Configure Smart Licensing Using Policy on the Nexus Platform

Contents

Introduction

This document describes how to configure Smart Licensing using Policy (SLP) on the Nexus 9K platform.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Nexus NX-OS software
- Cisco NX-OS licensing options
- Domain Name System (DNS)

Components Used

The information in this document is based on Cisco Nexus 9000 with NXOS version 10.2(5).

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configure

Smart Software Licensing (SL) provides a single, standardized licensing solution for all of your Cisco products. It is a cloud-based licensing end-to-end platform that consists of tools and processes to authorize the usage and reporting of your Cisco products. It is designed to run on a product instance and communicate

with the Cisco Cloud License Service through the Smart Call Home transport medium to complete product registration and authorization.

Smart Licensing Using Policy (SLP) was introduced in Cisco NX-OS Release 10.2(1)F, and it remains the only supported licensing mode to this day.

Smart Licensing Using Policy is an enhanced version of Smart Software Licensing, with the overarching objective of providing a licensing solution that does not interrupt the operations of your network, but rather, one that enables a compliance relationship to account for the hardware and software licenses you purchase and use.

Smart Licensing Using Policy is honor-based. However, license use compliance does require software reporting.

Cisco Smart Software Manager (CSSM) is responsible for managing the accounts and license instances. CSSM runs 24/7 on the [Cisco site](#).

Methods

Main methods to connect Nexus switches to CSSM:

- Directly: You point directly to the Cisco site using the Internet connection.
- Via Cisco Smart Licensing Utility (CSLU): This is a software application you can run on your computer. [Installation guide](#).
- Via On-Prem license server: Dedicated server running operating system provided by Cisco. [Installation guide](#).
- Offline: You generate a report on the Nexus switch and upload the file to CSSM to generate an acknowledgment file, which then needs to be applied to the Nexus switch.

Note: It does not matter what method is used, the first report must still be done to CSSM within the next 90 days. Later, report frequency is required every 365 days, unless a license usage change occurs, which requires another report within the next 90 days.

Configurations

These configurations are implemented on Nexus 9K switch using management VRF for all communications, which is the default VRF for SLP.

Method 1: Directly Connected

- Both smart and call-home modes of transport are supported.
- Only management VRF is supported on call home mode of transport until NXOS 10.2(2)F, starting NXOS 10.2(3)F non-management VRF is supported as well.
- Before NXOS 10.3(2)F, only management VRF is supported on smart mode of transport. Starting from NXOS 10.3(2)F, non-management VRF is supported as well.

Step 1. Configure DNS client.

```
Nexus(config)# ip domain-lookup
Nexus(config)# vrf context management
Nexus(config-vrf)# ip name-server <dns server ip>
```

Step 2. Configure smart transport mode.

```
Nexus(config)# license smart transport smart
```

Step 3. Indicate CSSM URL.

```
Nexus(config)# license smart url smart https://smartreceiver.cisco.com/licservice/license
```

Step 4. Create the Trust Code (token) in the [Cisco site](#).

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > General**.

Click **New Token...**.

Cisco Software Central > Smart Software Licensing

Smart Software Licensing

InternalTestDemoAccount69.cisco.com

SL Product Details   Support   Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: **CML - bpaez**

❶ Major   Hide Alerts

| General | Licenses | Product Instances | Event Log |

Virtual Account

| Description: | Private virtual account for personal use of CML. |
| 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	Uses	Export-Controlled	Description	Created By	Actions
			No Records Found			

The token will be expired when either the expiration or the maximum uses is reached

Step 4a. Fill in the required information and click **Create Token**.

Create Registration Token

This will create a token that is used to register product instances, so that they can use licenses from this virtual account.Once it's created, go to the Smart Licensing configuration for your products and enter the token, to register them with this virtual account.

Virtual Account: CML - bpaez

Description: SLP Test

* Expire After: 30   Days

                       Between 1 - 365, 30 days recommended

Max. Number of Uses: 10

                       The token will be expired when either the expiration or the maximum uses is reached

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

Create Token   Cancel

Step 4b. Click the newly created token.

Cisco Software Central > **Smart Software Licensing**   InternalTestDemoAccount69.cisco.com

Smart Software Licensing   SL Product Details   Support   Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: CML - bpaez   ● 1 Major   Hide Alerts

| General | Licenses | Product Instances | Event Log |

Virtual Account

Description: Private virtual account for personal use of CML.

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	Uses	Export-Controlled	Description	Created By	Actions
NGFjYjcwMjYtZjIkNi0... 🔗	2023-Aug-21 02:58:42 (in 30 days)	0 of 10	Allowed	SLP Test	bpaez	Actions ▼

The token will be expired when either the expiration or the maximum uses is reached

Step 4c. Press **ctrl + c** to copy the selected text to the clipboard.

Smart Software Licensing

SL Product Details Support Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: CML - bpaez

🔴 1 Major | **Hide Alerts**

| General | Licenses | Product Instances | Event Log |

**Virtual Account**

Description: Private virtual account for personal use of CML.

Default Virtual Account: No

NGFjYjcwMjYtZjlkNi00ZDA4LTlhNWMtMzM4ZTJlO
TkzY2YxLTE2OTI1ODY3%0AMjl1Nzl8SThuU0dhdF
AwYUxXbjNBOVdUMGQwYVRjTVNnNXQvaHJ3bi9
oNDM4%0Ac0RCND0%3D%0A

Press ctrl + c to copy selected text to clipboard.

product instances to this virtual account.

		Uses	Export-Controlled	Description	Created By	Actions
NGFjYjcwMjYtZjlkNi0... 🔳	2023-Aug-21 02:58:42 (in 30 days)	0 of 10	Allowed	SLP Test	bpaez	Actions ▾

The token will be expired when either the expiration or the maximum uses is reached

Step 5. Install Trust Code in Nexus switch.

```
Nexus# license smart trust idtoken <token from step 4> all force
Initiated trust establishment with backend. run show license status, for trust establishment status
```

Step 6. Ensure Nexus is present on CSSM.

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Product Instances**.

Smart Software Licensing

SL Product Details Support Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: CML - bpaez

🔴 1 Major | **Hide Alerts**

| General | Licenses | **Product Instances** | Event Log |

Authorize License-Enforced Features...	🗗		Search by Device or by Product Type	🔍

Name	Product Type	Last Contact	Alerts	Actions
UDI_PID:N9K-C9336C-FX2; UDI_SN:FDO24400PT4;	N9300	2023-Jul-22 01:51:01		Actions ▾

Showing 1 Record

Step 7. Enable any feature that requires your desired license. For this example, a feature is enabled that requires an NX-OS LAN Enterprise Services license.
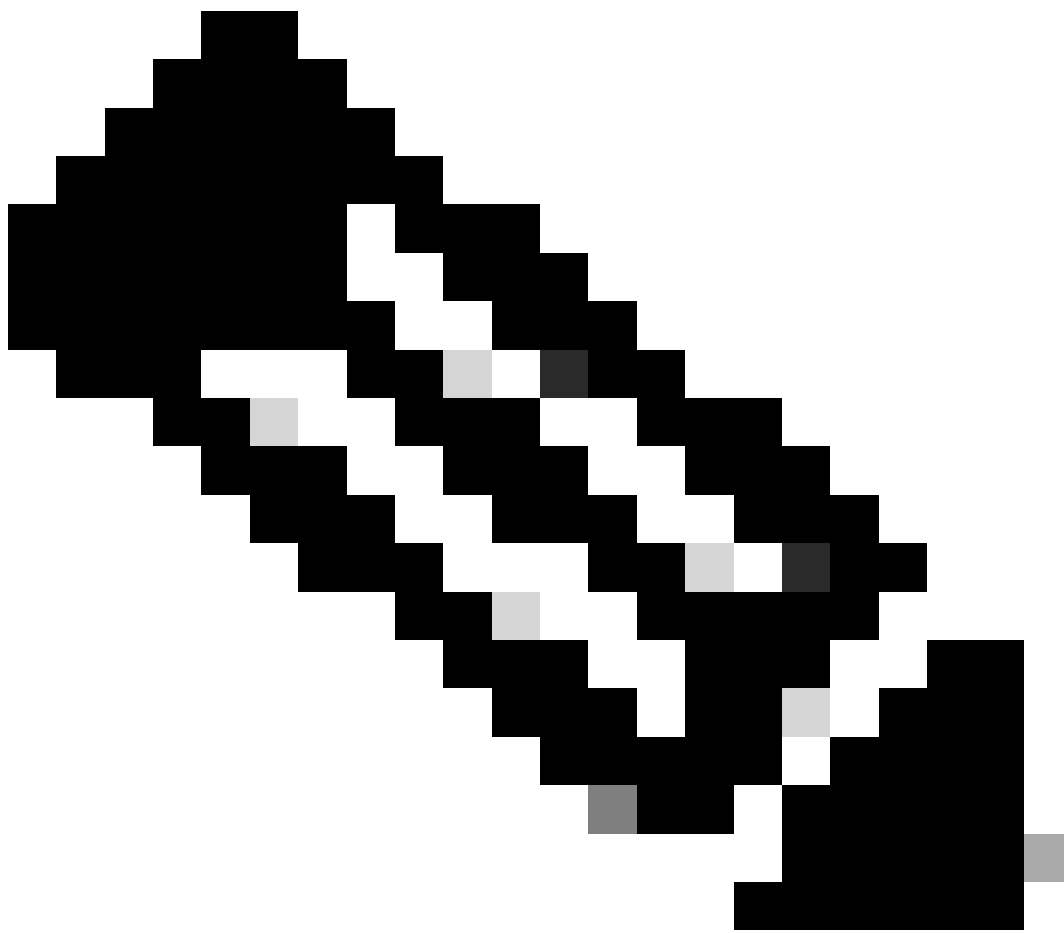
Note: NX-OS always asks for the leaf nodes in the license hierarchy.
NX-OS always asks for Feature-Based Licenses, instead of Tier-Based Licenses.

```
Nexus(config)# feature eigrp
```

Step 8. Confirm you have the expected license (feature-based) in use.

```
Nexus# show license summary
License Usage:
License                    Entitlement tag                Count    Status
--------------------------------------------------------------------------
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)   1       IN USE
Nexus# show license usage LAN_ENTERPRISE_SERVICES_PKG

Feature List:
eigrp
```

Step 9. Verify the expected license is consumed on the [Cisco site](#).

Log in to Cisco **Software Central > Smart Software Licensing > Inventory > Licenses**.

Log in to Cisco **Software Central > Smart Software Licensing > Inventory > Licenses**, Click the expected license from the list to see the details.

Step 10. Verify communication is successful with the Cisco site.

```
Nexus# 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: Smart
    URL: https://smartreceiver.cisco.com/licservice/license
    Proxy:
        Not configured

Policy:
    Policy in use: Merged from multiple sources
    Reporting ACK required: Yes
    Unenforced/Non-Export:
        First report requirement (days): 90 (CISCO default)
        Ongoing reporting frequency (days): 365 (CISCO default)
        On change reporting (days): 90 (CISCO default)
    Enforced (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)
    Export (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)

Miscellaneous:
    Custom Id: <empty>

Usage reporting:
    Last ACK received: Jul 21 19:28:32 2023 UTC
    Next ACK deadline: Jul 20 19:28:32 2024 UTC
    Reporting push interval: 30 days
    Next ACK push check: <none>
    Next report push: Aug 20 19:23:33 2023 UTC
    Last report push: Jul 21 19:23:33 2023 UTC
    Last report file write: <none>

Trust Code installed: Jul 21 19:18:04 2023 UTC
    Active: PID: N9K-C9336C-FX2, SN: FDO24400PT4
        Jul 21 19:18:04 2023 UTC


Nexus#
```

Method 2: CSLU

Before NXOS 10.3(2)F, only management VRF is supported on CSLU mode of transport. Starting from NXOS 10.3(2)F, non-management VRF is supported as well.

Step 1. Configure DNS client.

Note: You can skip to step 3 if you are not using a Fully Qualified Domain Name (FQDN) on the host running CSLU.

```
Nexus(config)# ip domain-lookup
Nexus(config)# vrf context management
Nexus(config-vrf)# ip name-server <dns server ip>
```

Step 2. Add an entry for cslu-local on your DNS server.

Note: Nexus automatically discovers hostname cslu-local and cslu-local.<domain>

Step 3. Ensure cslu transport is configured. This is the default configuration.

```
Nexus(config)# license smart transport cslu
```

Step 4. Indicate CSLU transport URL.

```
Nexus(config)# license smart url cslu http://<ip address of the host running CSLU>:8182/cslu/v1/pi
```

Step 5. Enable any feature that requires your desired license. For this example, you enable a feature that requires NX-OS LAN Enterprise Services license.

Note: NX-OS always asks for the leaf nodes in the license hierarchy.
NX-OS always asks for Feature-Based Licenses, instead of Tier-Based Licenses.

```
Nexus(config)# feature isis
```

Step 6. Confirm you have the expected license (feature-based) in use.

```
Nexus# show license summary
License Usage:
License                    Entitlement tag                Count    Status
--------------------------------------------------------------------------
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)   1       IN USE
Nexus# show license usage LAN_ENTERPRISE_SERVICES_PKG

Feature List:
isis
```

Step 7. Send the license usage report (known as RUM report) to CSSM.

```
Nexus# license smart sync all
Initiated sync with backend.
```

Step 8. Click **Refresh Product Instance List** and verify product instance is present on CSLU, indicating **Complete: Usage report uploaded to CSSM**.

Open **CSLU > Inventory > Product Instances**.
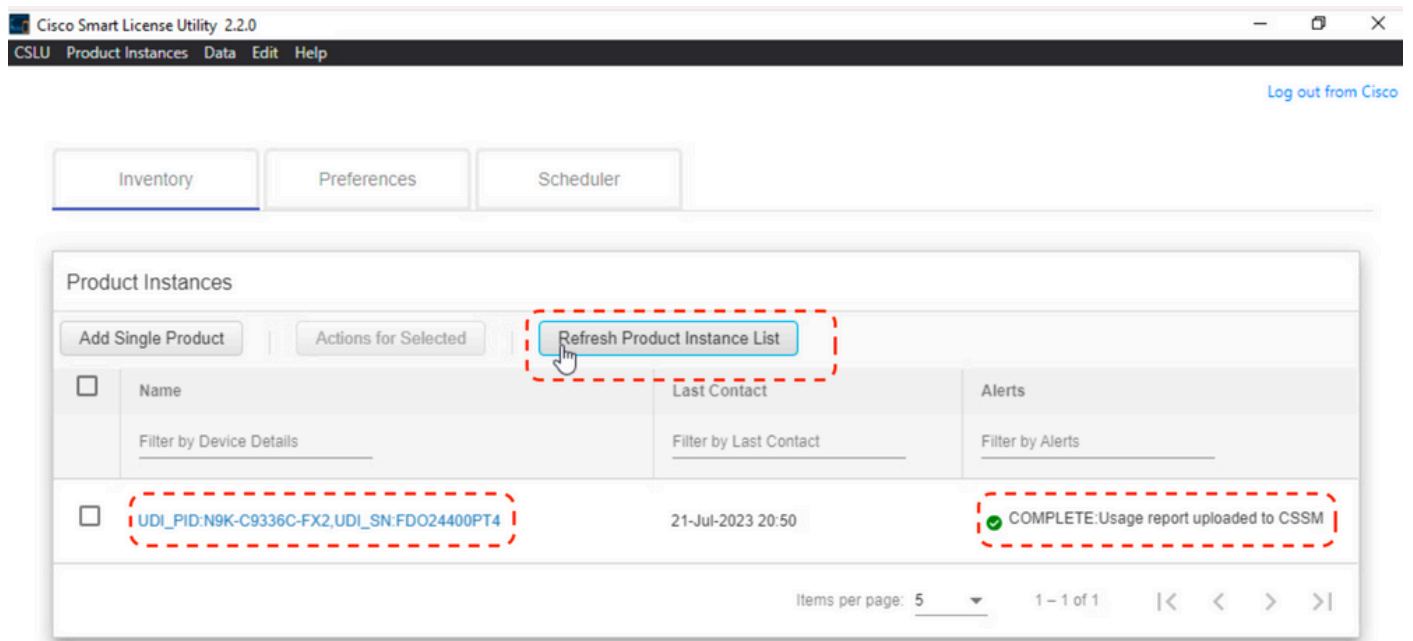
Step 9. Ensure Nexus is present on CSSM. This confirms communication works properly between CSLU and CSSM.

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Product Instance**.

Step 10. Verify the expected license was consumed on CSSM On-Prem local server.

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Licenses**.

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Licenses > Click on License > Product Instances**.

NXOS LAN for Nexus 9300 10G+ Leaf XF in CML - bpaez

| Overview | **Product Instances** | Event Log | Transaction History |

Product Instance	Product Type	Licenses used
UDI_PID:N9K-C9336C-FX2; UDI_SN:FDO24400PT4;	N9300	1

Showing 1 Record

Actions ▲   Close

Step 11. Verify communication is successful with the Cisco site.

```
Nexus# 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: http://10.201.255.233:8182/cslu/v1/pi

Policy:
    Policy in use: Merged from multiple sources
    Reporting ACK required: Yes
    Unenforced/Non-Export:
        First report requirement (days): 90 (CISCO default)
        Ongoing reporting frequency (days): 365 (CISCO default)
        On change reporting (days): 90 (CISCO default)
    Enforced (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)
    Export (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)

Miscellaneous:
    Custom Id: <empty>

Usage reporting:
    Last ACK received: <none>
    Next ACK deadline: Oct 20 01:09:12 2023 UTC
    Reporting push interval: 30 days
    Next ACK push check: Jul 22 01:18:02 2023 UTC
    Next report push: Aug 21 01:13:03 2023 UTC
    Last report push: Jul 22 01:13:03 2023 UTC
```
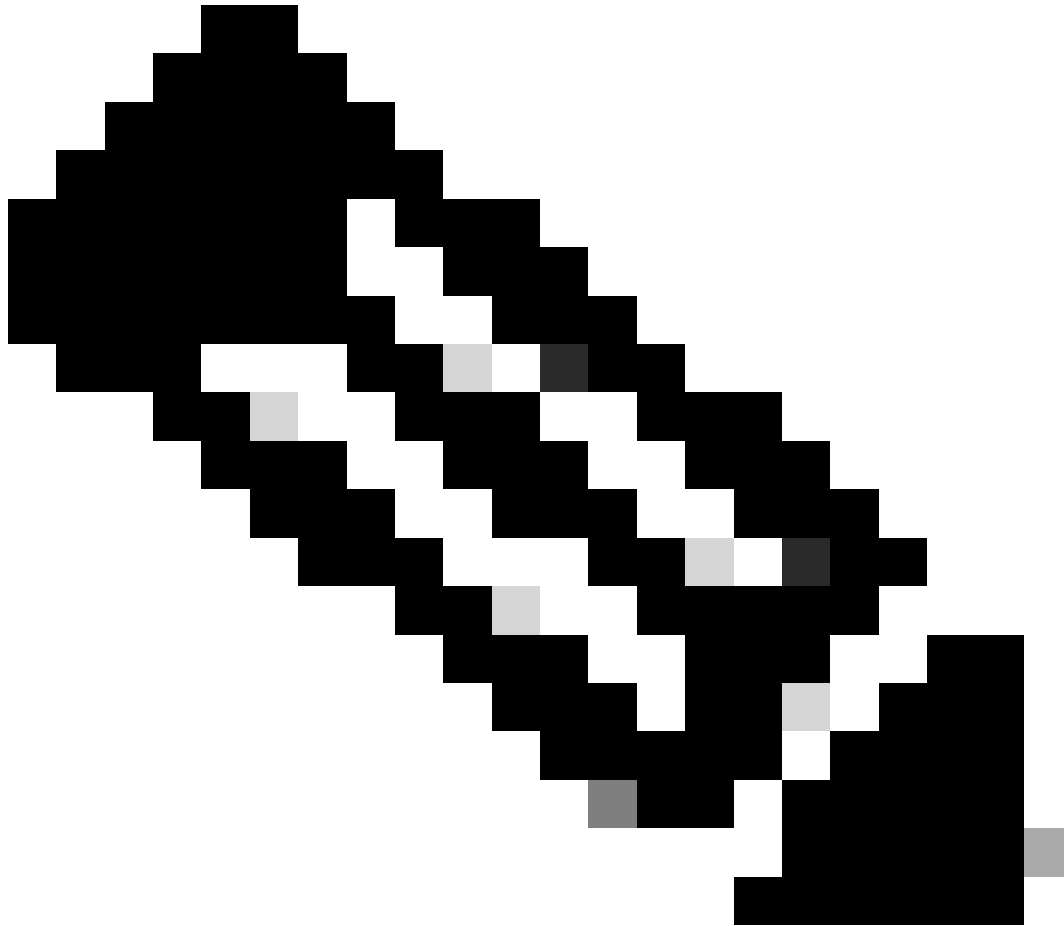
```
   Last report file write: <none>

Trust Code installed: <none>
```


Note:

It is expected to see Trust Code Installed as in the show license status using this method.

It is expected to see Last ACK received as in the show license status the first time you sync up with CSSM On-Prem. This changes after the first Next report push is done.

Method 3: On-Prem License Server

- Only CSLU mode of transport is supported on On-Prem.

- Before NXOS 10.3(2)F, only management VRF is supported on CSLU mode of transport. Starting from NXOS 10.3(2)F, non-management VRF is supported as well.

Step 1. Configure DNS client.

```
Nexus(config)# ip domain-lookup
Nexus(config)# vrf context management
Nexus(config-vrf)# ip name-server <dns server ip>
```

Step 2. Ensure CSLU transport is configured. This is the default configuration.

```
Nexus(config)# license smart transport cslu
```

Step 3. Identify the CSLU transport URL.

Log in to **CSSM On-Prem > Smart Software Manager On-Prem > Select Local Virtual Account** (top right corner). From the drop-down menu, choose **Inventory > General**, then click **CSLU Transport URL** to copy.

Step 4. Indicate CSLU transport URL.

```
Nexus(config)# license smart url cslu https://<on-prem hostname>/cslu/v1/pi/<virtual account>
```

Step 5. Enable any feature that requires your desired license. For this example, a feature is enabled that requires an NX-OS LAN Enterprise Services license.

Note: NX-OS always asks for the leaf nodes in the license hierarchy.

NX-OS always asks for Feature-Based Licenses, instead of Tier-Based Licenses.

```
Nexus(config)# feature ospf
```

Step 6. Confirm you have the expected license (feature-based) in use.

```
Nexus# show license summary
License Usage:
License                       Entitlement tag                Count   Status
-----------------------------------------------------------------------
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)     1       IN USE
Nexus# show license usage LAN_ENTERPRISE_SERVICES_PKG

Feature List:
ospf
```

Step 7. Send RUM report to CSSM.

```
Nexus# license smart sync all
Initiated sync with backend.
```

Step 8. Ensure Nexus is present on CSSM On-Prem.

Log in to **CSSM On-Prem > Smart Software Manager On-Prem > Select Local Virtual Accoun**t (top right corner). From the drop-down menu, choose **Inventory > SL Using Policy**.

Step 9. Verify the expected license was consumed on CSSM On-Prem local server.

Log in to **CSSM On-Prem > Smart Software Manager On-Prem > Select Local Virtual Account** (top right corner) from the drop-down **menu > Inventory > Licenses**.

Log in to **CSSM On-Prem > Smart Software Manager On-Prem > Select Local Virtual Account** (top right corner). From the drop-down menu, choose **Inventory > Licenses**. Click the expected license from the list to see the details.

NXOS LAN for Nexus 9300 10G+ Leaf XF In Default
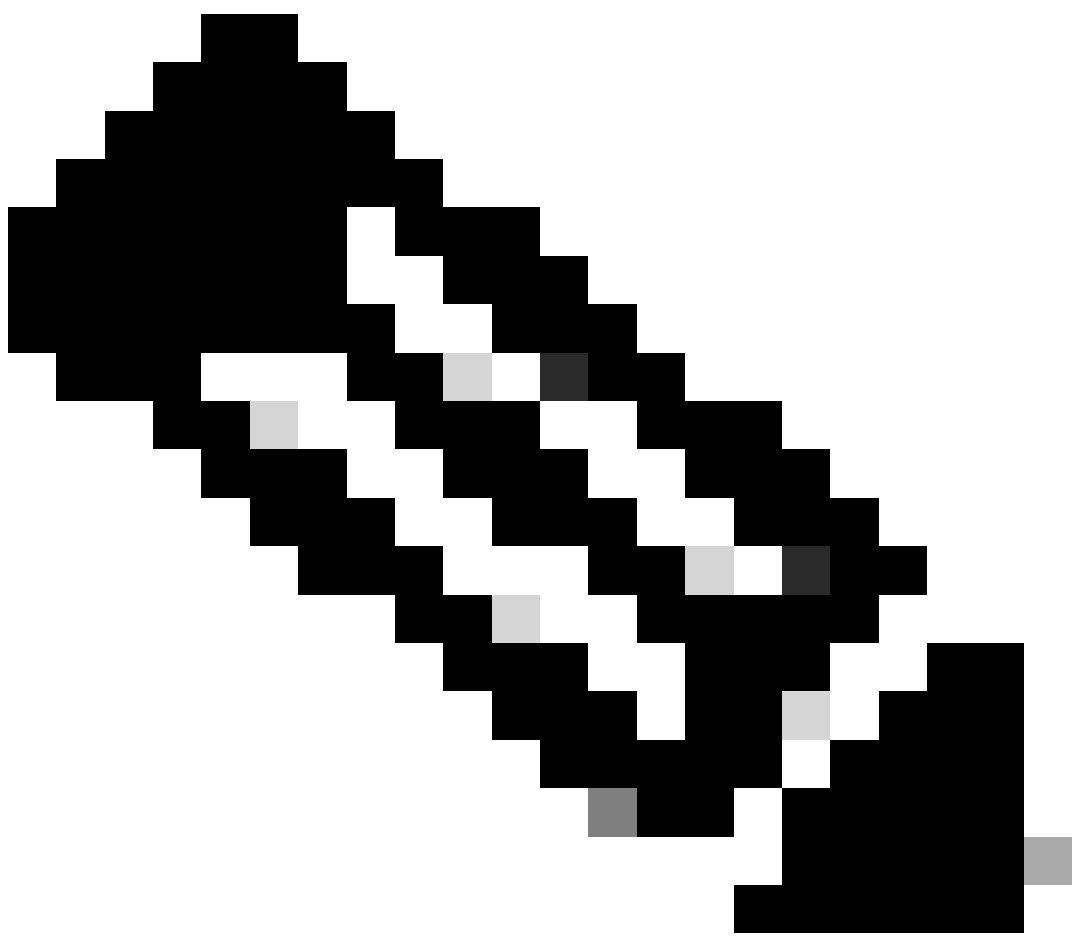
LAN license for Nexus 9300-XF

| Overview | Product Instances | Event Log | Transaction History |

Product Instance	Product Type	Licenses Used
UDI_PID:N9K-C9336C-FX2;UDI_SN:FDO2434107N;UDI_VID:;	N9300	1

Showing All 4 Records

Transfer License...

> **Note**: It is expected to see Trust Code Installed as <none> in in show license status using this method.

It is expected to see Last ACK received as in show license status the first time you sync up with CSSM On-Prem. This changes after the first Next report push is done.

Method 4: Offline

Step 1. Disable smart transport mode.

```
Nexus(config)# license smart transport off
```

Step 2. Enable any feature that requires your desired license. For this example, a feature is enabled that requires an NX-OS LAN Enterprise Services license.
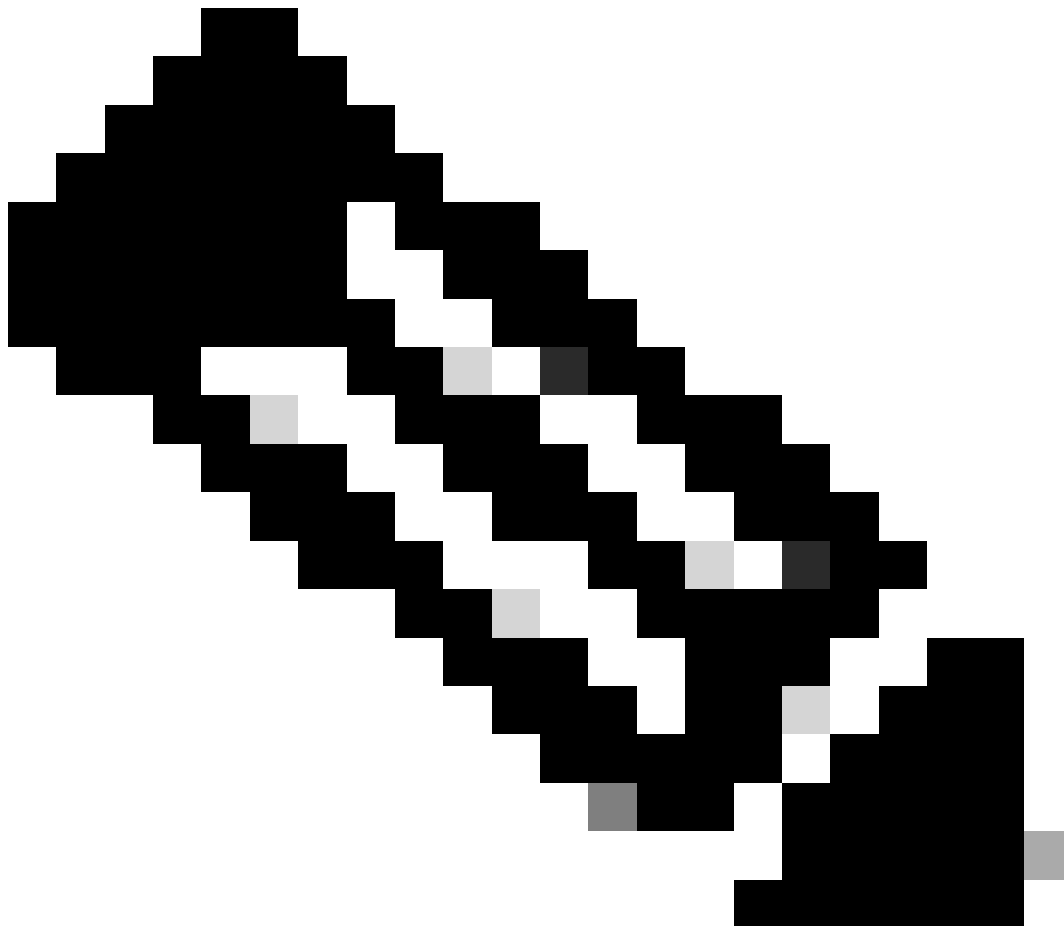
Note: NX-OS always asks for the leaf nodes in the license hierarchy.

NX-OS always asks for Feature-Based Licenses, instead of Tier-Based Licenses.

> RUM reports cannot be saved if no licensing features are active. 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.

```
Nexus(config)# feature bgp
```

Step 3. Confirm you have the expected license (feature-based) in use.

```
Nexus# show license summary
License Usage:
License                         Entitlement tag              Count   Status
---------------------------------------------------------------------------
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)   1       IN USE
Nexus# show license usage LAN_ENTERPRISE_SERVICES_PKG
Feature List:
bgp
```

Step 4. Generate and save RUM report.

```
Nexus# license smart save usage all bootflash:all_rum.txt
Success: Saved in bootflash:/all_rum.txt.
```

Step 5. Copy the file from Step 4 to a device with an Internet connection.

Step 6. Upload RUM report (usage data) to CSSM.

Log in to **Cisco Software Central > Smart Software Licensing > Reports > Usage Data File**s.

Step 6a. Click **Upload Usage Data**.

Step 6b. Click **Browse**.

Upload Usage Data

Please select the Usage File you wish to upload.

* Usage Data File:　　　　　Browse　No File Chosen

Upload Data　　Cancel

Step 6c. Select **all_rum.txt** on the pop-up window, then click **Upload Data**.

Upload Usage Data

Please select the Usage File you wish to upload.

* Usage Data File:　　　　　Browse　all_rum.txt

Upload Data　　Cancel

Step 6d. Select the Virtual Account that receives the uploaded file from the drop-down menu, then click **Ok**.

Select Virtual Accounts   ✕

Some of the usage data files do not include the name of the virtual account that the data refers to, or the virtual account is unrecognized.

Please select an account:

⚠️◉ Select one account for all files: [Select VA   ▼]

◯ Select a virtual account per file:

                                                           [Ok]   [Cancel]

Select Virtual Accounts   ✕

Some of the usage data files do not include the name of the virtual account that the data refers to, or the virtual account is unrecognized.

Please select an account:

⚠️◉ Select one account for all files: [Select VA   ▼]

◯ Select a virtual account per file:
                                               [🔍]

                                               CML - bpaez
                                                           OK   Cancel

Select Virtual Accounts   ✕

Some of the usage data files do not include the name of the virtual account that the data refers to, or the virtual account is unrecognized.

Please select an account:

⚠️🔘 Select one account for all files: [CML - bpaez ▼]

⭘ Select a virtual account per file:

[Ok] [Cancel]

Step 7. Wait for **Reporting Status** to change to **No errors**, then click **Download** to get the ACK file.

Cisco Software Central > Smart Software Licensing   InternalTestDemoAccount69.cisco.com

Smart Software Licensing   SL Product Details Support Help

Alerts | Inventory | Convert to Smart Licensing | **Reports** | Preferences | On-Prem Accounts | Activity

Reports

| Report | **Usage Data Files** | Reporting Policy | Synch File for Device Controllers |

Devices can be configured to report the features that they are using.
This usage then determines which licenses are needed, in order to be compliant.

[Upload Usage Data...]   [Search by File Name, Virtual Account 🔍]

⊕ Usage Data File	Reported	Virtual Account	Reporting Status	Devices	Acknowledgement
all_rum.txt	2023-Jul-22	CML - bpaez	⚠️ Data Being Processed	0	Pending

Cisco Software Central > Smart Software Licensing   InternalTestDemoAccount69.cisco.com

Smart Software Licensing   SL Product Details Support Help

Alerts | Inventory | Convert to Smart Licensing | **Reports** | Preferences | On-Prem Accounts | Activity

Reports

| Report | **Usage Data Files** | Reporting Policy | Synch File for Device Controllers |

Devices can be configured to report the features that they are using.
This usage then determines which licenses are needed, in order to be compliant.

[Upload Usage Data...]   [Search by File Name, Virtual Account 🔍]

⊕ Usage Data File	Reported	Virtual Account	Reporting Status	Devices	Acknowledgement
all_rum.txt	2023-Jul-22	CML - bpaez	ℹ️ No Errors	1	Download

Step 8. Ensure Nexus is present on CSSM.

Step 9. Verify the expected license was consumed on the [Cisco site](#).

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Licenses**.

Log in to **Cisco Software Central > Smart Software Licensing > Inventory > Licenses**, Click the expected license from the list to see the details.
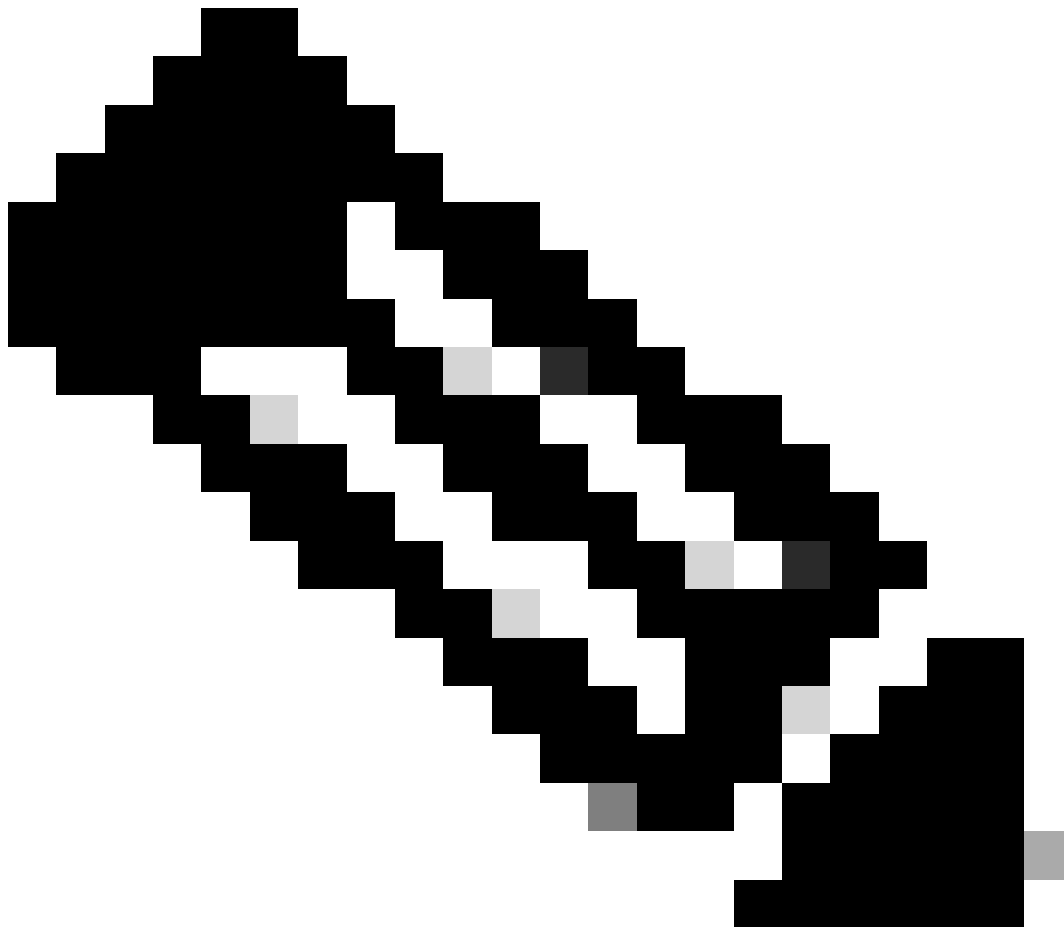

Step 10. Upload the ACK file from step 7 to the Nexus switch.

Step 11. Install ACK file in Nexus switch.

```
Nexus# license smart import bootflash:ACK_all_rum.txt
Done smart import.
```

Step 12. Verify ACK was installed successfully.

Note: It is expected to see Trust Code Installed as <none> in show license status output using this method.

```
Nexus# 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: Off

Policy:
    Policy in use: Merged from multiple sources
    Reporting ACK required: Yes
    Unenforced/Non-Export:
        First report requirement (days): 90 (CISCO default)
        Ongoing reporting frequency (days): 365 (CISCO default)
        On change reporting (days): 90 (CISCO default)
    Enforced (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)
    Export (Perpetual/Subscription):
        First report requirement (days): 0 (CISCO default)
        Ongoing reporting frequency (days): 0 (CISCO default)
        On change reporting (days): 0 (CISCO default)

Miscellaneous:
    Custom Id: <empty>

Usage reporting:
    Last ACK received: Jul 21 20:29:40 2023 UTC
    Next ACK deadline: Oct 19 20:29:40 2023 UTC
    Reporting push interval: 30 days
    Next ACK push check: <none>
    Next report push: Jul 21 20:02:40 2023 UTC
    Last report push: <none>
    Last report file write: <none>

Trust Code installed: <none>
```

Related Information

- [Cisco NX-OS Licensing Options Guide](#)
- [Cisco Nexus 9000 and 3000 Series NX-OS Smart Licensing Using Policy User Guide](#)