes (ranap+bssgp+s1ap) that can be supported is 16.

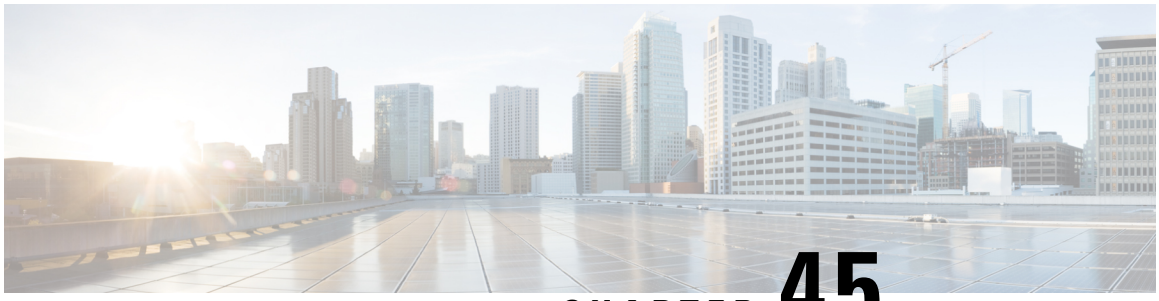
Benefit of specifying the cause codes in a group :

- **if** the BSSGP radio cause code configured by the operator matches with the radio cause received in the Radio Status message, and
- **if** the Subscriber Overcharging Protection feature is enabled for 2G service in the GPRS-Service configuration,
- **then** the S4-SGSN includes ARRL (Abnormal Release of Radio Link) bit in Release Access Bearer Request message Initiated on Ready-to-Standby state transition.

Example

Repeat the command with different cause values to create a group:

```
radio-cause 1
radio-cause 3
```



CHAPTER 45

Bulk Statistics Configuration Mode Commands

Refer to the *Common Syntax Options* section in this chapter for information about formatting the output of bulk statistics.

Important Unless otherwise indicated, all statistics are counters. For statistics with the Int32 data type, the roll-over to zero limit is 4,294,967,295. For statistics with the Int64 data type, the roll-over to zero limit is 18,446,744,073,709,551,615.

Command Modes

The Bulk Statistics Configuration Mode is used to manage the options for the collection, formatting and delivery of system statistics to remote nodes.

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

Important In release 20.0 and higher Trusted StarOS builds, FTP is not supported. SFTP is the recommended file transfer protocol. For additional information, refer to the *System Administration Guide*.

- Overview, on page 1384
- aal2 schema, on page 1385
- alcap schema, on page 1386
- apn schema, on page 1387
- asngw schema, on page 1389
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Overview

Schema Format String Syntax

The following defines common syntax block options. These options appear in similar commands and are detailed here for easy reference.

The schema format string is used to define the structure of generated bulk statistics data. The string may contain static text, dynamic content, and bulk statistic variables, or any combination.

Static text includes any ASCII characters that are of a fixed value. Static text may also include control characters by using Escape character sequences. Supported Escape character shortcuts are "\n" for new line and "\t" for tab.

Enclosing an alphanumeric string within double quotation marks (") allows you to include spaces in the string.

Variables within the format string must be enclosed within "% and %", for example, "%var%". The actual variables supported are command-dependent and are described in the *Statistics and Counters Reference* (prior to Release 20.0) and in the *Statistics and Counters* spreadsheet (Release 20.0 and higher).

Schema Format String Length

The maximum length for a schema format specified via the CLI command cannot be more than 3599 characters long. However, the format should be broken into multiple lines using backslash such that each line is less than 1024 characters in length. The syntax is shown below.

<*schema_type*> **schema** <*schema_name*> **format** <*schema_format*>

Where:

- <*schema_name*> can be a maximum of 31 alphanumeric characters.
- <*schema_format*> can be a maximum of 3599 characters, including spaces within double quotation marks (" ").

Bulk Statistic Variables

For a list of the statistical variables (%var%) available for use in creating a schema format for each schema type:

- Run the Exec mode **show bulkstats variables** *schema_type* command.
- See the *Statistics and Counters Overview* chapter of the *Statistics and Counters Reference* (StarOS releases prior to 20.0) or the *Statistics and Counters Reference* spreadsheet (release 20.0 and higher) .

aal2 schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the ATM adaptation layer 2 (AAL2) bulk statistics schema within an ATM virtual connection by the HNB-GW.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

aal2 schema *schema_name* **[active-only] format** *schema_format*
no aal2 schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for ATM adaptation layer 2 (AAL2) bulk statistics collection. Multiple AAL2 schemas can be created to further categorize HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple AAL2 schemas, re-issue the **aal2 schema** *schema_name* command using a different schema name.

You can also use this command to restrict the AAL2 schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *aal2stats1* that records the number of AAL2 uplink packets transmitted and AAL2 downlink packets received by Access Link Control Application Part (ALCAP) service on HNB-GW:

```
aal2 schema aal2stats1 format "%uplink-pkts-tx%" "%downlink-pkts-rx%"
```

alcap schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Access Link Control Application Part (ALCAP) bulk statistics schema for an ALCAP service on an HNB-GW node.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
alcap schema schema_name [ active-only ] format schema_format
no alcap schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Access Link Control Application Part (ALCAP) service bulk statistics collection on HNB-GW node. Multiple ALCAP schemas can be created to further categorize at AAL2 channel-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple ALCAP schemas, re-issue the **alcap schema** *schema_name* command using a different schema name.

You can also use this command to restrict the ALCAP schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *alcap1stats1* that records the number of AAL2 channels in connecting and connected state on ALCAP service:

```
alcap schema alcaplstats1 format "%num-aal2-channels-in-connecting%"
"%num-aal2-channels-in-connected-state%"
```

apn schema

Configures the Access Point Name (APN) bulk statistics schema.

Product

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

apn schema *schema_name* **[active-only] format** *schema_format*
no apn schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for APN bulk statistics collection. Multiple APN schemas can be created to further categorize APN-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple APN schemas, re-issue the **apn schema** *schema_name* command using a different schema name.

You can also use this command to restrict the APN schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *apn1stats1* that records the number of sessions currently facilitated by the APN:

```
apn schema apn1stats1 format "%sess-curr%"
```

asngw schema

Configures Access Service Gateway (ASN-GW) bulk statistics schema.

Product

ASN-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

asngw schema *schema_name* **[active-only] format** *schema_format*
no asngw schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for ASN-GW bulk statistics collection. Multiple ASN-GW service schemas can be created to further categorize ASN-GW service bulk statistics. All of the schemas are processed at each collection interval. To create multiple ASN-GW service schemas, re-issue the **asngw schema** *schema_name* command using a different schema name.

You can also use this command to restrict the ASN-GW schema statistics to those gathered on the Active ICSR chassis.

Example

To create an ASN-GW schema named *asngw_statistics* that specifies a schema format of:

- VPN context name: *vpnname*
- VPN Context Identifier: *vpnid*
- ASN-GW Service name: *servname*
- ASN-GW Service identifier: *servid*
- Peer IP address: *peeripaddr*

Use the following command:

```
asngw schema asngw_statistics format "VPN name: %vpnname%\nVPN ID:
%vpnid%\nASN-GW Service Name: %servname%\nASN-GW Service Identifier:
%servid%\nPeer IP Address: %peeripaddr%"
```

bcmcs schema

Configures Broadcast and Multicast Service (BCMCS) bulk statistics schema.

Product

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

bcmcs schema *schema_name* **[active-only] format** *schema_format*
no bcmcs schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for BCMCS bulk statistics collection. Multiple BCMCS schemas can be created to further categorize BCMCS-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple BCMCS schemas, re-issue the **bcmcs schema** *schema_name* command using a different schema name.

You can also use this command to restrict the BCMCS schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *bcmcs1stats1* that records the number of sessions currently facilitated by BCMCS:

```
bcmcs schema bcmcs1stats1 format "%sess-curr%"
```

card schema

Configures card bulk statistics schema. These are statistics for circuit cards installed in the ASR 5500 chassis.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
card schema schema_name [ active-only ] format schema_format
no card schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for card bulk statistics collection. Multiple card schemas can be created to categorize card-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple card schemas, re-issue the **card schema** *schema_name* command using a different schema name.

You can also use this command to restrict the card schema statistics to those gathered on the Active ICSR chassis.

Important Not supported on all platforms

Example

The following command creates a schema named *card1stats1* that records the number of processes for all installed cards:

```
card schema card1stats1 format "%slot%-%numproc%"
```

To create a card-level schema named *cardresourcestats* that specifies a schema format of:

- Chassis slot number: *slot*
- Available Memory: *memtotal* Memory Used (%): *memused*
- Available CPU (%): *cpuidle*

Use the following command:

```
card schema cardresourcestats format "Chassis slot number:
%slot%\nAvailable Memory: %memtotal%\tMemory Used (%): %memused%\nAvailable
 CPU (%): %cpuidle%"
```

closedrp schema

Configures Closed R-P bulk statistics schema.

Product

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

closedrp schema *schema_name* **[active-only] format** *schema_format*
no closedrp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for Closed R-P statistics collection. Multiple Closed R-P schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **closedrp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the Closed R-P schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *closedrp1stats1* that records the number of active subscriber sessions and the number of sessions that failed or were disconnected due to the maximum tunnel limit being reached:

```
schema closedrp1stats1 format "%sess-curactive%-%sess-maxtunnel%"
```

To create a schema named *closedrpresourcestats* that specifies a schema format of:

- Number of Successful Session Connections: *sess-successful*
- Number of Session Attempts That Failed: *sess-failed*
- Number of Sessions Currently Active: *sess-curative*

Use the following command:

```
closedrp schema closedrpresourcestats format "Number of Successful Session
 Connections: %sess-successful%\nNumber of Session Attempts That Failed:
 %sess-failed%\nNumber of Sessions Currently Active: %sess-curative%"
```

context schema

Configures context bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

context schema *schema_name* **[active-only] format** *schema_format*
no context schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For the complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Context bulk statistics collection. Multiple context schemas can be created to categorize context statistics. All of the schemas are processed at each collection interval. To create multiple context schemas, re-issue the **context schema** *schema_name* command using a different schema name.

You can also use this command to restrict the Context schema statistics to those gathered on the Active ICSR chassis.

Example

To create a Firewall context schema named *sfw_context_stats1* that specifies a schema format of:

- Total packets received by firewall: *sfw-total-rxpackets*
- Total packets sent by firewall: *sfw-total-txpackets*
- Total ICMP packets discarded by firewall: *fw-icmp-discardpackets*

Use the following command:

```
context schema sfw_context_stats1 format "Packets received Rx:
%sfw-total-rxpackets%\nPackets Sent Tx:: %sfw-total-txpackets%\nICMP
Packets discarded: %fw-icmp-discardpackets%"
```

cs-network-ranap schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Radio Access Network Application Part (RANAP) bulk statistics schema in a Circuit Switched (CS) network associated with an HNB-GW node.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

cs-network-ranap schema *schema_name* **[active-only] format** *schema_format*
no cs-network-ranap schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for RANAP procedure related bulk statistics collection in a CS network associated with HNB-GW in a Femto UMTS network. Multiple CS Networks RANAP schemas can be created to further categorize at CS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple CS Networks RANAP schemas, re-issue the **cs-network-ranap schema** *schema_name* command using a different schema name.

You can also use this command to restrict the RANAP schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *cs_ranap1stats1* that records the total number of Iu Release Request messages transmitted and total number of Iu Release Command message received by the HNB-GW node:

```
cs-network-ranap schema cs_ranaplstats1 format "%iu-rel-req-tx%"
"%iu-rel-cmd-rx%"
```

cs-network-rtp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Real-Time Transport Protocol (RTP) bulk statistics schema in a Circuit Switched (CS) network associated with an HNB-GW node.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

cs-network-rtp schema *schema_name* **[active-only] format** *schema_format*
no cs-network-rtp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for RTP procedure related bulk statistics collection in a CS network associated with HNB-GW in a Femto UMTS network. Multiple CS Networks RTP schemas can be created to further categorize at CS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple CS Networks RTP schemas, re-issue the **cs-network-rtp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the RTP schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *cs_rtp1stats1* that records the total number of RTP Downlink Packets received and RTP Uplink Packets transmitted by HNB-GW node in an associated CS network:

```
cs-network-rtp schema cs_rtplstats1 format "%rtp-uplink-pkts-tx%"
"%rtp-downlink-pkts-rx%"
```

cs-network-sccp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Signalling Connection Control Part (SCCP) bulk statistics schema in a Circuit Switched (CS) network associated with an HNB-GW node.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

cs-network-sccp schema *schema_name* **[active-only] format** *schema_format*
no cs-network-sccp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SCCP connection related bulk statistics collection in a CS network associated with HNB-GW in a Femto UMTS network. Multiple CS Networks SCCP schemas can be created to further categorize at CS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple CS Networks SCCP schemas, re-issue the **cs-network-sccp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the SCCP schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *cs_sccp1stats1* that records the total number of SCCP connection requests received by HNB-GW and responses sent to CN node in an associated CS network:

```
cs-network-sccp schema cs_sccplstats1 format "%sccp-conn-req-rx%"
"%sccp-conn-req-tx%"
```

dcca schema

Configures Diameter Credit Control Application (DCCA) bulk statistics schema. This command is available only in StarOS 9.0 and later releases.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

dcca schema *schema_name* **[active-only] format** *schema_format*
no dcca schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for DCCA bulk statistics collection.

You can also use this command to restrict the DCCA schema statistics to those gathered on the Active ICSR chassis.

dcca-group schema

This command configures Diameter Credit Control Application (DCCA) group bulk statistics schema.

Please note that the DCCA-group related bulk statistics are copied from the "system" schema to this schema "dcca-group".

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

dcca-group schema *schema_name* **[active-only] format** *schema_format*
no dcca-group schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for DCCA group bulk statistics collection.

You can also use this command to restrict the DCCA group schema statistics to those gathered on the Active ICSR chassis.

default

Restores the system default for the option specified.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

default { limit | receiver mode | remotefile format | sample-interval | transfer-interval }

limit

Restores the memory utilization limit system default: 1000 kilobytes.

receiver mode

Restores the behavior for sending files to the receivers to the default value.

Default: secondary-on-failure

remotefile format

Restores the format of remote bulkstats file names to the default value.

Default: "%date%-%time%"

sample-interval

Restores the system default for the local polling interval for statistic sampling.

Default: 15 minutes

transfer-interval

Restores the system default for the time between transfer of data files to receivers.

Default: 480 minutes

Usage Guidelines

Restore the default values when troubleshooting the system. Setting values to the system defaults places them in well known states as starting points for monitoring for problems.

Example

```
default limit
default transfer-interval
```

diameter-acct schema

Configures Diameter Accounting bulk statistics schema. This command is available only in StarOS 11.0 and later releases.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

diameter-acct schema *schema_name* **[active-only] format** *schema_format*
no diameter-acct schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Diameter Accounting bulk statistics collection.

You can also use this command to restrict the Diameter Accounting schema statistics to those gathered on the Active ICSR chassis.

diameter-auth schema

Configures Diameter Authentication bulk statistics schema. This command is available only in StarOS 11.0 and later releases.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

diameter-auth schema *schema_name* **[active-only] format** *schema_format*
no diameter-auth schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Diameter Authentication bulk statistics collection.

You can also use this command to restrict the Diameter Authentication schema statistics to those gathered on the Active ICSR chassis.

dlci-util schema

Configures the collection of statistics for the DLCI-Util (DLCI utilization) schema.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

dlci-util schema *schema_name* **[active-only] format** *schema_format*
no dlci-util schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the format of the collected DLCI utilization statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for the DLCI-Util schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for DLCI-Util bulk statistics collection in the generated stats report files.. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple schemas can be created to categorize DLCI-Util bulk statistics. All of the schemas are processed at each collection interval. To create multiple DLCI-Util schemas, re-issue the **dlci-util schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the DLCI-Util schema statistics to those gathered on the Active ICSR chassis.

Example

Include the bulk statistic variable names to create a schema named *dlciutilstats_sgsn1* that specifies collection of statistics (a schema format) for:

- card
- port
- path
- DS1/E1
- DLCI
- DLCI utilization snapshot for received packets

- DLCI utilization for received packets in the last 5 minutes
- DLCI utilization for received packets in the last 15 minutes

Use the following command:

```
gprs schema gprsstats_sgsn1 format "Card: %card%\nPort: %port%\nDLCI in
path: %dlci_util_path%\nDS1/E1: %dlci_util_ds1e1%\nDLCI ID:
%dlci_util_dlci_no%\nCurrent Rx: %dlci_util_dlci_curr_rx%\nRx in 5 minutes:
 %dlci_util_dlci_5min_rx%\nRx in 15 minutes: %dlci_util_dlci_15min_rx%\n"
```

dpca schema

Configures Diameter Policy Control Application (DPCA) bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

dpca schema *schema_name* **[active-only] format** *schema_format*
no dpca schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for DPCA bulk statistics collection.

You can also use this command to restrict the DPCA schema statistics to those gathered on the Active ICSR chassis.

ecs schema

Configures Enhanced Charging Service (ECS) bulk statistics schema.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
ecs schema schema_name [ active-only ] format schema_format
no ecs schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for ECS bulk statistics collection. Multiple ECS schemas can be created to categorize ECS bulk statistics. All of the schemas are processed at each collection interval. To create multiple ECS schemas, re-issue the **ecs schema** *schema_name* command using a different schema name.

You can also use this command to restrict the ECS schema statistics to those gathered on the Active ICSR chassis.

egtpc schema

Configures the enhanced GTP-C statistics schema for naming conventions of data files.

Product

MME

P-GW

S-GW

SAEGW

SGSN

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

egtpc schema *schema_name* **[active-only] format** *schema_format*
no egtpc schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for enhanced GTP-C bulk statistics collection. Multiple eGTP-C service schemas can be created to categorize eGTP-C service bulk statistics. All of the schemas are processed at each collection interval. To create multiple eGTP-C service schemas, re-issue the **egtpc schema** *schema_name* command using a different schema name.

You can also use this command to restrict the GTP-C schema statistics to those gathered on the Active ICSR chassis.

Example

For an eGTP-C-level schema named *egtpcservicestats* that specifies a schema format of:

- Tunnel - Create Session Request Sent: *tun-sent-cresess*
- Tunnel - Create Session Request Received: *tun-recv-cresess*

Use the following command:

```
egtpc schema egtpcservicestats format "Number of GTP Tunnel Requests Sent:
 %tun-sent-cresess%\nNumber of GTP Tunnel Requests Received:
%tun-recv-cresess%\n"
```

epdg-handoff-disc schema

Configures bulkstats schema for transferring LTE to Wi-Fi Ho disconnect reasons statistics.

Product

ePDG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

epdg-handoff-disc schema *schema_name* **format** *schema_format* **[active-only]**
epdg-handoff-disc schema *schema_name* **[active-only] format** *schema_format*
no epdg-handoff-disc schema *schema_name*

epdg-handoff-disc schema

Configures bulkstats schema for transferring LTE to Wi-Fi HO disconnect reason statistics.

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for transferring LTE to Wi-Fi HO disconnect reason statistics.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

end

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product

All

Privilege

Security Administrator, Administrator

Syntax Description

exit

Usage Guidelines

Use this command to return to the parent configuration mode.

fa schema

Configures Foreign Agent (FA) bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

fa schema *schema_name* **[active-only] format** *schema_format*
no fa schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for FA bulk statistics collection. Multiple FA service schemas can be created to categorize FA service bulk statistics. All of the schemas are processed at each collection interval. To create multiple FA service schemas, re-issue the **fa schema** *schema_name* command using a different schema name.

You can also use this command to restrict the FA schema statistics to those gathered on the Active ICSR chassis.

Example

To create a FA-level schema named *faservicestats* that separates the *date*, *time*, and *vpnname* by tabs, enter the following command:

```
fa schema faservicestats format %date%\t%time%\t%vpnname%
```

The schema format appears as follows:

```
date      time      vpnname
```

file

Enters the Bulk Statistics File Configuration Mode which supports the configuration of "files" used for grouping bulk statistic configuration information.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description **[no] file** *number*

no

Removes a previously configured bulk statistic file.

number

Specifies a number for the bulkstatistics file as an integer from 1 through 4. This number is how the file is recognized by the system.

Usage Guidelines

Bulk statistics "files" are used to group bulk statistic schema, delivery options, and receiver configuration. Because multiple "files" can be configured, this functionality provides greater flexibility in that it allows you to configure different schemas to go to different receivers. A Maximum of four files can be assigned for bulk statistics collection.

Executing this command allows you to enter the Bulk Statistics File Configuration Mode. This mode supports all of the commands from the Bulk Statistics Configuration mode except **limit, sample-interval** and **transfer-interval**. (these commands are configured globally for all "files".)

Important Use of bulk statistics "files" is optional. If you do not wish to configure bulk statistic "files", you can perform a standard configuration using the commands in the Bulk Statistic Configuration Mode. Note, however, that the system logically assigns "file 1" to the standard configuration. Therefore, if you wish to configure bulk statistics "files" at a later time, "file 1" will already be used.

Caution If the Web Element Manager application is used to collect and process (XML parsing, graphing, etc.) bulk statistics data, "file 1" is used by the Web Element Manager's default bulk statistics collection information and schemas. To avoid errors in processing by the Web Element Manager, do not configure "file 1" via the CLI. However, it is possible to configure files 1 through 4 using the system's CLI, regardless of whether or not the Web Element Manager is configured as a receiver. In this case, the bulk statistics data is written to the server but not processed by the Web Element Manager application.

Example

The following command creates a bulk statistics file numbered 2 and enters the Bulk Statistics File Configuration Mode:

```
file 2
```

flow-kpi schema

Configures the Flow KPI bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

flow-kpi schema *schema_name* **[active-only] format** *schema_format*
no flow-kpi schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for Flow KPI bulk statistics collection.

You can also use this command to restrict the Flow KPI schema statistics to those gathered on the Active ICSR chassis.

fng schema

Configures Femto Network Gateway (FNG) bulk statistics schema.

Product FNG

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
fng schema schema_name format schema_format
no fng schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

footer

Configures the footer string placed at the end of the generated bulk statistics data files.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
footer format schema_format
no footer format
```

no

Clears the footer format string which results in the default file footer being used in generated data files.

format *schema_format*

Specifies the footer format string for use in generated data files.

schema_format must be an alphanumeric string from 1 through 2047 characters. The format string syntax is described in the Schema Format String Syntax, on page 1384 section. Default: "" (an empty footer)

The following variables are supported:

Table 18: footer Command Format String Variables

Variable	Description	Data Type
date	The date that the collection file was created in YYYYMMDD format where YYYY represents the year, MM represents the month and DD represents the day.	String
host	The system hostname that created the file	String
ipaddr	The default management (local context) IP address in ###.###.###.### format. An empty string is inserted if no address is available.	String
sysuptime	The uptime (in seconds) of the system that created the file.	32-bit signed
time	The time that the collection file was created in HHMMSS format where HH represents the hours, MM represents the minutes, and SS represents the seconds.	String

Usage Guidelines

Define a unique footer in data files which allows for easy identification of which system generated the data file or any other useful information. The use of the variables is suggested so as to allow for a uniform footer across all systems. The hostname variable should be used to identify the source of the data in the footer and all remaining items can be formatted consistently across all chassis.

Example

The following commands define different footer formats:

```
footer format northStreet
footer format "Created on: %date%-%time% by %host%"
no footer format
```

gather-on-standby

Controls whether or not statistics are gathered when a system is in the standby state.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
[ no | default ] gather-on-standby
```

no

Does not gather bulk statistics when the system is in the standby state.

default

Resets this command to its default action of gathering bulk statistics when the system is in the standby state.

Usage Guidelines

Use this command to configure a system to either gather or not gather statistics when the system is in the standby state. This is useful for systems configured for Interchassis Session Recovery (ICSR). See the *System Administration Guide* for more details on this feature.

If a chassis transitions to standby state and it has accumulated but not yet transferred bulk statistics data, the previously accumulated data is transferred at the first opportunity. However, no additional statistics gathering takes place.

Example

The following command disables gathering statistics when the system is in the standby state:

```
no gather-on-standby
```

The following command enables the gathering of statistics when the system is in the standby state:

```
gather-on-standby
```

gprs schema

Configures the collection of statistics for the GPRS schema.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

gprs schema *schema_name* **[active-only] format** *schema_format*
no gprs schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 to 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the format of the collected GPRS statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for the GPRS schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for GPRS bulk statistics collection in the generated stats report files.. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple GPRS schemas can be created to categorize GPRS bulk statistics. All of the schemas are processed at each collection interval. To create multiple GPRS schemas, re-issue the **gprs schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the GPRS schema statistics to those gathered on the Active ICSR chassis.

Example

Include the bulk statistic variable names to create a GPRS schema named *gprsstats_sgsn1* that specifies collection of statistics (a schema format) for:

- context name
- GPRS service name
- number of LLC packets dropped

Use the following command:

```
gprs schema gprsstats_sgsn1 format "Context Name: %vpnname%\nGPRS Service
 Name: %servname%\nTotal LLC Packets Dropped: %bssgp-total-usr-req-drop%\n"
```

gtpc schema

Configures GPRS Tunneling Protocol-Control (GTPC) message statistics schema.

Product

GGSN

P-GW

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

gtpc schema *schema_name* **[active-only] format** *schema_format*
no gtpc schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for GTPC bulk statistics collection. Multiple GTPC schemas can be created to categorize GTPC bulk statistics. All of the schemas are processed at each collection interval. To create multiple GTPC schemas, re-issue the **gtpc schema** *schema_name* command using a different schema name.

You can also use this command to restrict the GTPC schema statistics to those gathered on the Active ICSR chassis.

Example

To create a GTPC-level schema named *gtpc_stats* that specifies a schema format of:

- Context Name: *vpnname*
- GGSN Service Name: *servname*
- Total PDP Contexts Processed: *setup-total*

Use the following command:

```
gtpc schema gtpc_stats format "Context Name: %vpnname%\nGGSN Service Name:
 %servname%\nTotal PDP Contexts Processed: %setup-total%\n"
```

gtpp schema

Configures GPRS Tunneling Protocol-Prime (GTPP) statistics schema.

Product

GGSN

SGSN

P-GW

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

gtpp schema *schema_name* **[active-only] format** *schema_format*
no gtpp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for GTPP bulk statistics collection. Multiple GTPP schemas can be created to categorize GTPP bulk statistics. All of the schemas are processed at each collection interval. To create multiple GTPP schemas, re-issue the **gtpp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the GTPP schema statistics to those gathered on the Active ICSR chassis.

Example

To create a GTPP schema named *gtpp_statistics* that specifies a schema format of:

- Time: *time*
- Total Redirection Requests Received: *redir-rcvd*

Use the following command:

```
gtpp schema gtpp_statistics format "Time: %time%\tTotal Redirection
Requests Received: %redir-rcvd%\n"
```

gtpu schema

Configures GTP-U bulk statistics schema.

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Product

GGSN

HNB-GW

P-GW

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

gtpu schema *schema_name* **[active-only] format** *schema_format*
no gtpu schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the format of the collected GTP-U statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for GTP-U bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple GTP-U schemas can be created to categorize GTP-U bulk statistics. All of the schemas are processed at each collection interval. To create multiple GTP-U schemas, re-issue the **gtpu schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the GTP-U schema statistics to those gathered on the Active ICSR chassis.

ha schema

Configures Home Agent (HA) bulk statistics schema.

Product

HA

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ha schema *schema_name* **[active-only] format** *schema_format*
no ha schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for HA bulk statistics collection. Multiple HA service schemas can be created to categorize HA service bulk statistics. All of the schemas are processed at each collection interval. To create multiple HA service schemas, re-issue the **ha schema** *schema_name* command using a different schema name.

You can also use this command to restrict the HA schema statistics to those gathered on the Active ICSR chassis.

Example

For an HA schema named *haservicestats* that specifies a schema format of:

- Number of HA authentication failures: *reply-haauthfail*
- Number of Mobile Node authentication failures: *reply-mnauthfail*

Use the following command:

```
ha schema haservicestats format "Number of HA authentication failures:
%reply-haauthfail%\nNumber of Mobile Node authentication failures:
%reply-mnauthfail%\n"
```

header

Configures the header string placed at the beginning of the generated bulk statistics data files.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
header format schema_format
no header format
```

no

Clears the header format string which results in the default file header being used in generated data files.

format *schema_format*

Specifies the header format string for use in generated data files.

schema_format must be an alphanumeric string of 1 through 2047 characters. The format string syntax is described in the Schema Format String Syntax, on page 1384 section. Default: "" (an empty header)

The following variables are supported:

Table 19: header Command Format String Variables

Variable	Description	Data Type
date	The UTC date that the collection file was created in YYYYMMDD format where YYYY represents the year, MM represents the month and DD represents the day.	String
date3	The UTC date that the collection file was created in YYMMDD format where YY represents the year, MM represents the month and DD represents the day.	String
host	The system hostname that created the file	String
ipaddr	The default management (local context) IP address in ###.###.###.### format. An empty string is inserted if no address is available.	String

Variable	Description	Data Type
sysuptime	The uptime (in seconds) of the system that created the file.	32-bit signed
time	The time that the collection file was created in HHMMSS format where HH represents the hours, MM represents the minutes, and SS represents the seconds.	String

Usage Guidelines

Define a unique header in data files which allows for easy identification as to which system generated the data file or any other useful information.

Using the variables described above allows for a uniform header across all systems. The hostname variable should be used to identify the source of the data in the header and all remaining items can be formatted consistently across all chassis.

Example

The following commands define different header formats:

```
header format northStreet
header format "Created on: %date%-%time% by %host%"
no header format
```

hnbgw-hnbap schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for HNB-Application Part (HNB-AP) message statistics collection in HNB-GW session instance.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-hnbap schema *schema_name* **format** *schema_format*
no hnbgw-hnbap schema *schema_name*

no

Removes the configured HNB-GW-HNB-AP schema.

schema_name

Specifies a name for the HNB-GW-HNB-AP schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for HNB-AP statistics collection. Multiple HNB-AP schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-hnbap schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *hnbap1stats1* that records the number of registered UEs and registered HNBs along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-hnbap schema hnbap1stats1 format
"%vpnname%-%vpnid%-%servname%-%registered-hnb%-%registered-ue%"
```

To create a schema named *hnbapuestats* that specifies a schema format of:

- Number of UEs with CS and PS Core Network Connections: *ue-with-ps-cs-conn*
- Number of UEs in Idle Condition: *idle-ue*

Use the following command:

```
hnbgw-hnbap schema hnbapuestats format "Number of UEs with CS and PS Core
 Network Connections: %ue-with-ps-cs-conn%\nNumber of UEs in Idle
Condition: %idle-ue%"
```

hnbgw-hnbap-access-closed schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for HNB-Application Part (HNB-AP) message statistics collection in HNB-GW session instance for closed access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-hnbap-access-closed schema *schema_name* **format** *schema_format*
no hnbgw-hnbap-access-closed schema *schema_name*

no

Removes the configured HNB-GW-HNB-AP-ACCESS-CLOSED schema.

schema_name

Specifies a name for the HNB-GW-HNB-AP-ACCESS-CLOSED schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for HNB-AP statistics collection in closed access mode. Multiple HNB-AP-ACCESS-CLOSED schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-hnbap-access-closed schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *hnbapclosed1stats1* that records the number of registered UEs and registered HNBs along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-hnbap-access-closed schema hnbapclosed1stats1 format
"%vpnname%-%vpnid%-%servname%-%registered-hnb%-%registered-ue%"
```

To create a schema named *hnbapaccessclosedueStats* that specifies a schema format of:

- Number of UEs with CS and PS Core Network Connections: *ue-with-ps-cs-conn*

- Number of UEs in Idle Condition: *idle-ue*

Use the following command:

```
hnbgw-hnbap-access-closed schema hnbapacccessclosedуestats format "Number
 of UEs with CS and PS Core Network Connections:
%ue-with-ps-cs-conn%\nNumber of UEs in Idle Condition: %idle-ue%"
```

hnbgw-hnbap-access-hybrid schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for HNB-Application Part (HNB-AP) message statistics collection in HNB-GW session instance for hybrid access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-hnbap-access-hybrid schema *schema_name* **format** *schema_format*
no hnbgw-hnbap-access-hybrid schema *schema_name*

no

Removes the configured HNB-GW-HNB-AP-ACCESS-HYBRID schema.

schema_name

Specifies a name for the HNB-GW-HNB-AP-ACCESS-HYBRID schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for HNB-AP statistics collection in hybrid access mode. Multiple HNB-AP-ACCESS-HYBRID schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-hnbap-access-hybrid schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *hnbaphyb1stats1* that records the number of registered UEs and registered HNBs along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-hnbap-access-hybrid schema hnbaphyb1stats1 format
"%vpnname%-%vpnid%-%servname%-%registered-hnb%-%registered-ue%"
```

To create a schema named *hnbapaccesshybuestats* that specifies a schema format of:

- Number of UEs with CS and PS Core Network Connections: *ue-with-ps-cs-conn*
- Number of UEs in Idle Condition: *idle-ue*

Use the following command:

```
hnbgw-hnbap-access-hybrid schema hnbapacccesshybuestats format "Number
of UEs with CS and PS Core Network Connections:
%ue-with-ps-cs-conn%\nNumber of UEs in Idle Condition: %idle-ue%"
```

hnbgw-hnbap-access-open schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for HNB-Application Part (HNB-AP) message statistics collection in HNB-GW session instance for open access mode.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-hnbap-access-open schema *schema_name* **format** *schema_format*
no hnbgw-hnbap-access-open schema *schema_name*

no

Removes the configured HNB-AP-ACCESS-OPEN schema.

schema_name

Specifies a name for the HNB-AP-ACCESS-OPEN schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for HNB-AP statistics collection in open access mode. Multiple HNB-AP-ACCESS-OPEN schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-hnbap-access-open schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *hnbapopen1stats1* that records the number of registered UEs and registered HNBs along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-hnbap-access-open schema hnbapopen1stats1 format
"%vpnname%-%vpnid%-%servname%-%registered-hnb%-%registered-ue%"
```

To create a schema named *hnbapaccessopenuestats* that specifies a schema format of:

- Number of UEs with CS and PS Core Network Connections: *ue-with-ps-cs-conn*
- Number of UEs in Idle Condition: *idle-ue*

Use the following command:

```
hnbgw-hnbap-access-open schema hnbapacccessopenuestats format "Number of
 UEs with CS and PS Core Network Connections: %ue-with-ps-cs-conn%\nNumber
 of UEs in Idle Condition: %idle-ue%"
```

hnbgw-ranap schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Radio Access Network-Application Part (RANAP) message statistics collection in HNB-GW session instance.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-ranap schema *schema_name* **format** *schema_format*
no hnbgw-ranap schema *schema_name*

no

Removes the configured HNB-GW-RANAP schema.

schema_name

Specifies a name for the HNB-GW-RANAP schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RANAP messaging statistics collection. Multiple RANAP schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-ranap schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ranap1stats1* that records the number of CS-Direct-Transfer messages sent and received on RANAP along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-ranap schema ranap1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-dir-transfer-rx%-%cs-dir-transfer-tx%"
```

To create a schema named *ranappagingstats* that specifies a schema format of:

- Number of paging requests sent on RANAP from CS Core Network Connections: *cs-paging-req-tx*
- Number of paging requests sent on RANAP from PS Core Network Connections: *ps-paging-req-tx*

Use the following command:

```
hnbgw-ranap schema ranappagingstats format "Number of paging requests
sent on RANAP from CS Core Network Connections: %cs-paging-req-tx%\nNumber
 of paging requests sent on RANAP from PS Core Network Connections:
%ps-paging-req-tx%"
```

hnbgw-ranap-access-closed schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Radio Access Network-Application Part (RANAP) message statistics collection in HNB-GW session instance for closed access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-ranap-access-closed schema *schema_name* **format** *schema_format*
no hnbgw-ranap-access-closed schema *schema_name*

no

Removes the configured HNB-GW-RANAP-ACCESS-CLOSED schema.

schema_name

Specifies a name for the HNB-GW-RANAP-ACCESS-CLOSED schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RANAP messaging statistics collection in closed access mode. Multiple HNB-GW-RANAP-ACCESS-CLOSED schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-ranap-access-closed schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ranapclosed1stats1* that records the number of CS-Direct-Transfer messages sent and received on RANAP along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-ranap-access-closed schema ranapclosed1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-dir-transfer-rx%-%cs-dir-transfer-tx%"
```

To create a schema named *ranapclosedpagingstats* that specifies a schema format of:

- Number of paging requests sent on RANAP from CS Core Network Connections: *cs-paging-req-tx*
- Number of paging requests sent on RANAP from PS Core Network Connections: *ps-paging-req-tx*

Use the following command:

```
hnbgw-ranap-access-closed schema ranapclosedpagingtats format "Number of
 paging requests sent on RANAP from CS Core Network Connections:
%cs-paging-req-tx%\nNumber of paging requests sent on RANAP from PS Core
 Network Connections: %ps-paging-req-tx%"
```

hnbgw-ranap-access-hybrid schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Radio Access Network-Application Part (RANAP) message statistics collection in HNB-GW session instance for hybrid access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-ranap-access-hybrid schema *schema_name* **format** *schema_format*
no hnbgw-ranap-access-hybrid schema *schema_name*

no

Removes the configured HNB-GW-RANAP-ACCESS-HYBRID schema.

schema_name

Specifies a name for the HNB-GW-RANAP-ACCESS-HYBRID schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RANAP messaging statistics collection in hybrid access mode. Multiple HNB-GW-RANAP-ACCESS-HYBRID schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-ranap-access-hybrid schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ranaphyb1stats1* that records the number of CS-Direct-Transfer messages sent and received on RANAP along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-ranap-access-hybrid schema ranaphyb1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-dir-transfer-rx%-%cs-dir-transfer-tx%"
```

To create a schema named *ranaphybpagingstats* that specifies a schema format of:

- Number of paging requests sent on RANAP from CS Core Network Connections: *cs-paging-req-tx*
- Number of paging requests sent on RANAP from PS Core Network Connections: *ps-paging-req-tx*

Use the following command:

```
hnbgw-ranap-access-hybrid schema ranaphybpagingtats format "Number of
paging requests sent on RANAP from CS Core Network Connections:
%cs-paging-req-tx%\nNumber of paging requests sent on RANAP from PS Core
 Network Connections: %ps-paging-req-tx%"
```

hnbgw-ranap-access-open schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Radio Access Network-Application Part (RANAP) message statistics collection in HNB-GW session instance for open access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-ranap-access-open schema *schema_name* **format** *schema_format*
no hnbgw-ranap-access-open schema *schema_name*

no

Removes the configured HNB-GW-RANAP-ACCESS-OPEN schema.

schema_name

Specifies a name for the HNB-GW-RANAP-ACCESS-OPEN schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RANAP messaging statistics collection in open access mode. Multiple HNB-GW-RANAP-ACCESS-OPEN schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-ranap-access-open schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ranapopen1stats1* that records the number of CS-Direct-Transfer messages sent and received on RANAP along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-ranap-access-open schema ranapopen1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-dir-transfer-rx%-%cs-dir-transfer-tx%"
```

To create a schema named *ranapopenpagingstats* that specifies a schema format of:

- Number of paging requests sent on RANAP from CS Core Network Connections: *cs-paging-req-tx*
- Number of paging requests sent on RANAP from PS Core Network Connections: *ps-paging-req-tx*

Use the following command:

```
hnbgw-ranap-access-open schema ranapopenpagingtats format "Number of
paging requests sent on RANAP from CS Core Network Connections:
%cs-paging-req-tx%\nNumber of paging requests sent on RANAP from PS Core
 Network Connections: %ps-paging-req-tx%"
```

hnbgw-rtp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Real-Time Protocol (RTP) message statistics collection in HNB-GW session instance.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rtp schema *schema_name* **format** *schema_format*
no hnbgw-rtp schema *schema_name*

no

Removes the configured HNB-GW-RTP schema.

schema_name

Specifies a name for the HNB-GW-RTP schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RTP messaging statistics collection. Multiple RTP schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rtp schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *rtp1stats1* that records the number of RTP uplink packets dropped and number of RTCP application report messages received on RTP link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rtp schema rtp1stats1 format
"%vpnname%-%vpnid%-%servname%-%rtp-uplink-pkts-dropped%-%rtcp-app-report-rx%"
```

hnbgw-rtp-access-closed schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Real-Time Protocol (RTP) message statistics collection in HNB-GW session instance for closed access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rtp-access-closed schema *schema_name* **format** *schema_format*
no hnbgw-rtp-access-closed schema *schema_name*

no

Removes the configured HNB-GW-RTP-ACCESS-CLOSED schema.

schema_name

Specifies a name for the HNB-GW-RTP-ACCESS-CLOSED schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for RTP messaging statistics collection in closed access mode. Multiple HNB-GW-RTP-ACCESS-CLOSED schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rtp-access-closed schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *rtpclosed1stats1* that records the number of RTP uplink packets dropped and number of RTCP application report messages received on RTP link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rtp-access-closed schema rtpclosed1stats1 format
"%vpnname%-%vpnid%-%servname%-%rtp-uplink-pkts-dropped%-%rtcp-app-report-rx%"
```

hnbgw-rtp-access-hybrid schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Real-Time Protocol (RTP) message statistics collection in HNB-GW session instance for hybrid access mode.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
hnbgw-rtp-access-hybrid schema schema_name format schema_format
no hnbgw-rtp-access-hyrbid schema schema_name
```

no

Removes the configured HNB-GW-RTP-ACCESS-HYBRID schema.

schema_name

Specifies a name for the HNB-GW-RTP-ACCESS-HYBRID schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for RTP messaging statistics collection in hybrid access mode. Multiple HNB-GW-RTP-ACCESS-HYBRID schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rtp-access-hybrid schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *rtphyb1stats1* that records the number of RTP uplink packets dropped and number of RTCP application report messages received on RTP link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rtp-access-hybrid schema rtphyb1stats1 format
"%vpnname%-%vpnid%-%servname%-%rtp-uplink-pkts-dropped%-%rtcp-app-report-rx%"
```

hnbgw-rtp-access-open schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Real-Time Protocol (RTP) message statistics collection in HNB-GW session instance for open access mode.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rtp-access-open schema *schema_name* **format** *schema_format*
no hnbgw-rtp-access-open schema *schema_name*

no

Removes the configured HNB-GW-RTP-ACCESS-OPEN schema.

schema_name

Specifies a name for the HNB-GW-RTP-ACCESS-OPEN schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RTP messaging statistics collection in open access mode. Multiple HNB-GW-RTP-ACCESS-OPEN schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rtp-access-open schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *rtpopen1stats1* that records the number of RTP uplink packets dropped and number of RTCP application report messages received on RTP link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rtp-access-open schema rtpopen1stats1 format
"%vpnname%-%vpnid%-%servname%-%rtp-uplink-pkts-dropped%-%rtcp-app-report-rx%"
```

hnbgw-rua schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for RANAP User Adaptation (RUA) protocol message statistics collection in HNB-GW session instance.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rua schema *schema_name* **format** *schema_format*
no hnbgw-rua schema *schema_name*

no

Removes the configured HNB-GW-RUA schema.

schema_name

Specifies a name for the HNB-GW-RUA schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RUA protocol messaging statistics collection. Multiple RUA schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rua schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *rua1stats1* that records the number of CS-Connect messages received and sent on RUA link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rua schema rua1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-connect-rx%-%cs-connect-tx%"
```

hnbgw-rua-access-closed schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for RANAP User Adaptation (RUA) protocol message statistics collection in HNB-GW session instance in closed access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rua-access-closed schema *schema_name* **format** *schema_format*
no hnbgw-rua-access-closed schema *schema_name*

no

Removes the configured HNB-GW-RUA-ACCESS-CLOSED schema.

schema_name

Specifies a name for the HNB-GW-RUA-ACCESS-CLOSED schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for RUA protocol messaging statistics collection in closed access mode. Multiple HNB-GW-RUA-ACCESS-CLOSED schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rua-access-closed schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ruaclosed1stats1* that records the number of CS-Connect messages received and sent on RUA link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rua-access-closed schema ruaclosed1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-connect-rx%-%cs-connect-tx%"
```

hnbgw-rua-access-hybrid schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for RANAP User Adaptation (RUA) protocol message statistics collection in HNB-GW session instance in hybrid access mode.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-rua-access-hybrid schema *schema_name* **format** *schema_format*
no hnbgw-rua-access-hyrbid schema *schema_name*

no

Removes the configured HNB-GW-RUA-ACCESS-HYBRID schema.

schema_name

Specifies a name for the HNB-GW-RUA-ACCESS-HYBRID schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for RUA protocol messaging statistics collection in hyrbid access mode. Multiple HNB-GW-RUA-ACCESS-HYBRID schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rua-access-hyrbid schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ruahyb1stats1* that records the number of CS-Connect messages received and sent on RUA link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rua-access-hybrid schema ruahyb1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-connect-rx%-%cs-connect-tx%"
```

hnbgw-rua-access-open schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for RANAP User Adaptation (RUA) protocol message statistics collection in HNB-GW session instance in open access mode.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
hnbgw-rua-access-open schema schema_name format schema_format
no hnbgw-rua-access-open schema schema_name
```

no

Removes the configured HNB-GW-RUA-ACCESS-OPEN schema.

schema_name

Specifies a name for the HNB-GW-RUA-ACCESS-OPEN schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines This command defines schemas used for RUA protocol messaging statistics collection in open access mode. Multiple HNB-GW-RUA-ACCESS-OPEN schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-rua-access-open schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ruaopen1stats1* that records the number of CS-Connect messages received and sent on RUA link along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-rua-access-open schema ruaopen1stats1 format
"%vpnname%-%vpnid%-%servname%-%cs-connect-rx%-%cs-connect-tx%"
```

hnbgw-sctp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures bulk statistics schema for Stream Control Transmission Protocol (SCTP) message statistics collection in HNB-GW session instance.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hnbgw-sctp schema *schema_name* **format** *schema_format*
no hnbgw-sctp schema *schema_name*

no

Removes the configured SCTP schema.

schema_name

Specifies a name for the SCTP schema.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

This command defines schemas used for SCTP protocol messaging statistics collection. Multiple SCTP schemas can be created to further categorize bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **hnbgw-sctp schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *sctp1stats1* that records the number of bytes received from lower layer and number of bytes sent to lower layer over SCTP connection along with Context name, Context Id, and HNB-GW service name:

```
hnbgw-sctp schema sctp1stats1 format
"%vpnname%-%vpnid%-%servname%-%total-bytes-sent-to-lower-layer%-%total-bytes-rcvd-from-lower-layer%%"
```

hsgw schema

Configures HRPD Serving Gateway (HSGW) bulk statistics schema.

Product

HSGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hsgw schema *schema_name* **format** *schema_format*
no hsgw schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the format of the collected HSGW statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for HSGW bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple HSGW schemas can be created to categorize HSGW bulk statistics. All of the schemas are processed at each collection interval. To create multiple HSGW schemas, re-issue the **hsgw schema** *schema_name* command using a different schema name each time.

hss schema

Configures Home Subscriber Service (HSS) bulk statistics schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

hss schema *schema_name* **format** *schema_format*
no hss schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for HSS bulk statistics collection. Multiple HSS schemas can be created to further categorize HSS bulk statistics. All of the schemas are processed at each collection interval. To create multiple HSS schemas, re-issue the **hss schema** *schema_name* command using a different schema name.

Example

To create an hss schema named *hss_stats* that specifies a schema format of:

- Message Stats: Number of Cancel Location Request messages sent: *msg-cl-req*
- Message Stats: Number of Cancel Location Answer messages sent: *msg-cl-ans*

Use the following command:

```
hss schema hss_stats format "Message Stats: Number of Cancel Location
Request messages sent: %msg-cl-req%\nMessage Stats: Number of Cancel
Location Answer messages sent: %msg-cl-ans%\n"
```

icsr schema

Configures ICSR (Interchassis Session Recovery) bulkstats schema.

Product All products that support ICSR

Privilege Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

icsr schema *schema_name* **[active-only] format** *schema_format*
no icsr schema *schema_name*

no

Deletes the named schema.

schema_name

Specifies the name of the schema as an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for ICSR bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple ICSR schemas can be created to categorize ICSR bulk statistics. All of the schemas are processed at each collection interval. To create multiple ICSR schemas, re-issue the **icsr schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the ICSR schema statistics to those gathered on the Active ICSR chassis.

imsa schema

Configures IP Multimedia System Authorization (IMSA) bulk statistics schema.

Product

GGSN

HA

HSGW

IPSG

PDSN

P-GW

S-GW

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

imsa schema *schema_name* **[active-only] format** *schema_format*
no imsa schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for IMSA bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple IMSA schemas can be created to categorize IMSA bulk statistics. All of the schemas are processed at each collection interval. To create multiple IMSA schemas, re-issue the **imsa schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the IMSA schema statistics to those gathered on the Active ICSR chassis.

ippool schema

Configures IP pool bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ippool schema *schema_name* **[active-only] format** *schema_format*
no ippool schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for IP pool bulk statistics collection. Multiple IP pool schemas can be created to further categorize IP pool bulk statistics. All of the schemas are processed at each collection interval. To create multiple IP pool schemas, re-issue the **ippool schema** *schema_name* command using a different schema name.

You can also use this command to restrict the IC IP pool schema statistics to those gathered on the Active ICSR chassis.

Example

To create an IP pool schema named *ippoolstats* that specifies a schema format of:

- Number of IP addresses on hold: *hold*
- Number of free IP addresses: *free*

Use the following command:

```
ippool schema ippoolstats format "Number of IP addresses on hold:
%hold%\nNumber of free IP addresses: %free%\n"
```

ipsg schema

Configures IP Services Gateway (IPSG) bulk statistics schema.

Product

IPSG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
ipsg schema schema_name format schema_format
no ipsg schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define the schemas used for IPSG bulk statistics collection. Multiple IPSG schemas can be created to categorize IPSG bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **ipsg schema** *schema_name* command using a different schema name.

Example

To create an IPSG schema named *ipsgstats* that specifies a schema format of:

- Context name: *vpnname*
- Service name: *servname*
- Total responses sent: *total-rsp-sent*

Use the following command:

```
ipsg schema ippoolstats format "Context name: %vpnname%\nService name:
%servname%\nTotal responses sent: %total-rsp-sent%\n"
```

lac schema

Configures LAC (L2TP Access Concentrator) bulk statistics schema.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
lac schema schema_name [ active-only ] format schema_format
no lac schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for LAC bulk statistics collection. Multiple LAC schemas can be created to categorize LAC bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **lac schema** *schema_name* command using a different schema name.

You can also use this command to restrict the LAC schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *lac1stats1* that records the number of active subscriber sessions and the number of sessions that failed or were disconnected due to the maximum tunnel limit being reached:

```
lac schema lac1stats1 format "%sess-curactive%-%sess-maxtunnel%"
```

To create a schema named *lacresourcestats* that specifies a schema format of:

- Number of Successful Session Connections: *sess-successful*
- Number of Session Attempts That Failed: *sess-failed*
- Number of Sessions Currently Active: *sess-curative*

Use the following command:

```
lac schema lacresourcestats format "Number of Successful Session
Connections: %sess-successful%\nNumber of Session Attempts That Failed:
%sess-failed%\nNumber of Sessions Currently Active: %sess-curative%"
```

limit

Configures the maximum amount of system memory bulk statistics may utilize.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

limit *kilobytes*

kilobytes

Specifies the maximum amount of memory (in kilobytes) that may be used for bulk statistics as an integer from 1 through 32000. The default value is 7500 KB for the ASR 5500 and 6000 KB for the VPC-SI.

Usage Guidelines

Use this command to configure the amount of memory to use on the SPC/SMC/MIO to store bulk statistics. It is mandatory to specify the memory limit for this command.

Adjust bulk statistics memory usage when considering the sampling interval adjustments.

Caution Bulk statistics are stored in Random Access Memory (RAM) on the SPC/SMC/MIO. In the event of power loss or system failure, the statistics will be lost. If the maximum storage limit has been reached before the system's configured transfer-interval is reached, the oldest information stored in the collection will be overwritten.

Example

limit 2048

link-aggr schema

Configures Link Aggregation bulk statistic schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

link-aggr schema *schema_name* **[active-only] format** *schema_format*
no link-aggr schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Link Aggregation bulk statistics collection. Multiple LMA service schemas can be created to categorize Link Aggregation service bulk statistics. All of the schemas are processed at each collection interval. To create multiple Link Aggregation service schemas, re-issue the **link-aggr schema** *schema_name* command using a different schema name.

You can also use this command to restrict the Link Aggregation schema statistics to those gathered on the Active ICSR chassis.

lma schema

Configures the Local Mobility Anchor (LMA) statistics schema for the naming conventions of data files.

Product

P-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

lma schema *schema_name* **[active-only] format** *schema_format*
no lma schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for LMA bulk statistics collection. Multiple LMA service schemas can be created to categorize LMA service bulk statistics. All of the schemas are processed at each collection interval. To create multiple LMA service schemas, re-issue the **lma schema** *schema_name* command using a different schema name.

You can also use this command to restrict the LMA schema statistics to those gathered on the Active ICSR chassis.

Example

For an LMA-level schema named *lmaservicestats* that specifies a schema format of:

- Binding Update Received: *bindupd*
- Binding Update Received - Denied: *bindupd-denied*

Use the following command:

```
lma schema lmaservicestats format "Number of Binding Updates Received:
%bindupd%\nNumber of Binding Updates Received and Denied:
%bindupd-denied%\n"
```

lns schema

Configures LNS (L2TP Network Server) bulk statistics schema.

Product

LNS

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

lns schema *schema_name* **[active-only] format** *schema_format*
no lns schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the format of the collected LNS statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for LNS bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple LNS schemas can be created to categorize LNS bulk statistics. All of the schemas are processed at each collection interval. To create multiple LNS schemas, re-issue the **lns schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the LNS schema statistics to those gathered on the Active ICSR chassis.

mag schema

Configures the Mobile Access Gateway (MAG) statistics schema for naming conventions of data files.

Product

HSGW

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

mag schema *schema_name* **format** *schema_format*
no mag schema *schema_name*

no

Removes the specified schema from MAG bulk statistics generation.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for MAG bulk statistics collection. Multiple MAG service schemas can be created to categorize MAG service bulk statistics. All of the schemas are processed at each collection interval. To create multiple MAG service schemas, re-issue the **mag schema** *schema_name* command using a different schema name.

Example

For a MAG-level schema named *magservicestats* that specifies a schema format of:

- Binding Update Sent: *bindupd*
- Binding Acknowledgement Received: *bindack*

Use the following command:

```
mag schema magservicestats format "Number of Binding Updates Sent:
%bindupd%\nNumber of Binding Acknowledgements Received: %bindack%\n"
```

mipv6ha schema

Configures MIPv6 HA (home Agent) bulk statistics schema.

Product HA

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
mipv6ha schema schema_name [ active-only ] format schema_format
no mipv6ha schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for MIPv6 HA bulk statistics collection. Multiple MIPv6 HA bulk statistics schemas can be created to categorize MIPv6 HA bulk statistics. All of the schemas are processed at each collection interval. To create multiple MIPv6 HA service schemas, re-issue the **mipv6ha schema** *schema_name* command using a different schema name.

You can also use this command to restrict the MIPv6 HA schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *mipv6haservicestats* that records the number of authorization attempt failures due to access rejects from AAA:

```
mipv6ha schema mipv6haservicestats format "%aaa-actauthfail%"
```

mme schema

Configures MME (Mobility Management Entity) bulk statistics schema.

Product MME

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
mme schema schema_name [ active-only ] format schema_format
no mme schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for MME bulk statistics collection. Multiple MME bulk statistics schemas can be created to categorize MME bulk statistics. All of the schemas are processed at each collection interval. To create multiple MME service schemas, re-issue the **mme schema** *schema_name* command using a different schema name.

You can also use this command to restrict the MME schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *mmeservice_s1ap_cfg_transfers* that records the total number of S1AP - transmit data - configuration transfers:

```
mme schema mmeservice_s1ap_cfg_transfersformat "s1ap-trnsdata-cfg-tfr
```

mon-di-net

Configures the collection of statistics for the Mon-DI-Net schema. This schema collects network latency and packet loss statistics for the internal DI-network used between cards in a VPC-DI deployment. This funtionality applies only to the VPC-DI platform.

Product All

Privilege Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

mon-di-net schema *schema_name* **[active-only] format** *schema_format*
no mon-di-net schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for Monitor DI Network (mon-di-net) bulk statistics collection. See also the **show cloud monitor di-network detail** Exec mode command to display similar information.

You can also use this command to restrict the schema statistics to those gathered on the Active ICSR chassis.

mvs schema

Configures MVS (Mobile Videoscape) bulk statistics schema.

Important In release 20.0, MVG is not supported. This command must not be used in release 20.0. For more information, contact your Cisco account representative.

Product

MVG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

mvs schema *schema_name* **[active-only] format** *schema_format*
no mvs schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference.*

Usage Guidelines

Use this command to define schemas for MVS bulk statistics collection. Multiple LMA service schemas can be created to categorize MVS bulk statistics. All of the schemas are processed at each collection interval. To create multiple MVS schemas, re-issue the **mvs schema** *schema_name* command using a different schema name.

You can also use this command to restrict the MVS schema statistics to those gathered on the Active ICSR chassis.

nat-realm schema

Creates and configures Network Address Translation (NAT) realm statistics schema.

Product

NAT

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

nat-realm schema *schema_name* **format** *schema_format*
no nat-realm schema *schema_name*

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for NAT Realm bulk statistics collection. Multiple NAT realm schemas can be created to further categorize NAT realm level bulk statistics. All of the schemas are processed at each collection interval. To create multiple NAT Realm schemas, re-issue the **nat-realm schema** *schema_name* command using a different schema name.

Example

The following command creates a NAT realm schema with the VPN name, realm name, and flows information:

```
nat-realm schema realm1 format "%vpnname% %realmname% %nat-rlm-flows%"
```

p2p schema

Creates and configures P2P (Peer-to-Peer) statistics schema.

Product

ADC

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

p2p schema *schema_name* **[active-only] format** *schema_format*
no p2p schema *schema_name*

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for P2P bulk statistics collection. Multiple P2P schemas can be created to further categorize P2P-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple P2P schemas, re-issue the **p2p schema** *schema_name* command using a different schema name.

You can also use this command to restrict the P2P schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *p2pstats* to record the total number of bytes detected in uplink and downlink direction:

```
p2p schema p2pstats format "%p2p-uplnk-bytes-name% %p2p-uplnk-bytes-value%
 %p2p-dwlnk-bytes-name% %p2p-dwlnk-bytes-value%"
```

pcc-af schema

Configures Policy and Charging Control-Application Function (PCC-AF) service bulk statistics schema.

Product

IPCF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

pcc-af schema *schema_name* **format** *schema_format*
no pcc-af schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for PCC-AF service bulk statistics collection. Multiple PCC-AF service schemas can be created to categorize PCC-AF service bulk statistics. All of the schemas are processed at each collection interval. To create multiple PCC-AF service schemas, re-issue the **pcc-af schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pcc_af1stats1* that records the total number of Rx STR messages received and total number of Rx AAR Accept messages sent along with Context name, Context Id, and PCC-AF service name:

```
pcc-af schema pcc_af1stats1 format
"%vpnname%-%vpnid%-%servname%-%total-rx-ccai-accept-sent%-%total-rx-aar-accept-sent%"
```

pcc-policy schema

Configures Policy and Charging Control-Policy (PCC-Policy) service bulk statistics schema.

Product

IPCF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

pcc-policy schema *schema_name* **format** *schema_format*
no pcc-policy schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for PCC-Policy service bulk statistics collection. Multiple PCC-Policy service schemas can be created to categorize PCC-Policy service bulk statistics. All of the schemas are processed at each collection interval. To create multiple PCC-Policy service schemas, re-issue the **pcc-policy schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pcc_plcy1stats1* that records the total number of Gx messages sent and total number of Gx CCR messages received along with Context name, Context Id, and PCC-Policy service name:

```
pcc-policy schema pcc_plcy1stats1 format
"%vpnname%-%vpnid%-%servname%-%total-gx-outbound-msgs%-%total-gx-ccr-rcvd%"
```

pcc-profile schema

Configures Policy and Charging Control Profile (PCC-Profile) bulk statistics schema.

Product

IPCF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

pcc-profile schema *schema_name* **format** *schema_format*
no pcc-profile schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for PCC-Profile bulk statistics collection. Multiple PCC-Profile schemas can be created to categorize PCC-Profile bulk statistics. All of the schemas are processed at each collection interval. To create multiple PCC-Profile schemas, re-issue the **pcc-profile schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pcc_profile1stats1* that records the total number of SGSN changes and QoS changes occured for paricular PCC profile along with Context name, Context Id, and PCC-Service name:

```
pcc-profile schema pcc_profile1stats1 format
"%vpnname%-%vpnid%-%servname%-%total-sgsn-change%-%total-qos-change%"
```

pcc-sp-endpt schema

Configures the bulkstats schema at the Sp interface endpoint for PCC procedures with Subscriber Service Controller/Subscriber Policy Register (SSC/SPR).

Product

IPCF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

pcc-sp-endpt schema *schema_name* **format** *schema_format*
no pcc-sp-endpt schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for PCC-Sp-Endpoint bulk statistics collection. Multiple PCC-Sp-Endpoint schemas can be created to categorize PCC-Sp-Endpoint bulk statistics. All of the schemas are processed at each collection interval. To create multiple PCC-Sp-Endpoint schemas, re-issue the **pcc-sp-endpt schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pcc_sp1stats1* that records the total number of SPRMgr Sh session close and open requests received from PCCMgr and processed by PCC-Sp-Endpoint along with Context name, Context Id, and PCC-Sp-Endpoint name:

```
pcc-sp-endpt schema pcc_svc1stats1 format
"%vpnname%-%vpnid%-%endpt-name%-%req-open%-%req-close%"
```

pcc-service schema

Configures Policy and Charging Control-Service (PCC-Service) bulk statistics schema.

Product

IPCF

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
pcc-service schema schema_name format schema_format
no pcc-service schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for PCC-Service bulk statistics collection. Multiple PCC-Service schemas can be created to categorize PCC-Service bulk statistics. All of the schemas are processed at each collection interval. To create multiple PCC-Service schemas, re-issue the **pcc-service schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pcc_svc1stats1* that records the total number of Gx and Gy request processed by PCC-Service along with Context name, Context Id, and PCC-Service name:

```
pcc-service schema pcc_svc1stats1 format
"%vpnname%-%vpnid%-%servname%-%total-gx-processed%-%total-gy-processed%"
```

pdif schema

Configures Packet Data Interworking Function (PDIF) bulk statistics schema.

Product PDIF

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
pdif schema schema_name format schema_format
no pdif schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for PDIF bulk statistics collection. Multiple PDIF schemas can be created to categorize PDIF bulk statistics. All of the schemas are processed at each collection interval. To create multiple schemas, re-issue the **pdif schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *pdifschema1* for the category current active ipv4 sessions:

```
pdif schema pdifschema1 format %sess-curactip4%
```

pgw schema

Configures Packet Data Network Gateway (P-GW) bulk statistics schema.

Product P-GW

SAEGW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
pgw schema schema_name [ active-only ] format schema_format
no pgw schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for P-GW bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple P-GW schemas can be created to categorize P-GW bulk statistics. All of the schemas are processed at each collection interval. To create multiple P-GW schemas, re-issue the **pgw schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the P-GW schema statistics to those gathered on the Active ICSR chassis.

port schema

Configures port bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
port schema schema_name [ active-only ] format schema_format
no port schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for port bulk statistics collection. Multiple port schemas can be created to categorize port-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple port schemas, re-issue the **port schema** *schema_name* command using a different schema name.

You can also use this command to restrict the port schema statistics to those gathered on the Active ICSR chassis.

Important The *card* variable in the Port schema is not supported on all platforms

Example

To create a port-level schema named *portstats1* that separates the *card/port*, *bcast_inpackets*, and *bcast-outpackets* variables by hyphens ("-"), enter the following command:

```
port schema portstats1 format "%card%/%port% - %bcast_inpackets% -
%bcast_outpackets%"
```

ppp schema

Configures Point-to-Point Protocol (PPP) bulk statistics schema.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ppp schema *schema_name* **[active-only] format** *schema_format*
no ppp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for point-to-point protocol bulk statistics collection. Multiple PPP-service schemas can be created to categorize PPP-service bulk statistics. All of the schemas are processed at each collection interval. To create multiple PPP-service schemas, re-issue the **ppp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the PPP schema statistics to those gathered on the Active ICSR chassis.

Example

To create a ppp-level schema named *pppstats* that specifies a schema format of:

- CHAP: (Challenge Handshake Authentication Protocol)
- Auth. Attempts: *auth-attempt-chapAuth*. Successes: *auth-success-chap*
- PAP: (Password Authentication Protocol)
- Auth. Attempts: *auth-attempt-papAuth*. Successes: *auth-success-pap*

Use the following command:

```
ppp schema pppstats format "CHAP:\nAuth. Attempts:
%auth-attempt-chap%\tAuth. Successes: %auth-success-chap%\nPAP:\nAuth.
Attempts: %auth-attempt-pap%\tAuth. Successes: %auth-success-pap%\n"
```

ps-network-gtpu schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the GTP-U bulk statistics schema in a Packet Switched (PS) network associated with an HNB-GW node.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ps-network-gtpu schema *schema_name* **format** *schema_format*
no ps-network-gtpu schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for GTP-U connection related bulk statistics collection in a PS network associated with HNB-GW in a Femto UMTS network. Multiple PS Networks GTP-U schemas can be created to further categorize at PS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple PS Networks GTPU schemas, re-issue the **ps-network-gtpu schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ps_gtpu1stats1* that records the total number of GTP-U packets received by HNB-GW from CN and sent to CN node in an associated PS network:

```
ps-network-gtpu schema ps_gtpu1stats1 format "%gtpu-pkt-rx%"
"%gtpu-pkt-tx%"
```

ps-network-ranap schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Radio Access Network Application Part (RANAP) bulk statistics schema in Packet Switched (PS) network associated with an HNB-GW node.

Product

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
ps-network-ranap schema schema_name format schema_format
no ps-network-ranap schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for RANAP procedure related bulk statistics collection in a PS network associated with HNB-GW in a Femto UMTS network. Multiple PS Networks RANAP schemas can be created to further categorize at PS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple PS Networks RANAP schemas, re-issue the **ps-network-ranap schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ps_ranap1stats1* that records the total number of Iu Release Request messages transmitted and total number of Iu Release Command message received by HNB-GW node:

```
ps-network-ranap schema ps_ranaplstats1 format "%iu-rel-req-tx%"
"%iu-rel-cmd-rx%"
```

ps-network-sccp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the Signalling Connection Control Part (SCCP) bulk statistics schema in a Packet Switched (PS) network associated with an HNB-GW node.

Product HNB-GW

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
ps-network-sccp schema schema_name format schema_format
no ps-network-sccp schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SCCP connection related bulk statistics collection in a PS network associated with HNB-GW in a Femto UMTS network. Multiple PS Networks SCCP schemas can be created to further categorize at PS network or HNB-GW-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple PS Networks SCCP schemas, re-issue the **ps-network-sccp schema** *schema_name* command using a different schema name.

Example

The following command creates a schema named *ps_sccp1stats1* that records the total number of SCCP connection requests received by HNB-GW and responses sent to CN node in an associated PS network:

```
ps-network-sccp schema ps_sccplstats1 format "%sccp-conn-req-rx%"
"%sccp-conn-req-tx%"
```

radius schema

Configures RADIUS bulk statistics schema.

Product

PDSN

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

radius schema *schema_name* **[active-only] format** *schema_format*
no radius schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters that is case sensitive.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for RADIUS bulk statistics collection. Multiple RADIUS schemas can be created to categorize RADIUS bulk statistics. All of the schemas are processed at each collection interval. To create multiple RADIUS schemas, re-issue the **radius schema** *schema_name* command using a different schema name.

You can also use this command to restrict the RADIUS schema statistics to those gathered on the Active ICSR chassis.

Example

To create a RADIUS schema named *radius_statistics* that specifies a schema format of:

- Server: *ipaddr*
- Authentication Requests Sent: *auth-req-sent*
- Accounting Requests Sent: *acc-req-sent*

Use the following command:

```
radius schema radius_statistics format "Server: %ipaddr%\nAuthentication
 Requests Sent: %auth-req-sent%\nAccounting Requests Sent: %acc-req-sent%"
```

radius-group schema

Configures RADIUS group bulk statistics schema.

Product

PDSN

GGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

radius-group schema *schema_name* **[active-only] format** *schema_format*
no radius-group schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters that is case sensitive.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for RADIUS group bulk statistics collection. Multiple RADIUS group schemas can be created to categorize RADIUS group bulk statistics. All of the schemas are processed at each

collection interval. To create multiple RADIUS group schemas, re-issue the **radius-group schema** *schema_name* command using a different schema name.

You can also use this command to restrict the RADIUS group schema statistics to those gathered on the Active ICSR chassis.

Example

To create a RADIUS group schema named *radius_statistics* that specifies a schema format of:

- Server: *ipaddr*
- Authentication Requests Sent: *auth-req-sent*
- Accounting Requests Sent: *acc-req-sent*

Use the following command:

```
radius-group schema radius_statistics format "Server:
%ipaddr%\nAuthentication Requests Sent: %auth-req-sent%\nAccounting
Requests Sent: %acc-req-sent%"
```

readdress-server schema

Configures the Readdress Server bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

readdress-server schema *schema_name* **[active-only] format** *schema_format*
no readdress-server schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for Readdress Server bulk statistics collection.

receiver

Configures a host system to receive bulkstats information through Trivial File Transfer Protocol (TFTP), File Transfer Protocol (FTP) or SSH File Transfer Protocol (SFTP).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
receiver { mode { redundant | secondary-on-failure } | ip_address { primary
 | secondary } [ mechanism { { ftp login user_name [ encrypted ] password
pwd } | sftp login user_name user_name { public-key | [ encrypted ] password
 pwd } | tftp } } ] }
no receiver ip_address
```

no

Removes the receiver specified from the list of receivers where data files are sent.

mode { redundant | secondary-on-failure }

Determines how bulkstats are delivered to the primary and secondary receivers.

Default: **secondary-on-failure**

redundant: Files are transferred to both the primary and secondary receivers. If either transfer is not currently possible, the file is transferred when possible. The system continues to hold in memory as much data as possible until the data has been successfully transferred to both receivers. Data is only discarded if the in-memory data reaches the configured limit. Refer to the **limit** command.

secondary-on-failure: Files are transferred to the secondary receiver if the primary receiver fails. In-memory data is erased once the data is transferred to either the primary or secondary receiver. This is the default behavior.

ip_address

Specifies the IP address of the receiver of interest using IPv4 dotted-decimal notation.

primary | secondary

Primary and secondary are used to indicate the order in which receivers are connected. The secondary is used when the primary is unreachable.

primary: indicates the receiver is the primary receiver of data.

secondary: indicates the receiver is the secondary receiver of data.

mechanism { { { ftp login *user_name* [encrypted] password *pwd* } | sftp login user_name *user_name* { public-key | [encrypted] password *pwd* } | tftp }

Specifies the method by which data is transferred to the receiver.

ftp login *user_name* **[encrypted] password** *pwd*: the FTP protocol shall be used for data file transfer. *user_name* specifies the user to provide for remote system secure logins and must be an alphanumeric string of 1 through 31 characters. The password to use for remote system authentication is specified as *pwd* and must be from 1 to 31 characters or 1 to 64 characters if the **encrypted** keyword is also specified.

sftp login user_name *user_name* **{ public-key | [encrypted] password** *pwd* **}**: the SFTP protocol shall be used for data file transfer. *user_name* specifies the user to provide for remote system secure logins and must be an alphanumeric string of 1 through 31 characters. The password to use for remote system authentication is specified as *pwd* and must be from 1 to 31 characters or 1 to 64 characters if the **encrypted** keyword is also specified. **public-key** specifies the public key used for SFTP public key authentication for bulkstats transfer.

tftp: the TFTP protocol is to be used to transfer files.

The **encrypted** keyword is intended only for use by the system while saving configuration scripts. The system displays the **encrypted** keyword in the configuration file as a flag that the variable following the **password** keyword is the encrypted version of the plain text password. Only the encrypted password is saved as part of the configuration file.

Usage Guidelines

Use TFTP methods to reduce transfer times if excessive system resources are being used across the network for transfer of data.

FTP transfer method allows for login which then provides system logging within the enabled FTP logs.

The initial connection is attempted to the primary receiver. If the primary receiver is unreachable for any reason, the secondary receiver is used. If the secondary receiver is also unreachable, the system retries after a delay period where it again attempts to connect to the primary receiver followed by the secondary receiver as necessary.

Important For redundant receivers, configuration changes to the receivers are applied to all existing and all subsequent data sets pending transfer. If no receiver is configured, bulk statistics will be collected and stored on the system until the maximum amount of memory is used; they will not be transferred to the receiver(s). When the storage limit has been reached the oldest information is overwritten. When a receiver is configured for the primary and secondary target, this command will use both receivers as default if no receiver is specified.

Example

```
receiver 10.2.3.4 primary mechanism tftp
receiver 10.2.3.5 secondary
no receiver 10.2.3.4
```

remotefile

Configures the naming convention with support for multiple file format to multiple receivers when storing the data files on the remote receiver(s).

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
remotefile format schema_format [ both-receivers | primary-receiver |
secondary-receiver ]
no remotefile format
```

no

Resets the remote file naming convention to the system default.

format *schema_format*

Specifies the naming convention format to use.

schema_format must be an alphanumeric string of 1 through 127 characters. The format string syntax is described in the Schema Format String Syntax, on page 1384 section. Default: "%date%-%time%"

Important The remote file naming format should only use static text and bulk statistic variables to avoid any possible file creation issues on the receivers.

The following variables are supported:

Table 20: remote file Command Naming Format Variables

Variable	Description	Data Type
date	The UTC date that the collection file was created in YYYYMMDD format where YYYY represents the year, MM represents the month and DD represents the day.	String
date3	The UTC date that the collection file was created in YYMMDD format where YY represents the year, MM represents the month and DD represents the day.	String
host	The system hostname that created the file	String
sysuptime	The uptime (in seconds) of the system that created the file.	32-bit signed
time	The time that the collection file was created in HHMMSS format where HH represents the hours, MM represents the minutes, and SS represents the seconds.	String

both-receivers | primary-receiver | secondary-receiver

Sets the remote file creation target to both receivers, primary receiver or secondary receiver. Default: Both receivers.

Usage Guidelines

Set the remote file naming format to ensure consistent data file naming across a network or adjusting a single system's format for easy identification.

This command specifies whether the format should be used in conjunction with both receivers, only the primary receiver, or only the secondary receiver.

Important For redundant receivers, the filenames for the output data files are applied when the information is first gathered. If the name format is modified, the change takes effect for the next data set. The current data set name remains unchanged. even if has not yet been transferred.

Example

```
remotefile format simpleFormat
remotefile format "%host%-%date%-%time%"
remotefile format "%host%-%date%-%time%" both-receivers
remotefile format "%host%-%date%" primary-receiver
no remotefile format
```

rlf schema

Configures the aggregated information for Rate Limiting Function (RLF) context statistics schema.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

rlf schema *schema_name* **format** *schema_format*
no rlf schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for RLF bulk statistics collection. Multiple RLF schemas can be created to categorize RLF bulk statistics. All of the schemas are processed at each collection interval. To create multiple RLF schemas, re-issue the **rlf schema** *schema_name* command using a different schema name.

Example

To create an RLF-level schema named *rlfstats* that specifies a schema format of:

- Date: *date*
- Time: *time*
- Number of Authentication Denials: *deny-auth*

Use the following command:

```
rlf schema rlfstats format "Date: %date%\nTime: %time%\nNumber of
Authentication Denials: %deny-auth%\n"
```

rlf-detailed schema

Configures the detailed instance level information for RLF context statistics schema.

Product

GGSN

P-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

rlf-detailed schema *schema_name* **format** *schema_format*
no rlf-detailed schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for detailed RLF bulk statistics collection. Multiple rlf-detailed schemas can be created to categorize RLF detailed bulk statistics. All of the schemas are processed at each collection interval. To create multiple rlf-detailed schemas, re-issue the **rlf-detailed schema** *schema_name* command using a different schema name.

Example

To create an rlf-detailed level schema named *rlfdetailedstats* that specifies a schema format of:

- Date: *date*
- Time: *time*
- Number of Authentication Denials: *deny-auth*

Use the following command:

```
rlf-detailed schema rlfstats format "Date: %date%\nTime: %time%\nNumber
of Authentication Denials: %deny-auth%\n"
```

rp schema

Configures R-P bulk statistics schema.

Product

PDSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
rp schema schema_name [ active-only ] format schema_format
no rp schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for R-P bulk statistics collection. Multiple PDSN service schemas can be created to categorize PDSN service bulk statistics. All of the schemas are processed at each collection interval. To create multiple PDSN service schemas, re-issue the **rp schema** *schema_name* command using a different schema name.

You can also use this command to restrict the R-P schema statistics to those gathered on the Active ICSR chassis.

Example

To create an PDSN-level schema named *pdsnservicestats* that specifies a schema format of:

- Date: *date*
- Time: *time*
- Number of Authentication Denials: *deny-auth*

Use the following command:

```
rp schema rpservicestats format "Date: %date%\nTime: %time%\nNumber of
Authentication Denials: %deny-auth%\n"
```

rulebase schema

Configures Enhanced Charging Service (ECS) Rulebase bulk statistics schema.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
rulebase schema schema_name [ active-only ] format schema_format
no rulebase schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for ECS Rulebase bulk statistics collection.

You can also use this command to restrict the Rulebase schema statistics to those gathered on the Active ICSR chassis.

saegw schema

Configures System Architecture Evolution Gateway (SAEGW) bulk statistics schema.

Product

SAEGW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
saegw schema schema_name [ active-only ] format schema_format
no saegw schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for SAEGW bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SAEGW schemas can be created to categorize SAEGW bulk statistics. All of the schemas are processed at each collection interval. To create multiple SAEGW schemas, re-issue the **saegw schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the SAEGW schema statistics to those gathered on the Active ICSR chassis.

sample-interval

Configures the time interval between collecting local statistics.

Product All

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description **sample-interval** *minutes*

minutes

Specifies the frequency (in minutes) of polling for local statistics as an integer from 1 through 1440.

Usage Guidelines

Adjust the sampling interval to tune the system response as shorter periods can cause undue system overhead whereas longer periods have less of a statistical importance when analyzing data.

The system is shipped from the factory with the sampling interval set to 15 minutes.

Example

```
sample-interval 120
```

sbc schema

Configures the collection of statistics for the SBc schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sbc schema *schema_name* **format** *schema_format*
no sbc schema *schema_name*

no

Removes the specified SBc schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SBc bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SBc schemas can be created to categorize SBc bulk statistics. All of the schemas are processed at each collection interval. To create multiple SBc schemas, re-issue the **sbc schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an SBc schema named *stats_SBc_pkts_tx_rx* that specifies a collection of statistics (a schema format). The following command defines the collection of the total number of SCTP packets transmitted and received:

```
sbc schema stats_SBc_pkts_tx_rx format "Total SCTP Packets Sent:
%sctp-totsent-pkts%\nTotal SCTP Packets Received: %sctp-totrec-pkts%\n"
```

sccp schema

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Configures the collection of statistics for the SCCP schema.

Product

SGSN

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sccp schema *schema_name* **format** *schema_format*
no sccp schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for the SCCP schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SCCP bulk statistics collection in the generated stats report files.. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SCCP schemas can be created to categorize SCCP bulk statistics. All of the schemas are processed at each collection interval. To create multiple SCCP schemas, re-issue the **sccp schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an SCCP schema named *sccpstats11* that specifies collection of statistics (a schema format) for:

- Subsystem available messages sent from the SCCP
- Subsystem available messages received by the SCCP

Use the following command:

```
sccp schema sccpstats11 format "Subsys avail SCCP Tx: %ssa-txed%\nSubsys
 avail SCCP Rx: %ssa-rcvd%\n"
```

schema

Configures the system-level bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
schema schema_name [ active-only ] format schema_format
no schema schema_name
```

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be an alphanumeric string of 1 through "1021 minus "number of characters in rest of the command, including spaces"" characters. For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for system-level bulk statistics collection. Multiple schemas can be created to categorize system-level bulk statistics. All of the schemas are processed at each collection interval. To create multiple system schemas, re-issue the **schema** *schema_name* command using a different schema name.

You can also use this command to restrict the schema statistics to those gathered on the Active ICSR chassis.

Example

The following command creates a schema named *systemstats1* that records the number of current Simple IP and the number of current Mobile IP sessions:

```
schema systemstats1 format "%sess-cursipconn% - %sess-curmipconn%"
```

To create a system-level schema named *bulksysstats* that specifies a schema format of:

- Number of currently active sessions: *sess-curactcall*
- Number of currently dormant sessions: *sess-curdormcall*

Use the following command:

```
schema bulksysstats format "Number of currently active sessions:
%sess-curactcall%\nNumber of currently dormant sessions:
%sess-curdormcall%\n"
```

sgs schema

Configures the collection of statistics for the SGs interface schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sgs schema *schema_name* **[active-only] format** *schema_format*
no sgs schema *schema_name*

no

Removes the specified SGs schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SGs bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SGs schemas can be created to categorize SGs bulk statistics. All of the schemas are processed at each collection interval. To create multiple SGs schemas, re-issue the **sgs schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the SGs schema statistics to those gathered on the Active ICSR chassis.

Example

Include the bulk statistic variable names to create an SGs schema named *stats_SGs_release* that specifies a collection of statistics (a schema format) for the total number of release messages transmitted, retransmitted, and received:

Use the following command:

```
sgs schema stats_SGs_release format "Total transmitted: %rel-req-tx%\nTotal
 retransmitted: %rel-req-retx%\nTotal received: %rel-req-rx%\n"
```

sgs-vlr schema

Configures the collection of statistics for the SGs-VLR schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sgs-vlr schema *schema_name* **[active-only] format** *schema_format*
no sgs schema *schema_name*

no

Removes the specified SGs-VLR schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SGs-VLR bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SGS-VLR schemas can be created to categorize SGS-VLR bulk statistics. All of the schemas are processed at each collection interval. To create multiple SGS-VLR schemas, re-issue the **sgs-vlr schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the SGs-VLR schema statistics to those gathered on the Active ICSR chassis.

Example

Include the bulk statistic variable names to create an SGs-VLR schema named *stats_SGsVLR_release* that specifies a collection of statistics (a schema format) for the total number of release messages transmitted, retransmitted, and received:

Use the following command:

```
sgs-vlr schema stats_SGsVLR_release format "Total Paging requests
transmitted: %pag-req-tx%\nTotal Paging requests retransmitted:
%pag-req-retx%\nTotal Paging requests received: %pag-req-rx%\n"
```

sgsn schema

Configures the collection of statistics for the SGSN schema.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sgsn schema *schema_name* **format** *schema_format*
no sgsn schema *schema_name*

no

Removes the specified SGSN schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SGSN bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SGSN schemas can be created to categorize SGSN bulk statistics. All of the schemas are processed at each collection interval. To create multiple SGSN schemas, re-issue the **sgsn schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an SGSN schema named *stats_3Gsgsn1* that specifies collection of statistics (a schema format) for the total number of 3G Attaches per LAC/RAC per MCC & MNC:

Use the following command:

```
sgsn schema stats_3Gsgsn1 format "MCC: %mcc%\nMNC: %mnc%\nLAC: %lac%\nRAC:
 %rac%\nTotal 3G Subs Attached: %3G-attached%\n"
```

sgtp schema

Configures the collection of the SGSN's GTP-C and GTP-U activity statistics.

Product

SGSN

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

```
sgtp schema schema_name format schema_format
no sgtp schema schema_name
```

no

Removes the specified SGTP schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SGTP bulk statistics collection in the generated stats report files.. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SGTP schemas can be created to categorize SGTP bulk statistics. All of the schemas are processed at each collection interval. To create multiple SGTP schemas, re-issue the **sgtp schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an SGTP schema named *sgtpstats_sgsn1* that specifies collection of statistics (a schema format) will be by IuPS service interface and by RNC for the total number of GTP-C Create PDP Context Request messages received.

Use the following command:

```
sgtp schema sgtpstats_sgsn1 format "IuPS Service ID: %iups-service%\nRNC:
 %rnc-address%\nTotal CPCR Rx: %sgtpc-total-cpc-req%\n"
```

sgw schema

Configures the collection of the S-GW activity statistics.

Product

S-GW

SAEGW

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sgw schema *schema_name* **format** *schema_format*
no sgw schema *schema_name*

no

Removes the specified S-GW schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for S-GW bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple S-GW schemas can be created to categorize S-GW bulk statistics. All of the schemas are processed at each collection interval. To create multiple S-GW schemas, re-issue the **sgw schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an S-GW schema named *sgwstats_sgw1* that specifies collection of statistics (a schema format) will be by S-GW service interface for the total number of currently idle and active UEs.

Use the following command:

```
sgw schema sgwstats_sgw1 format "SGW Service ID: %servname%\nTotal Current
 Idle Ues: %sessstat-totcur-ueidle%\nTotal Current Active Ues:
%sessstat-totcur-ueactive%\n"
```

show variables

Displays the bulk statistics variable information based on schema names.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

show variables [*schema_name* **] [obsolete]**

show variables *schema_name*

Displays all valid bulkstat schema statistics, or only the statistics for the specified schema.

schema_name specifies the name of the schemas available on the system. Following is the list of available schemas in this release.

- aal2
- alcap
- apn
- asngw
- asnpc
- bcmcs
- card
- closedrp
- common
- context
- cs-network-ranap
- cs-network-rtp
- dcca
- dcca-group
- diameter-acct
- diameter-auth
- dlci-util
- dpca
- ecs
- egtpc
- epdg
- fa
- fng
- gprs
- gtpc

- gtpp
- gtpu
- ha
- hnbgw-hnbap

Important In Release 20 and later, HNBGW is not supported. This keyword must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

- hnbgw-ranap

Important In Release 20 and later, HNBGW is not supported. This keyword must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

- hnbgw-rtp

Important In Release 20 and later, HNBGW is not supported. This keyword must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

- hnbgw-rua

Important In Release 20 and later, HNBGW is not supported. This keyword must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

- hnbgw-sctp

Important In Release 20 and later, HNBGW is not supported. This keyword must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

- hsgw
- imsa
- ippool
- ipsg
- lac
- lma
- lns
- mag

- map
- mipv6ha
- mme
- mvs
- nat-realm
- p2p
- pcc-af
- pcc-policy
- pcc-quota
- pcc-service
- pcc-sp-endpt
- pdg
- pdif
- pgw
- phsgw
- phspc
- port
- ppp
- ps-network-ranap
- radius
- radius-group
- rlf
- rlf-detailed
- rp
- saegw
- sccp
- sgs
- sgsn
- sgtp
- sgw
- ss7link
- ss7rd
- system
- vpn

obsolete

Displays obsolete (but still available) schema variables. An asterisk (*) is displayed next to schema variables that have been obsoleted.

Usage Guidelines

Use this command to list supported bulk statistic variables. Variables can be listed for a specified schema. If no schema is specified, all supported variables are listed on a per-schema basis.

Example

The following command displays the bulkstat variables only for the card schema:

```
show variables card
```

sls schema

Configures the collection of statistics for the SLs interface schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

sls schema *schema_name* **format** *schema_format*
no sls schema *schema_name*

no

Removes the specified SLs schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SLs interface bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple SLs schemas can be created to categorize SLs bulk statistics. All of the schemas are processed at each collection interval. To create multiple SLs schemas, re-issue the **sls schema** *schema_name* command using a different schema name each time.

Example

Include the bulk statistic variable names to create an SLs schema named *stats_SLs_pkts_tx_rx* that specifies a collection of statistics (a schema format) for the total number of SCTP packets transmitted and received:

Use the following command:

```
sls schema stats_SLs_pkts_tx_rx format "Total SCTP Packets Sent:
%sctp-totsent-pkts%\nTotal SCTP Packets Received: %sctp-totrec-pkts%\n"
```

smart-license schema

Configures Cisco Smart Licensing bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

smart-license schema *schema_name* **[active-only] format** *schema_format*
no smart-license schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines Use this command to define schemas for Cisco Smart Licensing bulk statistics collection. Multiple service schemas can be created to categorize Smart License bulk statistics. All of the schemas are processed at each collection interval. To create multiple Smart License schemas, re-issue the **smart-license schema** *schema_name* command using a different schema name.

ss7link schema

Configures the collection of the SS7 link activity statistics.

Product SGSN

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ss7link schema *schema_name* **format** *schema_format*
no ss7link schema *schema_name*

no

Removes the specified SS7 Link schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for SS7 link and linkset bulk statistics collection per SS7 routing domain in a generated stats report file. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple collection schemas can be created to categorize SS7 link bulk statistics. All of the schemas are processed at each collection interval. To create multiple SS7 link schemas, re-issue the **ss7link schema** *schema_name* command using a different schema name each time.

Example

The following command creates a schema named *ss7lnk1stats1* that records the changeover orders sent and received per linkset and link and per SS7 routing domain:

```
ss7link schema ss7lnk1stats1 format
"%ss7rd-number% %ss7-linkset-id% %ss7-link-id% %ss7rd-ap_instance% %ss7-link-mtp3-changeover-order-tx% %ss7-link-mtp3-changeover-order-rx%"
```

ss7rd schema

Configures the collection of bulk statistics for SS7 routing domain services, which include the activity statistics for SCTP, MTP, and M3UA data.

Important In Release 20 and later, HNBGW is not supported. This command must not be used for HNBGW in Release 20 and later. For more information, contact your Cisco account representative.

Product

SGSN

HNB-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

ss7rd schema *schema_name* **format** *schema_format*
no ss7rd schema *schema_name*

no

Removes the specified SS7 routing domain schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see Schema Format String Syntax, on page 1384.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for collection of SS7 routing domain statistics to be included in the generated stats report file. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple collection schemas can be created to categorize SS7 routing domain bulk statistics. All of the schemas are processed at each collection interval. To create multiple SS7 routing domain schemas, re-issue the **ss7rd schema** *schema_name* command using a different schema name each time.

Example

The following command creates a schema named *ss7rd1stats1* that identifies the SS7 routing domain and records the Application Server Process instance in the SS7 routing domain, along with the total number of sent and received SHUTDOWN messages per SS7 routing domain:

```
ss7rd schema ss7rd1stats1 format
"%ss7rd-number%-%ss7rd-asp_instance%-%ss7rd-sctp-shutdown-tx%-%ss7rd-sctp-shutdown-rx%"
```

tai schema

Configures TAI (Tracking Area Identifier) bulk statistics schema.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

tai schema *schema_name* **format** *schema_format*
no tai schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

format *schema_format*

Specifies the format of the collected TAI statistics by identifying the statistics variables and ordering the variables for presentation within the bulk statistics messages.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for TAI bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified. Multiple TAI schemas can be created to categorize TAI bulk statistics. All of the schemas are processed at each collection interval. To create multiple TAI schemas, re-issue the **tai schema** *schema_name* command using a different schema name each time.

Important To enable collection of TAI schema bulk statistics, you must issue the MME Service Configuration Mode command: **statistics collection-mode tai**. Only those MME Services which are configured accordingly will provide TAI based statistics.

Example

The following command creates a TAI schema with the following information: MNC, MCC, TAC, and the total number of paging attempts.

```
tai schema paging_attempted format "%tai-mnc% %tai-mcc% %tai-tac%
%tai-paging-attempted%"
```

transfer-interval

Configures the frequency of transfer of collected statistics to the receiver.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

transfer-interval *minutes*

minutes

Specifies the number of minutes between the transfer of collected statistics to the receivers as an integer from 1 through 999999.

Usage Guidelines

Modify the transfer interval based upon the number of sessions per second. As the number of session requests a second increases it may become necessary to increase the transfer interval to reduce the processing overhead frequency for statistics delivery. This is tempered by the impact reduced resolution of statical data has on usefulness of data when the interval gets larger than the least busy hours and most busy hours of the day.

The system is shipped from the factory with the transfer interval set to 480 minutes (6 hours).

Example

The following command sets the transfer interval to 24 hours (1440 minutes):

transfer-interval 1440

vlan-npu schema

Configures the collection of VLAN-NPU activity statistics.

Product

Important The VLAN-NPU counters will only be displayed if the **logical-port-statistics** command has been enabled at the interface level under the Ethernet Interface Configuration mode.

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

vlan-npu schema *schema_name* **[active-only] format** *schema_format*
no vlan-npu schema *schema_name*

no

Removes the specified VLAN-NPU schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for VLAN-NPU bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple VLAN-NPU schemas can be created to categorize VLAN-NPU bulk statistics. All of the schemas are processed at each collection interval. To create multiple VLAN-NPU schemas, re-issue the **vlan-npu schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the VLAN-NPU schema statistics to those gathered on the Active ICSR chassis.

Example

Include the bulk statistic variable names to create a VLAN-NPU schema named *vlanstats_vlan12* that specifies collection of statistics (a schema format) will be by VLAN-NPU interface for the total number of frames and bytes received with no Access Control List (ACL) match.

```
vlan-npu schema vlanstats_vlan12 format "VLAN12: %interfacename%\nTotal
Frames Recv'd with no ACL match: %no-acl-match-rx-frames%\nTotal Bytes
Recv'd with no ACL match: %no-acl-match-rx-bytes%\n"
```

vrf schema

Configures VRF (Virtual Routing and Forwarding) bulk statistics schema.

Product

All

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

vrf schema *schema_name* **[active-only] format** *schema_format*
no vrf schema *schema_name*

no

Removes the specified schema.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for VRF bulk statistics collection. Multiple LMA service schemas can be created to categorize VRF bulk statistics. All of the schemas are processed at each collection interval. To create multiple VRF schemas, re-issue the **vrf schema** *schema_name* command using a different schema name.

You can also use this command to restrict the VRF schema statistics to those gathered on the Active ICSR chassis.

wsg schema

Configures the collection of Wireless Security Gateway (WSG) activity statistics.

Product

WSG

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Bulk Statistics Configuration

configure > bulkstats mode

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-bulkstats)#
```

Syntax Description

wsg schema *schema_name* **[active-only] format** *schema_format*
no wsg schema *schema_name*

no

Removes the specified WSG schema from statistics collection.

schema_name

Specifies the schema's name.

schema_name must be an alphanumeric string of 1 through 31 characters.

active-only

Specifies that the bulk statistics are to be gathered on the Active ICSR chassis only.

format *schema_format*

Specifies the schema's format.

schema_format must be a string of 1 through 3599 characters, including spaces within double quotation marks (" "). For more information, see the Schema Format String Length, on page 1384 section.

For information on the schema format's syntax, see the Schema Format String Syntax, on page 1384 section.

Important For a complete list of the statistics that are supported for this schema, refer to the *Statistics and Counters Reference*.

Usage Guidelines

Use this command to define schemas for WSG bulk statistics collection in the generated stats report files. Usually a schema consists of multiple variables to collect all the statistics for a particular situation. Using double quote marks and text within this command, the reported statistics can be easily identified.

Multiple WSG schemas can be created to categorize WSG bulk statistics. All of the schemas are processed at each collection interval. To create multiple WSG schemas, re-issue the **wsg schema** *schema_name* command using a different schema name each time.

You can also use this command to restrict the WSG schema statistics to those gathered on the Active ICSR chassis.