Cisco Nexus 3550-T NX-OS Smart Licensing Using Policy User Guide

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Preface

This preface includes the following sections:

Audience

This publication is for network administrators who install, configure, and maintain Cisco Nexus switches.

Document Conventions

Command descriptions use the following conventions:

Convention	Description
bold	Bold text indicates the commands and keywords that you enter literally as shown.
Italic	Italic text indicates arguments for which you supply the values.
[x]	Square brackets enclose an optional element (keyword or argument).
[x | y]	Square brackets enclosing keywords or arguments that are separated by a vertical bar indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments that are separated by a vertical bar indicate a required choice.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.

Convention	Description
`variable`	Indicates a variable for which you supply values, in context where italics cannot be used.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string includes the quotation marks.

Examples use the following conventions:

Convention	Description
`screen font`	Terminal sessions and information the switch displays are in screen font.
`boldface screen font`	Information that you must enter is in boldface screen font.
italic screen font	Arguments for which you supply values are in italic screen font.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Related Documentation for Cisco Nexus 3550-T Switches

The entire Cisco Nexus 3550-T switch documentation set is available at the following URL:

https://www.cisco.com/c/en/us/support/switches/nexus-3550-series/series.html

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to nexus9k-docfeedback@cisco.com. We appreciate your feedback.

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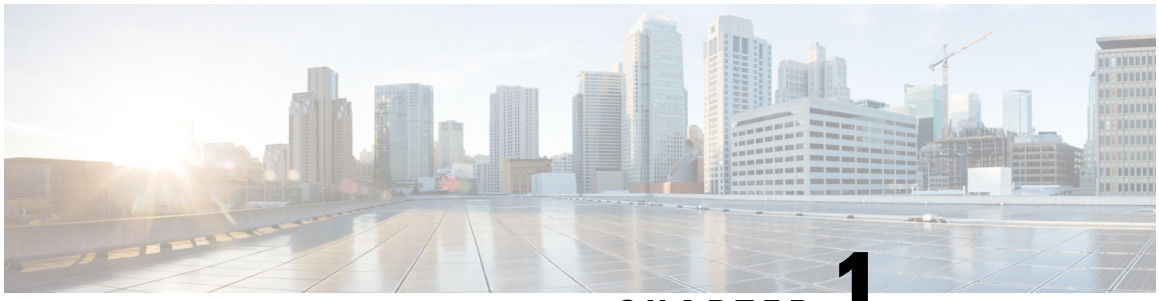
Cisco Bug Search Tool

Cisco Bug Search Tool (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

Preface



CHAPTER 1

New and Changed Information

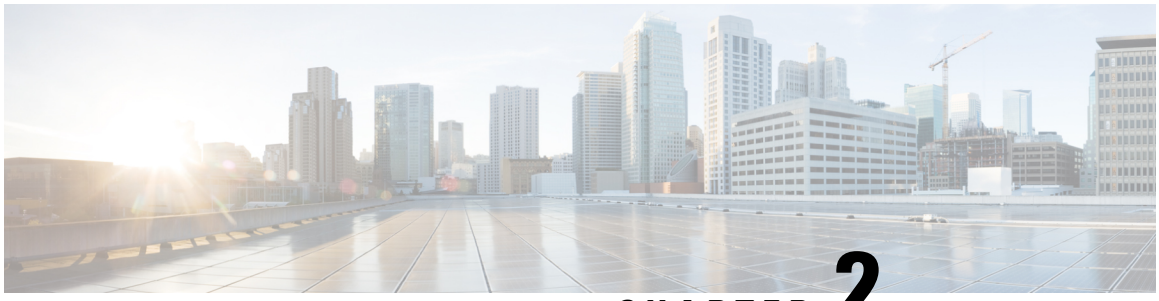
This chapter provides release-specific information for each new and changed feature in the Cisco Nexus 3550-T NX-OS Smart Licensing Using Policy User Guide , Release 10.2(3t) version.

New and Changed Information

The following table lists the changes to this document.

Date	Description
September 2022	Initial release of this document for Cisco NX-OS release 10.2(3t).

New and Changed Information



CHAPTER 2

Smart Licensing Using Policy

About this Guide

This document provides information about Smart Licensing Using Policy such as the concept, architecture, supported products and topologies, configuration, migration, tasks, and troubleshooting only for Cisco Nexus 3550-T switches, Release 10.2(3t).

Note The documentation set for this product strives to use bias-free language. For the 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.

Overview

Smart Licensing Using Policy (SLP) is an enhanced version of Smart Licensing, the objective of which is to provide a licensing solution that does not interrupt the operations of your network and to enable a compliance relationship to account for the hardware and software licenses you purchase and use.

SLP is supported starting with Cisco Nexus 3550-T switches, Release 10.2(3t). This document provides information only on SLP.

The primary benefits of this enhanced licensing model are:

- Seamless day-0 operations

  After a license is ordered, no preliminary steps, such as registration or generation of keys, are required unless you use an export-controlled or enforced license. There are no export-controlled or enforced licenses on Cisco Nexus Switches, and product features can be configured on the device right-away.

- Consistency in Cisco NX-OS

  Devices that run Cisco NX-OS software have a uniform licensing experience.

- Visibility and manageability

  Tools, telemetry, and product tagging.

- Flexible, time series reporting to remain compliant

  Easy reporting options are available, whether you are directly or indirectly connected to Cisco Smart Software Manager (CSSM).

This document provides conceptual, configuration, and troubleshooting information for SLP on Cisco Nexus Switches. For a more detailed overview on Cisco Licensing, go to cisco.com/go/licensingguide.

The conceptual information includes an overview of SLP, supported products, supported topology, and explains how SLP interacts with other features. SLP is a software license management solution that provides a seamless experience with the following aspects of licensing:

- Purchase licenses: Purchase licenses through the existing channels and use the Cisco Smart Software Manager (CSSM) portal to view product instances and licenses.

Note To simplify your implementation of SLP, provide your Smart Account and Virtual Account information when placing an order for new hardware or software. This allows Cisco to install applicable policies (terms explained in the Concepts section below), at the time of manufacturing.

- Use: All licenses on Cisco Nexus Switches are unenforced. This means that you do not have to complete any licensing-specific operations, such as registering or generating keys before you start using the software and the licenses that are tied to it. License usage is recorded on your device with timestamps and the required workflows can be completed later.
- Report license usage to CSSM: Multiple options are available for license usage reporting. You can use the Cisco Smart Licensing Utility (CSLU), or report usage information directly to CSSM. For air-gapped networks, a provision for offline reporting where you download usage information and upload it to CSSM, is also available. The usage report is in plain text XML format.
- Reconcile: For situations where delta billing applies (purchased versus consumed).

Glossary

The following list describes acronyms and definitions for terms used throughout this document:

- **SLP:** Smart License Using Policy

- **CSLU:** Cisco Smart Licensing Utility
- **PI:** Product Instance
- **SA:** Smart Agent
- **UDI:** Unique Device Identifier
- **CSSM:** Cisco Smart Software Manager
- **LCS:** Licensing Crypto Services
- **RUM report:** Resource Utilization Measurement (ISO19770-4)
- **Pull mode:** A mode in which the CSLU uses netconf/restconf/grpc & YANG or REST to connect to the PI and exchange data.
- **Push mode:** A mode in which the PI initiates communications with the CSLU by sending requests to a REST endpoint in the CSLU.
- **Enforced license:** Enforced license represents a feature that the product should not allow to be used without authorization.
- **Unenforced license:** Unenforced license represents a feature that the product does not enforce use.
- **Reported state:** Occurs when the device license state has been reported to be in use to the CSSM. This occurs when shipped or later when the device first reports.
- **Un-Reported state:** The device has not yet been reported its license usage to the CSSM and received an acknowledgment back from CSSM.

Architecture

This section explains the various components that can be part of your implementation of SLP.

Product Instance

A product instance, for example, a switch, is a single instance of a Cisco product, which is identified by a Unique Device Identifier (UDI).

A product instance records and reports license usage (Resource Utilization Measurement reports) and provides alerts and system messages about issues such as overdue reports and communication failures. Resource Utilization Measurement (RUM) reports and usage data are securely stored in the product instance.

Throughout this document, the term product instance refers to all supported physical and virtual product instances, unless noted otherwise. For information about the product instances that are within the scope of this document, see Supported Products, on page 17.

CSSM

Cisco Smart Software Manager (CSSM) is a portal that enables you to manage all your Cisco software licenses from a centralized location. CSSM helps you manage current requirements and review usage trends to plan for future license requirements.

You can access the CSSM Web UI at https://software.cisco.com. Navigate to Manage licenses link.

See Supported Topologies, on page 12 to know about the different ways in which you can connect to CSSM.

In CSSM you can perform the following:

- Create, manage, or view virtual accounts
- Create and manage Product Instance Registration Tokens
- Transfer licenses between virtual accounts or view licenses
- Transfer, remove, or view product instances
- Run reports against your virtual accounts
- Modify your email notification settings
- View overall account information

CSLU

Cisco Smart License Utility (CSLU) is a Windows-based reporting utility that provides aggregate licensing workflows. This utility performs the following key functions:

- Provides options relating to how workflows are triggered. The workflows can be triggered by CSLU or by the product instance.
- Collects usage reports from the product instance and uploads these usage reports to the corresponding Smart Account or Virtual Account, online or offline, using files. Similarly, the RUM report ACK is collected online or offline and sent back to the product instance.
- Sends authorization code requests to CSSM and receives authorization codes from CSSM, if applicable.

CSLU can be part of your implementation in the following ways:

- Install the Windows application to use CSLU as a standalone tool that is connected to CSSM.
- Install the Windows application to use CSLU as a standalone tool that is disconnected from CSSM. With this option, the required usage information is downloaded to a file and then uploaded to CSSM. This is suited for air-gapped networks.

SSM On-Prem

Smart Software Manager On-Prem (SSM On-Prem) is an asset manager, which works in conjunction with CSSM. It enables you to administer products and licenses on your premises instead of having to directly connect to CSSM.

Information about the required software versions to implement SLP with SSM On-Prem, is provided below:

Minimum Required SSM On-Prem Version for SLP	Minimum Required Cisco NX-OS Version
Version 8, August, 2021	Cisco NX-OS Release 10.2(3t)

[1] The minimum required SSM On-Prem version. This means support continues on all subsequent releases - unless noted otherwise.

2 The minimum required software version on the product instance. This means support continues on all subsequent releases - unless noted otherwise.

For more information about SSM On-Prem, see Smart Software Manager On-Prem on the Software Download page. Hover over the .iso image to display the documentation links to the following guides:

- Installation Guide – SSM On-Prem Installation Guide
- Release Notes – Cisco Smart Software Manager On-Prem Release Notes
- User Guide – Smart Software Manager On-Prem User Guide
- Console Guide – Smart Software Manager On-Prem Console Reference Guide
- Quick Start Guide – Smart Software Manager On-Prem Quick Start Installation Guide

Guidelines and Limitations

The SLP feature has the following guidelines and limitations:

- CSLU-initiated communication/pull mode is not supported in Cisco Nexus 3550-T switches, Release 10.2(3t).
- CSLU configuration is mandatory if callhome is not configured and the device is not registered with CSSM, when moving from pre-SLP releases to SLP in Cisco Nexus 3550-T switches, Release 10.2(3t). For more information, see Connected to CSSM Through CSLU.
- Standalone CSLU does not support multi-tenancy, it supports only single SA/VA. However, On-Prem CSLU supports multi-tenancy.
- For auto discovery, only one CSLU can be used in the network.
- SLP MIB is not supported.
- Only CSLU mode of transport is supported on On-Prem.
- While using the transport mode as CSLU, if licenses do not get released from the SA/VA after write-erase and reload of the switch, it is recommended to delete the Product Instance from the SA/VA.
- When a switch is being reset to factory defaults using “write erase” command, it is recommended to do a “License smart factory reset” before reloading the switch.
- Cisco Nexus 3550-T switches, Release 10.2(3t) supports only the SLP licensing mode.

Concepts

This section explains the key concepts of SLP.

License Enforcement Types

The only enforcement type supported on Cisco Nexus 3550-T switches, Release 10.2(3t) platform switches is Unenforced or Not Enforced. Unenforced licenses do not require authorization before use in air-gapped

networks or in connected networks. The terms of use for such licenses are as per the end user license agreement (EULA).

Note Enforced and Export licenses are not supported on Cisco Nexus 3550-T switches, Release 10.2(3t) platform switches.

License Duration

This refers to the duration or term for which a purchased license is valid. A given license may belong to any one of the enforcement types mentioned above and be valid for the following durations:

- Perpetual: There is no expiration date for such a license.
- Subscription: The license is valid only until a certain date.

Policy

A policy provides the product instance with these reporting instructions:

- License usage report acknowledgment requirement (Reporting ACK required): The license usage report is known as a RUM Report and the acknowledgment is referred to as an ACK (See RUM Report and Report Acknowledgment). This is a yes or no value that specifies if the report for this product instance requires CSSM acknowledgment. The default policy is always set to yes.
- First report requirement (days): The first report must be sent within the duration specified here.
- Reporting frequency (days): The subsequent report must be sent within the duration specified here.
- Report on change (days): If there is a change in license usage, a report must be sent within the duration specified here.

Understanding the Policy Selection

CSSM determines the policy that is applied to a product instance. Only one policy is in use at a given point in time. The policy and its values are based on several factors, including the licenses being used.

Cisco default is the default policy that is always available in the product instance. If no other policy is applied, the product instance applies this default policy. Table 1: Policy Cisco default for NX-OS shows the Cisco default policy values.

While you cannot configure a policy, you can request for a customized one, by contacting the Cisco Global Licensing Operations team. Go to Support Case Manager. Click **OPEN NEW CASE** > **Select Software Licensing**. The licensing team will contact you to start the process or for any additional information. Customized policies are also made available through your Smart account in CSSM.

Note To know which policy is applied (the policy in-use) and its reporting requirements, enter the **show license all** command in privileged EXEC mode.

Table 1: Policy Cisco default for NX-OS

Policy: Cisco Default	Default Policy Values
Unenforced/Non-Export	Reporting ACK required: Yes First report requirement (days): 90 Reporting frequency (days): 365 Report on change (days): 90

RUM Report and Report Acknowledgment

A Resource Utilization Measurement report (RUM report) is a license usage report, which the product instance generates, to fulfill reporting requirements as specified by the policy.

An acknowledgment (ACK) is a response from CSSM and provides information about the status of a RUM report.

The policy that is applied to a product instance determines the following reporting requirements:

- Whether a RUM report is sent to CSSM, and the maximum number of days provided to meet this requirement.
- Whether the RUM report requires an acknowledgment (ACK) from CSSM.
- The maximum number of days provided to report a change in license consumption.

A RUM report sent to CSSM from device/CSLU may be accompanied by other requests.

Note System logs are generated at X and X-30 days if reporting is not done. X is the reporting interval per the policy.

Below is the example for RUM:

```
<?xml version="1.0" encoding="UTF-8"?>
<smartLicense>
<RUMReport>
<![CDATA[
{
   "payload":"{
      "asset_identification":{
         "asset":{
          "name":"regid.2021-12.com.cisco.N3550_T,1.0_02ed5969-299b-49ea-9097-d4219b0d03a0"

          },
          "instance":{
             "sudi":{
                "udi_pid":"N35-T-48X",
                "udi_serial_number":"EXATRI-A-01828"
                }
           },
           "signature":{
              "signing_type":"builtin",

"key":"regid.2021-12.com.cisco.N3550_T,1.0_02ed5969-299b-49ea-9097-d4219b0d03a0",
              "value":"yMf1IwYjQoI9DXbM2z0NwxptvPqAa4GEbnfGIe9679A="
```

```
            }
          },
          "meta":{

"entitlement_tag":"regid.2021-12.com.cisco.NX_OS_ESSENTIALS_Nexus3550_T,1.0_1c469435-bfdb-4377-b402-6873b39d860b",

            "report_id":1659085457,
            "software_version":"10.2(3)I9(1)",
            "ha_udi":[
               {
                  "role":"Active",
                  "sudi":{
                  "udi_pid":"N35-T-48X",
                  "udi_serial_number":"EXATRI-A-01828"
                 }
               }
            ]
          },
          "measurements":[
           {
              "log_time":1659085460,
              "metric_name":"ENTITLEMENT",
              "start_time":1659085460,
              "end_time":1659085461,
              "sample_interval":1,
              "num_samples":1,
              "meta":{
                 "termination_reason":"CurrentUsageRequested"
              },
              "value":{
                 "type":"COUNT",
                 "value":"1"
              }
           }
        ]
    },
    "header":{
       "type":"rum"
    },
    "signature":{
       "sudi":{
          "udi_pid":"N35-T-48X",
          "udi_serial_number":"EXATRI-A-01828"
       },
       "signing_type":"builtin",
       "key":"regid.2021-12.com.cisco.N3550_T,1.0_02ed5969-299b-49ea-9097-d4219b0d03a0",
       "value":"3CiyiukUQwPKj54KMhOV9+Fq4munp5SzyhjKe+AiYU8="
    }
}
]]>
</RUMReport>
</smartLicense>
```


Below is the example for RUM ACK


```
<?xml version="1.0" encoding="UTF-8"?>
<smartLicense>
   <smartLicenseRumAck>
      <data>
        <![CDATA[[
        {
           "status_code":"OK",
           "status_message":"Rum Report is accepted.",
           "localized_message":"Rum Report is accepted.",
           "product_instance_identifier":"ebd10898-aa6d-4697-a7bc-5d4a0f24d775",
```

```
            "sudi":{
               "udi_pid":"N35-T-48X",
               "udi_serial_number":"EXATRI-A-01828"
            },
            "report_id":1659085457,
            "correlation_id":"62e3a463ff87b0c4989af00aa4d526bc-fdba9fd67bb17e0c",
            "subscription_id":null
         }
       ]]]>
     </data>

<signature>MEQCIAO/5kmtTQOVyUWWkRuuLR7FRC5RNtW4ZHp2XqyKixOPAiBOZjmZ8vfmMrqU9c4RplKgwJfIqKwnqP3BiWdO6udScQ==</signature>

   </smartLicenseRumAck>
   <smartLicensePolicy>
     <policyCode>
         <name>SLE Policy</name>
         <version>5</version>
         <flag></flag>
         <datestamp>2021-10-25T18:50:17</datestamp>
         <ackRequired>yes</ackRequired>
         <subscription>
            <firstTimeReport>120</firstTimeReport>
            <onGoingReporting>111</onGoingReporting>
            <reportOnMACD>111</reportOnMACD>
         </subscription>
         <perpetual>
            <firstTimeReport>30</firstTimeReport>
            <onGoingReporting>60</onGoingReporting>
            <reportOnMACD>60</reportOnMACD>
         </perpetual>
         <enforced>
            <onGoingReporting>90</onGoingReporting>
            <reportOnMACD>60</reportOnMACD>
         </enforced>
         <export>
            <onGoingReporting>30</onGoingReporting>
            <reportOnMACD>30</reportOnMACD>
         </export>
         <generic>
            <firstTimeReport>90</firstTimeReport>
            <onGoingReporting>365</onGoingReporting>
            <reportOnMACD>120</reportOnMACD>
         </generic>
     </policyCode>

<signature>MEYCIQC5RWI0zYVCfSnjxtopYjNFlQPbF4LG6egvHMmqmnalZgIhAIwxJzxIxWmj+NAYqO4Y14CRixKktiUs/SwWtWk8RybG</signature>

   </smartLicensePolicy>
   <smartLicenseAccountInfo>
      <customerInfo>
         <timestamp>1659085985394</timestamp>
         <smartAccount>BU Production Test</smartAccount>
         <virtualAccount>N39K_SA_Testing_01</virtualAccount>
         <smartAccountId>10560</smartAccountId>
         <virtualAccountId>506899</virtualAccountId>
         <smartAccountDomain>buproductiontest.cisco.com</smartAccountDomain>
      </customerInfo>

<signature>MEYCIQDEgcsiwUDiF8uLcDOPNQ3TCngiG8F99/27WtQ4KoEOugIhANsv++syb1DIhxC0h4hNyujRlYFCpagDKYJh836fHK+B</signature>

   </smartLicenseAccountInfo>
   <correlationID>ngnx-7cc93b23493a0a7eba0d5f12a9c85be7</correlationID>
</smartLicense>
```

Trust Code

Trust code is a UDI-tied public key with which the product instance signs a RUM report. This prevents tampering and ensures data authenticity.

Supported Topologies

This section describes the various ways in which you can implement SLP. For each topology, refer to the accompanying overview to know how the setup is designed to work, and refer to the considerations and recommendations, if any.

Choosing a Topology

The following table allows you to choose a topology depending on your network deployment.

Topology	Recommendations
Topology 1: Connected to CSSM Through CSLU, on page 13	Use this topology when you do not want the switches to be directly connected to CSSM. This topology will support only one SA/VA combination.
Topology 2: Connected Directly to CSSM, on page 13	Use this topology when you have switches that are already registered to CSSM and need to continue in the same mode. If you need to continue using this topology after upgrading to SLP, then Smart Transport is the preferred transport method.
Topology 3: CSLU Disconnected from CSSM, on page 15	Use this topology when you need to manage or view license consumption locally. You can also use multiple VA.
Topology 4: No Connectivity to CSSM and No CSLU, on page 15	Use this topology when you want to collect licensing information from a single source and when there is no connectivity to CSSM. You cannot view license consumption locally. Also, only a single VA can be used.
Topology 5: Connected to CSSM Through SSM On-Prem, on page 16	Use this topology when you want to collect licensing information from each switch in the network and when there is no connectivity to CSSM.
Topology 6: SSM On-Prem Disconnected from CSSM, on page 16	Use this topology when you want to manage or view licenses from a single source. You can view license consumption locally. You can also use multiple SA/VA combinations.

Topology 1: Connected to CSSM Through CSLU

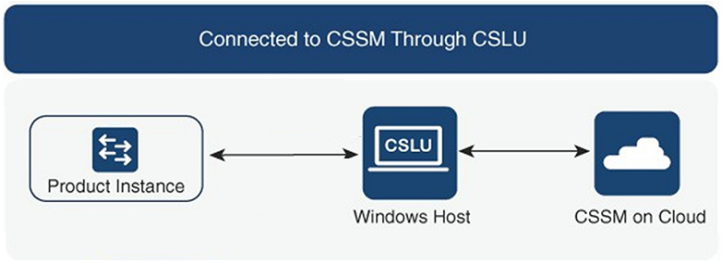
Overview:

Here, product instances in the network are connected to CSLU, and CSLU becomes the single point of interface with CSSM. A product instance can be configured to push the required information to CSLU.

The communication between PI to CSLU, and CSLU to CSSM occurs online through HTTPS mode. The Product Instance Service Port is 8182, and the REST API Port number is 8180.

Product instance-initiated communication (push): A product instance initiates communication with On-Prem CSLU, by connecting to a REST endpoint in CSLU. Data that is sent includes RUM reports. You can configure the product instance to automatically send RUM reports to CSLU at required intervals.

Figure 1: Topology: Connected to CSSM Through CSLU



Considerations or Recommendations:

Choose the method of communication depending on your network's security policy.

Where to Go Next:

To implement this topology, see Connected to CSSM Through CSLU, on page 19.

Topology 2: Connected Directly to CSSM

Overview:

This topology is available in the earlier version of Smart Licensing and continues to be supported with SLP.

Here, you establish a direct and trusted connection from a product instance to CSSM. The direct connection requires network availability to CSSM. For the product instance to then exchange messages and communicate with CSSM, configure one of the transport options available with this topology (described below). Lastly, the establishment of trust requires the generation of a token from the corresponding Smart Account and Virtual Account in CSSM, and installation on the product instance.

You can configure a product instance to communicate with CSSM in the following ways:

- Use Smart transport to communicate with CSSM

  Smart transport is a transport method where a Smart Licensing (JSON) message is contained within an HTTPs message, and exchanged between a product instance and CSSM, to communicate. The following Smart transport configuration options are available:

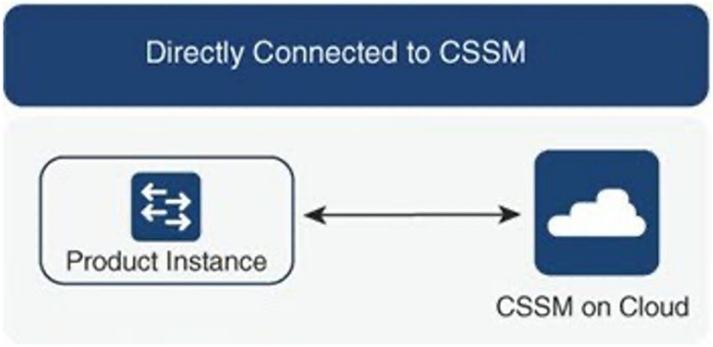
- Smart transport: In this method, a product instance uses a specific Smart transport licensing server URL. This must be configured exactly as shown in the workflow section.
- Smart transport through an HTTPS proxy: In this method, a product instance uses a proxy server to communicate with the licensing server, and eventually, CSSM.

- Use Callhome to communicate with CSSM.

  Callhome provides e-mail-based and web-based notification of critical system events. This method of connecting to CSSM is available in the earlier Smart Licensing environment and remains available with SLP. The following Callhome configuration options are available:

  - Direct cloud access: In this method, a product instance sends usage information directly over the internet to CSSM; no additional components are needed for the connection.
  - Direct cloud access through an HTTPS proxy: In this method, a product instance sends usage information over the internet through a proxy server - either a Callhome Transport Gateway or an off-the-shelf proxy (such as Apache) to CSSM.

Figure 2: Topology: Connected Directly to CSSM



Considerations or Recommendations:

Smart transport is the recommended transport method when directly connecting to CSSM. This recommendation applies to:

- New deployments.
- Earlier licensing models. Change configuration after migration to SLP.
- Registered licenses that currently use the Callhome transport method. Change configuration after migration to SLP.
- Evaluation or expired licenses in an earlier licensing model. Change configuration after migration to SLP.

To change configuration after migration, see **Connected Directly to CSSM** > **Product Instance Configuration** > **Configure a connection method and transport type** > **Option 1**.

Where to Go Next:

To implement this topology, see Connected Directly to CSSM, on page 21.

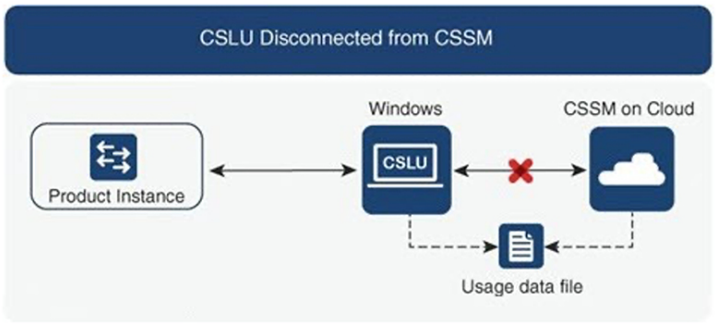
Topology 3: CSLU Disconnected from CSSM

Overview:

Here, a product instance communicates with CSLU, and you can implement the product instance-initiated communication. The other side of the communication, between CSLU and CSSM, is offline. CSLU provides you with the option of working in a move that is disconnected from CSSM.

Communication between CSLU and CSSM is sent and received in the form of signed files that are saved offline and then uploaded to or downloaded from CSLU or CSSM.

Figure 3: Topology: CSLU Disconnected from CSSM



Considerations or Recommendations:

None.

Where to Go Next:

To implement this topology, see CSLU Disconnected from CSSM, on page 22.

Topology 4: No Connectivity to CSSM and No CSLU

Overview:

Here you have a product instance and CSSM disconnected from each other, and without any other intermediary utilities or components. All communication is in the form of uploaded and downloaded files.

Figure 4: Topology: No Connectivity to CSSM and No CSLU

Considerations or Recommendations:

This topology is suited to a high-security deployment where a product instance cannot communicate online, with anything outside its network.

Where to Go Next:

To implement this topology, see No Connectivity to CSSM and No CSLU, on page 27.

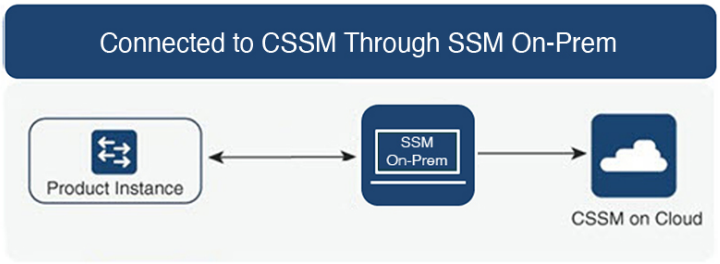
Topology 5: Connected to CSSM Through SSM On-Prem

Overview:

Here, product instances in the network are connected to Smart Software Manager (SSM) On-Prem, and SSM On-Prem becomes the single point of interface with CSSM. A product instance can be configured to push the required information to SSM On-Prem.

Product instance-initiated communication (push): A product instance initiates communication with SSM On-Prem, by connecting to a REST endpoint in SSM On-Prem. Data that is sent includes RUM reports. You can configure the product instance to automatically send RUM reports to SSM On-Prem at required intervals.

Figure 5: Topology: Connected to CSSM Through SSM On-Prem



Considerations or Recommendations:

Choose the method of communication depending on your network's security policy.

Where to Go Next:

To implement this topology, see Connected to CSSM Through SSM On-Prem, on page 24 .

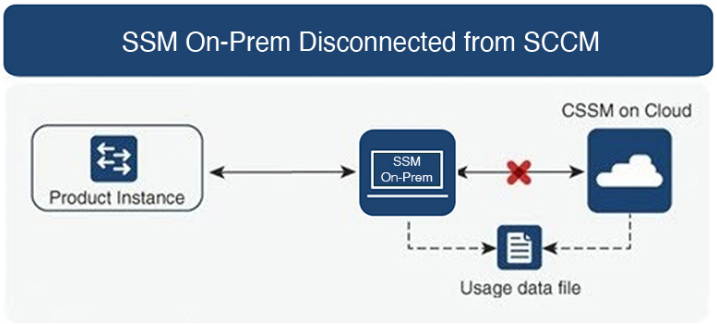
Topology 6: SSM On-Prem Disconnected from CSSM

Overview:

Here, a product instance communicates with SSM On-Prem, and you can implement the product instance-initiated communication. The other side of the communication, between SSM On-Prem and CSSM, is offline. SSM On-Prem provides you with the option of working in a mode that is disconnected from CSSM.

Communication between SSM On-Prem and CSSM is sent and received in the form of signed files that are saved offline and then uploaded to or downloaded from SSM On-Prem or CSSM.

Figure 6: Topology: SSM On-Prem Disconnected from CSSM



Considerations or Recommendations:

None.

Where to Go Next:

To implement this topology, see SSM On-Prem Disconnected from CSSM, on page 25.

After Topology Selection

After you have selected a topology, see Configuring Smart Licensing Using Policy, on page 19 . These workflows are only for new deployments. They provide the simplest and fastest way to implement a topology.

If you are migrating from an existing licensing model, see Migrating to Smart Licensing Using Policy, on page 29.

If you want to perform any additional configuration tasks, for instance, if you want to configure different license, or use add-on license, or if you want to configure a narrower reporting interval, see the Tasks: Smart Licensing Using Policy, on page 37. Check the Supported Topologies, before you proceed.

Supported Products

This section provides information about the Cisco NX-OS product instances that are within the scope of this document and support SLP. All models (Product IDs or PIDs) in a product series are supported – unless indicated otherwise.

Table 2: Supported Product Instances: Cisco Nexus Switches

Cisco Nexus Switches	When Support was Introduced
Cisco Nexus 3550-T Switches	Cisco Nexus 3550-T, Release 10.2(3t)

Note For the hardware that are not supported, refer to Cisco Nexus 3550-T Switches Release Notes, Release 10.2(3t).

Interactions with Other Features

Upgrades

This section describes how upgrade or migration to SLP is handled. To migrate to SLP, you must upgrade to a software version that supports SLP.

In Cisco Nexus 3550-T switches, Release 10.2(3t) SLP is the only mode of licensing available to the customers when upgrading from the previous version Cisco Nexus 3550-T switches, Release 10.1(2t).

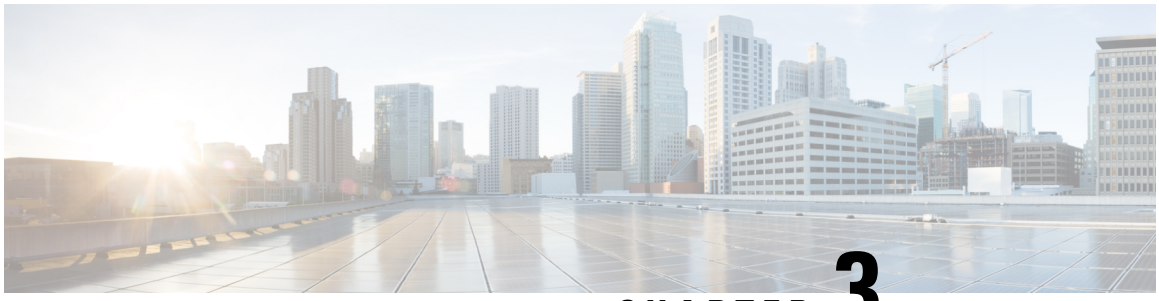
Downgrades

To downgrade, you must downgrade the software version on the product instance.

Upgrade and Then Downgrade

If you upgrade to a software version that supports SLP and then downgrade to any of the earlier release, and any product features you have configured on the product instance are preserved – only the features and functions that are available with SLP are not available anymore.

In Cisco Nexus 3550-T switches, Release 10.2(3t) SLP is not available after performing a downgrade.



CHAPTER 3

Configuring Smart Licensing Using Policy

This chapter provides the simplest and fastest way to implement a topology.

Note These workflows are meant for new deployments only. If you are migrating from an existing licensing model, see Migrating to Smart Licensing Using Policy, on page 29.

Connected to CSSM Through CSLU

When implementing the product instance-initiated method of communication, complete the following tasks:

Tasks for Product Instance-Initiated Communication

CSLU Installation > **CSLU Preference Settings** > **Product Instance Configuration**

Step 1 CSLU Installation

Where task is performed: A Windows host (laptop, desktop, or a Virtual Machine (VM) Download the file from Smart Software Manager > **Smart Licensing Utility**.

Refer to the Cisco Smart License Utility Quick Start Setup Guide for help with installation and setup.

Step 2 CSLU Preference Settings

Where tasks are performed: CSLU

a) Logging into Cisco (CSLU Interface), on page 39
b) Configuring a Smart Account and a Virtual Account (CSLU Interface), on page 40
c) Adding a Product-Initiated Product Instance in CSLU (CSLU Interface), on page 40

Step 3 Product Instance Configuration

Where tasks are performed: Product Instance

a) Ensuring Network Reachability for Product Instance-Initiated Communication, on page 40.

b) Ensure that transport type is set to **cslu**.

CSLU is the default transport type. If you have configured a different option, enter the **license smart transport cslu** command in global configuration mode. Save any changes to the configuration file.

```
Device(config)# license smart transport cslu
Device(config)# exit
Device# copy running-config startup-config
```

c) Specify how you want CSLU to be discovered (choose one):

- Option 1:

  No action required. Name server configured for Zero-touch DNS discovery of **cslu-local**.

  Here, if you have configured DNS (The name server IP address is configured on the product instance), and the DNS server has an entry where hostname **cslu-local** is mapped to the CSLU IP address, then no further action is required. The product instance automatically discovers hostname **cslu-local**.

- Option 2:

  No action required. Name server and domain configured for Zero-touch DNS discovery of **cslu-local.<domain>**.

  Here if you have configured DNS, (the name server IP address and domain is configured on the product instance), and the DNS server has an entry where **cslu-local.<domain>** is mapped to the CSLU IP address, then no further action is required. The product instance automatically discovers hostname cslu-local.

- Option 3:

  Configure a specific URL for CSLU.

  Enter the **license smart url cslu** *http://<cslu_ip_or_host>:8182/cslu/v1/pi* command in global configuration mode. For **<cslu_ip_or_host>**, enter the hostname or the IP address of the Windows host where you have installed CSLU. 8182 is the port number and it is the only port number that CSLU uses.

```
Device(config)# license smart url cslu http://192.168.0.1:8182/cslu/v1/pi
Device(config)# exit
Device# copy running-config startup-config
```

Result:

As the product instance initiates communication, it automatically sends out the first RUM report at the scheduled time, per the policy. To know when the product instance will be sending this information, enter the **show license all** command in privileged EXEC mode and in the output, check the date for field `Next report push:`.

CSLU forwards the information to CSSM and the returning ACK from CSSM, to the product instance.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.

Connected Directly to CSSM

When implementing the product instance-initiated method of communication, complete the following tasks:

Tasks for Product Instance-Initiated Communication

Smart Account Set-Up > **Product Instance Configuration** > **Trust Establishment with CSSM**

Step 1 Smart Account Set-Up

Where task is performed: CSSM Web UI, Smart Software Manager.

Ensure that you have a user role with proper access rights to a Smart Account and the required Virtual Accounts.

Step 2 Product Instance Configuration

Where tasks are performed: Product Instance.

a) Set up product instance connection to CSSM: Setting Up a Connection to CSSM, on page 41.
b) Configure a connection method and transport type (choose one):

- Option 1:

  Smart transport: Set transport type to **smart** using the **license smart transport smart**. Save any changes to the configuration file.

  ```
  Device(config)# license smart transport smart
  Device(config)# license smart url smart
  https://smartreceiver.cisco.com/licservice/license
  Device(config)# copy running-config startup-config
  ```

- Option 2:

  Configure Smart transport through an HTTPS proxy. See Configuring Smart Transport Through an HTTPS Proxy, on page 41.

- Option 3:

  Configure Callhome service for direct cloud access. See Configuring the Callhome Service for Direct Cloud Access, on page 42.

- Option 4:

  Configure Callhome service for direct cloud access through an HTTPS proxy. See Configuring an HTTP Proxy Server, on page 22.

Step 3 Trust Establishment with CSSM

Where task is performed: CSSM Web UI and then the product instance

a) Generate one token for each Virtual Account you have. You can use the same token for all the product instances that are part of one Virtual Account: Generating a New Token for a Trust Code from CSSM, on page 45.
b) Having downloaded the token, you can now install the trust code on the product instance: Installing a Trust Code, on page 45.

Result:

After establishing trust, CSSM returns a policy. The policy is automatically installed on all product instances of that Virtual Account. The policy specifies if and how often the product instance reports usage.

If you want to change your reporting interval to report more frequently: on the product instance, configure the **license smart usage interval** command in global configuration mode. For syntax details see the **license smart (privileged EXEC)** command in the Command Reference for the corresponding release.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.

Configuring an HTTP Proxy Server

You can configure Smart Callhome to send HTTP messages through an HTTP proxy server. If you do not configure an HTTP proxy server, Smart Callhome sends HTTP messages directly to the Cisco Transport Gateway (TG).

To configure an HTTP proxy server, follow these steps:

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters configuration mode.
Step 2	switch(config)# **callhome**	Enters Callhome configuration submode.
Step 3	switch(config-callhome)# **transport http proxy server** *ip address*	Configures the HTTP proxy server domain name server (DNS) name, IPv4 address, or IPv6 address. Optionally configures the port number. The port range is from 1 to 65535. The default port number is 8080.
Step 4	switch(config-callhome)# **transport http proxy enable**	Enables Smart Callhome to send all HTTP messages through the HTTP proxy server. **Note** You can execute this command only after the proxy server address has been configured.
Step 5	Optional: switch(config-callhome)# **show callhome transport**	Displays the transport-related configuration for Smart Callhome. **Note** The default value for full text destination and for XML is 1 MB.

CSLU Disconnected from CSSM

Depending on whether you want to implement a product instance-initiated method of communication. Complete the following tasks:

Tasks for Product Instance-Initiated Communication

CSLU Installation > **CSLU Preference Settings** > **Product Instance Configuration** > **Download All for Cisco and Upload From Cisco**

Step 1 CSLU Installation

Where task is performed: A Windows host (laptop, desktop, or a Virtual Machine (VM) Download the file from Smart Software Manager > **Smart Licensing Utility**.

Refer to the Cisco Smart License Utility Quick Start Setup Guide for help with installation and setup.

Step 2 CSLU Preference Settings

Where tasks are performed: CSLU.

a) In the CSLU Preferences tab, click the Cisco Connectivity toggle switch to **off**. The field switches to ″Cisco Is Not Available‟.
b) Configuring a Smart Account and a Virtual Account (CSLU Interface), on page 40.
c) Adding a Product-Initiated Product Instance in CSLU (CSLU Interface), on page 40.

Step 3 Product Instance Configuration

Where tasks are performed: Product Instance

a) Ensuring Network Reachability for Product Instance-Initiated Communication, on page 40.
b) Ensure that transport type is set to **cslu**.

CSLU is the default transport type. If you have configured a different option, enter the **license smart transport cslu** command in global configuration mode. Save any changes to the configuration file.

```
Device(config)# license smart transport cslu
Device(config)# exit
Device# copy running-config startup-config
```

c) Specify how you want CSLU to be discovered (choose one):

- Option 1:

  No action required. Name server configured for Zero-touch DNS discovery of cslu-local.

  Here, if you have configured DNS (The name server IP address is configured on the product instance), and the DNS server has an entry where hostname **cslu-local** is mapped to the CSLU IP address, then no further action is required. The product instance automatically discovers hostname **cslu-local**.

- Option 2:

  No action required. Name server and domain that is configured for Zero-touch DNS discovery of **cslu-local.<domain>**.

  Here if you have configured DNS, (the name server IP address and domain is configured on the product instance), and the DNS server has an entry where **cslu-local.<domain>** is mapped to the CSLU IP address, then no further action is required. The product instance automatically discovers hostname **cslu-local**.

- Option 3:

  Configure a specific URL for CSLU.

Enter the **license smart url cslu** *http://<cslu_ip_or_host>:8182/cslu/v1/pi* command in global configuration mode. For **<cslu_ip_or_host>**, enter the hostname or the IP address of the windows host where you have installed CSLU. 8182 is the port number and it is the only port number that CSLU uses.

```
Device(config)# license smart url cslu http://192.168.0.1:8182/cslu/v1/pi
Device(config)# exit
Device# copy running-config startup-config
```

Step 4 Download All for Cisco and Upload From Cisco.

Where tasks are performed: CSLU and CSSM

a) Download All for Cisco (CSLU Interface).
b) Uploading Usage Data to CSSM and Downloading an ACK, on page 47.
c) Upload From Cisco (CSLU Interface).

Result:

As the product instance initiates communication, it automatically sends out the first RUM report at the scheduled time, as per the policy. To know when the product instance will be sending this information, enter the **show license all** command in privileged EXEC mode and in the output, check the date for field **Next report push:**.

As the CSLU is disconnected from CSSM, you must save usage data which CSLU has collected from the product instance to a file. Then, from a workstation that is connected to Cisco, upload it to CSSM. After this, download the ACK from CSSM. In the workstation where CSLU is installed and connected to the product instance, upload the file to CSLU.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.

Connected to CSSM Through SSM On-Prem

When implementing the product instance-initiated method of communication, complete the corresponding sequence of tasks:

Note If the device is registered to SSM On-Prem with pre-SLP release using callhome transport, then the transport mode changes to CSLU after the migration. Also, the url will be populated on the product instance from **OnPrem CSLU tenant ID**. Ensure that you save the configuration using the **copy running-config startup-config** command.

Tasks for Product Instance-Initiated Communication

SSM On-prem Installation > **On-prem Settings** > **Product Instance Configuration**

Step 1 SSM On-Prem Installation

Where task is performed: Download the file from Smart Software Manager.

Refer to the Cisco Smart License Utility Quick Start Setup Guidefor help with installation and setup.

Step 2 On-Prem Settings

Where tasks are performed: On-Prem

Refer Smart Software Manager On-Prem User Guide.

Step 3 Product Instance Configuration

Where tasks are performed: Product Instance

a) Ensuring Network Reachability for Product Instance-Initiated Communication, on page 40.
b) Ensure that transport type is set to **cslu**.

If you have configured a different option, enter the **license smart transport cslu** command in global configuration mode. Save any changes to the configuration file.

```
Device(config)# license smart transport cslu
Device(config)# exit
Device# copy running-config startup-config
```

c) The SSM On-Prem url will be populated on the product instance from SSU On-Prem tenant ID.

This configuration is visible as license smart url *https://Cisco_SSM_OnPrem/cslu/v1/pi/XYZ-ON-PREM-1*.

In the above url **XYZ-ON-PREM-1** is the tenant ID.

d) To discover SSM On-Prem:

No action required. Name server configured for Zero-touch DNS discovery of **Cisco_SSM_OnPrem**.

Here, if you have configured DNS (The name server IP address is configured on the product instance), and the DNS server has an entry where hostname **Cisco_SSM_OnPrem** is mapped to the On-Prem IP address, then no further action is required. The product instance automatically discovers hostname **Cisco_SSM_OnPrem**.

Result:

As the product instance initiates communication, it automatically sends out the first RUM report at the scheduled time, as per the policy. To know when the product instance will be sending this information, enter the **show license all** command in privileged EXEC mode and in the output, check the date for field **Next report push:**.

On-Prem forwards the information to CSSM and the returning ACK from CSSM, to the product instance.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.

SSM On-Prem Disconnected from CSSM

Depending on whether you want to implement a product instance-initiated method of communication. Complete the following tasks:

Note If the device is registered SSM On-Prem with pre-SLP release, the transport mode will change to CSLU after the migration. Also, the url will be populated on the product instance from **OnPrem CSLU tenant ID**. Ensure that you save the configuration using the **copy running-config startup-config** command.

Tasks for Product Instance-Initiated Communication

SSM On-prem Installation > On-prem Settings > Product Instance Configuration

Step 1 SSM On-Prem Installation

Where task is performed: Download the file from Smart Software Manager.

Refer to the Cisco Smart License Utility Quick Start Setup Guide for help with installation and setup.

Step 2 On-Prem Settings

Where tasks are performed: On-Prem

Refer Smart Software Manager On-Prem User Guide.

Step 3 Product Instance Configuration

Where tasks are performed: Product Instance

a) Ensuring Network Reachability for Product Instance-Initiated Communication, on page 40.

b) Ensure that transport type is set to **cslu**.

If you have configured a different option, enter the **license smart transport cslu** command in global configuration mode. Save any changes to the configuration file.

```
Device(config)# license smart transport cslu
Device(config)# exit
Device# copy running-config startup-config
```

c) The SSM On-Prem url will be populated on the product instance from SSM On-Prem tenant ID. This configuration is visible as license smart url *https://Cisco_SSM_OnPrem/cslu/v1/pi/XYZ-ON-PREM-1*.

In the above url, **XYZ-ON-PREM-1** is the tenant ID.

d) To discover SSM On-Prem:

No action required. Name server configured for Zero-touch DNS discovery of **Cisco_SSM_OnPrem**.

Here, if you have configured DNS (The name server IP address is configured on the product instance), and the DNS server has an entry where hostname **Cisco_SSM_OnPrem** is mapped to the On-Prem IP address, then no further action is required. The product instance automatically discovers hostname **Cisco_SSM_OnPrem**.

Step 4 Download All for Cisco and Upload From Cisco.

Where tasks are performed: On-Prem and CSSM.

a) Log in to SSM On-Prem licensing workspace GUI.

1. Click **SL Using Policy** tab.
2. Click **Export/Import All** drop-down.

3. Select **Export Usage Cisco** to upload and save the file.

b) Uploading Usage Data to CSSM and Downloading an ACK, on page 47.
c) Log in to SSM On-Prem licensing workspace GUI.

1. Click **SL Using Policy** tab.
2. Click **Export/Import All** drop-down.
3. Select **Import From Cisco** to upload the ACK that is downloaded from CSSM.

Result:

Since the product instance initiates communication, it automatically sends out the first RUM report at the scheduled time, as per the policy. To know when the product instance will be sending this information, enter the **show license all** command in privileged EXEC mode and in the output, check the date for field `Next report push:`.

Since On-Prem is disconnected from CSSM, you must save usage data which On-Prem has collected from the product instance to a file. Then, from a workstation that is connected to Cisco, upload it to CSSM. After this, download the ACK from CSSM. In the workstation where On-Prem is installed and connected to the product instance, upload the file to On-Prem.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.

No Connectivity to CSSM and No CSLU

Since you do not have to configure connectivity to any other component, the list of tasks that are required to set up the topology is a small one. See, the Results section at the end of the workflow to know how you can complete requisite usage reporting after you have implemented this topology.

Product Instance Configuration

Where task is performed: Product Instance Set transport type to **off**.

Enter the **license smart transport off** command in global configuration mode. Save any changes to the configuration file.

```
Device(config)# license smart transport off
Device(config)# exit
Device# copy running-config startup-config
```

Result:

All communication to and from the product instance is disabled. To report license usage, you must save RUM reports to a file (on your product instance) and upload it to CSSM (from a workstation that has connectivity to the internet, and Cisco):

1. Generate and save RUM reports

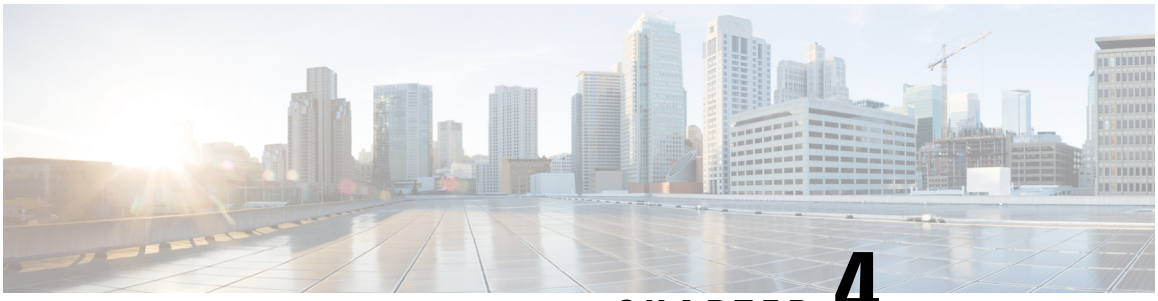
Enter the **license smart save usage** command in privileged EXEC mode. In the example below, all RUM reports are saved to the flash memory of the product instance, in the all_rum.txt file. In the example, the file is first saved to the bootflash and then copied to a TFTP location:

```
Device# license smart save usage all bootflash:all_rum.txt
Device# copy bootflash:all_rum.txt tftp://10.8.0.6/all_rum.txt
```

Note The RUM reports capture the licensing transactions in the device for upload. On a greenfield device, there is nothing to report, so it is empty and not generated. Also, when there are no licensing transactions, and the user tries to save the report, the **"Failure: save status: The requested item was not found"** error appears. After a few licensing transactions, such as enabling a licensing feature, the report gets populated and generated for online/offline upload.

2. Upload usage data to CSSM: Uploading Usage Data to CSSM and Downloading an ACK, on page 47.
3. Install the ACK on the product instance: Installing a File on the Product Instance, on page 47.

In case of a change in license usage, see Setting the Transport Type, URL, and Reporting Interval, on page 37 to know how it affects reporting.



CHAPTER 4

Migrating to Smart Licensing Using Policy

To upgrade to SLP, you must upgrade the software version (image) on the product instance to a supported version.

Before You Begin

Ensure that you have read the Upgrades section, to understand how SLP handles various aspects of all earlier licensing models.

When migrating from traditional licensing model to SLP, license conversion takes place automatically. This Device Led Conversion (DLC) process is triggered when traditional licenses are detected on the device during an upgrade. DLC request is sent to CSSM as part of the license report and may take up to an hour to complete.

Upgrading the Switch Software

See the corresponding release note for the upgrade procedure. If there are any general release-specific considerations, these are called-out in the corresponding release notes.

Also refer to the sample show command outputs of the migration scenarios provided below. Sample outputs are provided for before and after migration, for comparison.

- Smart Licensing to Smart Licensing Using Policy, on page 29

Smart Licensing to Smart Licensing Using Policy

The following is an example of a Cisco Nexus 3550-T, Release 10.2(3t) switch migrating from Smart Licensing to SLP. This is a High Availability setup with an active and a standby.

The show command outputs below call-out key fields to check, before and after migration.

Table 3: Smart Licensing to Smart Licensing Using Policy: Show Commands

Before Upgrade	After Upgrade

Not supported in Cisco NX-OS Release 10.1(2t).	**show license summary** (SLP)
	`Device# show license summary`
	`License Usage:`
	`License Entitlement tag Count Status`
	`NX-OS essentials licens... (NXOS_ESSENTIALS) 1 IN USE`
	The **Status** field shows that the licenses are now **IN USE** instead of registered and authorized.

Not supported in Cisco NX-OS Release 10.1(2t).	**show license usage** (SLP)
	`License Authorization: Status: Not Applicable`
	`(NXOS_ESSENTIALS):`
	`Description:NX-OS essentials license for Nexus 3550-T`
	`Count: 1`
	`Version: 1.0`
	`Status: IN USE`
	`Enforcement Type: NOT ENFORCED`
	`License Type: Generic`
	The license counts remain the same.
	The **Enforcement Type** field displays NOT ENFORCED. (There are no export-controlled or enforced licenses on Cisco Nexus Switches).

Before Upgrade	After Upgrade
Not supported in Cisco NX-OS Release 10.1(2t).	

Before Upgrade	After Upgrade

	Show license status (Smart Licensing)
	`Device# show license status`
	
	`Utility:`
	`  Status: DISABLED`
	
	`Smart Licensing using Policy:`
	`  Status: ENABLED`
	
	`Data Privacy:`
	`  Sending Hostname: yes`
	`  Callhome Hostname Privacy: DISABLED`
	`  Smart Licensing Hostname Privacy: DISABLED`
	`  Version Privacy: DISABLED`
	
	`Transport:`
	`  Type: CSLU`
	`Cslu address: cslu-local`
	
	`Policy:`
	`  Policy in use: Merged from multiple sources`
	`  Reporting ACK required: Yes`
	`  Unenforced/Non-Export:`
	`  First report requirement (days): 90 (Installed)`
	`  Ongoing reporting frequency (days): 365 (Installed)`
	`  On change reporting (days): 120 (Installed)`
	`  Enforced (Perpetual/Subscription):`
	`  First report requirement (days): 30 (Installed)`
	`  Ongoing reporting frequency (days): 90 (Installed)`
	`  On change reporting (days): 60 (Installed)`
	`Export (Perpetual/Subscription):`
	`  First report requirement (days): 30 (Installed)`
	`  Ongoing reporting frequency (days): 30 (Installed)`
	`  On change reporting (days): 30 (Installed)`
	`Miscellaneous:`
	`  Custom Id: <empty>`
	
	`Usage reporting:`
	`  Last ACK received: Jul 29 11:32:24 2022 UTC`
	`  Next ACK deadline: Jul 29 11:32:24 2023 UTC`
	`  Reporting push interval: 30 days`
	`  Next ACK push check: Aug 3 07:29:15 2022 UTC`
	`  Next report push: Aug 28 11:22:24 2022 UTC`
	`  Last report push: Jul 29 11:22:24 2022 UTC`

Before Upgrade	After Upgrade

	`Last report file write: <none>`
	
	`Trust Code installed: <none>`
	
	The Transport: **field**: A transport type was configured and therefore retained after upgrade.
	
	The `Policy:` header and details: A custom policy was available in the Smart Account or Virtual Account – this has also been automatically installed on the product instance. (After establishing trust, CSSM returns a policy. The policy is then automatically installed.)
	
	The `Usage Reporting: header: The Next report push:` field provides information about when the product instance will send the next RUM report to CSSM.
	
	The `Trust Code Installed: field:` The ID token is successfully converted and a trusted connected has been established with CSSM.

Not supported in Cisco NX-OS Release 10.1(2t).	**show license udi** (Smart Licensing)
	
	`Device# show license udi`
	`UDI: PID:N35-T-48X,SN:EXATRI-A-01828`
	`HA UDI List:`
	`Active: PID:N35-T-48X,SN:EXATRI-A-01828`

CSSM Web UI After Migration

Log in to the CSSM Web UI at https://software.cisco.com and click **Smart Software Licensing**. Under **Inventory** > **Product Instances**.

Registered licenses in the Smart Licensing environment were displayed with the hostname of the product instance in the Name column. After upgrade to SLP, they are displayed with the UDI of the product instance. All migrated UDIs are displayed. For example,

PID:N35-T-48X, UDI_SN:EXATRI-A-01828.

Only the active product instance reports usage, therefore PID:N35-T-48X,SN:EXATRI-A-01828 displays license consumption information under **License Usage**.

Figure 7: Smart Licensing to Smart Licensing Using Policy: Active and Standby Product Instances After Migration

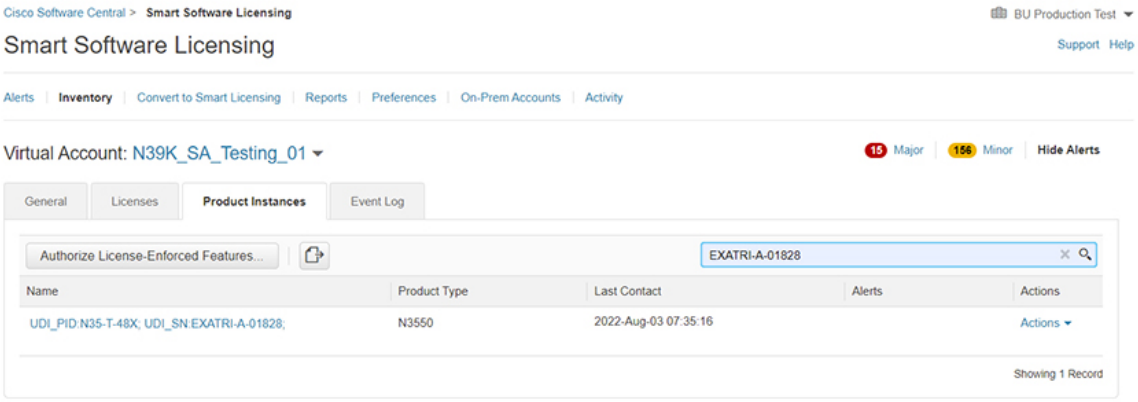


Figure 8: Smart Licensing to Smart Licensing Using Policy: UDI and License Usage under Active Product Instance

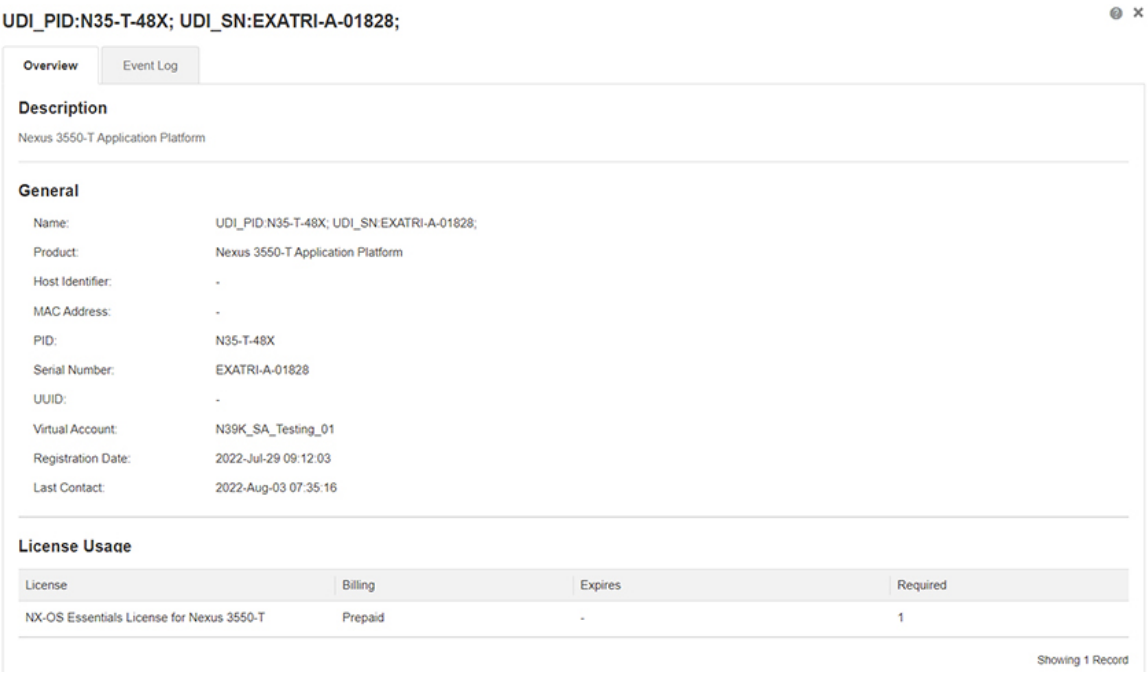
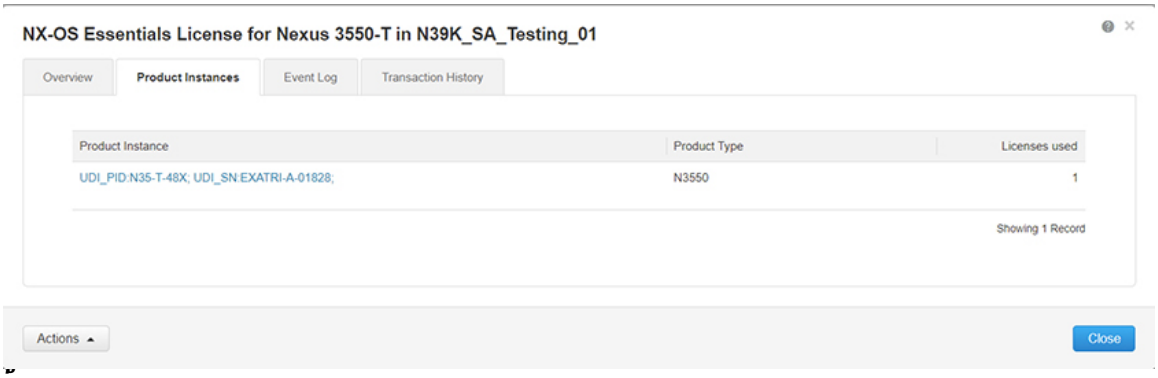


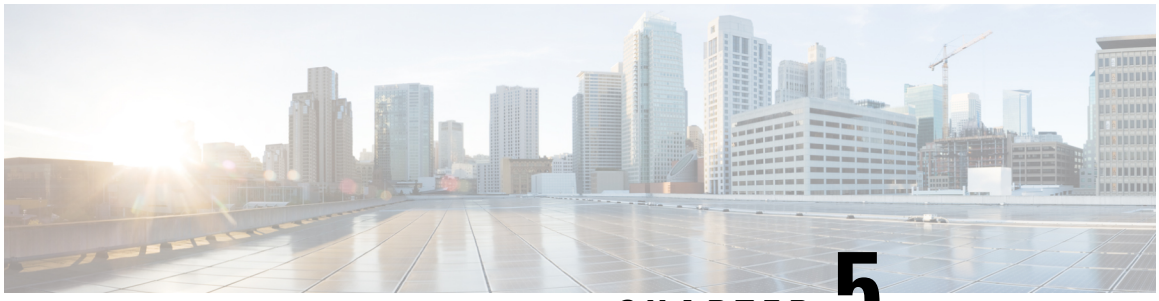
Figure 9: Smart Licensing to Smart Licensing Using Policy: DCN NDB/RTU Licenses Showing up After



Reporting After Migration

The product instance sends the next RUM report to CSSM, based on the policy.

If you want to change your reporting interval to report more frequently: on the product instance, configure the **license smart usage interval** command. For syntax details see the **license smart (global config)** command in the Command Reference for the corresponding release.



CHAPTER 5

Tasks: Smart Licensing Using Policy

This section is a grouping of tasks that apply to SLP. It includes tasks that are performed on a product instance, on the CSLU interface, and on the CSSM Web UI.

To implement a particular topology, refer to the corresponding workflow to know the sequential order of tasks that apply. See Configuring Smart Licensing Using Policy, on page 19 .

To perform any additional configuration tasks, for instance, to configure a different license, or use an add-on license, or to configure a narrower reporting interval, refer to the corresponding task here. Check the Supported Topologies, before you proceed.

Setting the Transport Type, URL, and Reporting Interval

To configure the mode of transport for a product instance, complete the following task:

Before you begin

Supported topologies: all

SUMMARY STEPS

1. **configure terminal**
2. **license smart transport**{ **callhome**|**cslu**|**off**|**smart**}
3. **license smart url**{**cslu** *cslu_url*|**smart** *smart_url*}
4. **license smart usage interval** *interval_in_days*
5. **exit**
6. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**license smart transport**{ **callhome**|**cslu**|**off**|**smart**} **Example:** `Device(config)# license smart transport cslu`	Selects the type of message transport the product instance uses. Choose from the following options: • **callhome**: Enables Callhome as the transport mode. • **cslu**: Enables CSLU as the transport mode. This is the default transport mode. • **off**: Disables all communication from the product instance. • **smart**: Enables Smart transport.
Step 3	**license smart url**{**cslu** *cslu_url*|**smart** *smart_url*} **Example:** `Device(config)# license smart url cslu http://192.168.0.1:8182/cslu/v1/pi`	Sets a URL for the configured transport mode (except callhome, which is in the callhome configuration). Depending on the transport mode you have chosen to configure in the previous step, configure the corresponding URL here: • **cslu** *cslu_url*: The default value for cslu_url is set to cslu_local. If you want to set a custom url, then follow below steps: If you have configured the transport mode as **cslu**, configure this option. Enter the CSLU URL as follows: **https://<cslu_ip_or_host>:8182/cslu/v1/pi** For `<cslu_ip_or_host>`, enter the hostname or the IP address of the Windows host where you have installed CSLU. 8182 is the port number and it is the only port number that CSLU uses. The **no license smart url cslu** *cslu_url* command reverts to cslu_local.

	Command or Action	Purpose
		• **smart** *smart_url*: If you have configured the transport type as **smart**, then url is automatically configured to: https://smartreceiver.cisco.com/licservice/license. The **no license smart url smart** *smart_url* command reverts to the default URL as above.
Step 4	**license smart usage interval** *interval_in_days* **Example:** `Device(config)# license smart usage interval 40`	(Optional) Sets the reporting interval in days. By default, the RUM report is sent every 30 days. The valid value range is 1 to 365. If you set a value that is greater than zero and the transport type is set to **off**, then, between the *interval_in_days* and the policy value for ongoing reporting frequency(days):, the lower of the two values is applied. For example, if *interval_in_days* is set to 100, and the value in the policy says `Ongoing reporting frequency (days):90`, RUM reports are sent every 90 days. If you do not set an interval, and the default is effective, the reporting interval is determined entirely by the policy value. For example, if the default value is effective and only unenforced licenses are in use, if the policy states that reporting is not required, then RUM reports are not sent.
Step 5	**exit** **Example:** `Device(config)# exit`	Exits global configuration mode and returns to privileged EXEC mode.
Step 6	**copy running-config startup-config** **Example:** `Device# copy running-config startup-config`	Saves your entries in the configuration file.

Logging into Cisco (CSLU Interface)

Depending on your needs, when working in CSLU, you can either be in connected or disconnected mode. To work in the connected mode, complete these steps to connect with Cisco.

Step 1 From the CSLU home screen, click **Login to Cisco** (located at the top-right corner of the screen).

Step 2 Enter your **CCO User Name** and **CCO Password**.

Step 3 In the CSLU **Preferences** tab, check that the Cisco connectivity toggle displays "Cisco Is Available".

Configuring a Smart Account and a Virtual Account (CSLU Interface)

Both the Smart Account and Virtual Account are configured through the Preferences tab. Complete the following steps to configure both the Smart and Virtual Accounts for connecting to Cisco.

Step 1 Select the **Preferences** tab from the CSLU home screen.

Step 2 Perform the following steps for adding both a Smart Account and Virtual Account:

a) In the **Preferences** window, navigate to the **Smart Account** field and add the **Smart AccountName**.

b) Next, navigate to the **Virtual Account** field and add the **Virtual Account Name.**

If you are connected to CSSM (in the Preferences tab, Cisco is Available), you can select from the list of available Smart Accounts (SA) and Virtual Accounts (VA).

If you are not connected to CSSM (in the Preferences tab, Cisco Is Not Available), enter the SA/VAs manually.

Note SA/VA names are case-sensitive.

Step 3 Click **Save**. The SA/VA accounts are saved to the system.

Only one SA/VA pair can reside on CSLU at a time. You cannot add multiple accounts. To change to another SA/VA pair, repeat Steps 2a and 2b then Save. A new SA/VA account pair replaces the previous saved pair.

Adding a Product-Initiated Product Instance in CSLU (CSLU Interface)

Complete these steps to add a device-created Product Instance using the **Preferences** tab.

Step 1 From the CSLU home screen, click **Login to Cisco** (located at the top-right corner of the screen).

Step 2 Enter your **CCO User Name** and **CCO Password**.

Step 3 In the CSLU **Preferences** tab, check that the Cisco connectivity toggle displays "Cisco Is Available".

Ensuring Network Reachability for Product Instance-Initiated Communication

This task provides possible configurations that may be required to ensure network reachability for product instance-initiated communication. Steps marked as "(Required)" are required for all product instances, all

other steps may be required or optional, depending on the kind of product instance and network requirements. Configure the applicable commands:

Before you begin

Supported topologies: Connected to CSSM Through CSLU (product instance-initiated communication).

Procedure

Ensure that CSLU is reachable from Product instance. For more information, see Connected to CSSM Through CSLU, on page 19.

Setting Up a Connection to CSSM

Ensure that product instance is reachable to CSSM. For more information about DNS configuration, see Configuring the Callhome Service for Direct Cloud Access, on page 42.

Configuring Smart Transport Through an HTTPS Proxy

To use a proxy server to communicate with CSSM when using the Smart transport mode, complete the following steps:

Note Authenticated HTTPS proxy configurations are not supported.

SUMMARY STEPS

1. **configure terminal**
2. **license smart transport smart**
3. **license smart proxy {address** *address_hostname*|**port** *port_num*}
4. **exit**
5. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**license smart transport smart** **Example:** `Device(config)# license smart transport smart`	Enables Smart transport mode.

	Command or Action	Purpose
Step 3	**license smart proxy {address** *address_hostname*|**port** *port_num*} **Example:** `Device(config)# license smart proxy 198.51.100.10 port 3128`	Perform this step only when HTTPS proxy is used in the network. Configures a proxy for the Smart transport mode. When a proxy is configured, licensing messages are sent to the proxy along with the final destination URL (CSSM). The proxy sends the message on to CSSM. Provide the address and port information: • **address** *address_hostname:* Specifies the proxy address. Enter the IP address or hostname of the proxy server. • **port** *port_num:* Specifies the proxy port. Enter the proxy port number.
Step 4	**exit** **Example:** `Device(config)# exit`	Exits global configuration mode and returns to privileged EXEC mode.
Step 5	**copy running-config startup-config** **Example:** `Device# copy running-config startup-config`	Saves your entries in the configuration file.

Configuring the Callhome Service for Direct Cloud Access

Make sure that Smart Callhome is enabled on the switch before configuring Smart Software Licensing.

Configuring a DNS Client

Before you begin

Make sure that the name server is reachable before you configure a DNS client.

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **ip domain-lookup**
3. switch(config)# **vrf context** *management*
4. switch(config-vrf)# **ip domain-name** *domain name*
5. switch(config-vrf)# **ip name-server** *address1 [address2... address6]* [**use-vrf** *management*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **ip domain-lookup**	Enables DNS-based address translation.
Step 3	switch(config)# **vrf context** *management*	Creates a new VRF and enters VRF configuration mode. The *name* can be any case-sensitive, alphanumeric string up to 32 characters.
Step 4	switch(config-vrf)# **ip domain-name** *domain name*	Defines the default domain name that Cisco NX-OS uses to resolve unqualified hostnames. Cisco NX-OS uses each entry in the domain list to append that domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup. Cisco NX-OS continues this process for each entry in the domain list until it finds a match.
Step 5	switch(config-vrf)# **ip name-server** *address1 [address2... address6]* [**use-vrf** *management*]	Defines up to six name servers. The address can be either an IPv4 or IPv6 address. You can optionally define a VRF that Cisco NX-OS uses to reach this name server if it cannot be reached in the VRF that you configured this name server under. **Note** Multiple DNS servers are for the case of unresponsive servers. If the first DNS server in the list replies to the DNS query with a reject, the remaining DNS servers are not queried. If the first one doesn't respond, the next DNS server in list is queried.

Configuring a VRF to Send a Message

SUMMARY STEPS

1. switch# **configure terminal**
2. switch(config)# **callhome**
3. switch(config-callhome)# **transport http use-vrf** *management*

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **callhome**	Enters Callhome configuration mode.

	Command or Action	Purpose
Step 3	switch(config-callhome)# **transport http use-vrf** *management*	Configures the VRF used to send email and other Smart Callhome messages over HTTP.

Viewing a Smart Callhome Profile

SUMMARY STEPS

1. switch# **show running-config callhome**

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# **show running-config callhome**	Displays the Smart Callhome profile.

Removing the Product Instance from CSSM

To remove a product instance and return all licenses to the license pool, complete the following task:

Before you begin

Supported topologies: all

Step 1 Log in to the CSSM Web UI at https://software.cisco.com and click **Smart SoftwareLicensing**.

Log in using the username and password that is provided by Cisco.

Step 2 Click the **Inventory** tab.

Step 3 From the **Virtual Account** drop-down list, choose your Virtual Account.

Step 4 Click the **Product Instances** tab.

The list of product instances that are available is displayed.

Step 5 Locate the required product instance from the product instances list. Optionally, you can enter a name or product type string in the search tab to locate the product instance.

Step 6 In the **Actions** column of the product instance you want to remove, click the **Remove** link.

Step 7 Click **Remove Product Instance**.

The license is returned to the license pool and the product instance is removed.

Generating a New Token for a Trust Code from CSSM

To generate a token to request a trust code, complete the following steps.

Generate one token for each Virtual Account you have. You can use the same token for all the product instances that are part of one Virtual Account.

Before you begin

Supported topology: Connected Directly to CSSM

Step 1 Log in to the CSSM Web UI at https://software.cisco.com and click **Smart SoftwareLicensing**.

Log in using the username and password that is provided by Cisco.

Step 2 Click the **Inventory** tab.

Step 3 From the **Virtual Account** drop-down list, choose the required virtual account.

Step 4 Click the **General** tab.

Step 5 Click **New Token**. The **Create Registration Token** window is displayed.

Step 6 In the **Description** field, enter the token description.

Step 7 In the **Expire After** field, enter the number of days the token must be active.

Step 8 (Optional) **In the Max. Number of Uses** field, enter the maximum number of uses allowed after which the token expires.

Step 9 Click **Create Token**.

Step 10 You will see your new token in the list. Click **Actions** and download the token as a `.txt` file.

Installing a Trust Code

To manually install a trust code, complete the following steps:

Before you begin

Supported topology: Connected Directly to CSSM

SUMMARY STEPS

1. Generating a New Token for a Trust Code from CSSM, on page 45
2. **license smart trust idtoken** *id_token_value*{**local**|**all**}[**force**]
3. **show license status**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Generating a New Token for a Trust Code from CSSM, on page 45	In case you have not completed this already, generate and download a trust code file from CSSM.

	Command or Action	Purpose
Step 2	**license smart trust idtoken** *id_token_value*{**local**|**all**}[**force**] **Example:** `Device# license smart trust idtoken NGMwMjk5mYtNZaxMS00NzMZmtgWm all force`	Enables you to establish a trusted connection with CSSM. For *id_token_value*, enter the token you generated in CSSM. Enter one of following options: • **local**: Submits the trust request only for the active device in a High Availability setup. This is the default option. • **all**: Submits the trust request for active and standby supervisors in HA setup. Enter the **force** keyword to submit the trust code request despite an existing trust code on the product instance. Trust codes are node-locked to the UDI of the product instance. If a UDI is already registered, CSSM does not allow a new registration for the same UDI. Entering the **force** keyword sets a force flag in the message sent to CSSM to create a new trust code even if one already exists.

Step 3	**show license status**
	Example:
	`<output truncated>`
	`Trust Code installed: Jul 16 15:15:47 2021 UTC`
	`Active: PID: N9K-C9504, SN: FOX2308PCEN`
	`Jul 16 15:15:47 2021 UTC`
	`Standby: PID: N9K-C9504, SN: FOX2308PCEN`
	`Jul 16 15:15:47 2021 UTC`
		Displays date and time if trust code is installed. Date and time are in the local time zone. See field `Trust Code Installed:`.

Downloading a Policy File from CSSM

If you have requested a custom policy or if you want to apply a policy that is different from the default that is applied to the product instance, complete the following task:

Before you begin

Supported topologies:

- No Connectivity to CSSM and No CSLU
- CSLU Disconnected from CSSM
- On-Prem CSLU disconnected from CSSM

Step 1 Log in to the CSSM Web UI at https://software.cisco.com and click **Smart Software Licensing**.

Log in using the username and password that is provided by Cisco.

Step 2 Follow this directory path: **Reports** > **Reporting Policy**.

Step 3 Click **Download**, to save the `.xml` policy file.

You can now install the file on the product instance. See Installing a File on the Product Instance, on page 47.

Uploading Usage Data to CSSM and Downloading an ACK

To upload a RUM report to CSSM and download an ACK when the product instance is not connected to CSSM or CSLU, complete the following task:

Before you begin

Supported topologies: No Connectivity to CSSM and No CSLU

Step 1 Log in to the CSSM Web UI at https://software.cisco.com.

Log in using the username and password that is provided by Cisco.

Step 2 Select the **Smart Account** (upper left corner of the screen) that will receive the report.

Step 3 Select **Smart Software Licensing** > **Reports** > **Usage Data Files**.

Step 4 Click **Upload Usage Data**. Browse to the file location (RUM report in tar format), select, and click **Upload Data**.

You cannot delete a usage report in CSSM, after it has been uploaded.

Step 5 From the Select Virtual Accounts pop-up, select the **Virtual Account** that receives the uploaded file. The file is uploaded to Cisco and is listed in the Usage Data Files table in the Reports screen showing the File Name, the time it was Reported, which Virtual Account it was uploaded to, the Reporting Status, the Number of Product Instances reported, and the Acknowledgment status.

Step 6 In the Acknowledgment column, click **Download** to save the `.txt` ACK file for the report you uploaded.

Wait for the ACK to appear in the Acknowledgment column. If there many RUM reports to process, CSSM may take a few minutes.

You can now install the file on the product instance, or you can transfer it to CSLU or On-Prem CSLU.

Installing a File on the Product Instance

To install a policy or ACK on the product instance when the product instance is not connected to CSSM, CSLU, or On-Prem CSLU, complete the following task:

Before you begin

Supported topologies: No Connectivity to CSSM and No CSLU

You must have the corresponding file saved in a location that is accessible to the product instance.

- For a policy, see Downloading a Policy File from CSSM, on page 46

- For an ACK, see Uploading Usage Data to CSSM and Downloading an ACK, on page 47

SUMMARY STEPS

1. **copy source bootflash**:`file-name`
2. **license smart import bootflash**: `file-name`
3. **show license all**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**copy source bootflash**:`file-name` **Example:** `Device# copy tftp://10.8.0.6/example.txt bootflash:`	Copies the file from its source location or directory to the flash memory of the product instance. **source**: This is the location of the source file or directory to be copied. The source can be either local or remote **bootflash:**: This is the destination for boot flash memory.
Step 2	**license smart import bootflash**: `file-name` **Example:** `Device# license smart import bootflash:example.txt`	Imports and installs the file on the product instance. After installation, a system message displays the type of file you installed.
Step 3	**show license all** **Example:** `Device# show license all`	Displays license authorization, policy, and reporting information for the product instance.

Setting the Transport Type, URL, and Reporting Interval

To configure the mode of transport for a product instance, complete the following task:

Before you begin

Supported topologies: all

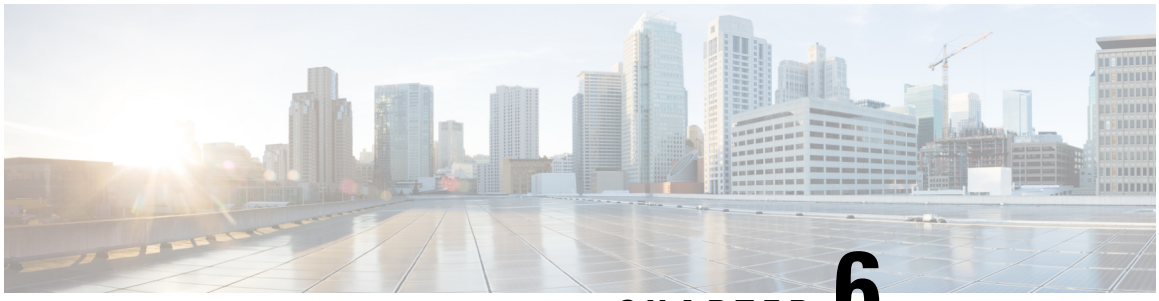
SUMMARY STEPS

1. **configure terminal**
2. **license smart transport**{ **callhome**|**cslu**|**off**|**smart**}
3. **license smart url**{**cslu** *cslu_url*|**smart** *smart_url*}
4. **license smart usage interval** *interval_in_days*
5. **exit**
6. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**license smart transport**{ **callhome**|**cslu**|**off**|**smart**} **Example:** `Device(config)# license smart transport cslu`	Selects the type of message transport the product instance uses. Choose from the following options: • **callhome**: Enables Callhome as the transport mode. • **cslu**: Enables CSLU as the transport mode. This is the default transport mode. • **off**: Disables all communication from the product instance. • **smart**: Enables Smart transport.
Step 3	**license smart url**{**cslu** *cslu_url*|**smart** *smart_url*} **Example:** `Device(config)# license smart url cslu http://192.168.0.1:8182/cslu/v1/pi`	Sets a URL for the configured transport mode (except callhome, which is in the callhome configuration). Depending on the transport mode you have chosen to configure in the previous step, configure the corresponding URL here: • **cslu** *cslu_url*: The default value for cslu_url is set to cslu_local. If you want to set a custom url, then follow below steps: If you have configured the transport mode as **cslu**, configure this option. Enter the CSLU URL as follows: **https://<cslu_ip_or_host>:8182/cslu/v1/pi** For `<cslu_ip_or_host>`, enter the hostname or the IP address of the Windows host where you have installed CSLU. 8182 is the port number and it is the only port number that CSLU uses. The **no license smart url cslu** *cslu_url* command reverts to cslu_local. • **smart** *smart_url*: If you have configured the transport type as **smart**, then url is automatically configured to: https://smartreceiver.cisco.com/licservice/license. The **no license smart url smart** *smart_url* command reverts to the default URL as above.
Step 4	**license smart usage interval** *interval_in_days* **Example:** `Device(config)# license smart usage interval 40`	(Optional) Sets the reporting interval in days. By default, the RUM report is sent every 30 days. The valid value range is 1 to 365.

	Command or Action	Purpose
		If you set a value that is greater than zero and the transport type is set to **off**, then, between the *interval_in_days* and the policy value for ongoing reporting frequency(days):, the lower of the two values is applied. For example, if *interval_in_days* is set to 100, and the value in the policy says `Ongoing reporting frequency (days):90`, RUM reports are sent every 90 days. If you do not set an interval, and the default is effective, the reporting interval is determined entirely by the policy value. For example, if the default value is effective and only unenforced licenses are in use, if the policy states that reporting is not required, then RUM reports are not sent.
Step 5	**exit** **Example:** `Device(config)# exit`	Exits global configuration mode and returns to privileged EXEC mode.
Step 6	**copy running-config startup-config** **Example:** `Device# copy running-config startup-config`	Saves your entries in the configuration file.



CHAPTER 6

Troubleshooting Smart Licensing Using Policy

This chapter provides the list of SLP-related system messages you may encounter, possible reasons for failure, and recommended action.

System Message Overview

The system software sends system messages to the console (and, optionally, to a logging server on another system). Not all system messages mean problems with your system. Some messages are informational, and others can help diagnose problems with communications lines, internal hardware, or the system software.

How to Read System Messages

System log messages can contain up to 80 characters. Each system message begins with a percent sign (%) and is structured as follows:

Figure 10:

%FACILITY

Two or more uppercase letters that show the facility to which the message refers. A facility can be a hardware device, a protocol, or a module of the system software.

SEVERITY

A single-digit code from 0 to 7 that reflects the severity of the condition. The lower the number, the more serious the situation.

Table 4: Message Severity Levels

Severity Level	Description
0 – emergency	System is unusable.
1 – alert	Immediate action required.
2 – critical	Critical condition.

Severity Level	Description
3 – error	Error condition.
4 – warning	Warning condition.
5 – notification	Normal but significant condition.
6 – informational	Informational message only.
7 - debugging	Message that appears during debugging only.

MNEMONIC

A code that uniquely identifies the message.

Message-text

Message-text is a text string describing the condition. This portion of the message sometimes contains detailed information about the event, including terminal port numbers, network addresses, or addresses that correspond to locations in the system memory address space. Because the information in these variable fields changes from message to message, it is represented here by short strings enclosed in square brackets ([ ]). A decimal number, for example, is represented as [dec].

Table 5: Variable Fields in Messages

Severity Level	Description
[char]	Single character
[chars]	Character string
[dec]	Decimal number
[enet]	Ethernet address (for example, 0000.FEED.00C0)
[hex]	Hexadecimal number
[inet]	Internet address (for example, 10.0.2.16)
[int]	Integer
[node]	Address or node name
[t-line]	Terminalline number in octal (or in decimal if the decimal-TTY service is enabled)
[clock]	Clock (for example, 01:20:08 UTC Tue Mar 2 1993

System Messages

This section provides the list of SLP-related system messages you may encounter, possible reasons for failure (in case it is a failure message), and recommended action (if action is required).

For all error messages, if you are not able to solve the problem, contact your Cisco technical support representative with the following information:

- The message, exactly as it appears on the console or in the system log.
- The output from the show license tech support and show license history message commands.

SLP-related system messages:

- %LICMGR-3-LOG_SMART_LIC_POLICY_INSTALL_FAILED
- %LICMGR-3-LOG_SMART_LIC_AUTHORIZATION_INSTALL_FAILED
- %LICMGR-3-LOG_SMART_LIC_COMM_FAILED
- %LICMGR-3-LOG_SMART_LIC_COMM_RESTORED
- %LICMGR-3-LOG_SMART_LIC_POLICY_REMOVED
- %LICMGR-3-LOG_SMART_LIC_TRUST_CODE_INSTALL_FAILED
- %LICMGR-4-LOG_SMART_LIC_REPORTING_NOT_SUPPORTED
- %LICMGR-6-LOG_SMART_LIC_POLICY_INSTALL_SUCCESS
- %LICMGR-6-LOG_SMART_LIC_AUTHORIZATION_INSTALL_SUCCESS
- %LICMGR-6-LOG_SMART_LIC_AUTHORIZATION_REMOVED
- %LICMGR-6-LOG_SMART_LIC_REPORTING_REQUIRED
- %LICMGR-6-LOG_SMART_LIC_TRUST_CODE_INSTALL_SUCCESS

```
Error Message %LICMGR-3-LOG_SMART_LIC_POLICY_INSTALL_FAILED: The
installation of a new licensing policy has failed: [chars].
```

Explanation: A policy was installed, but an error was detected while parsing the policy code, and installation failed. [chars] is the error string with details of the failure.

Possible reasons for failure include:

- A signature mismatch: This means that the system clock is not accurate.
- A timestamp mismatch: This means the system clock on the product instance is not synchronized with CSSM.

Recommended Action:

For both possible failure reasons, ensure that the system clock is accurate and synchronized with CSSM. Configure the ntp server command in global configuration mode. For example:

Device(config)# **ntp server 198.51.100.100 version 2 prefer**

If the above does not work and policy installation still fails, contact your Cisco technical support representative.


```
Error Message %LICMGR-3-LOG_SMART_LIC_AUTHORIZATION_INSTALL_FAILED: The
install of a new licensing authorization code has failed on [chars]:
[chars].
```

This message is not applicable to Cisco Nexus Switches, because there are no enforced or export-controlled licenses on these product instances.

```
Error Message %LICMGR-3-LOG_SMART_LIC_COMM_FAILED: Communications failure
with the [chars] : [chars]
```

Explanation: Smart Licensing communication either with CSSM or with CSLU failed. The first [chars] is the currently configured transport type, and the second [chars] is the error string with details of the failure. This message appears for every communication attempt that fails.

Possible reasons for failure include:

- CSSM or CSLU is not reachable: This means that there is a network reachability problem.
- 404 host not found: This means that the CSSM server is down.

For topologies where the product instance initiates the sending of RUM reports (Connected to CSSM Through CSLU: Product Instance-Initiated Communication, Connected Directly to CSSM, and CSLU Disconnected from CSSM: Product Instance-Initiated Communication) if this communication failure message coincides with scheduled reporting (**license smart usage interval** `interval_in_days` global configuration command), the product instance attempts to send out the RUM report for up to four hours after the scheduled time has expired. If it is still unable to send out the report (because the communication failure persists), the system resets the interval to 15 minutes. Once the communication failure is resolved, the system reverts the reporting interval to the value that you last configured.

Recommended Action:

Troubleshooting steps are provided for when CSSM is not reachable and when CSLU is not reachable. If CSSM is not reachable and the configured transport type is smart:

1. Check if the smart URL is configured correctly. Use the **show license status** command in privileged EXEC mode, to check if the URL is exactly as follows: https://smartreceiver.cisco.com/licservice/license. If it is not, reconfigure the **license smart url smart** `smart_URL` command in global configuration mode.
2. Check DNS resolution. Verify that the product instance can ping smartreceiver.cisco.com or the nslookup translated IP. The following example shows how to ping the translated IP:

```
Device# ping 171.70.168.183 Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 171.70.168.183, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

If CSSM is not reachable and the configured transport type is **callhome**:

1. Check if the URL is entered correctly. Use the **show license status** command in privileged EXEC mode, to check if the URL is exactly as follows: https://tools.cisco.com/its/service/oddce/services/DDCEService.
2. Check if Callhome profile **CiscoTAC-1** is active and destination URL is correct. Use the **show callhome profile all** command in privileged EXEC mode:

```
Current smart-licensing transport settings: Smart-license messages: enabled
Profile: CiscoTAC-1 (status: ACTIVE)
Destination  URL(s): https://tools.cisco.com/its/service/oddce/services/DDCEService
```

3. Check DNS Resolution. Verify that the product instance can ping tools.cisco.com, or the nslookup translated IP.

```
Device# ping tools.cisco.com Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 173.37.145.8, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 41/41/42 ms
```

   If the above does not work check the following: if the product instance is set, if the product instance IP network is up. To ensure that the network is up, configure the **no shutdown** command in interface configuration mode.

   Check if the device is subnet that is masked with a subnet IP, and if the DNS IP is configured.

4. Verify that the HTTPs client source interface is correct.

   Use the **show ip http client** command in privileged EXEC mode to display current configuration. Use **ip http client source-interface** command in global configuration mode to reconfigure it. In case the above does not work, double-check your routing rules, and firewall settings.

If CSLU is not reachable:

- Check if CSLU discovery works.
  - Zero-touch DNS discovery of cslu-local or DNS discovery of your domain.

    In the **show license all** command output, check if the Last ACK received: field. If this has a recent timestamp, it means that the product instance has connectivity with CSLU. If it is not, proceed with the following checks:

    Check if the product instance can ping **cslu-local**. A successful ping confirms that the product instance is reachable.

    If the above does not work, configure the name server with an entry where hostname **cslu-local** is mapped to the CSLU IP address (the Windows host where you installed CSLU). Configure the **ip domain name** domain-name and **ip name-server** server-address commands in global configuration mode. Here the CSLU IP is 192.168.0.1 and name-server creates entry **cslu-local.example.com**:

```
Device(config)# ip domain name example.com
Device(config)# ip name-server 192.168.0.1
```

  - CSLU URL is configured.

    In the **show license all** command output, under the **Transport:** header check the following: The **Type:** must be **cslu** and **Cslu address:** must have the hostname or the IP address of the Windows host where you have installed CSLU. Check if the rest of the address is configured as shown below and check if the port number is 8182.

```
Transport:
Type: cslu
Cslu address: http://192.168.0.1:8182/cslu/v1/pi
```

    If it is not, configure the **license smart transport cslu** and **license smart url cslu** *http://<cslu_ip_or_host>:8182/cslu/v1/pi* commands in global configuration mode.

If the above does not work and policy installation still fails, contact your Cisco technical support representative.


```
Error Message %LICMGR-3-LOG_SMART_LIC_COMM_RESTORED: Communications with the [chars] restored.
 [chars] - depends on the transport type
-  Cisco Smart Software Manager (CSSM)
-  Cisco Smart License utility (CSLU)
Smart Agent communication with either the Cisco Smart Software Manager (CSSM) or the Cisco
 Smart License
utility (CSLU) has been restored. No action required.
```

Explanation: Product instance communication with either the CSSM or CSLU is restored.

Recommended Action: No action required.

`Error Message %LICMGR-3-LOG_SMART_LIC_POLICY_REMOVED: The licensing policy has been removed.`

Explanation: A previously installed licensing policy has been removed. The Cisco default policy is then automatically effective. This may cause a change in the behavior of smart licensing.

Possible reasons for failure include:

If you have entered the **license smart factory reset** command in privileged EXEC mode all licensing information including the policy is removed.

Recommended Action:

If the policy was removed intentionally, then no further action is required.

If the policy was removed inadvertently, you can reapply the policy. Depending on the topology you have implemented, follow the corresponding method to retrieve the policy:

- Connected Directly to CSSM:

  Enter **show license status**, and check field **Trust Code Installed:**. If trust is established, then CSSM will automatically return the policy again. The policy is automatically re-installed on product instances of the corresponding Virtual Account.

  If trust has not been established, complete these tasks: Generating a New Token for a Trust Code from CSSM, on page 45 and Installing a Trust Code, on page 45. When you have completed these tasks, CSSM will automatically return the policy again. The policy is then automatically installed on all product instances of that Virtual Account.
- Connected to CSSM Through CSLU:
  - For product instance-initiated communication), enter the **license smart sync** command in privileged EXEC mode. The synchronization request causes CSLU to push the missing information (a policy or authorization code) to the product instance.
- CSLU Disconnected from CSSM:
  - For product instance-initiated communication), enter the **license smart sync** command in privileged EXEC mode. The synchronization request causes CSLU to push the missing information (a policy or authorization code) to the product instance. Then complete these tasks in the given order:

Download All For Cisco (CSLU Interface) > Uploading Usage Data to CSSM and Downloading an ACK > **Upload From Cisco (CSLU Interface)**.

- No Connectivity to CSSM and No CSLU

  If you are in an entirely air-gapped network, from a workstation that has connectivity to the internet and CSSM complete this task: Downloading a Policy File from CSSM, on page 46.

  Then complete this task on the product instance: Installing a File on the Product Instance, on page 47.

```
Error Message %LICMGR-3-LOG_SMART_LIC_TRUST_CODE_INSTALL_FAILED: The
install of a new licensing trust code has failed on [chars]: [chars].
```

Explanation: Trust code installation has failed. The first [chars] is the UDI where trust code installation was attempted. The second [chars] is the error string with details of the failure.

Possible reasons for failure include:

- A trust code is already installed: Trust codes are node-locked to the UDI of the product instance. If the UDI is already registered, and you try to install another one, installation fails.
- Smart Account-Virtual Account mismatch: This means the Smart Account or Virtual Account (for which the token ID was generated) does not include the product instance on which you installed the trust code. The token generated in CSSM, applies at the Smart Account or Virtual Account level, and applies only to all product instances in that account.
- A signature mismatch: This means that the system clock is not accurate.
- Timestamp mismatch: This means the product instance time is not synchronized with CSSM and can cause installation to fail.

Recommended Action:

- A trust code is already installed: If you want to install a trust code despite an existing trust code on the product instance, re-configure the **license smart trust idtoken** `id_token_value` {**local**|**all**} [**force**] command in privileged EXEC mode, and be sure to include the **force** keyword this time. Entering the **force** keyword sets a force flag in the message sent to CSSM to create a new trust code even if one exists.
- Smart Account-Virtual Account mismatch: Log in to the CSSM Web UI at https://software.cisco.com and click **Smart Software Licensing** > **Inventory** > **Product Instances**.
- Check if the product instance on which you want to generate the token is listed in the selected Virtual Account. If it is, proceed to the next step. If not, check and select the correct Smart Account and Virtual Account. Then complete these tasks again: Generating a New Token for a Trust Code from CSSM, on page 45 and Installing a Trust Code, on page 45.
- Timestamp mismatch and signature mismatch: Configure the ntp server command in global configuration mode. For example:

  ```
  Device(config)# ntp server 198.51.100.100 version 2 prefer
  ```

```
Error Message %LICMGR-4-LOG_SMART_LIC_REPORTING_NOT_SUPPORTED: The CSSM
OnPrem that this product instance is connected to is down rev and does
not support the enhanced policy and usage reporting mode.
```

Explanation: Cisco Smart Software Manager On-Prem (formerly known as Cisco Smart Software Manager satellite) is not supported in the SLP environment. The product instance behaves as follows:

- Stop sending registration renewals and authorization renewals.
- Start recording usage and saving RUM reports locally.

Recommended Action: Refer to and implement one of the supported topologies instead. See: Supported Topologies, on page 12.


```
Error Message %LICMGR-6-LOG_SMART_LIC_POLICY_INSTALL_SUCCESS: A new
licensing policy was successfully installed.
```

Explanation: A policy was installed in the following way:

- As part of an ACK response.

Recommended Action: No action is required. If you want to know which policy is applied (the policy in-use) and its reporting requirements, enter the **show license all** command in privileged EXEC mode.


```
Error Message %LICMGR-6-LOG_SMART_LIC_AUTHORIZATION_INSTALL_SUCCESS: A
new licensing authorization code was successfully installed on: [chars].
```

This message is not applicable to Cisco Nexus Switches, because there are no enforced or export-controlled licenses on these product instances.


```
Error Message %LICMGR-6-LOG_SMART_LIC_AUTHORIZATION_REMOVED: A licensing
authorization code has been removed from [chars]
```

Explanation: [chars] is the UDI where the authorization code was installed. The authorization code has been removed. This removes the licenses from the product instance and may cause change in the behavior of smart licensing and the features using licenses.

Recommended Action: No action is required. If you want to see the current state of the license, enter the **show license all** command in privileged EXEC mode.


```
Error Message %LICMGR-6-LOG_SMART_LIC_REPORTING_REQUIRED: A Usage report
acknowledgement will be required in [dec] days.
```

Explanation: This is an alert which means that RUM reporting to Cisco is required. [dec] is the amount of time (in days) left to meet this reporting requirements.

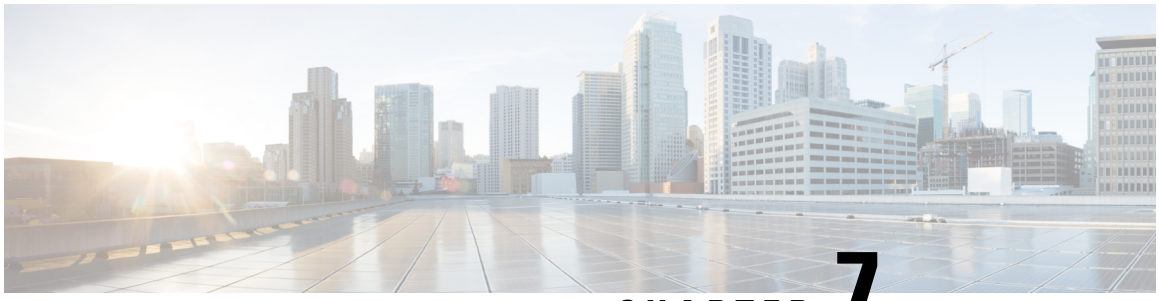
Recommended Action: Ensure that RUM reports are sent within the requested time.

- If the product instance is directly connected to CSSM, or to CSLU and the product instance is configured to initiate communication complete this step on the product instance, the product instance will automatically send usage information at the scheduled time.
- If it is not sent at the scheduled time, because of technical difficulties, you can **license smart sync** command in privileged EXEC mode. For syntax details, see the license smart (privileged EXEC) in the Command Reference.
- If the product instance is connected to CSLU, but CSLU is disconnected from CSSM, complete these tasks: **Download All For Cisco (CSLU Interface),** Uploading Usage Data to CSSM and Downloading an ACK**, and Upload From Cisco (CSLU Interface)**.
- If the product instance is disconnected from CSSM and you are not using CSLU either, enter the **license smart save usage** command in privileged EXEC mode, to save the required usage information in a file. Then, from a workstation where you have connectivity to CSSM, complete these tasks: Uploading Usage Data to CSSM and Downloading an ACK > **Installing a File on the Product Instance**.

```
Error Message %LICMGR-6-LOG_SMART_LIC_TRUST_CODE_INSTALL_SUCCESS: A new
licensing trust code was successfully installed on [chars].
```

Explanation: [chars] is the UDI where the trust code was successfully installed.

Recommended Action: No action is required. If you want to verify that the trust code is installed, enter the show license status command in privileged EXEC mode. Look for the updated timestamp under header **Trust Code Installed:** in the output.



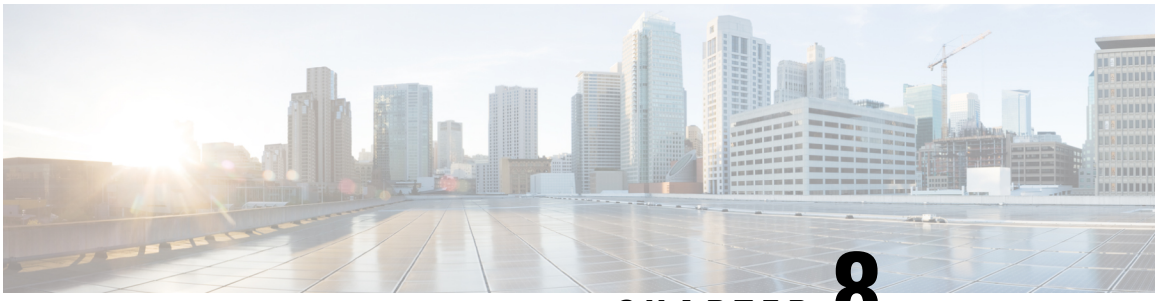
CHAPTER 7

Additional References for Smart Licensing Using Policy

Additional References for Smart Licensing Using Policy

Topic	Document Title
Cisco Smart Software Manager Help	Smart Software Manager Help
Cisco Smart License Utility (CSLU) installation and user guides	Cisco Smart License Utility Quick Start Setup Guide Cisco Smart License Utility User Guide

Additional References for Smart Licensing Using Policy



CHAPTER 8

Feature History for Smart Licensing Using Policy

Feature History for Smart Licensing Using Policy

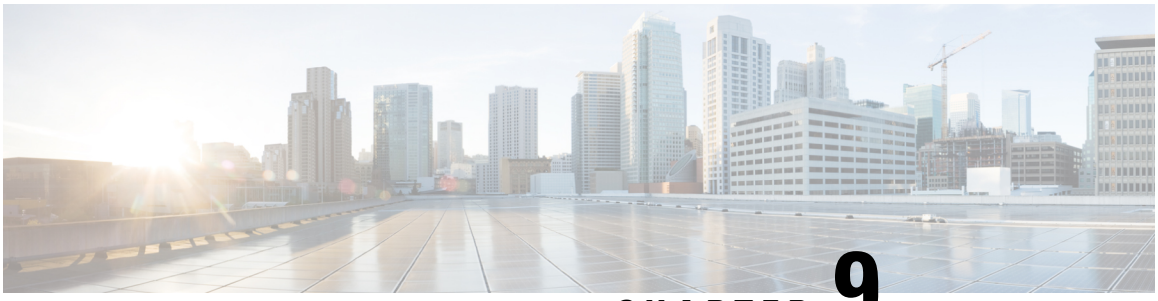
This table provides release and related information for features that are explained in this module.

These features are available on all releases after the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco Nexus 3550-T - 10.2(3t)	Smart Licensing Using Policy (SLP)	An enhanced version of Smart Licensing, with the overarching objective of providing a licensing solution that does not interrupt the operations of your network, rather, one that enables a compliance relationship to account for the hardware and software licenses you purchase and use. Starting with this release, SLP is automatically enabled on the device. This is also the case when you upgrade to this release. By default, your Smart Account and Virtual Account in CSSM is enabled for SLP.

Use Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn.

Feature History for Smart Licensing Using Policy



CHAPTER 9

Smart Licensing Using Policy FAQs

Smart Licensing Using Policy FAQs

Smart Licensing Using Policy

1. What is Smart Licensing Using Policy?

   The Smart Licensing Using Policy is an evolved version of the Smart Licensing.

   The Smart Licensing Using Policy simplifies the day-0 operations for customers. The product will not boot in evaluation-mode, per product software registration is not required, and ongoing communication every 30 days with the Cisco Cloud is not required. However, license use compliance does require software reporting. Reporting is and can be done:

   - From Cisco factory. when all new purchases include a Smart Account on an order
   - Smart Software Manager (SSM) On-Prem (Version XXXX)
   - Cisco Smart Licensing Utility (CSLU) lite-windows application
   - Via APIs / CLIs for any 3rd party system
   - Directly to a Smart Account

2. Which platform and software release supports Smart Licensing Using Policy?

   Smart Licensing Using Policy Release 10.2(3t) supports Cisco Nexus 3550-T platform switches. Enforced and Export licenses are not supported on Cisco Nexus 3550-T platform switches.

3. How often is reporting required?

   - Report is required within 90 days only when there is a change in software use.
   - Ongoing reporting frequency: 365 days.
   - Unenforced/Non-Export, first report is required within 90 days.

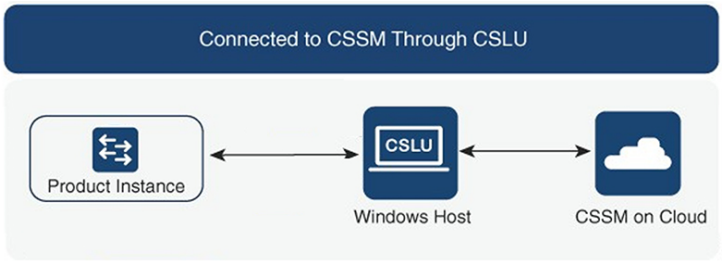
4. What are the supported topologies for connecting to Cisco Smart Software Manager (CSSM)?

   The following are the supported topologies.

Smart Licensing Using Policy FAQs

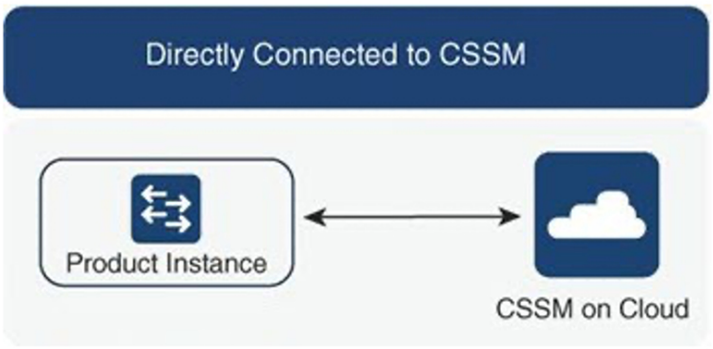
Topology 1: Connected to CSSM Through CSLU

Figure 11:



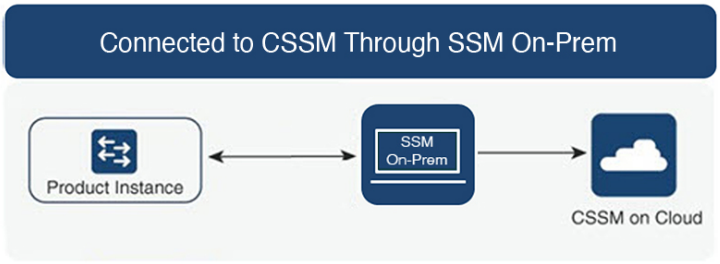
Topology 2: Connected Directly to CSSM

Figure 12:



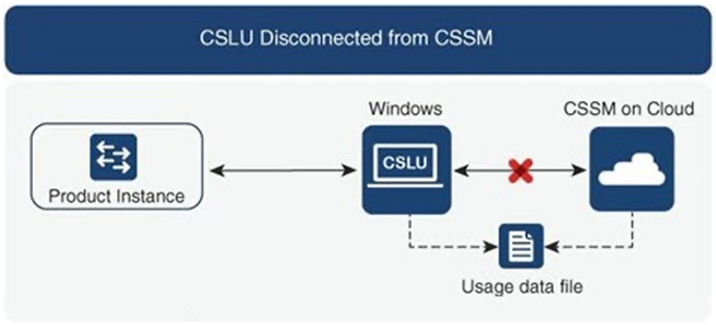
Topology 3: Connected to CSSM Through SSM On-Prem

Figure 13:



Topology 4: CSLU Disconnected from CSSM

Figure 14:

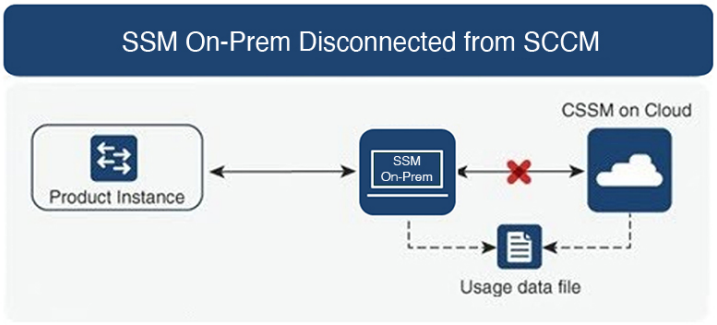


Topology 5: No Connectivity to CSSM and No CSLU

Figure 15:

Topology 6: SSM On-Prem Disconnected from CSSM

Figure 16:



5. How do customers Report software use?

   Cisco Smart Licensing Using Policy provides various reporting options using online and offline modes to report software use.

   - From the switch in off-line or direct connect mode.
   - Cisco Smart License Utility (CSLU) Lite-Windows application
   - SSM On-Prem
   - Direct to CSSM via APIs

6. Does the customer require to install a trust token?

   No, unless customer is using a direct connection to CSSM then a one-time trust exchange is established.

7. Will the Smart Account/Virtual Account migrate to Smart Licensing Using Policy by default, or does it must be requested?

   Smart Account/Virtual Account will be enabled with Smart Licensing Using Policy functionality. No migration of Smart Account is necessary.

8. Are all Virtual Accounts inside a Smart Account enabled for Smart Licensing Using Policy?

   Yes.

9. Can a Smart Licensing Using Policy-enabled SA/VA handle non-Smart Licensing Using Policy Images?

   Yes.

10. Can a non-Smart Licensing Using Policy connect to a Smart Licensing Using Policy SA/VA?

    Yes.

11. Does anything change with the existing software subscription tiers?

    No. The software subscription tier remains the same.

12. Does Release 10.2(3t) support only Smart Licensing Using Policy?

    Starting with Release 10.2(3t) devices will only support Smart Licensing Using Policy.

13. After migrating to Smart Licensing Using Policy, what's the maximum amount of time I get before I send the first report.

    A report is required within 90 days.

14. Who determines the policy and how many policies can be applied on a single device?

    CSSM determines the policy that is applied to a product. Only one policy is in use at a given point in time.

15. Is the Policy a hard requirement?

    The policy is a requirement from Cisco. It is a soft requirement on device and not an enforcement.

16. What is Cisco Smart Licensing Utility (CSLU)?

    Cisco Smart Licensing Utility (CSLU) is a Windows application that is used to automate receiving or pulling software use reports from a Cisco product and report the software use to a Smart Account on Cisco Smart Software Manager (CSSM).

17. What are the minimum Windows system requirements to install CSLU?

Component	Minimum	Recommended
Hard disk	100 GB	200 GB
RAM	8 GB	8 GB
CPU	x86 Dual Core	x86 Quad Core
Ethernet NIC	1	1

18. What are the key features of CSLU?

    - Collect license usage reports from the product instances in either a push or pull modes.

- Store and forward usage reports to CSSM for billing and analytics.
- Obtain and distribute policy and authorization codes from CSSM.
- It can be deployed as standalone micro service:
  - Windows host (up to 10,000 Product Instances (PI))
- It can also be integrated as software component with controller-based products.
- Regardless how the micro service is deployed, it is able to deliver an on-line or off-line connectivity model for the license data.

19. What is the report format in CSLU?

The CSLU report format is based on ISO 19770-4 standard RUM report format. It is delivered in JSON format and is signed per trust model.

20. What are the various tools to collect software use report?

Customers can use various sets of APIs that are available on NX-OS.

21. Which data does Cisco care about?

Below are the required data fields for software reconciliation for each Cisco product that supports Smart Licensing Using Policy.

UDI	HardwareProduct serial number
SN	Software Unique ID Serial Number
Software Package and Reg ID	Software product package and entitlement tag
Count	Software use count per license entitlement
Time and date stamp	Per license entitlement change and use

Below are optional data fields for software reconciliation for each Cisco product that support Smart Licensing Using Policy.

SA-VA Level 1	example, Entity (map to a SA)
SA-VA Level 2	example, GEO (map to a SA)
SA-VA Level 3	example, department (map to a SA)
SA-VA Level 4	example, building (map to a SA)
SA-VA Level 5	example, room (map to a SA)
Free form	Data does not go back to Cisco
Free form	Data does not go back to Cisco

(SA = Smart Account, VA = Virtual Account)

22. How does Smart Licensing Using Policy work with device replacement (RMA)?

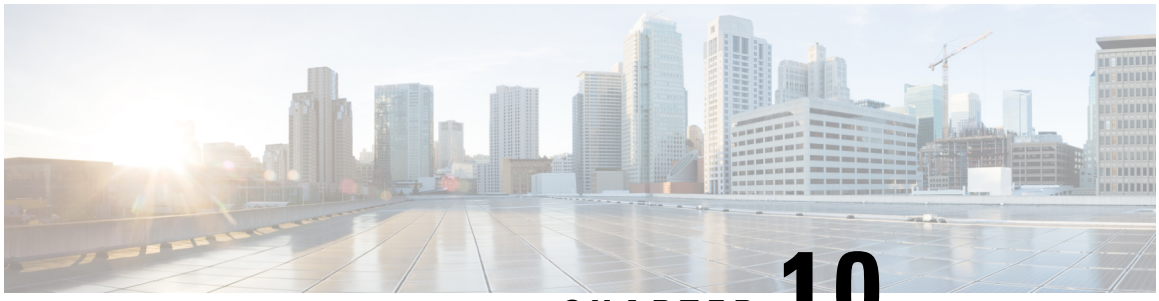
This can be realized through Cisco TAC.

23. What are Licenses Enforcement types?

The enforcement type indicates if the license requires authorization before use. Following are the two types of license enforcement.

- Unenforced - Unenforced licenses do not require authorization before use in connected networks. The terms of use for such licenses are as per the End User License Agreement (EULA)
- Enforced - Licenses that belong to this enforcement type require authorization before use. The required authorization is in the form of an authorization code, which must be installed in the corresponding product instance.

Note Only unenforced licenses are supported in Release 10.2(3t).



CHAPTER 10

Software Manager (SSM) On-Prem Server

Software Manager (SSM) On-Prem Server

1. Which version of SSM On-Prem supports Smart Licensing Using Policy?

   SSM On-prem with Smart Licensing Using Policy support will be available in Cisco Nexus 3550-T NX-OS Smart Licensing Using Policy User Guide, Release 10.2(3t) version.

Software Manager (SSM) On-Prem Server