

Configure Cisco Smart Licenses with NSO

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Introduction

This document is intended to describe the various Network Services Orchestrator (NSO) licenses and how they can be activated with the use of the Cisco Smart License. There can be various methods of how the NSO connects to the Smart Licensing server and it depends upon the environment where the NSO is installed. This document also talks about the different integrations between the NSO and the Cisco Licensing servers.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- How to use the NSO CLI
- Troubleshooting NSO
- Basic Linux knowledge

Components Used

The information in this document is based on these software and hardware versions:

- NSO 4.5 and later
- NSO 4.4

- NSO 4.1/4.2/4.3

NSO Licenses

Note: The user must possess a valid NSO license.

The licenses used by NSO are as follows:

PID	Display on SSM	type	Description
R-NSO-K 9		Top level	Required for each instance of NSO
NSO-P-PAK	NSO-platform-production	server	Required for Active node
NSO-HA-LIC-P	NSO-platform-production-standby	server	Required for Standby node
NSO-DEV-P-PAK	NSO-platform-development-test	server	Required for development environment
NSO-PNF-()	NSO-network-element	Network element	Southbound If the connected device is physical device
NSO-VNF-()	NSO-network-element	Network element	Southbound The connected device is virtual device
NED-()	Different for each NED Example: Cisco-ios-NED Cisco-iosxr-NED	NED	For NED. It is necessary for each type of various devices. Example: NED-IOS-P: For IOS NED NED-IOSX-P: For IOS-XR NED

Note: This might be included in a package Packet Identifier (PID) (bundle etc. with ESC etc.), so it is possible that these PIDs don't appear in the order.

From the Smart Software Manager, license status is seen here:

The screenshot shows the 'Licenses' tab in the Smart Software Manager interface. It features a search bar and a table with the following data:

License	Quantity	In Use	Surplus (+) / Shortage (-)	Alerts	Actions
cisco-ios-NED	20	1	19		Transfer..
cisco-iosxr-NED	20	1	19		Transfer..
juniper-junos-NED	0	1	-1	Insufficient Licenses	Transfer..
NSO-network-element	40	1	39		Transfer..
NSO-platform-development-test	40	0	40		Transfer..
NSO-platform-production	40	1	39		Transfer..
NSO-platform-production-standby	20	0	20		Transfer..

Showing All 7 Records

Configure

Step 1. Generate a Token

1. To create a new token, log into **Cisco Smart Software Manager (CSSM)** with the user id/or the CCO ID and select the appropriate virtual account.

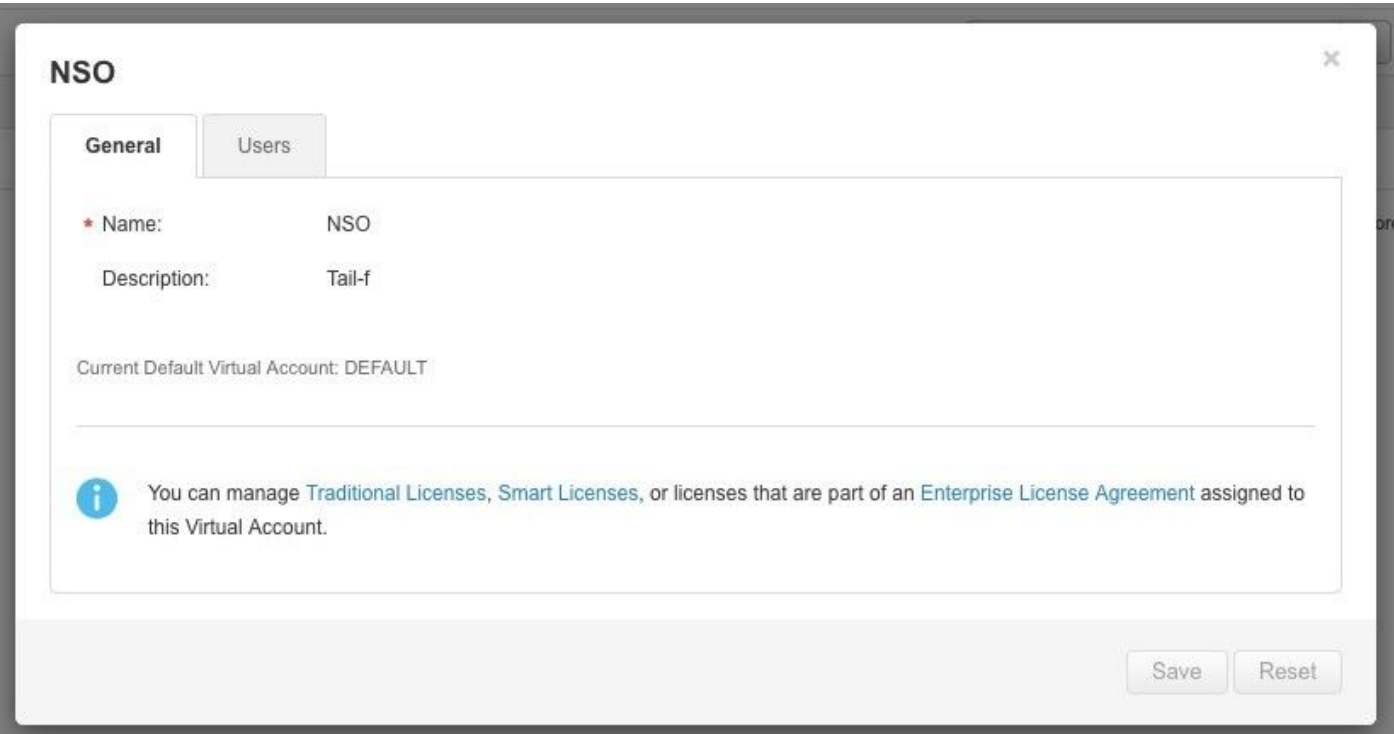
My Smart Account

[Account Properties](#) | [Virtual Accounts](#) | [Users](#) | [Account Agreements](#) | [Event Log](#)

Virtual Accounts

Virtual Account Name	Description
NSO	Tail-f

2. Click on the **Smart Licenses** link to enter CSSM.



NSO

General | Users

* Name: NSO

Description: Tail-f

Current Default Virtual Account: DEFAULT

i You can manage [Traditional Licenses](#), [Smart Licenses](#), or licenses that are part of an [Enterprise License Agreement](#) assigned to this Virtual Account.

Save Reset

3. In CSSM click on **New Token**.

Smart Software Manager

[Alerts](#) | [Inventory](#) | [License Conversion](#) | [Reports](#) | [Email Notification](#) | [Satellites](#) | [Activity](#)

Virtual Account: **NSO**

General | Licenses | Product Instances | Event Log

Virtual Account

Description: Tail-f
Default Virtual Account: No

Product Instance Registration Tokens

The registration tokens below can be used to register new product instances to this virtual account.

[New Token...](#)

Token	Expiration Date	Description	Export-Controlled
YjQ2YzhiNWMyOTM1My00NzQ...	2017-Mar-29 13:30:59 (in 338 days)	testing	Allowed

4. Follow the dialog to provide a description, expiration, and export compliance applicability before you accept the terms and responsibilities. Click on **Create Token** to continue.

Create Registration Token

This dialog will generate the token required to register your product instances with your Smart Account.

Virtual Account: NSO

Description:

* Expire After: Days
Enter the value between 1 and 365, but Cisco recommends a maximum of 30 days.

Allow export-controlled functionality on the products registered with this token

Terms and Responsibilities:

Instructions

To apply for eligibility to download strong encryption software images:

I accept the above terms and responsibilities

[Create Token](#) [Cancel](#)

5. Click on the **New Token**.

Virtual Account: NSO

General	Licenses	Product Instances	Event Log
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Virtual Account

Description:	Tail-f
Default Virtual Account:	No

Product Instance Registration Tokens

The registration tokens below can be used to register new product instances to this virtual account.

6. Copy the token from the dialogue window into your clipboard.

Registration Token



```
YzY2YjFIOTYtOWYzZi00MDg1LTk1MzgtMzlxYjhiZjcyN  
WYyLTE0NjQyNjM0%0AMzc2MDR8cIFKNkdScVBjSXd  
uMmRubXF6dXZDN0tuM0Z1TkhKa2ItRIJINVZV%0AU3  
R2cz0%3D%0A
```

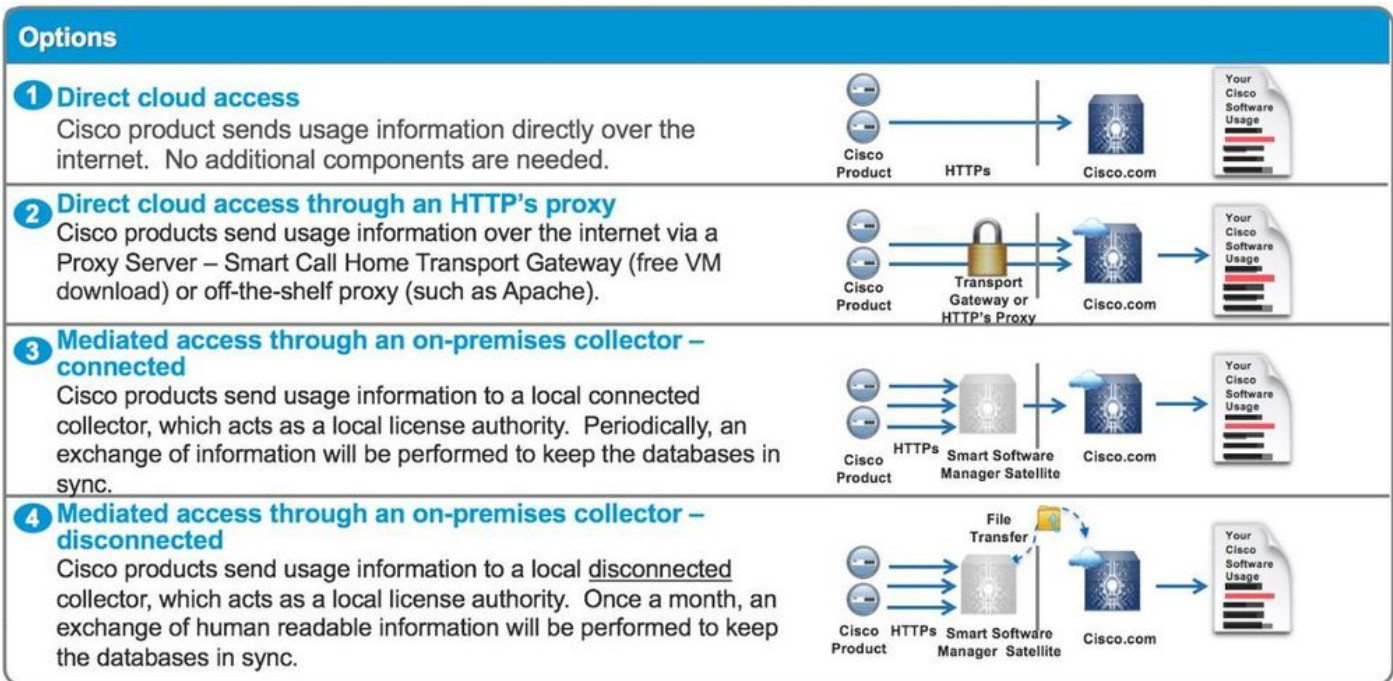
Press ctrl + c to copy selected text to clipboard.

Step 2. Token Registration Preparation

Here are the Registration methods (direct/proxy/satellite).

If NSO or any Cisco products need smart licenses talk to Cisco Smart Software Manager (or Cisco cloud) to register themselves.

There are four main options to set-up Smart License Supported Environment:



Option 1. Direct Cloud Access

With this method, NSO server needs to be able to talk to cisco cloud directly with https. Using HTTP is supported, however, it is not recommended for security reason.

In this method, the registration process can be started without special configuration.

Option 2. Direct Cloud Access through an HTTP's Proxy

If you need to use HTTP(S) proxy server to connect to the web on the Internet, the smart agent in NSO has to be configured with proxy server information.

When option 2 is used, smart-agent needs to be instructed to send its registration request to the proxy server instead of directly sending to Cisco.

It depends on versions, the way to configure is different.

NSO 4.5 or later

From NSO 4.5, it is now possible to configure smart-license configuration through ncs.conf. If smart-license configuration exists in both ncs.conf and NSO CDB, the configuration in ncs.conf will take presedent.

This means that the commands such as "smart-license smart-agent override-url url https://10.1.2.3/"; don't take effect if a different configuration is present in ncs.conf. When doing an NSO system install, ncs.conf by default includes the following:

```
<smart-license>
  <smart-agent>
    <java-executable>DEFAULT</java-executable>
    <java-options>DEFAULT</java-options>
    <production-url>DEFAULT</production-url>
    <alpha-url>DEFAULT</alpha-url>
    <override-url>
```

```
<url>DEFAULT</url>
</override-url>
<proxy>
  <url>DEFAULT</url>
</proxy>
</smart-agent>
</smart-license>
```

'DEFAULT' means it will use the default values as defined in \$install_dir/src/ncs/yang/taif-ncs-smart-license.yang.

To configure leafs listed in ncs.conf in NSO CDB instead, make sure to remove the respective entry from ncs.conf and perform "/etc/init.d/ncs reload"

NSO 4.4

Configure proxy URL on this path.

smart-license smart-agent proxy url <proxy url>

```
admin@ncs(config)# smart-license smart-agent proxy url https://10.10.10.10:8080
admin@ncs(config)#
```

In the default configuration, NSO connects to <https://tools.cisco.com/its/service/oddce/services/DDCEService>, so HTTPS proxy needs to be used.

This proxy configuration will set for both HTTPS and HTTP automatically, so if you change the target URL to HTTP for usage of Satellite that is explained at Option 3. or 4., one configuration will still be able to handle both cases.

Option 3. Mediated Access through an On-premises Collector-Connected

In many cases, the NSO network is not connected to the Internet directly. Other than Option 2., the Smart Software Manager Satellite can be introduced; so that NSO doesn't need to exchange messages directly to the cisco cloud.

The product details of Smart Software Manager Satellite can be found [here](#).

For how to install, find installation guide in the link.

When you use this method, NSO will talk to the Satellite instead of the cisco cloud.

To change the target, you can modify override-url:

```
admin@ncs(config)# smart-license smart-agent override-url url https://10.1.2.3/
admin@ncs(config)#
```

This URL can be found in the administrative web of Smart Software Manager Satellite.

Option 4: Mediated Access through an On-premises Collector-Disconnected

This method is exactly the same with method (3) above from NSO point of view. The difference is only how to sync with cisco cloud from Smart Software Manager Satellite.

Step 3. Token Registration

After you use the token, activate NSO with the generated token to the Cisco Server.

The token is used on the NSO CLI to register to CSSM. When the command is entered, the registration process is initiated asynchronously.

```
admin@ncs# smart-license register idtoken YWVlMmQ3ZjEtYT... result Registration process in progress. Use the 'show license status' command to check the progress and result. admin@ncs#
```

Verify

Use this section in order to confirm that your configuration works properly.

Before Registration: Smart Licensing is always enabled. The output indicates that NSO is not registered, and in EVAL MODE which will expire in 89 days 23 hours.

```
admin@ncs# show license status Smart Licensing is ENABLED Registration: Status: UNREGISTERED Export-Controlled Functionality: Allowed License Authorization: Status: EVAL MODE Evaluation Period Remaining: 89 days, 23 hr, 17 min, 36 sec Last Communication Attempt: NONE Next Communication Attempt: NONE Development mode: enabled admin@ncs#
```

The registration status can be checked with **show license status** command. If the registration is still in process, the command shows this output and says; "REGISTRATION PENDING".

<Still registering...>

```
admin@ncs# show license status Smart Licensing is ENABLED Registration: Status: UNREGISTERED - REGISTRATION PENDING Initial Registration: First Attempt Pending Export-Controlled Functionality: Allowed License Authorization: Status: EVAL MODE Evaluation Period Remaining: 89 days, 23 hr, 16 min, 36 sec Last Communication Attempt: SUCCEEDED on Aug 3 09:41:56 2016 UTC Next Communication Attempt: NONE Development mode: enabled admin@ncs#
```

After a while, the registration gets completed. When you see the status "REGISTERED", the system is registered to CSSM.

<Registered!!>

```
admin@ncs# show license status Smart Licensing is ENABLED Registration: Status: REGISTERED Smart Account: BU Production Test Virtual Account: TAC-Japan-Cloudorch Export-Controlled Functionality: Allowed Initial Registration: SUCCEEDED on Aug 4 05:29:52 2016 UTC Last Renewal Attempt: SUCCEEDED on Aug 4 05:30:03 2016 UTC Next Renewal Attempt: Jan 31 05:30:03 2017 UTC Registration Expires: Aug 4 05:24:56 2017 UTC Export-Controlled Functionality: Allowed
```

License Authorization:

License Authorization:

```
Status: AUTHORIZED on Aug 4 05:30:05 2016 UTC Last Communication Attempt: SUCCEEDED on Aug 4 05:25:02 2016 UTC Next Communication Attempt: Sep 3 05:30:07 2016 UTC Communication Deadline: Aug 4 05:24:56 2017 UTC
```



```
Development mode: enabled
admin@ncs#
```

Usage (Authorized Status)

What license is used can be seen with **show license summary** command. In the this example, NSO-platform-production, NSO-network-element and cisco-ios-NED are used in the system. Notice that License Authorization status is "AUTHORIZED". This means that the all components that require licenses are correctly working under a legal state.

```
admin@ncs# show license summary Smart Licensing is ENABLED Registration: Status: REGISTERED
Smart Account: COMPANY A Virtual Account: Network Department Last Renewal Attempt: None Next
Renewal Attempt: Jan 31 05:33:02 2017 UTC License Authorization: Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Sep 3 05:33:06 2016 UTC
```

License Usage:

License	Entitlement Tag
Count	Status

----- 348fbb21-7edf-42bb-baa7-198903058a54regid.2016-04.com.cisco. NSO-platform-production ,4.2_348fbb21-7edf-42bb-baa7-198903058a54	1 InCompliance
5d641fa0-757d-43b0-a926-166cb6e3cfddregid.2015-10.com.cisco. NSO-network-element ,1.0_5d641fa0-757d-43b0-a926-166cb6e3cfdd	3 InCompliance
d9eca34d-1f6a-4595-ad74-9c0c57e03c27regid.2015-10.com.cisco. cisco-ios-NED ,1.0_d9eca34d-1f6a-4595-ad74-9c0c57e03c27	1 InCompliance
Development mode: disabled	admin@ncs#

This is an output of **show license usage** command in a different example. In this example, cisco-iosxr-NED is also added, and the status is OutOfCompliance. This indicates that to register to CSSM is fine, however, a license for cisco-iosxr-NED is insufficient in the virtual account. Because of out of compliance status of cisco-iosxr-NED, the overall status is OUT_OF_COMPLIANCE.

```
admin@ncs # show license usage
```

```
License Authorization Status : OUT_OF_COMPLIANCE as of Oct 24 06 : 14 : 11 2016 UTC
```

```
NSO - platform - production ( regid . 2015 - 10.com . cisco . NSO - platform - production , 1.0_d1445dab - 9d96 - 4593 - 99f2 - 6f633b8a759c )
```

```
Description : API unavailable
```

```
Count : 1
```

```
Version : 1.0
```

```
Status : InCompliance
```

```
NSO - network - element ( regid . 2015 - 10.com . cisco . NSO - network - element , 1.0_5d641fa0 - 757d - 43b0 - a926 - 166cb6e3cfdd )
```

```
Description : API unavailable
```

```
Count : 3
```

```
Version : 1.0
```

```
Status : InCompliance
```

```
cisco - ios - NED ( regid . 2015 - 10.com . cisco . cisco - ios - NED , 1.0_d9eca34d - 1f6a - 4595 - ad74 - 9c0c57e03c27 )
```

```
Description : API unavailable
```

```
Count : 1
```

```
Version : 1.0
```

```
Status : InCompliance
```

```
cisco - iosxr - NED ( regid . 2015 - 10.com . cisco . cisco - iosxr - NED , 1.0_9956fc34 - cbed - 4d13 - a1ea - 6a36f4e40a99 )
```

```
Description : API unavailable
```

Count : 1
Version : 1.0
Status : **OutOfCompliance**

Troubleshoot

Try to enable debug on smart license feature as the below.

When debug is enabled, debug log is generated into the file specified in /smart-license/smart-agent/stdout-capture/file.

smart license debug generates much logs, and it is recommended to disable the debug after collecting data.

Debug enable

```
admin@ncs# debug smart_lic all  
ok  
admin@ncs#
```

Debug disable

```
admin@ncs# no debug smart_lic all  
ok  
admin@ncs#
```

Smart license log config

```
admin@ncs# show running-config smart-license  
smart-license smart-agent stdout-capture disabled  
smart-license smart-agent stdout-capture file ./logs/ncs-smart-licensing.log  
admin@ncs#
```

Enable smart license log

```
admin@ncs(config)# smart-license smart-agent stdout-capture enabled  
admin@ncs(config)# commit  
Commit complete.  
admin@ncs(config)#
```