Configure Cisco Smart Licenses with NSO

Contents

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 4.4
- NSO 4.1/4.2/4.3

Background Information

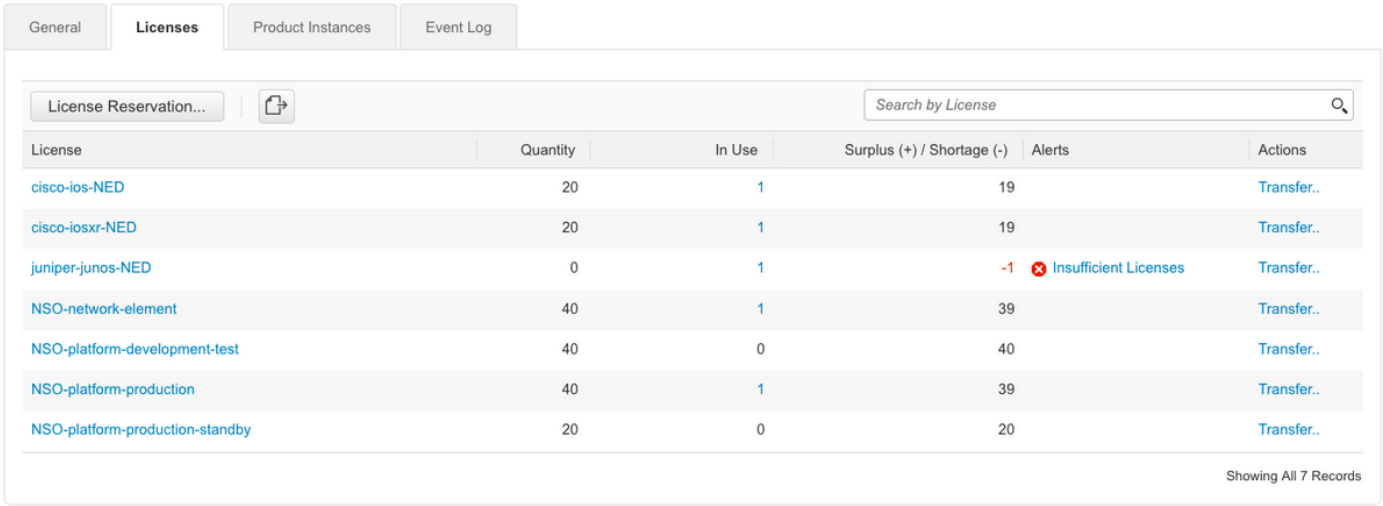
Note: The user must possess a valid NSO license.

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 environme
NSO-PNF-()	NSO-network-element	Network element	Southbound If the connected device i 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 typ 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.

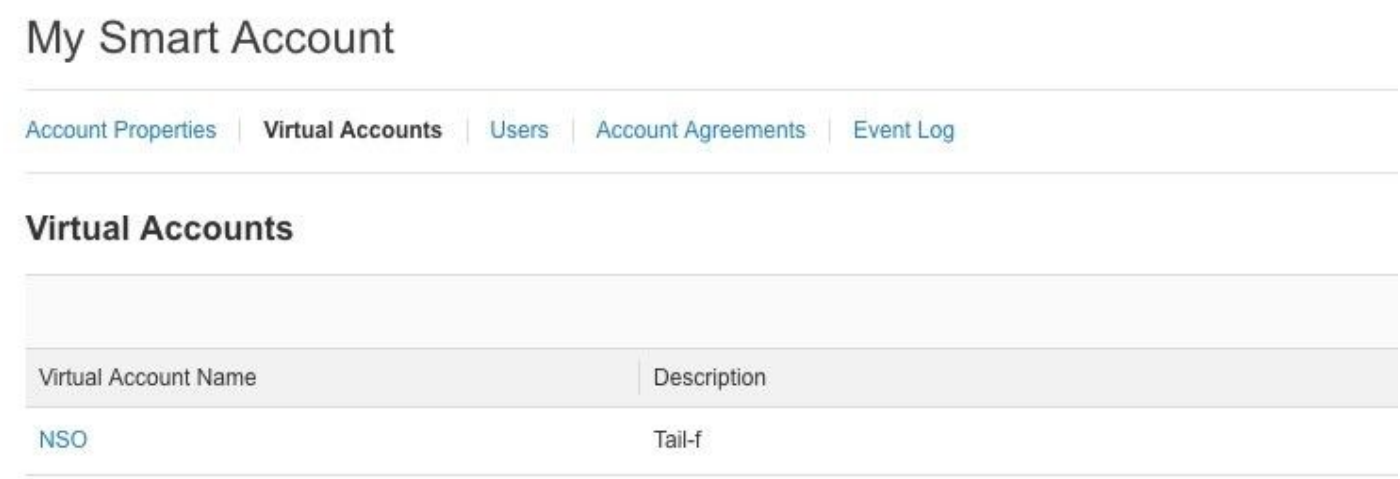
From the Smart Software Manager, license status is seen here:



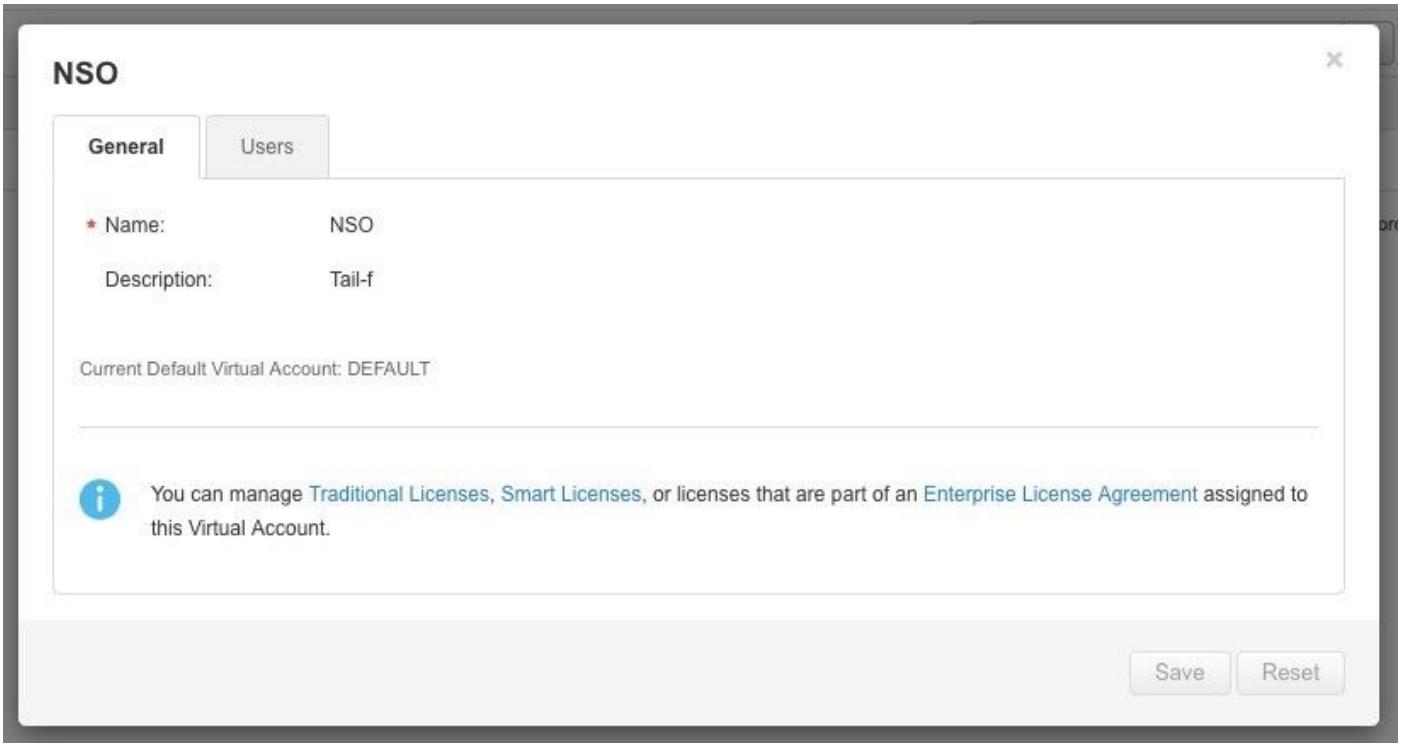
Configure

Step 1. Generate a Token

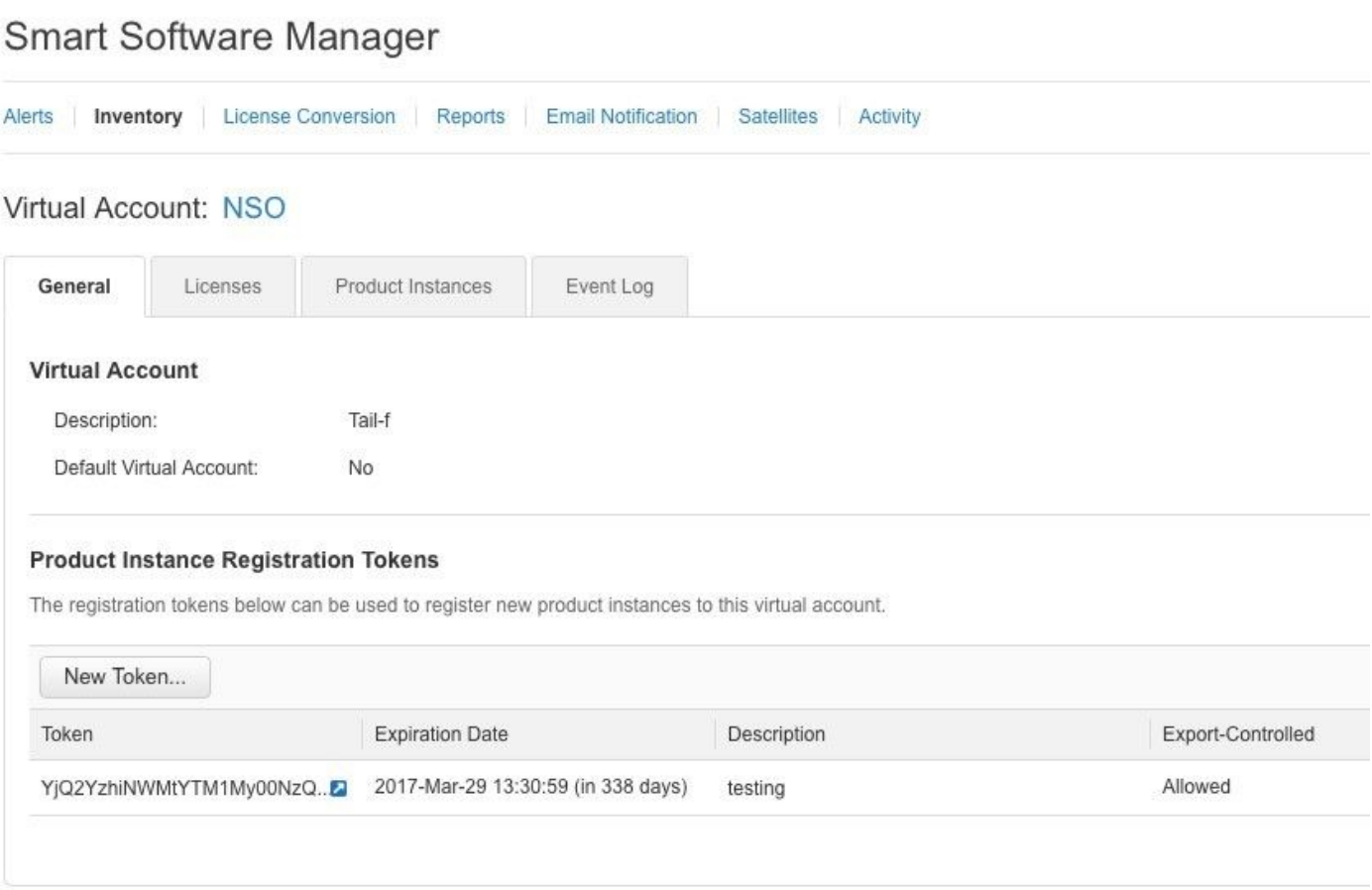
1. To create a new token, log into **Cisco Smart Software Manager** (CSSM) with the user id/or the CCO ID and select the appropriate virtual account.



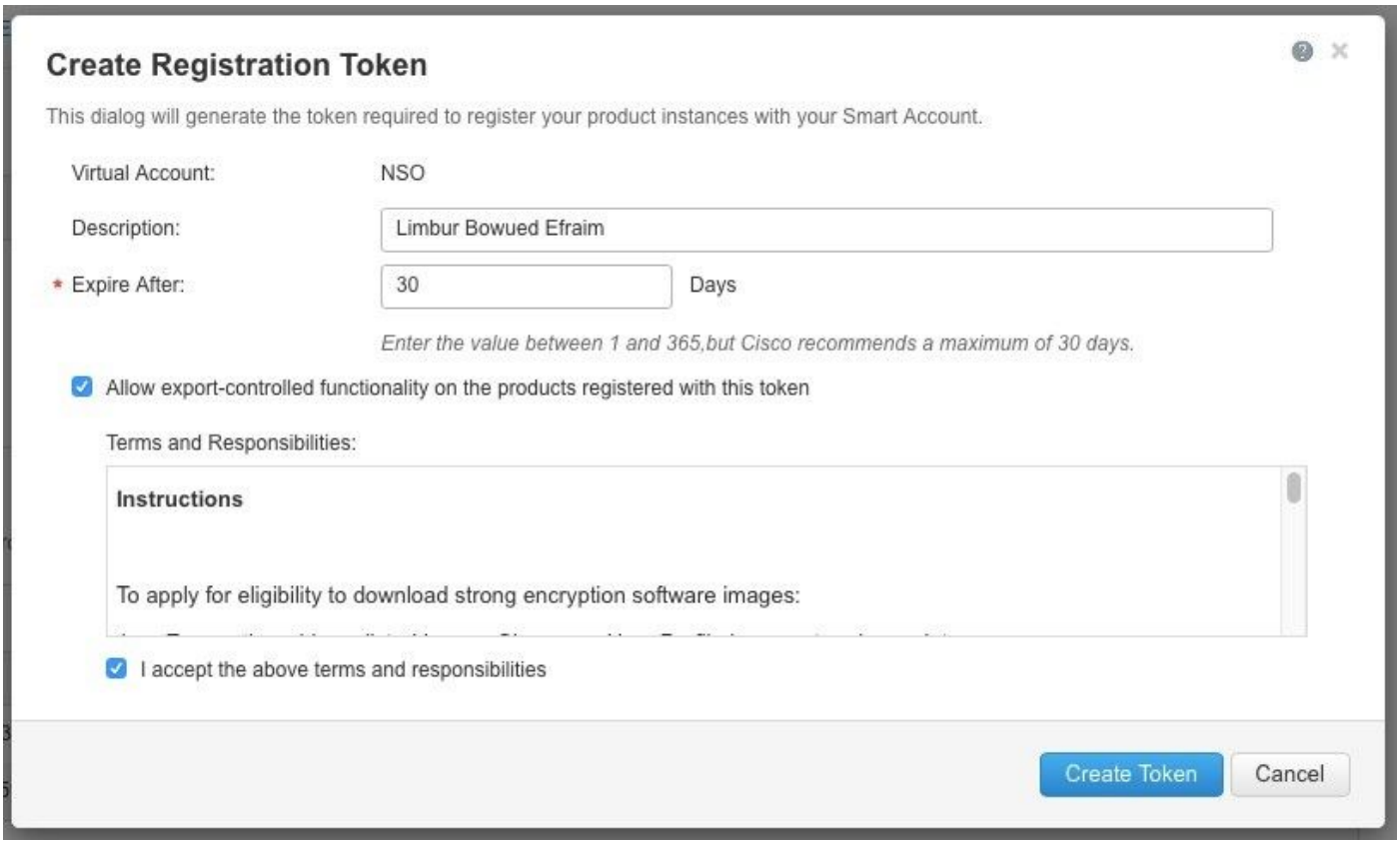
2. Click on the **Smart Licenses** link to enter CSSM.



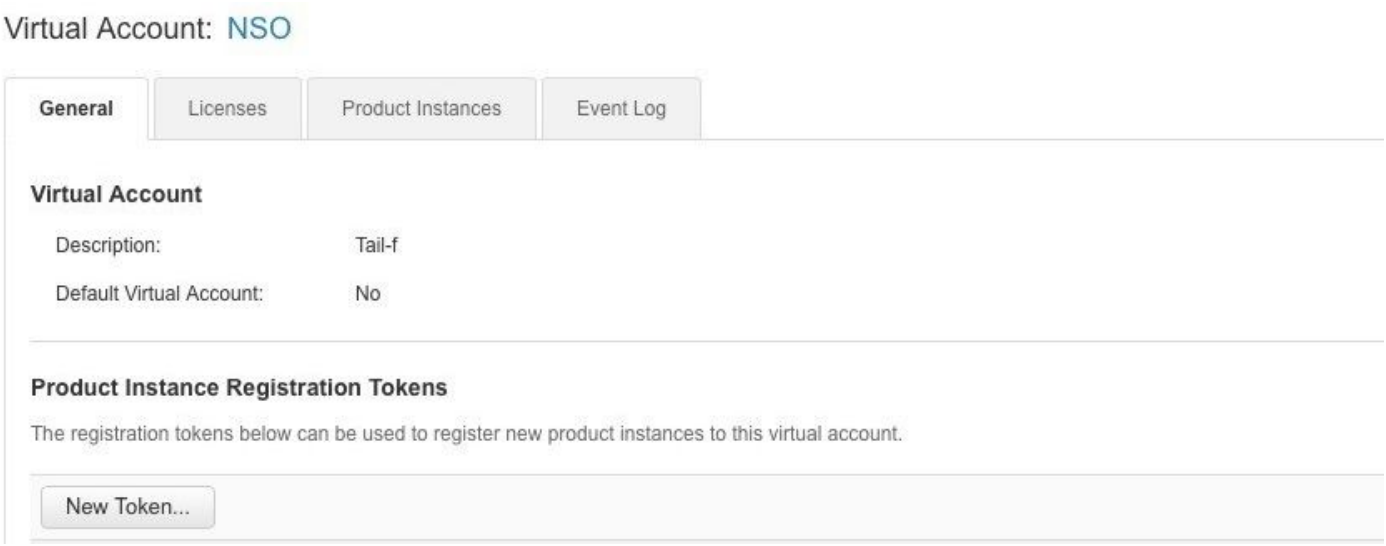
3. In CSSM click on **New Token**.



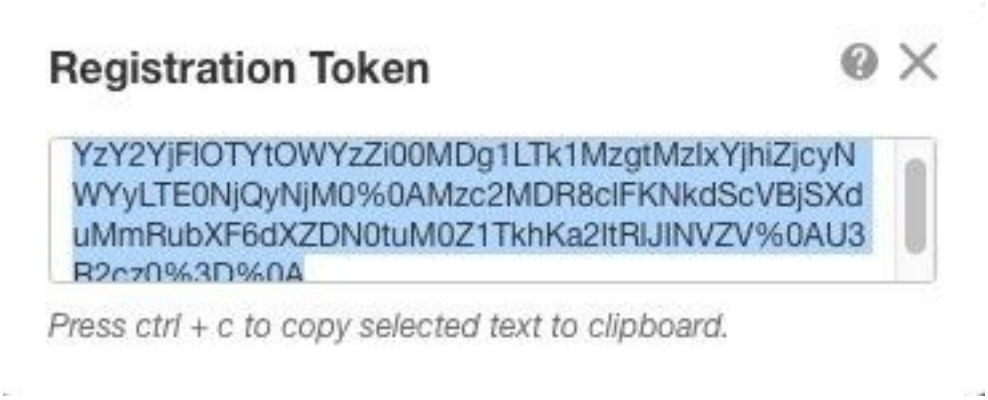
4. Follow the dialog to provide a description, expiration, and export compliance applicability before you accept the terms and responsibilities. Click on **Create Token** to continue.



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



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

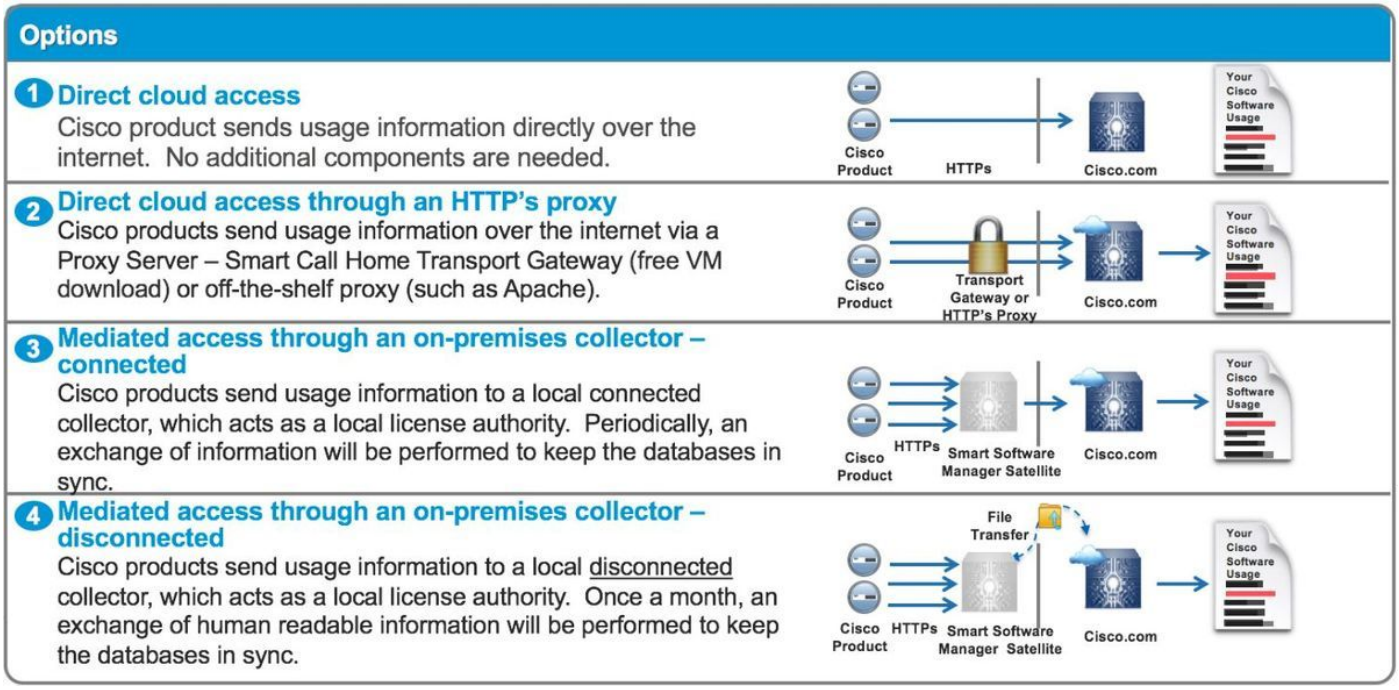


Step 2. Token Registration Preparation

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 4.4 or later

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.

NSO 4.1/4.2/4.3

Smart-agent is a piece of code provided by Cisco and it integrates with different products, amongst others with NSO.

Proxy configuration is not present in smart-agent, however, you can still configure the proxy servers to use for smart licenses.

The HTTP(s) connection itself is made by Java VM and smart-agent can be passed to java options based on the yang model itself:

```
leaf java-options {
        tailf:info "Smart licensing Java VM start options";
        type string;
        default "-Xmx64M -Xms16M -Djava.security.egd=file:/dev/./urandom";
        description
          "Options which NCS will use when starting the Java VM.";}
```

If you use HTTP, all the steps here are the same as for https. You just need to additionally override URL with HTTP option followed by smart-agent restart:

Smart-license smart-agent override-url
url: http://tools.cisco.com/its/service/oddce/services/DDCEService.

Step 1. Configure smart-license smart-agent java-options with this command:

smart-license smart-agent java-options "-**Dhttps.proxyHost**=<ip_address> -**Dhttps.proxyPort**=<port>-Xmx64M -Xms16M -Djava.security.egd=file:/dev/./urandom".

For example:

```
admin@ncs# show running-config smart-license smart-agent
smart-license smart-agent java-options "-Dhttps.proxyHost=10.10.10.10 -Dhttps.proxyPort=8080 -
Xmx64M -Xms16M -Djava.security.egd=file:/dev/./urandom"
smart-license smart-agent stdout-capture enabled
smart-license smart-agent stdout-capture file ./logs/ncs-smart-licensing.log
```

Commit the changes and restart smart-agent.

Step 2. Verify that smart-agent has started with correct options.

```
nso@ubuntu$ ps -ef | grep smart
nso        2827   2179  0 08:56 ?        00:00:00 /home/nso/nso-
4.2.1/lib/ncs/lib/core/sls/priv/agentwrapper
java -Dhttps.proxyHost=10.10.10.10 -Dhttps.proxyPort=8080 -Xmx64M -Xms16M -
Djava.security.egd=file:/dev/./urandom -
jar /home/nso/nso-4.2.1/lib/ncs/lib/core/sls/priv/webapp-runner.jar /home/nso/nso-
4.2.1/lib/ncs/lib/core/sls/priv/
smartagent --port 0 --path /smartagent --shutdown-override nso        2829   2827  9 08:56
?        00:00:08 java -Dhttps.proxyHost=10.10.10.10 -Dhttps.proxyPort=8080 -Xmx64M -
Xms16M -Djava.security.egd=file:/dev/./urandom -jar /home/nso/nso-
4.2.1/lib/ncs/lib/core/sls/priv/webapp-runner.jar
/home/nso/nso-4.2.1/lib/ncs/lib/core/sls/priv/smartagent --port 0 --path /smartagent --shutdown-
override nso        2871   2150  0 08:57 pts/17   00:00:00 grep --color=auto smart
```

Step 3. Verify by triggering token registration while tcpdump is enabled.

```
nso@ubuntu:~$ sudo tcpdump host 10.10.10.10
```

```
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
09:14:58.291348 IP 192.168.142.130.57982 > 10.10.10.10.http-alt: Flags [S], seq 252508171, win
29200, options
[mss 1460,sackOK,TS val 289920 ecr 0,nop,wscale 7], length 0 09:14:59.288706 IP
192.168.142.130.57982 > 10.10.10.10.http-alt: Flags [S], seq 252508171, win 29200, options
[mss 1460,sackOK,TS val 290170 ecr 0,nop,wscale 7], length 0
```

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

There is currently no specific troubleshooting information available for this configuration.