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NX-OS Smart Licensing Using Policy Deployment on Nexus Switches

Smart Licensing Using Policy for Nexus 9000 and 3000 switches

This article provides information about the deployment of Smart Licensing Using Policy (SLP) on Nexus 9000 and 3000 Switches. Before reading this document, ensure that you have read the Cisco NX-OS Smart Licensing Using Policy on Nexus Switches article from the *Learn* category on the Cisco NX-OS Licensing collection page.

Understand key concepts of SLP before deployment

This section explains the key components that you need to understand before deploying SLP on Cisco Nexus 9000 and 3000 Switches.

Policy selection

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

Policies can be customized. To customize policies, contact the 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.

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. RUM reports are data files with information about license usage and device identity. These reports are securely stored in the device and are cert-signed by the hardware.

Note

When a switch does not consume a license, it does not generate any RUM report. To verify license consumption, use the **show license usage** command.

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 these reporting requirements:

- Whether a RUM report is sent to CSSM, and the maximum number of days that are 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 or CSLU can 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.

For more information about RUM reports, see Reporting license usage , on page 28 .

RUM states

The RUM reports change state throughout the communication between product instance and CSSM.

Table 1: RUM states

State	Description
SmartAgentRumStateOpen	New report that is created by Smart Agent on the device
SmartAgentRumStateClosed	RUM report that is sent to CSSM (reloads will also push the open reports to closed state)

Sample RUM report

```
<?xml version="1.0" encoding="UTF-8"?>
<smartLicense>
<RUMReport>
<![CDATA[
{
"payload":{ "asset_identification":{
"asset":{

"name":"regid.2017-11.com.cisco.Nexus_9300,1.0_ac6ddieu7-89ju-4dne7-8699-4eeeklljnk"
},
"instance":{
"sudi":{
"udi_pid":"N9K-C9364C-GX",
"udi_serial_number":"FDjhjudyw8778"
},
"product_instance_identifier":"f804e59b-7296-4c6d-a4f4-e61207ddf150"
},
"signature":{ "signing_type":"CISC123", "key":"00000000",
"value":"A0EPZ4grbhDeNG2q1wJxeRAkEIFabnHp8UCB+qoFMFRA3oMkZ3G572mm
FDFZXVSaA2yfVRym0GMgKDo2glzz7er1RVIyB8XnrqgdgFBMkvJiuHb5B9Bdvs
8qABGErQZP7m5HTUQcHNwczYYAoflIMo2ltaaUzhbmjppoh1b6cIvjUqTVTyg37cj/

Z0r7hIviUxrzvHBVFFVA50Ik8wXPFWS24aLC4ubXvEDNzDv1UWQwfJy0XmkegJ07PBVAfcRPhfZ4/5J9YtsQ1xRb5ot+
IdogZmhX7ISVOAh3WFjvAMVhQrH4xeSKD1wgIZtLAC+TnixvU6HAc4p168UK6aZV4A==
}
},
"meta":{
"entitlement_tag":"regid.2019-06.com.cisco.LAN_Nexus9300_XF2,1.0_ ac6ddieu7-89ju-4dne7-8699-4eeeklljnk",
"report_id":16283555555, "software_version":"10.2(1)FI9(1)", "ha_udi":[
{
"role":"Active", "sudi":{
"udi_pid":"N9K-C9364C-GX",
"udi_serial_number":" FDjhjudyw8778"
}
}
]
},
"measurements":[
{
"log_time":1628323253, "metric_name":"ENTITLEMENT", "start_time":1628323253, "end_time":1628323254,
"sample_interval":1, "num_samples":1,
"meta":{
"termination_reason":"CurrentUsageRequested"
},
"value":{
"type":"COUNT",
"value":"1"
}
```

```
}
]
},
"header":{
"type":"rum"
},
"signature":{
"sudi":{
"udi_pid":"N9K-C9364C-GX",
"udi_serial_number":"FDOkjahwdiuw78"
},
"signing_type":"CISC123", "key":"782198723987",
"value":"BIoW16suShhDdAJZgRGtxdk/b4yhdvtDJQzE4eujgG+w/
UKICJ40oEsh2HfIy0kcbfSn3gaAPwhlwHxFUVjLh+kYHxuwSvsI0RwwyIgBIlYbc9JojQ40dZGLRVmJt05djYIRkRHI5dYMO0Fn/

a/F+VnaEQ2hVbbTWMW0pDLnJksPyQ9Mn91RmI4ZCfkS5gGNeS9U0CyeBpSYfh/r+N4bn/gmf+XDmK30x6yukTflvUC6IV/


lNMxJYOpZ87mV/4XX6Bw88Ab1K3KX6VHVpeMr45UeUNGd0efaigReB9ERISJnERxAEs4SuU/ZhnFMONAwW/4WCpDXD/p8bcw76mmSkw=="

}
}
]]>
</RUMReport>
</smartLicense>
```

Sample 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":"f80003456-1234-3g5h-b6b6-e1234hrtu5678", "sudi":{
"udi_pid":"N9K-C9364C-GX",
"udi_serial_number":"FDO3456yuth"


}
]]]>

},
"report_id":162123456, "correlation_id":"610e4fcecebababeyro678990-bf94ajdu47878787hdj", "subscription_id":null


  </data>
  <signature>MEQCIBtBcrLc384LDGgD9axXIMFiV4usLWOeOvJiP4nL9PKhAiA16
yiPufFIFwfEPIGbqMbfTKB+gGxB52m5tPVWZ/MP6Q==</signature>
  </smartLicenseRumAck>
  <smartLicenseAccountInfo>
  <customerInfo>
  <timestamp>1628327760658</timestamp>
  <smartAccount>InternalTestDemoAccount10.cisco.com</smartAccount>
  <virtualAccount>nxofirst</virtualAccount>
  <smartAccountId>2312345</smartAccountId>
  <virtualAccountId>509876</virtualAccountId>
  <smartAccountDomain>internaltestdemoaccount10.cisco.com</smartAccountDomain>
  </customerInfo>
  <signature>MEQCIBelsrxUBMzZSi406NeeHOJRlboJedEThjgyutwiqwge2iuey2
uehdufydwinGOsmgLaef1HAG+naWneLqZ139ARFiTsmA==</signature>
  </smartLicenseAccountInfo>
```

```
<correlationID>ngnx-d3chwyt37hgdytf1924b4a57c190bc6</correlationID>
</smartLicense>
```

Smart Licensing Using Policy deployment use cases

This table describes various Smart Licensing Using Policy use cases based on your device.

Table 2: SLP deployment use cases

If your device is...	And you want to deploy...	Then, go to...
new	Smart Licensing Using Policy	Based on the topology, see: • Online deployments • Offline deployments
Smart Licensing-enabled	Smart Licensing Using Policy	Upgrades, on page 33
Smart Licensing Using Policy-enabled	Smart Licensing	Downgrades, on page 48

Note

Your network can have a mix of both Smart Licensing and Smart Licensing Using Policy enabled devices.

Smart Licensing Using Policy workflow

Smart Licensing Using Policy solution makes it easier for you to procure, deploy, and manage your license. Cisco Smart Software Manager (CSSM) is your primary licensing server and portal where you can create your smart accounts and manage licenses.

Smart Software Manager On-Prem and Cisco Smart Licensing Utility (CSLU) are your locally installed on-premises user portals that work with CSSM.

After purchasing licenses, activate your licenses on your devices in your deployments. As the devices establish trust and report license usage, you can manage your licenses through continuous reporting.

Summary

Key components involved in the Smart Licensing Using Policy workflow:

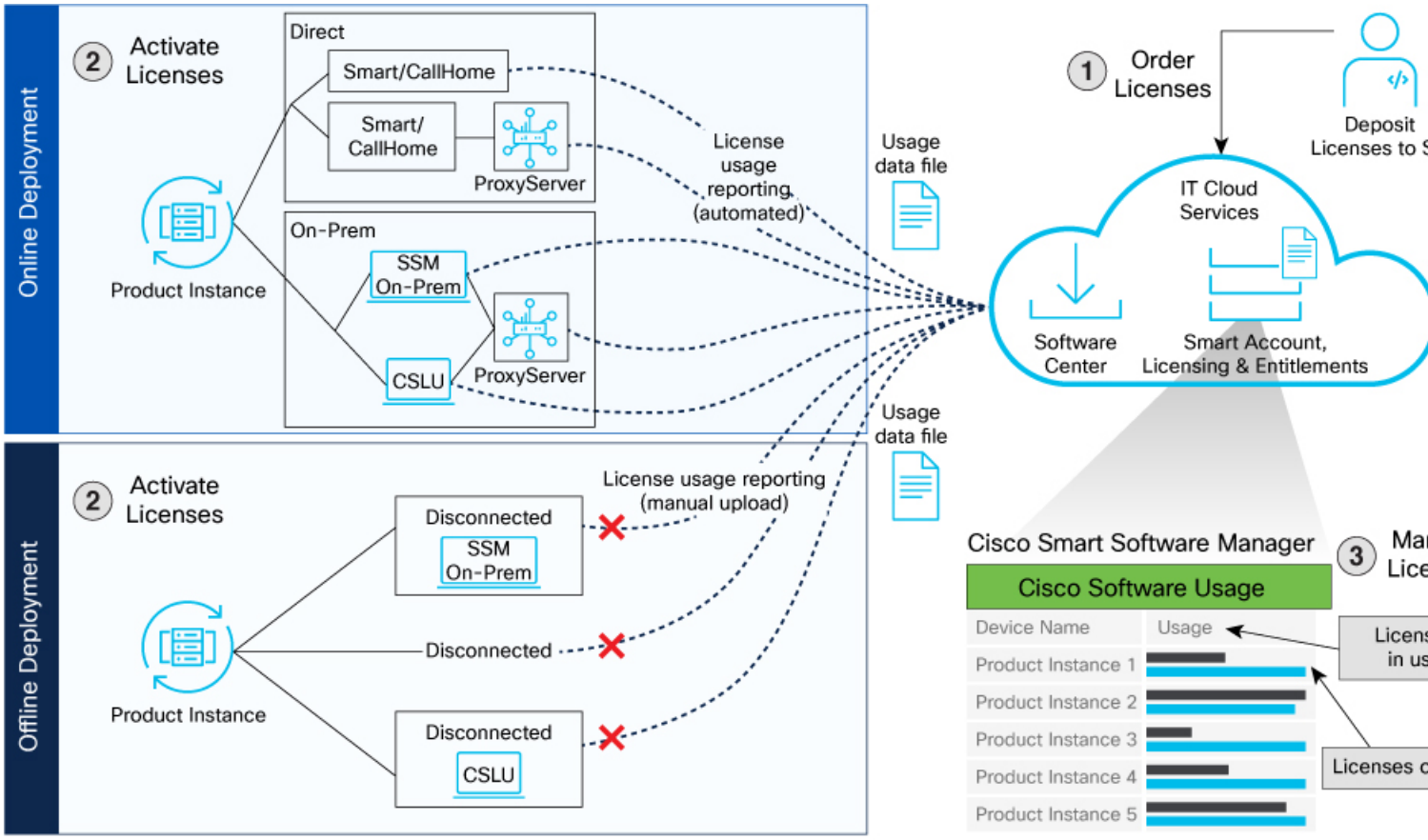
- Cisco Smart Software Manager (CSSM): Primary licensing server and portal for creating smart accounts and managing licenses.
- Smart Software Manager On-Prem: Locally installed on-premises user portal that works with CSSM.
- Cisco Smart Licensing Utility (CSLU): Another on-premises user portal that works with CSSM.

This process enables you to order, activate, and manage licenses efficiently for your devices and deployments.

Smart Licensing Using Policy workflow in a nutshell

Workflow

Figure 1: Workflow to deploy Smart Licensing Using Policy



These are the stages for deploying Smart Licensing Using Policy:

1. Order licenses
    - Order your license from Cisco Commerce Workspace (CCW).
    - Access CSSM and create the smart account and virtual accounts to organize your licenses.
2. Activate licenses
    - Select the deployment methods:
        - Online Deployments
        - Offline or air-gapped Deployments
    - Configure the smart license transport mode and establish trust with CSSM.
3. Manage licenses

- Generate your Resource Utilization Measurement (RUM) report from the device and synchronize the report with CSSM either automatically or manually.
- Monitor the license usage and compliance status through the CSSM portal.

Deployment models for Smart Licensing Using Policy

The deployment models available for Smart Licensing Using Policy are listed in this section.

Online deployments

- Direct deployments (with transport mode as Smart or Call Home)
  - Direct cloud access (CSSM)
  - Direct cloud access (CSSM) through a proxy server
- On-premises deployments
  - Smart Software Manager (SSM) On-Prem (recommended)
  - Smart Software Manager (SSM) On-Prem through a proxy server
  - Cisco Smart License Utility (CSLU)
  - Cisco Smart License Utility (CSLU) through a proxy server

Offline or air-gapped deployments

- Disconnected (from the switch where transport is off) or air-gapped deployment from the switch
- SSM On-Prem disconnected (remote deployment)
- CSLU offline (remote deployment)

Supported deployment models and topologies

This section describes the various ways in which you can implement a smart licensing policy. 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

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

Note

To learn about the Topologies, see *NX-OS Smart Licensing Using Policy* under the *Learn* category on the *NX-OS Licensing* collection page.

Deployment Model	Topology	Recommendations
Online deployment > Direct (Smart transport/call home)	Topology 2: Connected directly to CSSM	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. See Direct deployments, on page 10 .
Online deployment > On-Prem > Smart Software Manager (SSM) On-Prem (recommended)	Topology 4: Connected to CSSM through SSM On-Prem	Use this topology when you want to collect licensing information from each switch in the network and when there is no connectivity to CSSM. See *Connected mode* in Smart Software Manager On-Prem , on page 16
Online deployment > On-Prem > CSLU	Topology 1: Connected to CSSM through CSLU	Use this topology when you do not want the switches to be directly connected to CSSM. This topology supports only one SA/VA combination. See *Online mode* in Cisco Smart Licensing Utility, on page 19 .
Offline deployment > from the switch	Topology 6: No connectivity to CSSM and no CSLU (offline mode)	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. See Air-gapped deployment from the switch, on page 26 .
Offline deployment > SSM On-Prem disconnected	Topology 5: SSM On-Prem disconnected from CSSM	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. See *SSM On-Prem in disconnected mode* in Remote deployments, on page 22 .
Offline deployment > CSLU offline	Topology 3: CSLU disconnected from CSSM	Use this topology when you need to manage or view license consumption locally. You can also use multiple VA. See CSLU in Offline Mode in Remote deployments, on page 22 .

Guidelines and limitations for Smart Licensing Using Policy

This section lists the guidelines and limitations for Smart Licensing Using Policy for these categories:

- General

- Upgrade
- DNS
- Transport
- Commands

General

- NX-OS Release 10.2(1)F supports only the SLP licensing mode.
- NX-OS Release 10.2(1)F does not support SL and PAK-based licensing.
- SLP MIB is not supported.
- In NX-OS Release 10.2(x) , management VRF is supported on CSLU, Smart, and Callhome modes, and non-management VRF is supported only on Callhome. Beginning with NX-OS Release 10.3(2)F, non-management VRF is also supported on Smart and CSLU modes of transport.
- Beginning with NX-OS Release 10.3(1)F, logging 2.0 is supported for SLP. From Release 10.5(1)F onwards, logging 2.0 support for callhome is introduced for SLP.
- Beginning with NX-OS Release 10.3(2)F, source-interface is supported on Callhome mode with direct CSSM connectivity only. Beginning with NX-OS Release 10.3(3)F, support is introduced for source-interface with CSLU and Smart transport with both direct and indirect CSSM connectivity.
- Beginning with NX-OS Release 10.4(3)F, Nexus switches provide TLSv1.3 support in SLP licensing mode.

Upgrade

- For SL registered devices, when upgrading from NX-OS Release 9.3(3) or 9.3(4) to NX-OS Release 10.2(1)F, the transport mode may go to CSLU instead of callhome. It is recommended that you configure the transport mode to callhome manually and establish the trust with CSSM.
- During upgrade from earlier release with Traditional Licensing (PAK) to NX-OS Release 10.2(1)F, reflection of RUM sync in show command may take up to 24 hrs after migration.
- In NX-OS Release 10.3(2)F, **license smart vrf** is not supported on Nexus C92348GC-X switch. When management VRF is configured, upgrade of Nexus C92348GC-X switch from NX-OS Release 10.3(2)F to 10.3(3)F is supported. When management VRF is not configured, to upgrade Nexus C92348GC-X switch from NX-OS Release 10.3(2)F to 10.3(3)F, first configure **no license smart vrf** and then proceed with the upgrade.
- For SL registered devices that are connected to On-Prem, when upgrading from any Traditional Licensing (PAK) to NX-OS Release 10.2(1)F, the license consumption may not adhere hierarchy rules of tier licenses at On-Prem. It is recommended that CSSM to be referred for proper consumption of licenses post sync from On-Prem.
- For SL registered devices with CSSM, when upgrading from NX-OS Release 9.3(3) or 9.3(4) to NX-OS Release 10.2(1)F, duplicate entry may occur for the same product instance on CSSM/On-Prem for a day.

DNS

- When configuring the DNS resolution, configure it under the management VRF, as only management VRF is supported.

Transport

Callhome

- IPv6 is only supported on callhome transport mode.

CSLU

- CSLU-initiated communication/pull mode is not supported in NX-OS Release 10.2(1)F.
- Only CSLU mode of transport is supported on On-Prem.
- For auto discovery, only one CSLU can be used in the network.
- 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 NX-OS Release 10.2(1)F. For more information, see Connected to CSSM Through CSLU .
- 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.
- Standalone CSLU does not support multi-tenancy, it supports only single SA/VA. However, SSM On-Prem supports multi-tenancy.
- Transport mode CSLU does not support HTTPS URL.

Commands

- When a switch is being reset to factory defaults using the **write erase** command, it is recommended to do a **license smart factory reset** before reloading the switch.
- The following commands do not support XMLized output:
  - **show tech-support license**
  - **show license eventlog**
  - **show license history message**
  - **show license rum id all**
  - **show license data conversion**
- The output of the **show license status** command may show discrepancy in timer values, but has no functional impact. The timer gets updated automatically and the RUM Reporting will be retried after 24 hours.
- To find more information about rum reports, use these show commands:
  - **show license rum id all** - The output of this show command displays the list of all rum ids.

    Note

    The **show license rum id 0** command also displays the list of all rum reports. The value **0** also represents **all** in the case of this command.

  - **show license rum id** *report_id* - This command allows you to select one rum id from the list and the output of this command displays a short summary of the report.
  - **show license rum id all detail** - The output of this command provides a list of all rum ids in a detailed format.
  - **show license rum id** *report_id* **detail** - This command allows you to select one rum id, about which you want to know the details, from the list and the output displays a detailed format of the report.

Online deployments

Online Deployments are classified as Direct and On-premises deployments.

Direct online deployment is done using either Smart or Call Home transport mode. Both the transport modes have the option to use proxy servers. On-premises deployment is done using either SSM On-prem or CSLU. SSM On-prem and CSLU also have the option to use proxy servers.

Direct deployments

Direct deployment involves connecting devices to *tools.cisco.com* through the internet or an HTTP proxy server to report usage information using the Smart transport mode.

Direct deployment works out of the box with no additional configuration. Direct deployment is most suitable for small networks, especially in the enterprise world. It's when a user doesn't want to manage an on-premises server and communicates with Cisco directly or through a proxy.

Transport modes

The two modes of transport available for Direct deployment are Smart and Call home.

Smart – The Smart Transport mode is a transport method where a Smart Licensing (JSON) message is contained within an HTTP message and exchanged between a product instance and CSSM to communicate.

Call Home –The Call Home Transport mode provides e-mail-based and web-based notifications of critical system events. This method of connecting to CSSM is available in the Smart Licensing environment and remains available with SLP.

Direct deployment methods

Direct deployment is also termed as Topology 2 Connected Directly to CSSM. The transport mode is Smart transport or call home. Direct deployment offers these methods:

- Direct cloud access – In this method, the product instance or device sends usage information directly over the internet to CSSM. The transport mode can be either Smart or Call Home.
- Direct cloud access through a proxy server – In this method, the product instance or device sends usage information over the internet through a proxy server using either Smart or Call Home transport mode to CSSM.

Report license usage

In direct deployments, the device automatically generates reports once it establishes a trusted connection with the CSSM. The device initiates communication and automatically sends out the license usage report as per the default policy. CSSM automatically sends the ACK reports in the first 5 minutes. You can set up a subsequent reporting frequency as per the policy.

Steps to deploy Smart Licensing Using Policy using direct deployment mode

Summary

After you order the licenses and set up your smart accounts in CSSM, activate and manage licenses for your chosen mode of direct deployment.

Workflow

These stages describe the process to deploy Smart Licensing Using Policy in the direct deployment mode.

1. Choose the appropriate procedure to activate licenses based on your choice of transport mode.
   - Activate licenses on direct deployment with Smart transport mode, on page 11
   - Activate licenses on direct deployment with Call Home transport mode, on page 13
2. Manage licenses in the direct deployment mode. This procedure is the same irrespective of the mode of transport used.
   - Manage licenses on direct deployment with Smart or Call Home transport mode, on page 15

Activate licenses on direct deployment with Smart transport mode

Step 1 Enable smart transport mode on your device using the **license smart transport smart** command.

Example:

```
switch# configure
switch(config)# license smart transport smart
```

Step 2 Configure the transport URL with the **license smart url smart** *transport-url* command.

The switch automatically configures the Smart URL (*https://smartreceiver.cisco.com/licservice/license*).

Example:

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

Step 3 If you are deploying direct cloud access through an HTTPS proxy method, configure a proxy for the smart transport mode using the **license smart proxy address** *address* command. Skip this step for direct cloud access deployment.

When you configure a proxy server, licensing messages are sent to the proxy along with the final destination URL (CSSM). The proxy sends the message to CSSM.

Example:

```
switch(config)# license smart proxy address proxy.esl.cisco.com
```

Step 4 If you are deploying direct cloud access through an HTTPS proxy method, configure a proxy port for the smart transport mode using the **license smart proxy port** *port-number* command. Skip this step for direct cloud access deployment.

When you configure a proxy server, licensing messages are sent to the proxy along with the final destination URL (CSSM). The proxy sends the message to CSSM.

Example:

```
switch(config)# license smart proxy port 80
```

Step 5 Establish trust by generating a token from the smart account and virtual account in CSSM and copy the token on the devices using the **license smart trust idtoken** command.

Example:

```
switch# license smart trust idtoken MjczNDMwZWYtNDAzMS00NjNmLWJmMTQtMzM1YmRhZD
AxZWNmLTE3MjA1OTE3%0ANzM4MTh8eit1NENmLzNYaHg3WVk3VzFYeDVxc0xSaEZqNjhtNERGMnc5UHZK%0AU1RMYz0%3D%0A
all force
```

Step 6 (Optional) Save the trust-request details on the device using the **license smart save trust-request** *filepath_filename* command.

Example:

```
switch# license smart save trust-request file1
```

Step 7 Verify license status using the **show license status** command. Verify the latest date at `Trust Code Installed`.

Example:

```
switch# show license status

switch(config)# 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
    VRF: management

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: Oct 11 19:53:10 2023  UTC
    Next ACK deadline: Jan  9 19:53:10 2024  UTC
    Reporting push interval: 30 days
    Next ACK push check: Oct 11 19:59:06 2023  UTC
    Next report push: Nov 10 19:55:08 2023  UTC
    Last report push: Oct 11 19:55:08 2023  UTC
    Last report file write: <none>

Trust Code installed: Oct 11 18:52:39 2023  UTC
    Active: PID: N9K-C9364C-H1, SN: FDO27220LPP
        Oct 11 18:52:39 2023  UTC

switch(config)#
```

Activate licenses on direct deployment with Call Home transport mode

Step 1 Enable call home transport mode on your device using the **license smart transport callhome** command.

Example:

```
switch# configure
switch(config)# license smart transport callhome
```

Step 2 Configure the basic call home configurations.

a. **callhome**

b. **email-contact** <*email_id*>

c. **phone-contact** <*contact_number*>

d. **streetaddress** <*address*>

e. **destination-profile CiscoTAC-1 transport-method http**

f. **destination-profile CiscoTAC-1 index 1 http https://tools.cisco.com/its/service/oddce/services/DDCEService**

g. **transport http use-vrf** <*vrf*>

h. **enable**

Example:

```
switch(config)# callhome
switch(config-callhome)# email-contact sch-smart-licensing@cisco.com
switch(config-callhome)# phone-contact +1-408-800-900
switch(config-callhome)# streetaddress 270 E Tasman Dr
switch(config-callhome)# destination-profile CiscoTAC-1 transport-method http
switch(config-callhome)# destination-profile CiscoTAC-1 index 1 http
https://tools.cisco.com/its/service/oddce/services/DDCEService
switch(config-callhome)# transport http use-vrf management
switch(config-callhome)# enable
switch(config-callhome)# exit
switch(config)#
```

Step 3 If you are deploying direct cloud access through a proxy method, configure a proxy for the call home transport mode using the **transport http proxy** *hostname* **port** *port-number* command. Skip this step for Direct Cloud Access deployment.

When you configure a proxy server, licensing messages are sent to the proxy along with the final destination URL (CSSM). The proxy sends the message to CSSM.

Example:

```
switch(config)# callhome
switch(config-callhome)# transport http proxy server 192.168.0.1 port 3128
switch(config-callhome)# exit
```

Step 4 Establish trust by generating a token from the smart account and virtual account in CSSM and copy the token on the devices using the **license smart trust idtoken** command.

Example:

```
switch# license smart trust idtoken
MjczNDMwZWYtNDAzMS00NjNmLWUzMIQtMzM1YmRhZDAxZWNmLTE3MjA1OTE3%0ANzM4MTh8eit1NENmLzNYaHg3WWk3VzFYeDVxc0xSaEZqNjhtNERGMnc5UHZK%0AU1RMYz0%3D%0A
 all force
```

Step 5 (Optional) Save the trust-request details on the device using the **license smart save trust-request** *filepath_filename* command.

Example:

```
switch# license smart save trust-request file1
```

Step 6 Verify license status using the **show license status** command. Verify the latest date at `Trust Code Installed`.

Example:

```
switch(config-callhome)# 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: Callhome

Policy:
Policy in use: Merged from multiple sources
Reporting ACK required: Yes
Unenforced/Non-Export:
First report requirement (days): 1 (Installed)
Ongoing reporting frequency (days): 1 (Installed)
On change reporting (days): 1 (Installed)
Enforced (Perpetual/Subscription):
First report requirement (days): 1 (Installed)
Ongoing reporting frequency (days): 1 (Installed)
On change reporting (days): 1 (Installed)
Export (Perpetual/Subscription):
First report requirement (days): 1 (Installed)
Ongoing reporting frequency (days): 1 (Installed)
On change reporting (days): 1 (Installed)

Miscellaneous:
Custom Id: <empty>

Usage reporting:
Last ACK received: <none>
Next ACK deadline: Oct 1 08:10:04 2024 UTC
Reporting push interval: 1 days
Next ACK push check: <none>
Next report push: Sep 30 08:10:34 2024 UTC
Last report push: <none>
Last report file write: <none>

Trust Code installed: Sep 30 08:10:03 2024 UTC
Active: PID: N9K-C93600CD-GX, SN: FDO24510644
Sep 30 08:10:03 2024 UTC


switch(config-callhome)#
```

Manage licenses on direct deployment with Smart or Call Home transport mode

Step 1 Navigate to **Smart Software Licensing > Reports** on the CSSM user interface.

Step 2 Download the acknowledgment sent and upload to your device.

Step 3 Manage the license consumption on your devices. View the license status and summary using the **show license summary** **show license usage** command.

Example:

```
switch# show license usage
switch(config)# show license usage

License Authorization:
  Status: Not Applicable

(DCN_NDB):
  Description: DCN NDB Add-On License
  Count: 1
  Version: 1.0
  Status: IN USE
  Enforcement Type: NOT ENFORCED
  License Type: Generic

(NXOS_ESSENTIALS):
  Description: NX-OS essentials license for fixed XF2 platforms
  Count: 1
  Version: 1.0
  Status: IN USE
  Enforcement Type: NOT ENFORCED
  License Type: Generic

switch(config):
```

Step 4 (Optional) Set the time interval to automatically synchronize RUM reports using the **license smart usage interval** command.

Example:

```
switch# license smart usage interval <days>
```

You can generate and view RUM report on your device. See Reporting License Usage . The variable *days* represents reporting interval days, a value between 1 and 365 days and the default is 30 days.

On-premise deployments

On-Premise deployment is a deployment option for organizations that prefer not to have their products communicate directly with CSSM over the internet.

This type of deployment involves the use of either a license server, such as Smart Software Manager (SSM), or a Windows application, such as Cisco Smart License Utility (CSLU), on the premises to manage devices and licenses. These tools use a synchronization process to exchange license information with CSSM, which can be done automatically over the network or manually offline.

The two ways to set up On-Premises deployments are:

- SSM On-Prem
- CSLU

Smart Software Manager On-Prem

Smart Software Manager (SSM) is an On-Premise version of CSSM and provides a similar set of features. When you connect a device to SSM On-Prem, SSM On-Prem becomes the single point of interface with CSSM. Once the SSM On-Prem is operational, devices register to SSM On-Prem and report license consumption.

SSM On-Prem modes

SSM On-Prem connects with Cisco Smart Software Manager in the cloud to synchronize license consumption and usage at the desired frequency such as daily, weekly, or monthly. You can also deploy SSM On-Prem in a totally disconnected mode.

- Connected – Manage your devices on premises with a license server connected to CSSM. Devices register to SSM On-Prem and report license consumption and usage to CSSM at the desired frequency. Based on topologies, this online deployment is classified as On-Premises Deployment using SSM On-Prem and also termed as Topology 4 – Connected to CSSM through SSM On-Prem. See Steps to Deploy SSM On-Prem to deploy SSM-On Prem in Connected Mode.
- Disconnected – Manage your devices on premises without connecting to CSSM. SSM On-Prem synchronizes to CSSM through a manual file transfer process for reporting license consumption and usage. Based on topologies, this Offline Deployment mode is classified as SSM On-Prem in Disconnected Mode and also termed as Topology 5 – SSM On-Prem disconnected from CSSM. See the deployment of SSM On-Prem in Disconnected Mode in the Remote deployments, on page 22 section.

Report license usage

To report license usage, synchronize local accounts on SSM On-Prem with CSSM by using the **Synchronization** widget in the SSM On-Prem user interface.

Execute the **license smart sync all** command to synchronize device information with SSM On-Prem. You can synchronize license usage with CSSM using the following:

- Set up on-demand synchronization with CSSM
- Schedule synchronization with CSSM at a specified time
- Synchronize the license usage with CSSM, either by connecting to CSSM immediately or by downloading and uploading files for SSM On-Prem disconnected mode.

Steps to deploy SSM On-Prem in connected mode

After you order the license and set up your smart accounts in CSSM:

1. Activate licenses on SSM On-Prem in connected mode, on page 17
2. Manage licenses on SSM On-Prem in connected mode, on page 18

Note

Use the same procedures to deploy SSM On-Prem proxy method.

Activate licenses on SSM On-Prem in connected mode

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 is populated on the product instance from **OnPrem CSLU tenant ID** . Ensure that you save the configuration using the **copy running-config startup-config** command.

Step 1 Go to the Software Download. page, click **Smart Software Manager On-Prem** , and download and install Smart Software Manager On-Prem. See Cisco Smart License Utility Quick Start Setup Guide.

Step 2 Configure SSM On-Prem and create a local account. See SSM On-Prem User Guide

Step 3 Navigate to the **License workspace > Inventory > General > Product Usage Registration Tokens**, select **CSLU Transport URL** at the SSM On-Prem user interface.

Note If you are deploying SSM On-Prem proxy method, to configure a proxy see Cisco Smart Software Manager On-Prem User Guide.

Step 4 Configure the transport mode and SSM On-Prem URL on your device using the **license smart transport cslu** command.

The SSM On-Prem URL is *http://<ip>/cslu/v1/pi/<tenant ID>*. Enter the hostname or the IP address of the server where you have installed SSM On-Prem. The *tenantID* is the default local virtual account ID.

Example:

```
switch# configure
switch(config)# license smart transport cslu
switch(config)# license smart url cslu http://192.0.2.1:8182/cslu/v1/pi/SATELLITE9-1
switch(config)# exit
```

Step 5 Establish trust by generating the token from the SSM On-Prem UI and copy the token to the switch using the **license smart trust idtoken** *idtoken* **all force** command.

Example:

```
switch# license smart trust idtoken
MjczNDMwZWYtNDAzMS00NjNmLWUmMIQtMzM1YmRhZDAxZWNmLIE3MjA1OIE3%0ANzM4MIh8eit1NENmLzNYaHg3WVk3VzFYeDVxc0xSaEZqNjhtNERGMnc5UHZK%0AU1RMYz0%3D%0A
all force
```

Step 6 Verify the license status using the **show license status** command. View the trust establishment on the device and verify the latest date at `Trust Code Installed`.

Example:

```
switch# 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
```

```
    VRF: management

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: Dec 17 16:56:03 2024  IST
    Reporting push interval: 30 days
    Next ACK push check: <none>
    Next report push: Sep 18 16:58:03 2024  IST
    Last report push: <none>
    Last report file write: <none>

Trust Code installed: May  2 17:42:31 2024  IST
    Active: PID: N9K-C93240YC-FX2, SN: FDO250202BV
        May  2 17:42:31 2024  IST

switch(config)#
```

Manage licenses on SSM On-Prem in connected mode

Step 1 Log into the **SSM On-Prem > Smart Licensing** workspace.

If you have deployed	Then perform these steps ...
SSM On-Prem connected mode	**a.** Navigate to **Reports > Usage Schedules > Synchronize now with Cisco** and generate a license usage RUM report in the Smart Licensing workspace. **b.** Navigate to **Inventory > SL Using Policy** and select one or more devices by enabling the corresponding check box, and **Click Actions for Selected... > Collect Usage**.

Step 2 Manage the license consumption on your devices. View the license status and summary using the **show license summary** or **show license usage** commands.

Example:

```
switch# show license summary
License Usage:
License                    Entitlement tag                Count   Status
-----------------------------------------------------------------------------
```

```
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)    1       IN USE
switch#
switch# show license usage
 License Authorization:
Status: Not Applicable

(LAN_ENTERPRISE_SERVICES_PKG):
Description: LAN license for Nexus 9300-XF
Count: 1
Version: 1.0
Status: IN USE
Enforcement Type: NOT ENFORCED
License Type: Generic


switch(config)#
```

Step 3 (Optional) Set the time interval for automatic synchronizing of the RUM reports using the **license smart usage interval** *<1-365>* command.

Example:

```
switch# license smart usage interval 90
```

Cisco Smart Licensing Utility

Cisco Smart License Utility Manager (CSLU) is a Windows-based application that enables you to administer licenses for your devices on premises instead of having to directly connect your devices to CSSM. When you connect a device to CSLU, CSLU becomes the only interface with CSSM. Once the CSLU is operational, devices register to CSLU and report license consumption.

For information about downloading, installing, and using CSLU, see Cisco Smart License Utility.

CSLU modes

The CSLU can be configured in both online and offline modes.

- CSLU online or connected – Device initiates communication automatically and sends the RUM report to CSLU as per the default policy. CSLU forwards the RUM report to CSSM and retrieves the acknowledgment (ACK). Based on topologies, this online deployment is classified as On-Premise deployment using CSLU and also termed as Topology1 – Connected to CSSM through CSLU. See Steps to deploy CSLU On-Prem in online mode, on page 19.
- CSLU offline or disconnected – Device initiates communication automatically and sends the RUM reports to CSLU. CSLU is not connected to CSSM, so you need to manually connect to CSSM and upload the RUM reports. Based on the topologies, this offline deployment is classified as offline deployment using CSLU in offline mode and also termed as Topology 3 – CSLU disconnected from CSSM. See *CSLU Offline Mode* in the Remote deployments, on page 22 section.

Report license usage

By default, the CSLU utility application is scheduled to collect data information at 24-hour intervals. CSLU connects to the selected Product Instance(s) and collects the RUM reports. These RUM reports are then stored in the CSLU's local library.

Steps to deploy CSLU On-Prem in online mode

After you order the license and set up your smart accounts in CSSM, perform these tasks:

1. Activate licenses on CSLU in online mode, on page 20
2. Manage licenses on CSLU in online mode, on page 21

Note

Use the same procedures to deploy CSLU On-Prem proxy method.

Activate licenses on CSLU in online mode

Activate licenses on CSLU in online mode using the Smart Licensing Utility (CSLU) in online mode.

Step 1 Go to the Software Download page, click **Smart Licensing Utility** , and download and install the latest version of CSLU application on your Windows or Linux server. See Cisco Smart Licensing Utility Quick Start Setup Guide for CSLU and Software Download for Linux.

Note If you are deploying CSLU proxy method, to configure a proxy see Cisco Smart Licensing Utility User Guide .

Step 2 Set up CSLU preference settings and associate the Smart account and virtual account details. See Cisco Smart Licensing Utility User Guide .

Step 3 Configure the transport mode on the device using the **license smart transport cslu** command.

Example:

```
switch# configure
switch(config)# license smart transport cslu
```

Step 4 Configure the transport URL using the **license smart url cslu** command.

The default CSLU URL is http://cslu-local:8182/cslu/v1/pi . 8182 is the port number on the CSLU.

Example:

```
switch(config)# license smart url cslu http://192.0.2.1:8182/cslu/v1/pi
switch(config)# exit
```

Step 5 If you want to establish trust immediately with CSLU, use the **license smart sync all** command.

Step 6 Verify the license status using the **show license status** command. Verify the latest date in the `Trust Code Installed` field.

Example:

```
switch# 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
    VRF: cisco

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: Nov 15 02:51:57 2022  UTC
    Next ACK deadline: Nov 15 02:51:57 2023  UTC
    Reporting push interval: 30 days
    Next ACK push check: <none>
    Next report push: Dec 15 02:46:56 2022  UTC
    Last report push: Nov 15 02:46:56 2022  UTC
    Last report file write: <none>

Trust Code installed: Nov 13 22:36:48 2022  UTC
    Active: PID: N9K-C93180YC-FX3H, SN: FDO26170Q6A
        Nov 13 22:36:48 2022  UTC
```

Manage licenses on CSLU in online mode

Perform these steps to manage licenses on CSLU.

Step 1 Log in to CSLU user interface.

Step 2 Synchronize the reports from CSLU with Cisco using the CSLU user interface.

If you have deployed	Then perform these steps ...
CSLU Online	Navigate to **CSLU > Data Menu > Send to CSSM** to immediately send RUM reports to Cisco. See Reporting License Usage.

Offline deployments

Offline deployment is deployment where a device is not communicating with Cisco. Offline deployments, also termed as air-gapped deployments, are used in highly secure environments which have no internet access.

Offline deployments based on your network

Depending on your network environment, you can select the offline deployment methods.

- Remote deployments – Your on-premise servers offer disconnected modes. Use disconnected licensing mode by turning off communication with Cisco on your on-premise servers.

- SSM On-Prem in disconnected mode
- CSLU in offline or disconnected mode

See Remote deployments, on page 22 .

- Air-gapped deployments from the switch – License reservation offers security for organizations that need a full air-gapped environment when on-premises licensing is not an option. The license reservation solution is for classified environments that don't allow electronic communication in or out of the environment. With a license reservation solution, you are fully offline without any ongoing communication or additional infrastructure. After you order the license and set up your smart accounts in CSSM, you can Activate Licenses in Air-gapped deployment from the switch, on page 26 .

Report license usage

Report license usage for remote environments – In remote offline deployments, turn off device communication to CSSM on the On-Premises servers. Manually upload the license consumption using RUM reports to establish trust and reporting to CSSM.

Report license usage for air-gapped environments from the switch – In fully offline deployment, no action is required, as there is no trust establishment or reporting of devices to CSSM.

Remote deployments

Based on the topologies, the two types of remote deployments, where licenses are activated on SSM On-Prem and on CSLU are also termed as Topology 5 – SSM On-Prem disconnected from CSSM and Topology 3 – CSLU disconnected from CSSM respectively.

Steps to deploy SSM On-Prem in disconnected mode

To deploy SLP remotely using SSM On-Prem in disconnected mode, perform these two steps.

1. Activate licenses on SSM On-Prem in disconnected mode, on page 22
2. Manage licenses on SSM On-Prem in disconnected mode, on page 23

Activate licenses on SSM On-Prem in disconnected mode

Activate licenses on Smart Software Manager (SSM) On-Prem in disconnected mode by downloading, installing, and configuring SSM On-Prem, and performing manual license operations.

Step 1 Go to the Software Download page, click **Smart Software Manager On-Prem** , and download and install Smart Software Manager On-Prem. See Cisco Smart License Utility Quick Start Setup Guide .

Step 2 Configure SSM On-Prem and create a local account. See SSM On-Prem User Guide .

Step 3 Navigate to the **License workspace > Inventory > General > Product Usage Registration Tokens** , select **CSLU Transport URL** at the SSM On-Prem user interface.

Step 4 Configure the transport mode and SSM On-Prem URL on your device using the **license smart transport cslu** command.

The SSM On-Prem URL is `http://<ip>/cslu/v1/pi/<tenant ID>` . Enter the hostname or the IP address of the server where you have installed SSM On-Prem. The `tenantID` is the default local virtual account ID.

Example:

```
switch# configure
switch(config)# license smart transport cslu
switch(config)# license smart url cslu http://192.0.2.1:8182/cslu/v1/pi/SATELLITE9-1
switch(config)# exit
```

Step 5 If you are deploying SSM On-Prem disconnected mode, log off from CSSM.

a) Set the license transport mode on the device using the **license smart transport cslu** command.

b) Retrieve the RUM report on the device using the **license smart save usage** command.

Example:

```
switch# license smart save usage all usage.txt
```

c) Navigate to **Manage Licenses** > **Reports** > **Usage Data Files** in the CSSM workspace to upload the report manually.

d) Download the acknowledgment (ACK) file from CSSM and import it to the device using the **license smart import** command.

Example:

```
switch# license smart import tftp://203.0.113.5/auto/tftp-abc/ACK_RUM-usage-20240125.txt
Import Data Successfull
```

Manage licenses on SSM On-Prem in disconnected mode

Step 1 Log in to **SSM On-Prem > Smart Licensing** workspace.

Step 2 Synchronize the reports from SSM On-Prem with Cisco using the SSM **On-Prem > Smart Licensing** workspace.

If you have deployed	Then perform these steps ...
SSM On-Prem disconnected mode	**a.** Navigate to **Inventory > SL Using Policy> Export/Import All** and select **Export Usage to Cisco** to manually trigger usage collection from the device. Upload the report to CSSM and receive the ACK file. **b.** Navigate to **Inventory > SL Using Policy> Export/Import All...** and select **Import From Cisco** to upload the `.tar` ACK file on the device.

Step 3 Manage the license consumption on your devices. View the license status and summary using the **show license summary** or **show license usage** commands.

Example:

```
switch# show license summary
License Usage:
License                    Entitlement tag                Count   Status
-----------------------------------------------------------------------------
LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG)    1       IN USE
switch#
switch# show license usage
 License Authorization:
Status: Not Applicable

(LAN_ENTERPRISE_SERVICES_PKG):
Description: LAN license for Nexus 9300-XF
Count: 1
Version: 1.0
Status: IN USE
Enforcement Type: NOT ENFORCED
License Type: Generic


switch(config)#
```

Step 4 (Optional) In the disconnected mode, manually upload the RUM reports with SSM On-Prem for synchronization.

Steps to deploy CSLU in offline mode

To deploy SLP remotely using CSLU in offline mode, perform these two steps.

1. Activate licenses on CSLU in offline mode, on page 24
2. Manage licenses on CSLU in offline mode, on page 26

Activate licenses on CSLU in offline mode

Activate licenses on the Cisco Smart Licensing Utility (CSLU) in offline mode using the CSLU application and device command line interface commands.

Step 1 Go to the Software Download page, click **Smart Licensing Utility**.and download and install the latest version of the CSLU application on your Windows or Linux server. See Cisco Smart Licensing Utility Quick Start Setup Guide for CSLU and Software Download for Linux.

Step 2 Set up CSLU preference settings and associate the Smart account and virtual account details. See Cisco Smart Licensing Utility User Guide .

Step 3 If you want to deploy CSLU Offline mode, navigate to **CSLU Preference > Cisco Connectivity** and set the option to **off** in the CSLU user interface.

The field switches to **Cisco Is Not Available**.

a) Set the license transport mode on the device using the **license smart transport off** command.

Example:

```
switch# license smart transport off
```

b) Retrieve the RUM report using the **license smart save usage all** command. Specify the filename (`usage.txt`) for the report.

Example:

```
switch# license smart save usage all usage.txt
```

c) Navigate to **Manage Licenses > Reports > Usage Data Files** and select **Upload Usage Data** on the CSSM workspace to upload the report manually. The reporting status changes to **No errors**.

d) Download the acknowledgment (ACK) file from CSSM and import the acknowledgment (ACK) file using the **license smart import** command. The first offline communication establishes trust on the device after the import. You can view the updates using the **show license summary** or **show license usage** command.

Example:

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

switch# show license usage
 License Authorization:
Status: Not Applicable

(LAN_ENTERPRISE_SERVICES_PKG):
Description: LAN license for Nexus 9300-XF
Count: 1
```

```
Version: 1.0
Status: IN USE
Enforcement Type: NOT ENFORCED
License Type: Generic


switch(config)#
```

Step 4 Verify the license status using the **show license status** command. Verify the latest date in the **Trust Code Installed** field.

Example:

```
switch# show license status

switch# 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 (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: <none>
    Next ACK deadline: <none>
    Reporting push interval: 30 days
    Next ACK push check: <none>
    Next report push: <none>
    Last report push: <none>
    Last report file write: <none>

Trust Code installed: Nov 13 22:36:48 2022  UTC
    Active: PID: N9K-C93180YC-FX3H, SN: FDO26170Q6A
        Nov 13 22:36:48 2022  UTC
```

Manage licenses on CSLU in offline mode

Perform these steps to manage licenses on CSLU

Log in to CSLU user interface to synchronize the reports from CSLU with Cisco.

If you have deployed...	Then perform these steps....
CSLU Offline	**a.** Navigate to **Menu > Product Instances > Download All for Cisco** and download the `tar.gz` file. **b.** Access the CSSM UI and upload the report at **Manage Licenses > Reports > Usage Data Files > Upload Usage Data** . Download the acknowledgment (ACK) file from CSSM. **c.** Specify a file path on the device and import the acknowledgment (ACK) file using the **license smart import** command.

Air-gapped deployment from the switch

Based on the topology you have chosen, if you have chosen Topology 6 – No connectivity to CSSM and no CSLU (offline mode), the air-gapped deployment is done from the switch.

Activate licenses in air-gapped deployments from the switch

Activate licenses in air-gapped deployments directly from the switch by configuring transport mode, generating and uploading RUM reports, and importing the acknowledgment file.

Step 1 On the device, configure transport mode to off using the **license smart transport off** command.

Example:

```
switch(config)# license smart transport off
switch(config)# exit
```

Step 2 Generate and save the RUM report on the device using the **license smart save usage** command.

Example:

```
switch# license smart save usage all bootflash:all_rum.txt
switch# 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 new 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.

Step 3 Navigate to **Manage Licenses > Reports > Usage Data Files** in the CSSM workspace to upload the report manually.

Step 4 Download the acknowledgment (ACK) file from CSSM and import it to the device using the **license smart import** command.

Example:

```
switch# license smart import tftp://203.0.113.5/auto/tftp-abc/ACK_RUM-usage-20240125.txt
Import Data Successfull
```

Step 5 Verify the installed ACK on the device using the **show license status** command.

Example:

```
switch(config)# 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 (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: <none>
Next ACK deadline: <none>
Reporting push interval: 30 days
Next ACK push check: <none>
Next report push: <none>
Last report push: <none>
Last report file write: <none>

Trust Code installed: Oct 23 22:10:21 2023 UTC
Active: PID: N9K-C9364C-H1, SN: FDO27220LPP
Oct 23 22:10:21 2023 UTC


switch(config)#
```

Reporting license usage

License reporting is important to manage license consumption. Devices generate the Resource Utilization Measurement (RUM) report and CSSM uses RUM reports to manage license consumption.

Verification commands for RUM reports in NX-OS

- **show license rum id all** - The output of this show command displays the list of all rum ids.

  Note

  - The **show license rum id 0** command also displays the list of all rum reports. The value 0 also represents all in the case of this command.
  - This command does not support XML output.

  Sample output

```
switch(config)# show license rum id all
Smart Licensing Usage Report:
====================================
Report Id,          State,    Flag, Feature Name
1726227775          CLOSED    N     LAN_ENTERPRISE_SERVICES_PKG
1726227776          OPEN      N     LAN_ENTERPRISE_SERVICES_PKG
1726227777          OPEN      N     VPN_FABRIC
```

- **show license rum id** *report_id* - This command allows you to select one rum id from the list and the output of this command displays a short summary of the report.

  Sample output

```
switch(config)# show license rum id 1726227777
Smart Licensing Usage Report:
====================================
Report Id,          State,    Flag, Feature Name
1726227777          OPEN      N     VPN_FABRIC
```

- **show license rum id all detail** - The output of this command provides a list of all rum ids in a detailed format.

  Sample output

```
switch(config)# show license rum id all detail
Smart Licensing Usage Report Detail:
====================================
Report Id: 1726227775
  Metric Name: ENTITLEMENT
  Feature Name: LAN_ENTERPRISE_SERVICES_PKG
  Metric Value: regid.2019-06.com.cisco.LAN_Nexus9300_XF,1.0_76a87ea7-465b-40fd-b403-1bf9d845aa1b
  UDI: PID:N9K-C93180YC-FX3S,SN:FDO24521BTZ
  Previous Report Id: 1726227774,    Next Report Id: 1726227776
  State: CLOSED,      State Change Reason: DECONFIG
  Close Reason: DECONFIG
  Start Time: Sep 20 2024 22:53:49 IST,      End Time: Sep 26 2024 18:49:13 IST
  Storage State: EXIST
  Transaction ID: 0
  Transaction Message: <none>
Report Id: 1726227776
  Metric Name: ENTITLEMENT
  Feature Name: LAN_ENTERPRISE_SERVICES_PKG
  Metric Value: regid.2019-06.com.cisco.LAN_Nexus9300_XF,1.0_76a87ea7-465b-40fd-b403-1bf9d845aa1b
```

```
  UDI: PID:N9K-C93180YC-FX3S,SN:FDO24521BTZ
  Previous Report Id: 1726227775,    Next Report Id: 0
  State: OPEN,      State Change Reason: None
  Close Reason: None
  Start Time: Sep 26 2024 18:59:29 IST,      End Time: Sep 27 2024 14:30:45 IST
  Storage State: EXIST
  Transaction ID: 0
  Transaction Message: <none>
Report Id: 1726227777
  Metric Name: ENTITLEMENT
  Feature Name: VPN_FABRIC
  Metric Value: regid.2019-06.com.cisco.FAB_Nexus9300_XF,1.0_e0928396-a363-443a-b2b0-f1fcc15d0553
  UDI: PID:N9K-C93180YC-FX3S,SN:FDO24521BTZ
  Previous Report Id: 0,    Next Report Id: 0
  State: OPEN,      State Change Reason: None
  Close Reason: None
  Start Time: Sep 27 2024 14:30:45 IST,      End Time: Sep 27 2024 14:30:46 IST
  Storage State: EXIST
  Transaction ID: 0
  Transaction Message: <none>
```

- **show license rum id** *report_id* **detail** - This command allows you to select one rum id, about which you want to know the details, from the list and the output displays a detailed format of the report.

  Sample output

```
switch(config)# show license rum id 1726227777 detail
Smart Licensing Usage Report Detail:
====================================
Report Id: 1726227777
  Metric Name: ENTITLEMENT
  Feature Name: VPN_FABRIC
  Metric Value: regid.2019-06.com.cisco.FAB_Nexus9300_XF,1.0_e0928396-a363-443a-b2b0-f1fcc15d0553
  UDI: PID:N9K-C93180YC-FX3S,SN:FDO24521BTZ
  Previous Report Id: 0,    Next Report Id: 0
  State: OPEN,      State Change Reason: None
  Close Reason: None
  Start Time: Sep 27 2024 14:30:45 IST,      End Time: Sep 27 2024 14:30:46 IST
  Storage State: EXIST
  Transaction ID: 0
 Transaction Message: <none>
```

Generate RUM reports

You can generate the RUM report from the device using the **show license rum id** command. You can sync or manually upload the RUM report to CSSM based on your deployment.

Table 3: Procure RUM reports

If your deployment is...	Then...
SSM On-Prem using connected mode	perform these tasks: **1.** Generate the RUM report from the device using the **show license rum** command. SSM On-Prem server connects to the selected device and collects the usage reports and stores the report in the local library. **2.** Navigate to **SSM On-Prem > Smart Licensing** workspace on SSM On-Prem UI to synchronize the reports with Cisco.
SSM On-Prem using disconnected mode	perform these tasks: **1.** Generate the RUM report on the router using the **show license rum id** command and upload it to CSSM. **2.** Download the ACK (acknowledgment) file and import it on the device using the **license smart import** command.
CSLU Utility using online mode	no action is required. The device automatically sends RUM reports to CSLU as per the default policy. If you want to synchronize the reports immediately, navigate to **CSLU> Data Menu** workspace, select **Send to CSSM** .
CSLU Utility using offline mode	perform these tasks: **1.** Generate the RUM report on the router using the **show license rum id** command and upload it to CSSM. **2.** Download the ACK (acknowledgment) file, and import it on the device using the **license smart import** command.
Direct deployment	no action is required. The device automatically sends the RUM report as per the default policy.

Statistical view of RUM reports

A statistical view of a RUM report includes

- total number of reports on the device
- number of reports that have a corresponding ACK
- number of reports waiting for an ACK, and so on.

To view the statistical RUM report information, use the **show license all** and **show license tech support** commands.

Nexus Dashboard controller license consumption

Nexus Dashboard (ND) controller or cluster is bundled with Day2Ops applications. These applications request for controller licenses such as controller-ess, controller-adv, or controller-pre from the NX-OS switch. Based on this request, the corresponding licenses such as NXOS_ESSENTIALS, NXOS_ADVANTAGE, or DCN_PREMIER are used on the switch.

You can verify the license usage using the **show license controller usage** or **show license usage** commands.



Note

If you downgrade from NX-OS Release 10.5(2)F to a lower image version, and upgrade to the 10.5(2)F or later versions, you must verify the controller license again.

This is a sample output for **show license controller usage** command.

```
switch# show license controller usage
cluster01
NXOS_ESSENTIALS: TRUE
NXOS_ADVANTAGE: FALSE
DCN_PREMIER: FALSE

cluster02
NXOS_ESSENTIALS: FALSE
NXOS_ADVANTAGE: TRUE
DCN_PREMIER: FALSE

cluster03
NXOS_ESSENTIALS: FALSE
NXOS_ADVANTAGE: FALSE
DCN_PREMIER: TRUE

switch#
```

This is a sample output for **show license usage** command.

```
switch# show license usage

License Authorization:
Status: Not Applicable

(DCN_PREMIER):
Description: ACI Premier SW license for a 10/25/40G (XF) N9K Leaf
Count: 1
Version: 1.0
Status: IN USE
Enforcement Type: NOT ENFORCED
License Type: Generic

switch# show license usage DCN_PREMIER
Feature List:
controller-adv
controller-ess
controller-pre

switch#
```

When the feature is enabled on the NX-OS switch with the license feature on the ND controller side, the highest between the two licenses is used. This is a sample output that depicts this scenario.

```
switch# show license usage
```

```
License Authorization:
Status: Not Applicable

(DCN_PREMIER):
Description: ACI Premier SW license for a 10/25/40G (XF) N9K Leaf
Count: 1
Version: 1.0
Status: IN USE
Enforcement Type: NOT ENFORCED
License Type: Generic

switch# show license usage DCN_PREMIER
Feature List:
bgp
controller-adv
controller-ess
controller-pre

switch#
```

Note

If there is no communication between the NX-OS switch and the ND controller for more than 24 hours, then the controller license usage information is deleted from the switch.

High Availability

This section explains considerations that apply to a High Availability configuration, when running a software version that supports SLP.

Trust code requirements in a High Availability setup

In Dual Supervisor setup, two trust codes are installed. The active product instance can submit the requests for both the supervisors and install the trust codes that are returned in an ACK.

Policy requirements in a High Availability setup

There are no policy requirements that apply exclusively to a High Availability setup. As in case of a standalone product instance, only one policy exists in a High Availability setup as well, and this is on the active. The policy on the active applies to the standby in the setup.

Product instance functions in a High Availability setup

This section explains general product instance functions in a High Availability setup, and what the product instance does when a standby is added.

For trust codes – The active product instance can request (if necessary) and install trust codes for standby.

For policies – The active product instance synchronizes with the standby.

For reporting – Only the active product instance reports usage. The active reports usage information for standby.

In addition to scheduled reporting, these events trigger reporting:

- The addition or removal of a standby. The RUM report includes information about the standby that was added or removed.
- A switchover

- A reload

For addition of a standby:

- A product instance that is connected to CSLU, does not take any further action.
- A product instance that is directly connected to CSSM, performs trust synchronization. Trust synchronization involves:
  - Installation of trust code on the standby if not installed already.
  - Installation of policy and purchase information, if applicable.
  - Sending of a RUM report with current usage information.

Upgrades

Beginning with NX-OS Release 10.2(1)F, Smart Licensing Using Policy is the default licensing solution. This section describes how upgrade or migration to SLP is handled. It also clarifies how SLP handles earlier licensing models including:

- traditional licensing or Product Authorization Key (PAK) based licensing,
- Smart licensing,
- Right-to-Use licensing (RTU), and
- evaluation or expired licenses.

To migrate to SLP, you must upgrade to a software version that supports SLP. After you upgrade, SLP is the only supported licensing model and the switch continues to operate without any licensing changes. If your existing devices are SL-enabled, you can upgrade to appropriate deployment models and topologies of the Smart Licensing Using Policy.

Upgrade devices to Smart licensing Using Policy

This section provides information about how to upgrade the devices from an earlier licensing mode to Smart Licensing Using Policy that include:

- Traditional licensing and Smart Licensing,
- Right-to-Use (RTU) licensing, and
- Evaluation or expired licenses from any of the above-mentioned licensing models

Traditional and Smart Licensing

The two upgrade scenarios from the legacy licensing models to Smart Licensing Using Policy are:

- Traditional licensing (PAK) to Smart Licensing Using Policy
- Smart licensing to Smart Licensing Using Policy

Traditional licensing to Smart Licensing Using Policy

Perform these steps to upgrade Nexus switches from traditional or PAK licensing to Smart Licensing Using Policy (SLP):

1. Upgrade the switch software to a version that supports SLP, that is, 10.2(1)F or later versions.

2. During the upgrade, the device automatically performs the DLC process and converts traditional PAK licenses directly to SLP licenses. Contact your Cisco technical support representative for troubleshooting.
3. The switch continues to operate without any licensing changes after the upgrade. License reporting methods and transport types are retained or adjusted automatically based on the previous licensing model. So, upgrade the device based on the deployment model or the topology as explained in this section.

Note

You need not upgrade manually from PAK to SL before moving to SLP.

Smart Licensing to Smart Licensing Using Policy

Perform these steps to upgrade Nexus switches from Smart Licensing to Smart Licensing Using Policy (SLP):

1. Upgrade the switch software to a version that supports SLP, that is, 10.2(1)F or later versions.

Note

Ensure that the **license smart reservation** command is disabled before upgrading to Smart Licensing Using Policy.

2. The switch continues to operate without any licensing changes after the upgrade. License reporting methods and transport types are retained or adjusted automatically based on the previous licensing model. So, upgrade the device based on the deployment model or the topology as explained in this section.

Upgrade switches based on the deployment model or topology

The table lists the sections that you need to refer to based on your deployment model or topology.

Table 4: Upgrades based on the deployment model

If your deployment model or topology is…	Then, see this section to upgrade to SLP
Online > Direct deployment	Upgrade switch in direct deployment in online mode
Online > On-prem > SSM On-prem	Upgrade switch in on-prem deployment in online mode with SSM On-prem
Online > On-prem > CSLU	Upgrade switch in on-prem deployment in online mode with CSLU, on page 42
Offline > Remote deployment > SSM On-prem	Upgrade switch in remote deployment in offline mode with SSM On-prem
Offline > Remote deployment > CSLU	Upgrade switch in remote deployment in offline with CSLU
Offline > Air-gapped	Upgrade switch in air-gapped deployment in offline mode

Prerequisites

You must have performed the following prerequisite before upgrading the switch to SLP in any of the deployment modes.

- Upgrade to the required Nexus 9000 or Nexus 3500 or 3600 release that supports Smart Licensing Using Policy. For more information about upgrade, see the software upgrade and downgrade guides for Nexus 9000, Nexus 3600 or Nexus 3500.

Upgrade preparations

Upgrade preparations are pre-upgrade assessments and actions that

- verify the current licensing model and system compatibility,
- determine the potential impact of the upgrade on license reporting and transport, and
- ensure all prerequisites for successful migration to Smart Licensing Using Policy (SLP) are met.

Prepare for upgrade

Preparation for an upgrade from earlier licensing versions to SLP involves planning and readiness to ensure a smooth transition to the new version. Before upgrading, you need to understand the migration scenarios, be aware of the approach required for the upgrade, and so on. A few recommendations include:

- **Identify the current licensing model before upgrade**

  Before you upgrade to SLP, use the **show running license all** command in privileged EXEC mode to know the current licensing model present on the switch. This command displays information about the current licensing model for all except the RTU licensing model.

- **Understand how an upgrade affects enforcement types for existing licenses**

  To upgrade to SLP, you must upgrade the software version (image) on the switch to a supported version. 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. See the corresponding release note for the upgrade procedure on Cisco.com. If there are any general release-specific considerations, these are called out in the corresponding release notes.

  Before upgrading to a software version that supports SLP, refer to the ISSU Matrix for information about PIDs, releases, and upgrade paths.

- **Understand how an upgrade affects enforcement types for existing licenses**

  An unenforced license that was being used before upgrade, remains available after upgrade. All licenses on Nexus switches are unenforced licenses. This includes licenses from the earlier licensing models such as Traditional Licensing (PAK), Smart Licensing, Right-to-Use (RTU) Licensing, and Evaluation or expired licenses from any of the above-mentioned licensing models.

- **Understand how an upgrade affects reporting for existing licenses**

  When you upgrade to a software version that supports SLP, reporting is based on the reporting requirements in the policy. This is displayed in the output of the **show license status** command for the licenses such as Traditional Licenses (PAK), Smart Licenses (Registered and Authorized licenses), Right-to-Use (RTU) Licenses, and Evaluation or expired licenses.

- **Know how an upgrade affects transport type for existing licenses**

  The transport type, if configured in your existing setup, is retained after upgrade to SLP. When compared to the earlier version of Smart Licensing, other transport types are available with SLP. There is also a change in the default transport mode, and the table clarifies how this can affect upgrades.

Migration from	Transport type before upgrade	Transport type after upgrade
SL (EVAL)	Callhome	CSLU
SL (Registered)		Callhome
PAK-based	NA	CSLU
SL (Registered) with On-Prem	Callhome	CSLU

- **Know how an upgrade affects the token registration process**

  The token generation feature is still available in CSSM and is used to establish trust when a switch is directly connected to CSSM. Token generation is required for Smart, Callhome, and SSM On-prem.

- **Be aware of Device Led Conversion or automatic license conversion**

  When migrating from traditional licensing model to SLP, Device Led Conversion (DLC) process takes place. DLC is a license conversion process that is triggered automatically 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.

- **Refer to the sample show command outputs of the migration scenarios**

  This table illustrates sample show command outputs of before and after scenarios of Nexus 9000 switch migrating from Smart Licensing to SLP. The outputs call out key fields to check, before and after migration.

Before upgrade	**After upgrade**
show license summary (Smart Licensing) `switch# show license summary` `Smart Licensing is ENABLED` `Registration:` `  Status: REGISTERED` `  Smart Account: BU Production Test 1` `  Virtual Account: N9K_SA_49_Testing` `  Export-Controlled Functionality: Allowed` `License Authorization:` `  Status: AUTHORIZED on Jul 16 14:26:01 2021 UTC` `  Last Communication Attempt: SUCCEEDED` `  Next Communication Attempt: Aug 15 14:26:01 2021 UTC` `  Communication Deadline: Oct 14 14:20:59 2021 UTC` `Smart License Conversion:` `  Automatic Conversion Enabled: False` `  Status: Not started` `License Usage:` `License  Entitlement tag` `  Count  Status` `---` `LAN license for Nexus 9...` `(LAN_ENTERPRISE_SERVICES_PKG)  1  AUTHORIZED` `Network Services for Ne... (NETWORK_SERVICES_PKG)` `  1  AUTHORIZED` The Status and License Authorization fields show that the license is REGISTERED and AUTHORIZED.	**show license summary** (SLP) `switch# show license summary` `License Usage:` `License  Entitlement tag` `  Count  Status` `---` `DCN NDB Add-On License ... (DCN_NDB)` `  1  IN USE` `Network Services for Ne... (NETWORK_SERVICES_PKG)` `  1  IN USE` `LAN license for Nexus 9...` `(LAN_ENTERPRISE_SERVICES_PKG)  1  IN USE` The Status field shows that the licenses are now IN USE instead of registered and authorized.

Before upgrade	After upgrade
show license usage (Smart Licensing) `switch# show license usage` `License Authorization:` `  Status: AUTHORIZED on Jul 16 14:26:01 2021 UTC` `(LAN_ENTERPRISE_SERVICES_PKG):` `  Description: LAN license for Nexus 9500-M4` `  Count: 1` `  Version: 1.0` `  Status: AUTHORIZED` `(NETWORK_SERVICES_PKG):` `  Description: Network Services for Nexus 9500 -M4` `  Count: 1` `  Version: 1.0` `  Status: AUTHORIZED`	**show license usage** (SLP) `switch(config)# show license usage` `License Authorization:` `Status: Not Applicable` `(LAN_ENTERPRISE_SERVICES_PKG):` `Description: LAN license for Nexus 9300-XF` `Count: 1` `Version: 1.0` `Status: IN USE` `Enforcement Type: NOT ENFORCED` `License Type: Generic` `(NETWORK_SERVICES_PKG):` `Description: Network Services for Nexus9300-XF` `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 Nexus Switches).

Before upgrade	After upgrade
show license status (Smart Licensing) `switch# show license status` `Smart Licensing is ENABLED` `Registration:` `  Status: REGISTERED` `  Smart Account: BU Production Test 1` `  Virtual Account: N9K_SA_49_Testing` `  Export-Controlled Functionality: Allowed` `  Initial Registration: SUCCEEDED on Jul 16 14:25:49 2021 UTC` `  Last Renewal Attempt: None` `  Next Renewal Attempt: Jan 12 14:25:48 2022 UTC` `  Registration Expires: Jul 16 14:20:45 2022 UTC` `License Authorization:` `  Status: AUTHORIZED on Jul 16 14:26:01 2021 UTC` `  Last Communication Attempt: SUCCEEDED on Jul 16 14:26:01 2021 UTC` `  Next Communication Attempt: Aug 15 14:26:00 2021 UTC` `  Communication Deadline: Oct 14 14:20:58 2021 UTC` `Smart License Conversion:` `  Automatic Conversion Enabled: False` `Status: Not started`	

Before upgrade	After upgrade
	show license status (SLP) `switch# 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: Callhome` `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 16 15:22:31 2021 UTC` `  Next ACK deadline: Jul 16 15:22:31 2022 UTC` `  Reporting push interval: 30 days` `  Next ACK push check: <none>` `  Next report push: Aug 15 15:18:28 2021 UTC` `  Last report push: Jul 16 15:18:28 2021 UTC` `  Last report file write: <none>` `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` The descriptions for fields seen in the output include: • `Transport`: A transport type was configured and therefore

Before upgrade	After upgrade
	retained after upgrade. • `Policy`: Provides information about the policy header and the policy details. For example, a custom policy was available in the Smart Account or Virtual Account – this has also been automatically installed on the switch. (After establishing trust, CSSM returns a policy. The policy is then automatically installed.) • `Usage Reporting: header: The Next report push:` This field provides information about when the switch will send the next RUM report to CSSM. • `Trust Code Installed:` This field provides information regarding the successful conversion of the ID token and establishing a trusted connection with CSSM. **Note** The information about SA/VA can be seen in the out put of the **show license tech support** command in the `Account Information` field.
show license udi(Smart Licensing) `Device# show license udi` `UDI: PID:N9K-C9504, SN:FOX2308PCEN`	**show license udi**(SLP) `Device# show license udi` `UDI: PID:N9K-C9504, SN:FOX2308PCEN` `HA UDI List:` `Active: PID:N9K-C9504, SN:FOX2308PCEN` `HA UDI List:` `Standby: PID:N9K-C9504, SN:FOX2308PCEN` This is a High Availability setup, and the command displays all UDIs in the setup.

Upgrade switch in direct deployment in online mode

Perform these steps to upgrade devices to Smart Licensing Using Policy in the direct deployment model or topology.

Step 1 Perform the steps to deploy SLP using direct deployment mode

Step 2 Use the **show license summary** command to confirm that the expected license (feature-based) is in use.

Step 3 Log in to Cisco **Software Central** > **Smart Software Licensing** > **Inventory** > **Licenses** to verify the expected license is consumed on the Cisco site. Then click the required license from the list to see the details.

Upgrade switch in on-prem deployment in online mode with SSM On-Prem

Perform these steps to upgrade devices in SSM On-Prem deployment to Smart Licensing Using Policy.

Note

If you need to upgrade to the latest SSM On-Prem, see Cisco Smart Software Manager On-Prem Migration Guide.

Step 1 Perform on-prem deployment.

Step 2 Use the **show license summary** command to confirm that the chosen license (feature-based) is in use.

Step 3 Log in to Cisco **Software Central** > **Smart Software Licensing** > **Inventory** > **Licenses** to verify the expected license is consumed on the Cisco site. Then click the required license from the list to see the details.

Upgrade switch in on-prem deployment in online mode with CSLU

Follow these steps to upgrade devices in CSLU On-prem deployment to Smart Licensing Using Policy.

Note

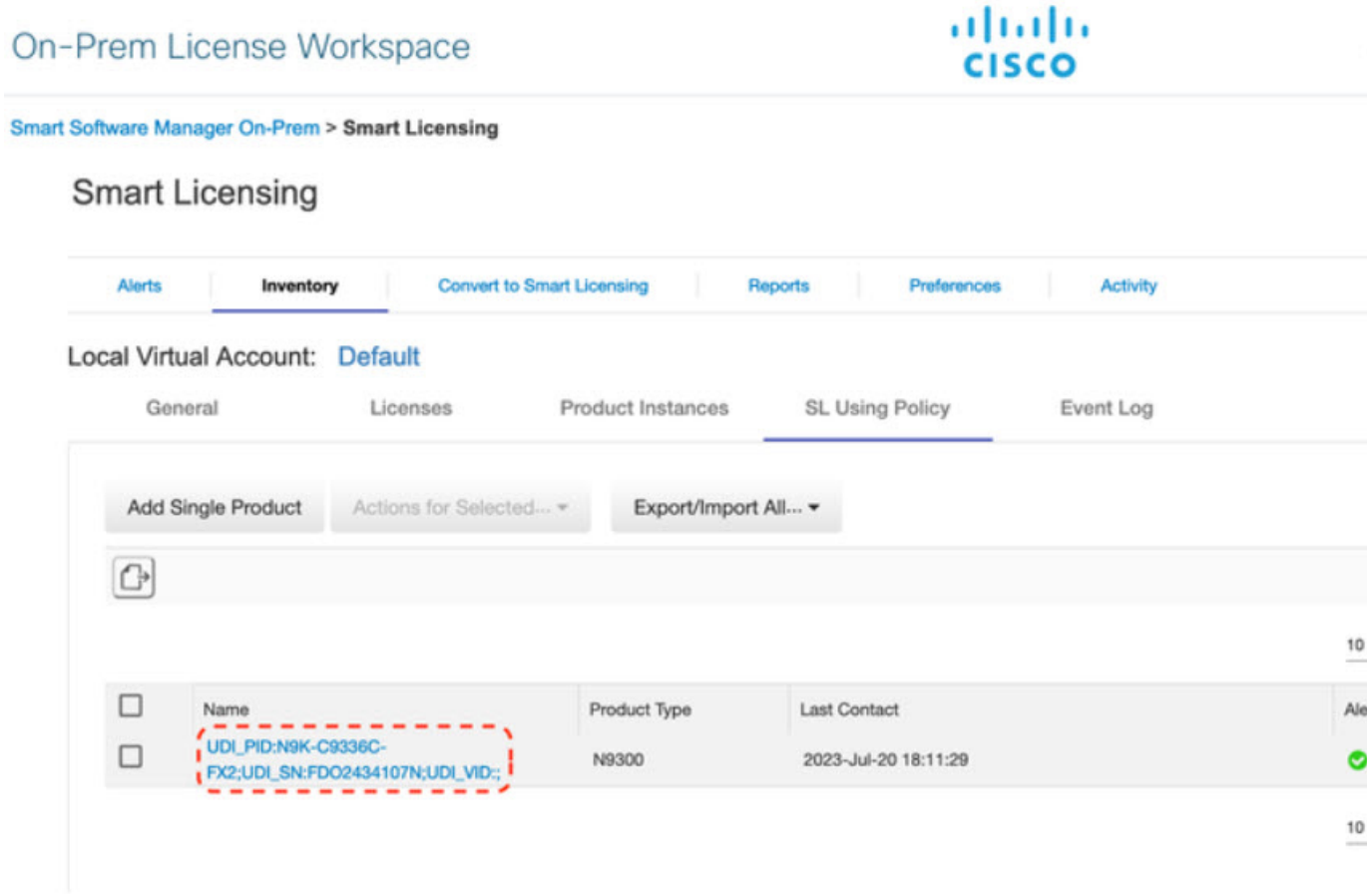
If you need to upgrade to the latest version of CSLU. See Cisco Smart License Utility.

Step 1 Perform the steps to deploy CSLU On-Prem in online mode.

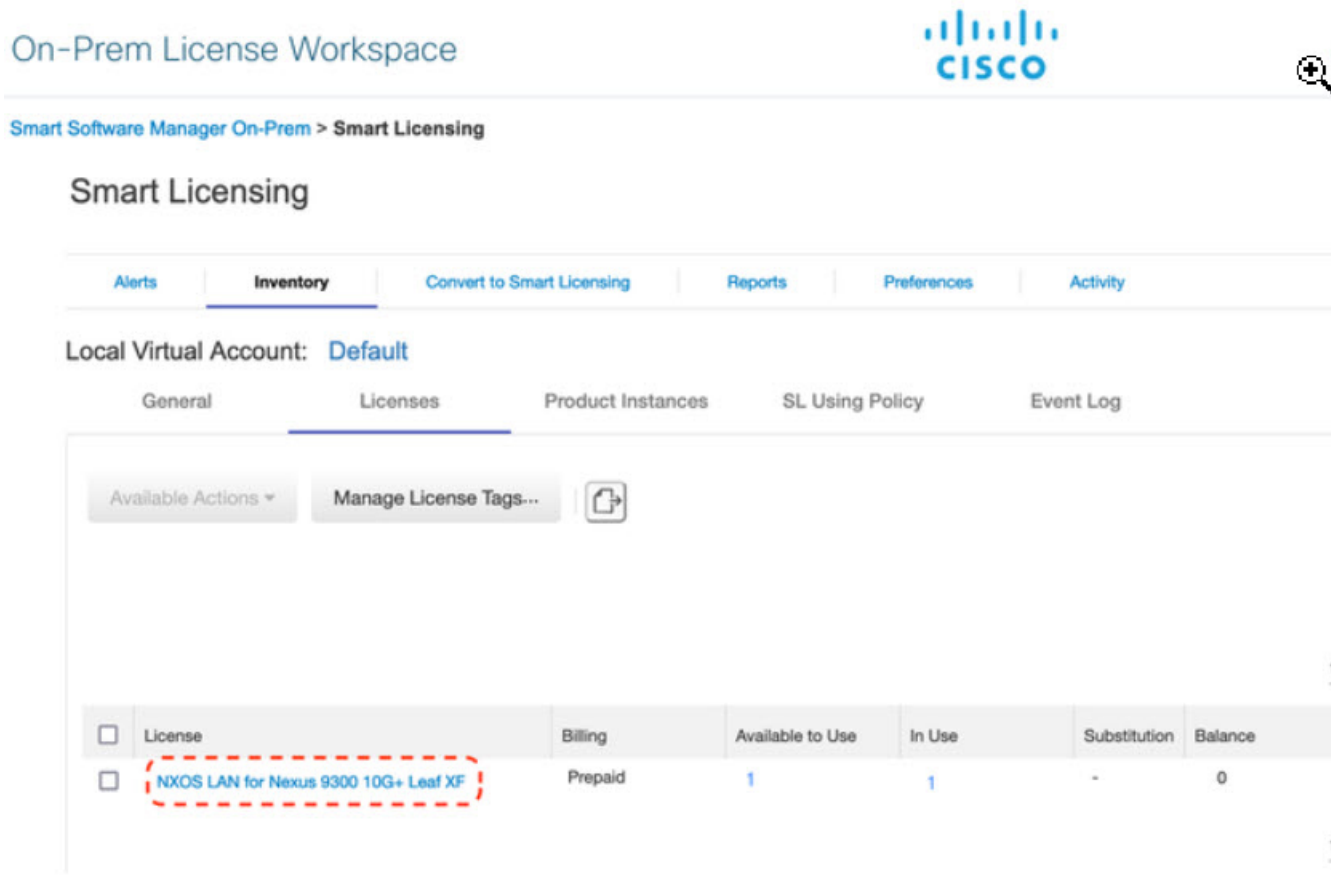
Step 2 Use the **show license summary** command to confirm that the expected license (feature-based) is in use.

Step 3 Log in to **CSSM On-Prem** > **Smart Software Manager On-Prem**. Select your Local Virtual Account on the top right corner from the drop-down menu. Then,

a) Choose **Inventory** > **SL Using Policy** to ensure that Nexus is present on CSSM On-Prem.



b) Choose **Inventory** > **Licenses** to see the details to verify the required license is consumed on the CSSM On-prem local server. Then click the license from the list to see the details.



Upgrade switch in remote deployment in offline mode with SSM On-prem

Perform these steps to upgrade devices in remote offline mode with SSM On-Prem deployment to Smart Licensing Using Policy.

Step 1 Upgrade to the latest SSM On-Prem. For more information, see Cisco Smart Software Manager On-Prem Migration Guide.

Step 2 Perform the steps to deploy SSM On-prem in disconnected mode.

Upgrade switch in remote deployment in offline mode with CSLU

Perform these steps to upgrade devices in remote offline mode with CSLU deployment to Smart Licensing Using Policy.

Step 1 Upgrade to the latest version of CSLU. See Cisco Smart License Utility.

Step 2 Perform the steps to deploy CSLU in offline mode.

Upgrade switch in air-gapped deployment in offline mode

This section provides you the steps to upgrade devices in an air-gapped remote offline deployment to Smart Licensing Using Policy.

Perform the steps mentioned in the Air-Gapped Deployment from the Switch section.

RTU licensing to Smart Licensing Using Policy

This section provides information about migrating a Nexus 9000 Series switch from Right-to-Use (RTU) licensing to Smart Licensing Using Policy.

RTU Licensing is available for Nexus 9000 Series Switches until NX-OS Release 10.1(2), and SLP is introduced from NX-OS Release 10.2(1)F.

When the software version is upgraded from a pre-SLP version to the SLP version, all licenses are displayed as IN USE and the Cisco default policy is applied on the product instance. If any add-on licenses are used, the default policy requires usage reporting in 90 days. As all licenses on Nexus switches are unenforced, no functionality is lost.

RTU licensing to SLP migration - feature TAP aggregation

In a scenario where a Nexus 9000 Series switch is migrated from a pre-SLP to an SLP-supported release, an NDB license, which is the only RTU license, cannot be consumed unless ACL is configured as below in the pre-SLP release. This is equivalent of the consumption of NDB RTU license in pre-SLP release.

A sample configuration for pre-SLP release is:

```
switch# config
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# ip access-list iptest
switch(config-acl)# permit ip any any redirect Ethernet1/1
switch(config-acl)#
```

Here is a sample show command output after ACL configuration for a pre-SLP release.

show ip access-lists iptest

```
IP access list iptest
10 permit ip any any redirect Ethernet1/1
```

Here is a sample show command output for license verification after upgrading to an SLP-supported release and the show feature command shows that the feature tap-aggregation is enabled, and NDB license is consumed.

show license usage

```
Device# show license usage
License Authorization:
  Status: Not Applicable
(DCN_NDB):
  Description: DCN NDB Add-On License N9K Modular
  Count: 1
  Version: 1.0
  Status: IN USE
  Enforcement Type: NOT ENFORCED
  License Type: Generic
```

show feature
show feature | inc tap

```
tap-aggregation        1          enabled
```

Note

Beginning with NX-OS Release 10.2(1)F, feature tap-aggregation is licensed, supported on all Nexus 9000 Series switches, and requires you to configure feature tap-aggregation before configuring related commands.

CSSM web user interface after migration

No changes in the CSSM web user interface.

Reporting after migration

Implement any one of the supported topologies and fulfill reporting requirements. See Supported deployment models and topologies, on page 6 . The reporting method you can use depends on the topology you implement.

Evaluation or Eval Expired to Smart Licensing Using Policy

Here is an example of a Nexus 9000 switch with evaluation licenses (Smart Licensing) that are migrated to SLP.

The notion of evaluation licenses does not apply to SLP. When the software version is upgraded to one that supports SLP, all licenses are displayed as IN USE and the Cisco default policy is applied to the product instance. Since all licenses on Nexus switches are unenforced, no functionality is lost.

The table below calls out key changes or new fields to check for in the show command outputs, after upgrade to SLP:

Table 5: Show commands for Evaluation or Eval Expired to Smart Licensing Using Policy

Before Upgrade	After Upgrade
switch(config)# show license usage License Authorization: Status: EVAL MODE Evaluation Period Remaining: 86 days, 11 hours, 49 minutes, 40 seconds (LAN_ENTERPRISE_SERVICES_PKG): Description: <empty> Count: 1 Version: 1.0 Status: EVAL MODE (NETWORK_SERVICES_PKG): Description: <empty> Count: 1 Version: 1.0 Status: EVAL MODE (VPN_FABRIC): Description: <empty> Count: 1 Version: 1.0 Status: EVAL MODE	**switch# show license usage** License Authorization: Status: Not Applicable (NETWORK_SERVICES_PKG): Description: Network Services for Nexus9300-XF Count: 1 Version: 1.0 **Status: IN USE** Enforcement Type: NOT ENFORCED License Type: Generic (VPN_FABRIC): Description: FAB License for Nexus 9300-XF Count: 1 Version: 1.0 **Status: IN USE** Enforcement Type: NOT ENFORCED License Type: Generic (LAN_ENTERPRISE_SERVICES_PKG): Description: LAN license for Nexus 9300-XF Count: 1 Version: 1.0 **Status: IN USE** Enforcement Type: NOT ENFORCED License Type: Generic

Before Upgrade	After Upgrade
switch(config)# show license summary Registration: Status: UNREGISTERED Smart Account: SA1 Virtual Account: VA1 Export-Controlled Functionality: Allowed License Authorization: Status: EVAL MODE Evaluation Period Remaining: 86 days, 11 hours, 49 minutes, 6 seconds Smart License Conversion: Automatic Conversion Enabled: False Status: Successful on Aug 13 17:19:07 2021 UTC License Usage: License Entitlement tag Count Status ---------- <empty> (LAN_ENTERPRISE_SERVICES_PKG) 1 EVAL MODE <empty> (NETWORK_SERVICES_PKG) 1 EVAL MODE <empty> (VPN_FABRIC) 1 EVAL MODE	**switch# show license summary** License Usage: License Entitlement tag Count Status ---------- Network Services for Ne... (NETWORK_SERVICES_PKG) 1 IN USE FAB License for Nexus 9... (VPN_FABRIC) 1 IN USE LAN license for Nexus 9... (LAN_ENTERPRISE_SERVICES_PKG) 1 IN USE

Before Upgrade	After Upgrade
switch(config)# show license status `Smart Licensing is ENABLED` `Registration:` `  Status: UNREGISTERED` `  Smart Account: SA1` `  Virtual Account: VA1` `  Export-Controlled Functionality: Allowed` `License Authorization:` `  Status: EVAL MODE` `  Evaluation Period Remaining: 86 days, 11 hours, 49 minutes, 3 seconds` `Smart License Conversion:` `  Automatic Conversion Enabled: False` `  Status: Successful on Aug 13 17:19:07 2021 UTC`	**switch# 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 (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: Nov 16 09:38:37 2021 UTC` `    Reporting push interval: 30 days` `    Next ACK push check: <none>` `    Next report push: Aug 18 09:39:14 2021 UTC` `    Last report push: <none>` `    Last report file write: <none>` `Trust Code installed: <none>`

CSSM web user interface after migration

No changes in the CSSM web user interface.

Reporting after migration

Implement any one of the supported topologies and fulfill reporting requirements. See Supported deployment models and topologies, on page 6. The reporting method that you can use depends on the topology you implement.

Downgrades

A downgrade is a licensing operation that

- restores an earlier software version with a prior licensing model,
- can alter supported features and required registrations, and
- requires distinct actions based on deployment scenario and trust status.

Downgrade devices from Smart Licensing Using Policy

This section provides information about downgrades for new deployments and existing deployments (you upgraded to SLP and now want to downgrade). The downgrade scenarios covered in this section include:

- New deployment and then downgrade – Downgrade from a new deployment that supports SLP to an earlier version where Smart Licensing is supported and SLP is not supported.
- Upgrade to SLP and then downgrade to Smart Licensing – Upgrade from an earlier version to a software version that supports SLP and then downgrade to an earlier version where SL is supported.

Note

- Before you downgrade the device from SLP to Smart Licensing, use the **show license all** command. Save the output of this command for reference.
- While downgrading from SLP to Smart Licensing the device comes up in traditional mode by default.

New deployment and then downgrade

This section applies if you had a newly purchased switch with a software version where SLP was already enabled by default, and you want to downgrade to a software version where SL is supported.

The outcome of the downgrade depends on whether a Trust Code was installed while you were still operating in the SLP environment, and further action may be required depending on the release you downgrade to.

This table displays the outcome and action for downgrading SLP from a new deployment a release that supports Smart Licensing.

Table 6: Action required after downgrade

SLP environment before downgrade	Downgrade to…	Action required after downgrade
Standalone product instance, which is connected directly to CSSM, and trust established	Any earlier release that supports SLP	No action is required as re-registration occurs automatically.

SLP environment before downgrade	Downgrade to…	Action required after downgrade
High Availability setup, which is connected directly to CSSM, and trust established	Any release that supports Smart Licensing	Re-register the product instance. Generate an ID token in the CSSM web user interface and on the product instance, enable smart licensing using license smart enable and configure the **license smart register idtoken** *idtoken* **all** command in global configuration mode.
Any other topology (Connected to CSSM through CSLU, CSLU disconnected from CSSM, No connectivity to CSSM and no CSLU)	Any release that supports Smart Licensing	Restore licenses to a registered and authorized state by following the procedures that are applicable in the Smart Licensing environment.

Upgrade to SLP and then downgrade to Smart Licensing

If you upgrade to a software version that supports SLP and then downgrade to any of the earlier licensing models, license consumption does not change, 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.

The outcome of the downgrade depends on whether a Trust Code was installed while you were still operating in the SLP environment, and further action may be required depending on the release you downgrade to. See Table 6: Action required after downgrade, on page 48.

Downgrade switches based on the deployment model or topology

This table lists the sections that you need to refer based on your deployment model or topology.

Table 7:

If your deployment model or topology is…	Then, see this section to downgrade from SLP
Online > Direct deployment	Downgrade switch in direct deployment in online mode, on page 50
Online > On-prem > SSM On-prem	Downgrade switch in on-prem deployment in online mode with SSM On-prem, on page 50
Online > On-prem > CSLU	Downgrade switch in on-prem deployment in online mode with CSLU, on page 50
Offline > Remote deployment > SSM On-prem	Downgrade switch in remote deployment in offline mode with SSM On-prem, on page 50
Offline > Remote deployment > CSLU	Downgrade switch in remote deployment in offline mode with CSLU, on page 51
Offline > Air-gapped	Downgrade switch in air-gapped deployment in offline mode, on page 51

Prerequisites

You must have performed the following prerequisite before downgrading the switch to SLP in any of the deployment modes.

- Downgrade to Nexus 9000 or Nexus 3500 or 3600 Release 10.1(2) or earlier that supports Smart Licensing. For more information about downgrade, see the software upgrade and downgrade guides for Nexus 9000, Nexus 3600 or Nexus 3500.

Downgrade switch in direct deployment in online mode

While you downgrade switch in direct deployment in online mode, the only step you need to follow is the prerequisite where you directly downgrade to a release that supports Smart Licensing.

Downgrade switch in on-prem deployment in online mode with SSM On-prem

Follow the steps in this section to downgrade switches in on-prem deployment in online mode with SSM On-prem deployment from Smart Licensing Using Policy to Smart Licensing:

Based on the mode of transport, perform the required action:

a) Smart Transport mode—Reregister your device with the **license smart register idtoken** <*idtoken*> command on the switch.

An authorization error might occur during registration.

```
Failure reason: {"product_instance_identifier":["ProductInstance
'0a17705c-cf31-4b4f-ad8a-9605fd867ddc' is not valid"]}
```

If you encounter this error, then use the **license smart register idtoken** <*idtoken*> **force** command to force the registration.

The transport mode changes to **smart**.

b) Callhome Transport mode—Reregister your device with the **license smart register idtoken** <*idtoken*> command on the switch.

1. Reregister your device with SSM On-Prem with the **license smart register idtoken** <*idtoken*> command on the switch.
2. Sync your SSM On-Prem local account with CSSM, see Cisco Smart Software Manager On-Prem Migration Guide.

The transport mode changes to **callhome**.

Downgrade switch in on-prem deployment in online mode with CSLU

Follow the steps in this section to downgrade switches in on-prem deployment in online mode with CSLU from Smart Licensing Using Policy to Smart Licensing.

CSLU is not supported in Smart Licensing.

We recommend you to deploy SSM On-Prem for the downgrade. See Downgrade switch in on-prem deployment in online mode with SSM On-prem, on page 50.

Downgrade switch in remote deployment in offline mode with SSM On-prem

Follow the steps in this section to downgrade switches in remote deployment in offline mode with SSM On-prem from Smart Licensing Using Policy to Smart Licensing.

Sync your SSM On-Prem local account with CSSM, see Cisco Smart Software Manager On-Prem Migration Guide.

The transport mode changes to **callhome**.

Downgrade switch in remote deployment in offline mode with CSLU

Perform the steps in this section to downgrade switches in remote deployment in offline mode with CSLU from Smart Licensing Using Policy to Smart Licensing.

CSLU is not supported in Smart Licensing.

> We recommend you to deploy SSM On-Prem for the downgrade. See Downgrade switch in on-prem deployment in online mode with SSM On-prem, on page 50.

Downgrade switch in air-gapped deployment in offline mode

While you downgrade switch in air-gapped deployment in offline mode, the only step you need to follow is the prerequisite where you directly downgrade to a release that supports Smart Licensing.

Feature history for Smart Licensing Using Policy

This table provides release-related information for features that are explained in this document.

Release	Feature	Feature Information
NX-OS Release 10.6(2n)	Licensing (SLP) Support on N9164E-NS4-O switch	Added support for SLP on N9164E-NS4-O switch
NX-OS Release 10.6(2)F	• Licensing (SLP) Support on Nexus 9396Y12C-SE1 and 9396T12C-SE1 switches • Licensing (SLP) Support on N9300 Series Smart Switches	• Added support for SLP on Nexus 9396Y12C-SE1 and 9396T12C-SE1 switches • Added support for SLP on N9324C-SE1U and N9348Y2C6D-SE1U Smart Switches
NX-OS Release 10.6(1)F	Restructure Upgrade, Downgrade and Migration	Revamped Upgrade, Downgrade, and Migration sections into Upgrades and Downgrades sections.
NX-OS Release 10.6(1)F	Licensing (SLP) Support on Nexus 9336C-SE1 switch	Added support for SLP on Nexus 9336C-SE1 switch
NX-OS Release 10.6(1)F	Smart License HTTP Connect Message - User Agent String	Introduced HTTP User Agent string that is set to **cisco-nxos** as part of Smart License HTTP Connect header
NX-OS Release 10.5(3)F	Licensing(SLP) Support on Nexus 9364E-SG2 switches	Added support for SLP on Nexus 9364E-SG2-Q and 9364E-SG2-O switches
NX-OS Release 10.5(2)F	Nexus Dashboard License consumption on NX-OS Switches	Added support to allow the NX-OS switch to be notified about the controller (ND) tier license consumption

Release	Feature	Feature Information
NX-OS Release 10.5(1)F	Logging 2.0 support for callhome	Added logging 2.0 support for callhome for SLP
NX-OS Release 10.4(3)F	Licensing (SLP) Support for Nexus 9364C-H1 platform switch	Added support for SLP on Nexus 9364C-H1 platform switch
NX-OS Release 10.4(3)F	TLS v1.3	Added Transport Layer Security protocol version 1.3 support on SLP Licensing mode for Nexus platform switches
NX-OS Release 10.4(2)F	Licensing (SLP) Support for the following Nexus platform switches: • N9K-C9232E-B1 • N9K-C93108TC-FX3 • N9K-C93400LD-H1	Added support for SLP on the following Nexus platform switches. • N9K-C9232E-B1 • N9K-C93108TC-FX3 • N9K-C93400LD-H1
NX-OS Release 10.4(1)F	Licensing (SLP) Support for the following Nexus platform switches: • 9804 • N9K-C9332D-H2R • N9K-C9348GC-FX3 • N9K-C9348GC-FX3PH	Added support for SLP on the following Nexus platform switches: • 9804 • N9K-C9332D-H2R • N9K-C9348GC-FX3 • N9K-C9348GC-FX3PH
NX-OS Release 10.3(3)F	Ability to select Source Interface for DNS	Provides the user an option to define a source-interface through which the name server can be reached • Only one source interface can be mapped against one ip name-server. • The same source interface cannot be configured for more than one use-vrf.
NX-OS Release 10.3(3)F	Source interface support for Smart and CSLU modes of transport	Added a command to configure the source interface for Smart and CSLU modes of transport
NX-OS Release 10.3(2)F	Support for Source Interface for callhome	Added a CLI option source-interface under callhome context
NX-OS Release 10.3(2)F	Licensing (SLP) Support for Nexus 9408 platform switches	Added support for SLP on Nexus 9408 platform switches
NX-OS Release 10.3(2)F	CSSM to display the host name of the Product Instance	CSSM displays the host name of the Product Instance instead of UDI

Release	Feature	Feature Information
NX-OS Release 10.3(2)F	Support SLP on Non-Management VRF	Added support for SLP on non-management VRF for smart transport and CSLU mode of transport
NX-OS Release 10.3(1)F	24-port Licensing (SLP) Support on Nexus 9300-FX3, 9300-FX3H, and 9300-FX3P platform switches	Added support for 24-port SLP on Nexus 9300-FX3, 9300-FX3H, and 9300-FX3P platform switches
NX-OS Release 10.2(1)F	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 Feature Navigator to find information about platform and software image support. To access Feature Navigator, go to http://www.cisco.com/go/cfn .

Appendix

This section includes common tasks that are required while configuring Smart Licensing Using Policy on Nexus switches.

Configure a DNS client

Before you begin

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

Step 1 Enter global configuration mode using the switch# **configure terminal** command.

Step 2 Enable DNS-based address translation using the switch(config)# **ip domain-lookup** command.

Step 3 Create a new VRF and enters VRF configuration mode using the switch(config)# **vrf context** *vrf-name* command. The name can be any case-sensitive, alphanumeric string up to 32 characters.

Step 4 Define the default domain name that NX-OS uses to resolve unqualified hostnames using the switch(config-vrf)# **ip domain-name** *domain name* command.

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. NX-OS continues this process for each entry in the domain list until it finds a match.

Step 5 Define up to six name servers using the switch(config-vrf)# **ip name-server** *address1 [address2... address6]* [**source-interface** { **loopback** | **port-channel** | **ethernet** | **mgmt.** | **vlan** }] [**use-vrf** *vrf-name*] command.

The address can be either an IPv4 or IPv6 address.

- **source-interface** - Configures the source interface for all DNS packets. Available options for source-interface are loopback, port-channel, ethernet, management, or vlan interface. Only one source-interface can be mapped to one or more ip name-servers.



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.

- **use-vrf** - Configures the VRF on which the IP name server can be reached.

Configure the Call Home service for direct cloud access

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

Configure a source interface to send messages using HTTP

Beginning with NX-OS 10.3(2)F, you can optionally specify a source interface to send Smart Call Home messages over HTTP. If a source interface is not configured, the interface used to reach the Call Home server is chosen.

Step 1 Enter global configuration mode using the **configure terminal** command.

Example:

```
switch# configure terminal
switch(config)#
```

Step 2 Enter Smart Call Home configuration mode using the **callhome** command.

Example:

```
switch(config)# callhome
switch(config-callhome)#
```

Step 3 Configure Smart Call Home to use this source interface when connecting to the Call Home server using the **source-interface** *interface* command.

Example:

```
switch(config-callhome)# source-interface Ethernet1/1
switch(config-callhome)#
```

Step 4 Enable Call Home using the **enable** command.

Example:

```
switch(config-callhome)# enable
switch(config-callhome)#
```

Step 5 (Optional) Display information about Smart Call Home using the **show callhome** command.

Example:

```
switch(config-callhome)# show callhome
switch(config-callhome)#
```

Step 6 (Optional) Copy the running configuration to the startup configuration using the **copy running-config startup-config** command.

Example:

```
switch(config)# copy running-config startup-config
switch(config-callhome)#
```

What to do next

Optionally use VRFs to send Smart Call Home messages over HTTP.

Configure a VRF to send messages using HTTP

Step 1 Enter global configuration mode using the switch# **configure terminal** command.

Step 2 Enter Call Home configuration mode using the switch(config)# **callhome** command.

Step 3 Configure the VRF used to send email and other Smart Call Home messages over HTTP using the switch(config-callhome)# **transport http use-vrf** *vrf-name* command.

View a Smart Call Home profile

Display the Smart Call Home profile using the switch# **show running-config callhome** command.

Reference

For more information about SLP, see Cisco Nexus 9000 and 3000 Series NX-OS Smart Licensing Using Policy User Guide.