Cisco NX-OS License Installation Guide (PAK-based and Smart Software Licensing)

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CHAPTER 3   **Smart Software Licensing for Cisco Nexus 3000 and 9000 Series Switches   43**

Licensing Cisco NX-OS Software Features

This chapter contains information related to feature and module-based licensing for Cisco Nexus switches that run Cisco NX-OS software.

Note Cisco Data Center Network Manager (DCNM) is a GUI that you can use to manage your data center infrastructure. See the Cisco DCNM Installation and Licensing Guide for details about installing and licensing Cisco DCNM.

License Installation

You can either obtain a factory-installed license (only applies to new device orders) or perform a manual license installation of the license (applies to existing devices in your network).

Note All licenses for the Cisco Nexus 3000 and 9000 series switches are managed with Smart Licensing Using a Policy from 10.2(1) release. Manual installation of license is not required.

Note	Only users with the network-admin role can install licenses on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Obtaining a Factory-Installed License

You can obtain factory-installed licenses for a new Cisco NX-OS device.

SUMMARY STEPS

1. Contact your reseller or Cisco representative and request this service.
2. Start using the device and the licensed features.

DETAILED STEPS

Step 1 Contact your reseller or Cisco representative and request this service.

Note	If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.

Your device is shipped with the required licenses installed in the system.

Step 2 Start using the device and the licensed features.

Performing a Manual Installation

If you have existing devices or if you wish to install the licenses on your own, you must first obtain the license key file and then install that file in the device.

Note	All licenses for the Cisco Nexus 5000 Series and the Cisco Nexus 4000 Series are factory-installed. Manual installation is not required.

Figure 1: Obtaining a License Key File

This figure shows how to obtain a license key file.
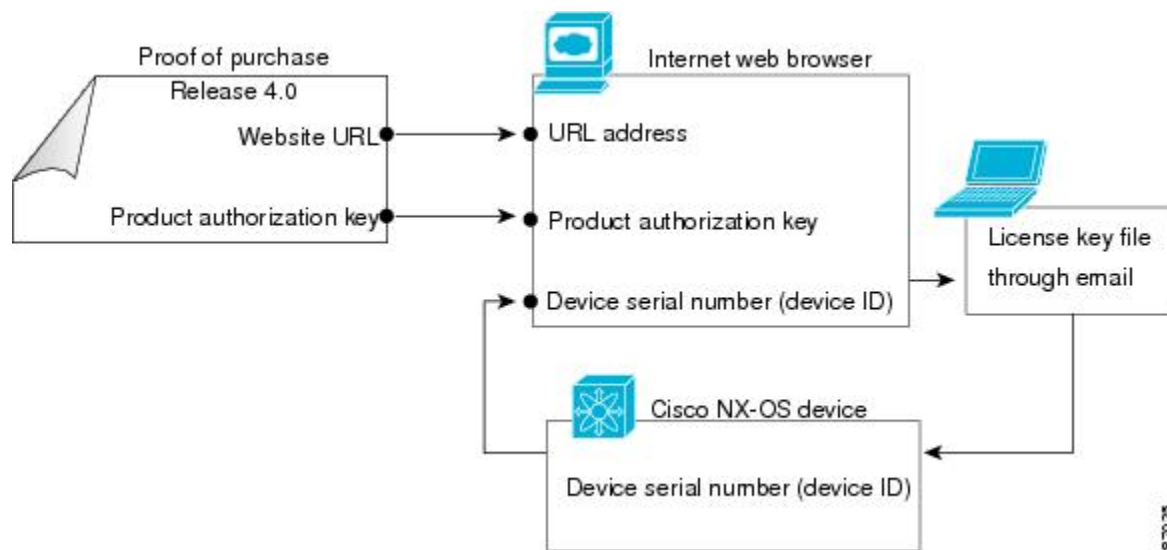
Obtaining the License Key File

You can obtain new or updated license key files.

SUMMARY STEPS

1. Obtain the serial number for your device by entering the **show license host-id** command. The host ID is also referred to as the device serial number.
2. Obtain your software license claim certificate document. If you cannot locate your software license claim certificate, contact Cisco Technical Support at http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.
3. Locate the product authorization key (PAK) from the software license claim certificate document.
4. Locate the website URL from the software license claim certificate document. You can access the Product License Registration website https://tools.cisco.com/SWIFT/LicensingUI/Home.
5. Follow the instructions on the Product License Registration website to register the license for your device.
6. For the Cisco Nexus 9000 Series switches, Cisco Nexus 3164Q switches, and Cisco Nexus 31128PQ switches, use the **copy licenses** command to save your license file to one of three locations—the bootflash: directory, the usb1: device, or the usb2: device. For the Cisco Nexus 7000 Series, use the **copy licenses** command from the default VDC to save your license file to one of four locations—the bootflash: directory, the slot0: device, the usb1: device, or the usb2: device. For all other platforms, use the **copy licenses** command to save your license file to one of two locations—the bootflash: directory or the volatile: directory.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Obtain the serial number for your device by entering the **show license host-id** command. The host ID is also referred to as the device serial number.	```switch# show license host-id``` ```License hostid: VDH=FOX064317SQ```

	Command or Action	Purpose
		Tip Use the entire ID that appears after the equal sign (=). In this example, the host ID is FOX064317SQ.
Step 2	Obtain your software license claim certificate document. If you cannot locate your software license claim certificate, contact Cisco Technical Support at http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.	
Step 3	Locate the product authorization key (PAK) from the software license claim certificate document.	
Step 4	Locate the website URL from the software license claim certificate document. You can access the Product License Registration website https://tools.cisco.com/SWIFT/LicensingUI/Home.	
Step 5	Follow the instructions on the Product License Registration website to register the license for your device.	The license key file is sent to you by e-mail and is digitally signed to only authorize use on the requested device. The requested features are also enabled once the Cisco NX-OS software on the specified device accesses the license key file. **Caution** Do not make any modifications to the license key file. It will alter the digital signature and render the license invalid. A license is permanent. If you do not have a license, the grace period for using a feature starts from the first time you start using a feature offered by a license. **Note** Cisco TrustSec for the Cisco Nexus 7000 Series and Layer 3 Enterprise for the Cisco Nexus 5000 Series do not have a grace period. You must obtain an Advanced Services license to use Cisco TrustSec.
Step 6	For the Cisco Nexus 9000 Series switches, Cisco Nexus 3164Q switches, and Cisco Nexus 31128PQ switches, use the **copy licenses** command to save your license file to one of three locations—the bootflash: directory, the usb1: device, or the usb2: device. For the Cisco Nexus 7000 Series, use the **copy licenses** command from the default VDC to save your license file to one of four locations—the bootflash: directory, the slot0: device, the usb1: device, or the usb2: device. For all other platforms, use the **copy licenses** command to save your license file to one of two locations—the bootflash: directory or the volatile: directory.	**Note** Only users with the network-admin role can copy licenses on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Related Topics

Backing Up Licenses, on page 7

Installing the License Key File

You can install the license to enable features on your device. For the Cisco Nexus 7000 Series, the license must be installed in the default VDC or admin VDC. A license applies to features in all VDCs and VRFs on the physical device.

Tip   If you need to install multiple licenses in any device, be sure to provide unique filenames for each license key file.

Note   If you have a single supervisor module on your Cisco NX-OS device and you replace the supervisor module, you must reinstall the license key file.

If you are currently running with a grace period license to avoid service disruptions when you install your permanent license, do not disable the grace period by using the **no license grace-period** command. Instead, just install your new license. The license manager will automatically transition from grace licensing to the installed license.

SUMMARY STEPS

1. Log into the device through the console port of the active supervisor.
2. Perform the installation by using the **install license** command on the active supervisor module from the device console.
3. (Optional) Back up the license key file.
4. Exit the device console and open a new terminal session to view all license files installed on the device using the **show license** command.
5. (Optional) Enable licensed features, if necessary, by using the **feature** *feature-name* command in global configuration mode. For example, you can enable the BGP feature as follows:

DETAILED STEPS

Step 1   Log into the device through the console port of the active supervisor.

Note   Only users with the network-admin role can install licenses on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Step 2   Perform the installation by using the **install license** command on the active supervisor module from the device console.

```
switch# install license bootflash:license_file.lic
Installing license ..done
```

Note   If you provide a target name for the license key file, the file is installed with the specified name. Otherwise, the filename specified in the license key file is used to install the license.

Step 3   (Optional) Back up the license key file.

Step 4   Exit the device console and open a new terminal session to view all license files installed on the device using the **show license** command.

```
switch# show license
Enterprise.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT LAN_ENTERPRISE_SERVICES_PKG cisco 1.0 permanent uncounted \
        VENDOR_STRING=<LIC_SOURCE>MDS_SWIFT</LIC_SOURCE><SKU>N7K-LAN1K9=</SKU> \
        HOSTID=VDH=TBC10412106 \
        NOTICE="<LicFileID>20071025133322456</LicFileID><LicLineID>1</LicLineID>\
        <PAK></PAK>" SIGN=0CC6E2245FBE
```

Note   If the license meets all guidelines when the **install license** command is used, all features and modules continue functioning as configured.

You can use the **show license brief** command to display a list of license files installed on the device.

```
switch# show license brief
Enterprise.lic
```

You can use the **show license file** command to display information about a specific license file installed on the device.

```
switch# show license file Enterprise.lic
Enterprise.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT LAN_ENTERPRISE_SERVICES_PKG cisco 1.0 permanent uncounted \
        VENDOR_STRING=<LIC_SOURCE>MDS_SWIFT</LIC_SOURCE><SKU>N7K-LAN1K9=</SKU> \
        HOSTID=VDH=TBC10412106 \
        NOTICE="<LicFileID>20071025133322456</LicFileID><LicLineID>1</LicLineID>\
        <PAK></PAK>" SIGN=0CC6E2245FBE
```

Step 5   (Optional) Enable licensed features, if necessary, by using the **feature** *feature-name* command in global configuration mode. For example, you can enable the BGP feature as follows:

```
swtich# configure terminal
switch(config)# feature bgp
```

Related Topics

Backing Up Licenses

If the configuration or bootflash memory on your device becomes corrupted, you might need to reinstall your license. You can do a reinstallation from a backed-up copy of the license key file. If you do not have a license key file, you can create a copy of the license key file from your installed license.

Note   If you have a single supervisor module on your Cisco NX-OS device and you replace the supervisor module, you must reinstall the license key file. You cannot reinstall the license key file from the backed-up copy.

Caution   If you erase any existing licenses installed on your device, you can reinstall them only by using the **install license** command using the license key file.

Note   Only users with the network-admin role can back up licenses on Cisco NX-OS devices. On the Cisco Nexus 7000 Series, licenses must be backed up from the default VDC (VDC 1). For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Backing Up the License Key File

You can back up your license key file to a remote server or to an external device by using the **copy** command.

This example shows how to save a license key file to a remote server:

```
switch# copy bootflash:license_file.lic tftp://10.10.1.1//license_file.lic
```

Some Cisco NX-OS platforms support external flash devices. This example shows how to save a license key file to an external Flash device:

```
switch# copy bootflash:license_file.lic slot0:license_file.lic
```

Backing Up an Installed License

You can back up your license key file to a remote server or to an external device by using the **copy** command.

This example saves all licenses installed on your device to a .tar file and copies it to a remote UNIX-based server:

```
switch# copy licenses bootflash:Enterprise.tar
Backing up license done
switch# copy bootflash:Enterprise.tar tftp://10.10.1.1//Enterprise.tar
```

You can uncompress the .tar file on the remote UNIX-based server to create one or more backup license key files, depending on how many licenses you have installed. You can also extract the license files on your Cisco NX-OS device by using the **tar extract** command.

This example shows how to extract license files from a .tar file:

```
switch# tar extract bootflash:Enterprise.tar
```

Enabling Licensed Features

You might have to enable a licensed feature to configure it. To enable a licensed feature, use the **feature** *feature-name* command in global configuration mode. For example, you can enable the BGP feature as follows:

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

Identifying License Features in Use

Use the **show license usage** [*package-name*] command to identify all of the active features.

```
switch# show license usage
Feature                        Ins  Lic   Status Expiry Date Comments
                                    Count
--------------------------------------------------------------------------------
LAN_ENTERPRISE_SERVICES_PKG   Yes   -    In use Never      -
--------------------------------------------------------------------------------


switch# show license usage LAN_ENTERPRISE_SERVICES_PKG
Application
-----------
bgp
msdp
ospf
-----------
```

✎

Note   Licenses are disabled if the system clock is reset. The show license usage command shows that the licensed feature is not enabled. To work around this behavior, reboot the device.

For Cisco Nexus 3000, 3500, 3600, and 9000 Series switches, the Comments field displays the time elapsed (in minutes and seconds) from when honor mode is enabled for a license package. This field is populated when a feature is enabled but the corresponding license is not installed.

```
switch# show license usage
Feature                      Ins     Lic    Status   Expiry Date   Comments
                                     Count
--------------------------------------------------------------------------------
FC_PORT_ACTIVATION_PKG       No      0      Unused                      -
LAN_ENTERPRISE_SERVICES_PKG  No      -      In use                Honor Start 0M 33S

--------------------------------------------------------------------------------
```

For Cisco Nexus 7000 or 9000 Series switches, if "license missing" appears in the output of the **show license usage** command, the license file for your device is either not installed on the internal directory of the device or contains incorrect information. Complete these steps to resolve the issue:

1. Validate that the license host ID and file match the chassis serial number.

> **Note** If these do not match and you see the log on two devices, the license files are most likely swapped between the chassis. Compare the host ID and serial numbers between each chassis and move the appropriate file to the correct chassis.

2. Update the license file (.lic) with the file from the bootflash.

3. If these steps do not work, clear the license SPROM with the **clear license sprom** command and reinstall the license.

For the Cisco Nexus 7000 Series, use the **show license usage vdc-all** *license-name* command to identify the features active in a VDC for a specific license.

```
switch# show license usage vdc-all LAN_ADVANCED_SERVICES_PKG
Application
-----------
bgp
ospf
bgp@2
ospf@2
-----------
```

> **Note** The "@2" after the feature name in the **show license usage vdc-all** command output indicates that the feature is enabled in VDC 2.

For the Cisco Nexus 7000 Series, use the **show license usage vdc-all** command from the default VDC to identify all of the active features in all VDCs.

```
switch# show license usage vdc-all
```

Uninstalling Licenses

You can only uninstall a permanent license that is not in use. If you try to delete a permanent license that is currently being used, the software rejects the request and issues an error message.

When you enable a Cisco NX-OS software feature, it can activate a license grace period. Uninstalling an unused license causes the grace period to come into effect. The grace period is counted from the first use of the feature without a license and is reset when a valid license file is installed.

For the Cisco Nexus 7000 Series, you can uninstall a license only from the default VDC (VDC 1).

Note   Only users with the network-admin role can uninstall licenses on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Note   Permanent licenses cannot be uninstalled if they are currently being used. Features turned on by permanent licenses must be disabled before that license is uninstalled.

Tip   If you are using an evaluation license and would like to install a new permanent license, you can do so without service disruption and before the evaluation license expires. Removing an evaluation license immediately triggers a grace period without service disruption.

Caution   You must disable the features that are related to the feature before uninstalling a license. The delete procedure fails if the license is in use.

Step 1   Save your running configuration to a remote server by using the **copy** command.

```
switch# copy running-config tftp://server/path/filename
```

Step 2   Display a list of all installed license key files and identify the file to be uninstalled by using the **show license brief** command. In this example, the file to be uninstalled is the Enterprise.lic file.

```
switch# show license brief
Enterprise.lic
```

Step 3   Disable the features provided by the license to be uninstalled. Use the **show license usage vdc-all** *package-name* command to view the enabled features for a specified package.

```
switch# show license usage vdc-all LAN_ENTERPRISE_SERVICES_PKG
Application
-----------
bgp
ospf
bgp@2
ospf@2
-----------
```

Note   For the Cisco Nexus 7000 Series, if the feature names in the **show license usage vdc-all** command output are followed by "@" and a number, that means that the feature is enabled in a nondefault VDC and must be disabled from that VDC. The number after the feature name is the nondefault VDC identifier number. Use the **show vdc** command and **switchto vdc** command to reach the nondefault VDC where you can disable the features.

Step 4   Uninstall the Enterprise.lic file by using the **clear license** *filename* command, where *filename* is the name of the installed license key file.

```
switch# clear license Enterprise.lic
Clearing license Enterprise.lic:
SERVER this_host ANY
VENDOR cisco
```

Step 5   Continue uninstalling the license by entering **y** for yes.

```
Do you want to continue? (y/n) y
Clearing license ..done
```

The Enterprise.lic license key file is now uninstalled.

Updating Licenses

If your license is time bound, you must obtain and install an updated license. Contact technical support to request an updated license.

For the Cisco Nexus 7000 Series, you can update the license only from the default VDC (VDC 1).

Note   If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html.

Note   Only users with the network-admin role can update licenses on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

SUMMARY STEPS

1.   Obtain the updated license file.
2.   Save your running configuration to a remote server by using the **copy** command.
3.   Verify the name of the file to be updated by using the **show license brief** command.
4.   Update the license file by using the **update license** {**bootflash:** | **slot0:** | **usb0:** | **usb1:**}*new-license-filename old-license-filename* command.
5.   Continue with the license update by entering **y** (yes is the default).
6.   (Optional) Enable licensed features, if necessary, by using the **feature** *feature-name* command in global configuration mode. For example, you can enable the BGP feature as follows:

DETAILED STEPS

Step 1 Obtain the updated license file.

Step 2 Save your running configuration to a remote server by using the **copy** command.

Step 3 Verify the name of the file to be updated by using the **show license brief** command.

```
switch# show license brief
Enterprise1.lic
```

Step 4 Update the license file by using the **update license** {**bootflash:** | **slot0:** | **usb0:** | **usb1:**}*new-license-filename old-license-filename* command.

```
switch# update license bootflash:Enterprise2.lic Enterprise1.lic
```

Note Make sure to use the **install** command to install a new license and the **update** command to update a license.

Step 5 Continue with the license update by entering **y** (yes is the default).

```
Do you want to continue? (y/n) y
Updating license ..done
switch#
```

The Enterprise1.lic license key file is now updated.

Step 6 (Optional) Enable licensed features, if necessary, by using the **feature** *feature-name* command in global configuration mode. For example, you can enable the BGP feature as follows:

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

Related Topics
Obtaining the License Key File , on page 3

Configuring the Grace Period Feature

The grace period feature allows you to use licensed features that do not have a license key. By default, the license period feature is disabled. While the grace period feature is disabled, users cannot accidentally enable licensed features.

Note The Cisco Nexus 9000 Series and Cisco Nexus 3000 Series do not support the grace period feature.

For the Cisco Nexus 7000 Series, you can enable and disable the grace period only from the default VDC (VDC 1).

On a Cisco Nexus 7000 Series switch, the grace period gets automatically started for features that do not have a license key installed (even when the **no license grace-period** command is enabled).

Note   Starting from Cisco NX-OS Releases 8.2(4) and 8.4(1), Grace period is not supported on Cisco Nexus 7000 Series switches.

For the Cisco Nexus 5000 Series, the **license grace-period** command is enabled by default.

Note   Only users with the network-admin role can enable the grace period on Cisco NX-OS devices. For information on user accounts and roles, see the *Security Configuration Guide* for your platform.

Grace Period Alerts

The Cisco NX-OS software gives you a 120-day grace period. This grace period starts or continues when you are evaluating a feature for which you have not installed a license. For the Cisco Nexus 7000 Series, the grace period applies to all VDCs on the physical device. If you start the grace period by enabling a licensed feature in one VDC, the grace period starts for all VDCs.

The grace period stops if you disable a feature that you are evaluating, but if you enable that feature again without a valid license, the grace period countdown continues where it left off.

Note   Starting from Cisco NX-OS Releases 8.2(4) and 8.4(1), Grace period is not supported on Cisco Nexus 7000 Series switches.

Note   To avoid service disruptions when you install the permanent license, do not disable the grace period by using the **no license grace-period** command. Instead, just install your new license. The license manager will automatically transition from grace licensing to the installed license.

Once the license manager is using your installed license, the grace period alerts will cease.

The grace period operates across all features in a license package. License packages can contain several features. If you disable a feature during the grace period and there are other features in that license package that are still enabled, the countdown does not stop for that license package. To suspend the grace period countdown for a license package, you must disable every feature in that license package. For the Cisco Nexus 7000 Series, you must disable the licensed features in all VDCs on the physical device. Use the **show license usage vdc-all** *license-name* command in the default VDC to determine which features to disable.

```
switch# show license usage vdc-all LAN_ENTERPRISE_SERVICES_PKG
Application
-----------
bgp
ospf
bgp@2
ospf@2
```

```
-----------
```

> **Note** For the Cisco Nexus 7000 Series, if a feature name in the **show license usage vdc-all** command output is followed by "@" and a number, that means that the feature is enabled in a nondefault VDC and you must disable it from that VDC. The number after the feature name is the nondefault VDC identifier number. Use the **show vdc** command and **switchto vdc** command to reach the nondefault VDC where you can disable the feature.

> **Note** When you disable a feature or when the license grace period expires, the Cisco NX-OS software generates a checkpoint containing the feature configuration that you can use to reconfigure the feature when you reenable the license after you install the license or resume the grace period countdown. For more information on checkpoints, see the *System Management Configuration Guide* for your platform.

The Cisco NX-OS license counter keeps track of all licenses on a device. If you are evaluating a feature and the grace period has started, you will receive console messages, SNMP traps, system messages, and Call Home messages on a daily basis. The frequency of the messages becomes hourly during the last seven days of the grace period.

In addition to the grace period alerts, Cisco NX-OS will display a banner at login in the last 15 days of the grace period:

```
NOTICE: NX-OS LICENSED FEATURES NEED ATTENTION

------------------------------------------------------------------------------
Feature                      Ins  Lic    Status Expiry Date Comments
                                  Count
------------------------------------------------------------------------------
LAN_ENTERPRISE_SERVICES_PKG  No   -   In use              Grace 14D 6H
------------------------------------------------------------------------------
**** WARNING: License(s) about to expire. When license(s) expire,
all licensed conditional features will be disabled ****
```

During the last seven days of the grace period, the banner will include a prompt which you must dismiss before you can complete login:

```
NOTICE: NX-OS LICENSED FEATURES NEED ATTENTION

------------------------------------------------------------------------------
Feature                      Ins  Lic    Status Expiry Date Comments
                                  Count
------------------------------------------------------------------------------
LAN_ENTERPRISE_SERVICES_PKG  No   -   In use              Grace 3D 23H
------------------------------------------------------------------------------
**** WARNING: License(s) about to expire. When license(s) expire,
all licensed conditional features will be disabled ****

CISCO TAC must be contacted asap for required licenses to prevent imminent
downtime/service disruption.
Please press Enter to confirm you understand this risk and wish to continue: [ENTER]
```

For example, if you enabled a licensed feature on January 30, you will receive grace period ending messages as follows:

- Daily alerts from January 30 to May 21. Starting from May 15, Cisco NX-OS would display the banner at login.

- Hourly alerts from May 22 to May 30. The login banner would require you to dismiss its prompt before you can complete login.

On May 31, the grace period ends, and the licensed feature is automatically disabled. You will not be allowed to use the licensed feature until you purchase a valid license.

Note   You cannot modify the frequency of the grace period messages.

Caution   After the final seven days of the grace period, the feature is turned off and your network traffic may be disrupted. Any future upgrade to Cisco NX-OS will enforce license requirements and the 120-day grace period.

Use the **show license usage** command to display grace period information for a device.

```
switch# show license usage
Feature                     Ins  Lic   Status Expiry Date Comments
                                 Count
--------------------------------------------------------------------------------
LAN_ADVANCED_SERVICES_PKG    Yes   -    In use Never      -
LAN_ENTERPRISE_SERVICES_PKG  No    -    In use            Grace 119D 22H
--------------------------------------------------------------------------------
```

Enabling the License Grace Period

Enable the grace period feature by using the **license grace-period** command:

```
switch# configure terminal
switch(config)# license grace-period
```

For the Cisco Nexus 7000 Series, you can only enable the grace period feature from the default VDC.

Disabling the License Grace Period

To disable the grace period, you must disable all features that use the license grace period. Otherwise, the Cisco NX-OS software rejects the request and issues an error message.

Note   To avoid service disruptions, you should not disable the grace period before you install a permanent license.

SUMMARY STEPS

1. Display the licenses using the grace period by using the **show license usage** command. For the Cisco Nexus 7000 Series, you must work in the default VDC.

2. Disable the features provided by the license using the grace period. Display the enabled features for a specified package by using the **show license usage** *package-name* command. For the Cisco Nexus 7000 Series, use the **show license usagevdc-all** *package_name* in the default VDC to view the enabled features in all VDCs.

3. Disable the grace period.

DETAILED STEPS

Step 1 Display the licenses using the grace period by using the **show license usage** command. For the Cisco Nexus 7000 Series, you must work in the default VDC.

```
switch# show license usage
Feature                      Ins  Lic    Status Expiry Date Comments
                                  Count
--------------------------------------------------------------------------
LAN_ADVANCED_SERVICES_PKG    Yes   -   In use Never        -
LAN_ENTERPRISE_SERVICES_PKG  No    -   In use             Grace 119D 22H
--------------------------------------------------------------------------
```

Step 2 Disable the features provided by the license using the grace period. Display the enabled features for a specified package by using the **show license usage** *package-name* command. For the Cisco Nexus 7000 Series, use the **show license usagevdc-all** *package_name* in the default VDC to view the enabled features in all VDCs.

```
switch# show license usage vdc-all LAN_ENTERPRISE_SERVICES_PKG
Application
-----------
bgp
ospf
bgp@2
ospf@2
-----------
```

Note For the Cisco Nexus 7000 Series, if a feature name in the **show license usage vdc-all** command output is followed by "@" and a number, that means that the feature is enabled in a nondefault VDC and you must disable it from that VDC. The number after the feature name is the nondefault VDC identifier number. Use the **show vdc** command and **switchto vdc** command to reach the nondefault VDC where you can disable the feature.

When you disable a feature or when the license grace period expires, the Cisco NX-OS software generates a checkpoint containing the feature configuration that you can use to reconfigure the feature when you reenable the license after you install the license or reenable the grace period. For more information on checkpoints, see the *System Management Configuration Guide* for your platform.

Step 3 Disable the grace period.

```
switch# configure terminal
switch(config)# no license grace-period
```

Port-License Feature Configuration

Port license are hardware licenses that are independent of any Cisco NX-OS or ACI software feature sets or software licenses.

Port licenses will be in out-of-compliance state when you move from a traditional license to a Smart Software License.

Command	Purpose
port-license	Changes the license state of an ineligible port to eligible.
port-license acquire	Acquires license for a port and changes the license state to acquired.
no port-license	Releases the license for a port, if the port has acquired a license, and then change its license state to eligible. If the port has not acquired a license, this command changes the license state of the port to ineligible.
no port-license acquire	Releases the license for a port, if the port has acquired a license, and then change its license state to eligible. If the port has not acquired a license, this command changes the license state of the port to ineligible.

Associating a License with a Module

You must associate a module-based license with a module to enable the licensed features on that module.

Before you begin

- Ensure you have installed the correct license.

- Ensure you are in the correct VDC.

- Ensure you have met all required prerequisites for the feature. See the appropriate feature documentation for details.

SUMMARY STEPS

1. **license fcoe module** *module-number*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**license fcoe module** *module-number* **Example:** `switch(config)# license fcoe module 2`	Associates the module-based license with the module.

License Transfers Between Devices

A license is specific to the physical device for which it is issued and is not valid on any other physical device. If you need to transfer a license from one physical device to another, contact your customer service representative.

Note If you have a single supervisor module on your Cisco NX-OS device and you replace the supervisor module, you must reinstall the license key file.

If you are evaluating a license when you replace the supervisor module, the grace period of the license is usually set to 120 days. On a dual supervisor system, the grace period of the license will be overwritten from the existing active supervisor module to the new standby supervisor module.

Note If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at this URL: http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html

Verifying the License Configuration

To display the license configuration information, perform one of the following tasks:

Command	Purpose
show license [**brief**]	Displays information for all installed license files.
show license feature package mapping	Displays information about features available in installed license packages. **Note** The Cisco Nexus 9000 Series and the Cisco Nexus 3164Q switches do not support this command.

Command	Purpose
show license file	Displays information for a specific license file.
show license host-id	Displays the host ID for the physical device.
show license usage [*license-package*]	Displays the usage information for installed licenses.

Release History for Licensing

This table lists the release history for this feature.

Table 1: Release History for Licensing

License	Release	Notes
Synchronous Ethernet (SyncE) add-on license	Cisco Nexus NX-OS Release 10.1(2)	Support for the SyncE add-on license.
C1P1TN9500M4-3Y C1P1TN9500M4-5Y C1P1TN9500M816-3Y C1P1TN9500M816-5Y (not ACI)	Cisco Nexus NX-OS Release 9.3(5)	Introduced for the Cisco Nexus 9500 Series switches.
SyncE add-on license	Cisco Nexus NX-OS Release 9.3(5)	Introduced Synchronous Ethernet (SyncE) add-on license for the Cisco Nexus 93180YC-FX3S platform switch.

License	Release	Notes
ACI-SEC-XF license	Cisco Nexus NX-OS Release 9.3(5)	Added support for Secure VXLAN EVPN Multi-Site using CloudSec licensing. **Note** Secure VXLAN EVPN Multi-Site using CloudSec licensing support is available with the ACI-SEC-XF license. **Note** For Cisco Nexus NX-OS Release 9.3(5), Secure VXLAN EVPN Multi-Site using CloudSec is supported only on Cisco Nexus 9300-FX2 platform switches,
ACI-STRG, C1-N9K-STRG-XF-3Y, and C1-N9K-STRG-XF-5Y licenses	Cisco Nexus NX-OS Release 9.3(3)	Introduced for the Cisco Nexus 93180YC-FX platform switch.
N3K-STR2K9 license	Cisco Nexus NX-OS Release 9.3(3)	Added support for the Cisco Nexus 3408-S and 3432D-S switches.
N93-LAN1K9-XF2 license	Cisco Nexus NX-OS Release 9.3(3)	Introduced for the Cisco Nexus 9300-GX switches.
NX-OS Advantage license	Cisco Nexus NX-OS Release 9.3(3)	Added support for the Cisco Nexus 3132Q (excluding the 3132Q-40GE), 3172, 3172PQ, 3172TQ, 31128PQ, 3100-V, 3232C, 3264Q, and 3500 switches. **Note** The Cisco Nexus 3132Q, 3172, 3172PQ, and 3172TQ platform switches support the NX-OS Advantage license only when running in N9K mode. You can view the switch mode using the `show system switch-mode` command.

License	Release	Notes
NXOS-ES-XF2 and NXOS-AD-XF2 licenses	Cisco Nexus NX-OS Release 9.3(3)	Introduced for the Cisco Nexus 9300-GX switches.
NXOS-SEC-XF license	Cisco Nexus NX-OS Release 9.3(3)	Added support for the Cisco Nexus 93216TC-FX2 and 93360YC-FX2 platform switches.
C1P1TN9300GF-3Y C1P1TN9300GF-5Y C1P1TN9300XF-3Y C1P1TN9300XF-5Y C1P1TN9300XF2-3Y C1P1TN9300XF2-5Y	Cisco Nexus NX-OS Release 9.3(2)	Introduced for the Cisco Nexus 9300 Series switches.
Honor mode syslog in the output of the **show license usage** command	Cisco Nexus NX-OS Release 9.3(1)	Introduced for the Cisco Nexus 3000, 3500, 3600, and 9000 Series switches.
NX-OS Advantage license	Cisco Nexus NX-OS Release 9.3(1)	Introduced for the Cisco Nexus 3132C-Z, 3264C-E, 3636C-R, and 36180YC-R switches.
NX-OS Essentials license	Cisco Nexus NX-OS Release 9.3(1)	Introduced for the Cisco Nexus 3132C-Z, 3132Q (excluding the 3132Q-40GE), 3172, 3172PQ, 3172TQ, 31128PQ, 3100-V, 3232C, 3264C-E, 3264Q, 3464C, 34180YC, 3500, 3636C-R, and 36180YC-R switches.
NX-OS Essentials and Advantage licenses	Cisco Nexus NX-OS Release 9.3(1)	Recommended that the -XF2 licenses be purchased for Cisco Nexus 3000 Series switches and Cisco Nexus 9364C switches.
NXOS-SEC-XF license	Cisco Nexus NX-OS Release 9.3(1)	Added support for the Cisco Nexus 9332C, 9348C-FXP, and 9364C platform switches.
DCN (ACI+NX-OS) Essentials and Advantage license packages and add-on licenses	Cisco Nexus NX-OS Release 9.2(3)	Introduced for the Cisco Nexus 9300 platform switches.
N3K-LAN2K9 license	Cisco Nexus NX-OS Release 9.2(3)	Added support for the Cisco Nexus 3264C-E and 3464C switches.
N3K-STR1K9 license	Cisco Nexus NX-OS Release 9.2(3)	Added support for the Cisco Nexus 34180YC switch.

License	Release	Notes
N3K-STR2K9 license	Cisco Nexus NX-OS Release 9.2(3)	Added support for the Cisco Nexus 3464C switch.
N9K-LIC1-24P, N9K-EX-24P-UPG=, and N9K-FX-24P-UPG= licenses	Cisco Nexus NX-OS Release 9.2(3)	Added these 24-port licenses for the Cisco Nexus 93108TC-EX, 93108TC-FX, 93180YC-EX, and 93180YC-FX switches.
N3K-LAN2K9 license	Cisco Nexus NX-OS Release 9.2(2v)	Added support for the Cisco Nexus 3432D-S switch.
N3K-LAN2K9 license	Cisco Nexus NX-OS Release 9.2(2t)	Added support for the Cisco Nexus 3408-S switch.
NXOS-SEC-XF license	Cisco Nexus NX-OS Release 9.2(1)	Added this license for Cisco Nexus 9000 Series ToR switches that support MACsec.
Honor Mode Licensing	Cisco Nexus NX-OS Release 8.4(1) Cisco Nexus NX-OS Release 8.2(4)	Introduced for the Cisco Nexus 7000 Series switches.
ENHANCED_LAYER2_PKG license	Cisco NX-OS Release 8.2(1)	iCAM feature is available under the ENHANCED_LAYER2_PKG license on Cisco Nexus 7000 Series switches.
N95-FAB1K9 and N3K-FAB1K9 licenses	Cisco NX-OS Release 7.0(3)F3(3)	Added support for the InterAS option B and MPLS Layer 3 VPN features.
N3K-LAN1K9 license	Cisco NX-OS Release 7.0(3)F3(1)	Added support for the Cisco Nexus 3600 platform switches.
ACI Premier license packages	Cisco Nexus NX-OS Release 7.0(3)I7(7)	Introduced for the Cisco Nexus 9300 Series switches.
NX-OS Essentials and Advantage licenses	Cisco Nexus NX-OS Release 7.0(3)I7(7)	The -XF2 licenses now have priority over the -XF licenses for Cisco Nexus 3000 and 3600 Series switches and Cisco Nexus 9364C switches.
NXOS-ES-XF2, NXOS-AD-XF2, and NXOS-NDB licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(6)	Introduced for the Cisco Nexus 9364C switch.
N93-LAN1K9-XF2 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(6)	Introduced for the Cisco Nexus 9364C switch.
NX-OS Essentials and Advantage license packages and NX-OS upgrade licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(3)	Introduced for the Cisco Nexus 9000 Series switches.

License	Release	Notes
NXOS-SEC-XM license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(2)	Added support for the MACsec feature for Cisco EoR switches.
FC NPV and FCoE NPV licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(2)	Added support for FC and FCoE NPV.
N95-FAB1K9 and N93-FAB1K9 licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(1)	Added support for the Pervasive Load Balancing, Tenant Routed Multicast, and VXLAN EVPN Multi-Site features.
N93-1G-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(1)	Introduced this license for the Cisco Nexus N9K-C9348GC-FXP switch.
N95-SERVICES1K9 and N93-SERVICES1K9	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I7(1)	Added support for the iCAM feature.
N3K-FAB1K9, N95-FAB1K9, and N93-FAB1K9 licenses	Cisco Nexus 3000 and 9000 Series NX-OS Release 7.0(3)I6(1)	Added support for the Layer 3 EVPN over segment routing MPLS feature.
N95-SERVICES1K9 and N93-SERVICES1K9 licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I6(1)	Added support for the catena and smart channel features.
N93-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I4(2)	Added support for the non-blocking multicast (NMB) feature on Cisco Nexus 9236C, 9272Q, and 92160YC-X switches.
N3K-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I4(1)	Added support for the Cisco Nexus 3100-V switches.
N95-FNPV1K9 license and N93-FNPV1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I3(1)	Added these licenses to support FCoE NPV on Cisco Nexus 9500 and 9300 Series switches.
N93-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I3(1)	Added support for the Cisco Nexus 9200 Series switches.
N3K-LAN1K9 license	Cisco Nexus 3232C and 3264Q NX-OS Release 7.0(3)IX1(2)	Added support for the Cisco Nexus 3232C and 3264Q switches.
N3172T-32T-LIC, N3172T-16T-UPG	Cisco Nexus 3000 Series NX-OS Release 7.0(3)I2(1)	N3172T-32T-LIC is the default 32-port license for Cisco Nexus 3172TQ switches. N3172T-16T-UPG is the 16-port upgrade license for Cisco Nexus 3172TQ switches. This is the upgrade license to enable 16 ports and it can only be applied to N3K-C3172TQ-32T.

License	Release	Notes
N3K-LAN1K9 license	Cisco Nexus 3000 Series NX-OS Release 7.0(3)I2(1)	Added support for the Cisco Nexus 31128PQ switch and the Cisco Nexus 3100 Series switches in N9K mode.
N95-LAN1K9 and N93-LAN1K9 licenses	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I2(1)	Added support for PIM bidirectional mode and Source-Specific Multicast (SSM) mode.
N6K-SERVICES1K9, N56-SERVICES1K9, and N55-SERVICES1K9	Cisco Nexus 5500, 5600, and 6000 Series NX-OS Release 7.2(0)N1(1)	Added these licenses to support the Intelligent Traffic Director (ITD) and Remote Integrated Services Engine (RISE) on the Cisco Nexus 5500, 5600 and 6000 Series switches.
N95-SERVICES1K9 license and N93-SERVICES1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I1(2)	Added these licenses to support the Intelligent Traffic Director (ITD) on the Cisco Nexus 9500 and 9300 Series switches.
N95-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I1(2)	Added VXLAN and BGP eVPN control plane support for the Cisco Nexus 9500 Series switches.
FCoE F3 Series	Cisco Nexus 7000 Series NX-OS Release 7.2(0)D1(1)	Added licenses for FCoE on F3 Series modules.
MPLS	Cisco Nexus 7000 Series NX-OS Release 7.2(0)D1(1)	Added license for MPLS on Cisco Nexus 7700 switches.
N93-LAN1K9 license and N3K-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 7.0(3)I1(1)	Added support for the BGP eVPN control plane for the Cisco Nexus 9300 Series switches and the Cisco Nexus 3164Q switch.
N95-LAN1K9 license, N93-LAN1K9 license, and N3K-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 6.1(2)I3(1)	Added support for policy-based routing.
N3K-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 6.1(2)I2(2a)	Added support for the Cisco Nexus 3164Q switch.
N93-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 6.1(2)I2(1)	Added the license for the Cisco Nexus 9300 Series switches.
N95-LAN1K9 license	Cisco Nexus 9000 Series NX-OS Release 6.1(2)I1(1)	Added the license for the Cisco Nexus 9500 Series switches.

License	Release	Notes
N77-LAN1K9 license N77-VDC1K9 license N77-EL21K9 license N77-SAN1K9 license	Cisco Nexus 7000 Series NX-OS Release 6.2(2)	Added licenses for the Cisco Nexus 7718 switch and the Cisco Nexus 7710 switch.
Layer 3 Base Services Package	Cisco Nexus 3548 Switch NX-OS Release 5.0(3)A1(1)	Added the Cisco Nexus 3548 Layer 3 Base License.
Layer 3 Enterprise Services Package	Cisco Nexus 3548 Switch NX-OS Release 5.0(3)A1(1)	Added the Cisco Nexus 3548 Layer 3 Enterprise License.
NAT, Warp Mode, Warp SPAN	Cisco Nexus 3548 Switch NX-OS Release 5.0(3)A1(1)	Added the new 3500 Algo Boost License.
N7K-C7004-XL license	Cisco Nexus 7000 Series NX-OS Release 6.1(2)	Added the Cisco Nexus 7004 Scalable Feature License.
VDC and FCoE F2 Series	Cisco Nexus 7000 Series NX-OS Release 6.1(1)	Added licenses for VDCs and FCoE on F2 Series modules. Removed Cisco TrustSec from the Advanced Services Package.
MPLS, LISP, and FCoE	Cisco Nexus 7000 Series NX-OS Release 5.2(1)	Added licenses for the MPLS, LISP, and FCoE features.
Grace period	Cisco Nexus 7000 Series NX-OS Release 4.2(1)	Automatic checkpoints are created for configured licensed features when the grace period expires.

Smart Software Licensing for Cisco Nexus 7000 Series Switches

This chapter provides an overview of Smart Software Licensing and describes the tools and processes required to complete the registration and authorization for Cisco Nexus 7000 Series Switches.

Requesting a Smart Account

Requesting a Smart account is a one-time process. Subsequent management of users is a capability provided through the tool.

Before you begin

Ensure that you have a Cisco Employee Connection (CEC) ID.

Step 1   Go to http://software.cisco.com, and log in to your account.

Step 2   Click the **Request a Smart Account** link in the **Administration** section.

Step 3   Perform one of the following tasks to select the Account Approver:

- To select yourself as the approver, click **Yes, I will be the Approver for the account** option.

- To select a different person as the approver, click **No, the person specified below will be the Approver for the account** option and specify the person's email ID.

Note The specified approver must have the authority to enter legal agreements. The approver serves as the primary owner and nominates account administrators.

Step 4 Depending on the approver type, perform one of the following procedures:

- If you are the approver, perform the following tasks:

  a. Enter **Account Name**, **Company/Organization Name**, **Country**, and **State/Province/Region** information.

  b. (Optional) Click **Edit**.

  c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier** and **Contact Phone Number**, and click **OK**.

  Note The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

  d. Click **Continue** to select the legal address to be linked to your Smart account.

- If you are not the approver, perform the following procedure:

  a. Enter the **Account Name** and an optional **Message** to the approver.

  b. (Optional) Click **Edit**.

  c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier**, and click **OK**.

  Note The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

  d. Click **Continue**.

  e. Follow the instructions in the email that is sent to you to complete the request.

Adding a User to a Smart Account

Smart account user management is available in the **Administration** section of Cisco Software Central.

Step 1 Go to http://software.cisco.com, and log in to your account.

Step 2 Click the **Manage Smart Account** link in the **Administration** section.

Step 3 Click the **Users** tab.

Step 4 Click **New User**.

Step 5 Provide the required information in the **New User** section.

(Define roles to manage the entire Smart account or specific virtual accounts.)

Step 6 Click **Continue**.

Converting a Traditional License to a Smart License Through GUI

Traditional licenses associated with Product Activation Keys (PAK) can be converted to Smart Licenses. Access Traditional licenses through the License Registration Portal by clicking the **PAKs/Tokens** tab, and then use the information provided in this section to convert PAKs to smart licenses.

Step 1 Go to http://software.cisco.com, and log in to your account.

Step 2 Click the **Traditional Licensing** link in the **License** section.
You will be redirected to the **LRP** window.

Step 3 Click the **PAKs/Tokens** tab under **Manage**, if it is not already selected.

Step 4 Check the **PAK/Token ID** check box.

Step 5 Select **Convert to Smart Entitlements** from the **Actions** drop-down menu.

Step 6 Select a smart account from the **Smart Account** drop-down list.

> **Note** You can view only the smart accounts that are assigned to you.

Step 7 Select a virtual account from the **Virtual Account** drop-down list.

> **Note** You can view only the virtual accounts that are assigned to you.

Step 8 Click **Assign**.
The selected PAK will be converted to a smart license.

Converting a Traditional License to a Smart License Through CLI

Traditional licenses associated with Product Activation Keys (PAK) can be converted to smart licenses using CLI.

Before you begin

- Ensure that Smart Software Licensing is enabled.

- Ensure that you have a valid smart account.

- Ensure that you have valid user rights for the smart account.

Step 1 switch# **license smart conversion start**

Starts a manual conversion of a traditional license to a smart license. The conversion takes place in the background. After the conversion succeeds or fails, a system log message is displayed on the switch console.

Step 2   (Optional) switch# **license smart conversion stop**

Stops the manual conversion.

Step 3   (Optional) switch# **show license status**

Displays the license conversion status. If you run this command from an active device in an high availability (HA) configuration, this will display the status of all the devices in the HA configuration.

Converting a Traditional License to a Smart License Through CLI

The following example shows how to convert a traditional license to a smart license using the CLI:

```
switch# license smart conversion start

Smart License Conversion process is in progress. Use the 'show license status' command to
check the progress and result.
```

The following example shows how to stop the process of converting a traditional license to smart license using the CLI:

The following example shows the status of the license conversion for a standalone device:

```
switch# license smart conversion stop
stop manual conversion failed:
Some Smart Licensing Conversion jobs stopped successfully.
```

The following example shows the status of line conversion for a standalone device:

```
switch# show license status

Smart Licensing is ENABLED.
Registration:
Status: REGISTERED
Smart Account: Big-U University
Virtual Account: Physics
Export-Controlled Functionality: Not Allowed
Initial Registration: SUCCEEDED on Feb 24 23:30:12 2014 PST
Last Renewal Attempt: SUCCEEDED on Feb 24 23:30:12 2014 PST
Next Renewal Attempt: Aug 24 23:30:12 2014 PST
Registration Expires: Feb 24 23:30:12 2015 PST

!The following show output is applicable from Cisco NX-OS Release 8.2(1) onwards!
Smart License Conversion:
Automatic Conversion Enabled: False
Status: SUCCEEDED on Jan 1 00:00:00 1970 UTC

License Authorization:
Status: AUTHORIZED on Aug 31 17:04:56 2017 UTC
Last Communication Attempt: SUCCEEDED on Aug 31 17:04:56 2017 UTC
Next Communication Attempt: Sep 30 17:04:56 2017 UTC
Communication Deadline: Nov 29 16:58:31 2017 UTC
```

Configuring Smart Software Licensing

Configuring a DNS Client

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **ip domain-lookup**	Enables DNS-based address translation.
Step 3	switch(config)# **ip domain-name** *name* [**use-vrf** *vrf-name*]	Defines the default domain name that Cisco NX-OS uses to resolve unqualified host names. You can also define a virtual routing and forwarding (VRF) that Cisco NX-OS uses to resolve this domain name if it cannot be resolved in the VRF that you configured this domain name under. Cisco NX-OS appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup.
Step 4	switch(config)# **ip name-server** *address1* [*address2... address6*] [**use-vrf** *vrf-name*]	Defines up to six name servers. The address can be either an IPv4 address or an IPv6 address. You can optionally define a VRF that Cisco NX-OS uses to reach this name server if it cannot be reached in the VRF that you configured this name server under.
Step 5	switch(config)# **vrf context** *vrf-name*	Creates a VRF and enters VRF configuration mode.
Step 6	switch(config-vrf)# **ip domain-name** *name* [**use-vrf** *vrf-name*]	Defines the default domain name that Cisco NX-OS uses to complete unqualified host names. You can optionally define a VRF that Cisco NX-OS uses to resolve this domain name if it cannot be resolved in the VRF that you configured this domain name under. Cisco NX-OS appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup.
Step 7	switch(config-vrf)# **ip name-server** *address1* [*address2... address6*] [**use-vrf** *vrf-name*]	Defines up to six name servers. The address can be either an IPv4 address or an IPv6 address. You can also define a VRF that Cisco NX-OS uses to reach this name server if it cannot be reached in the VRF that you configured this name server under.

Configuring a VRF To Send a Message Using HTTP

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **callhome**	Enters Call Home configuration mode.
Step 3	switch(config-callhome)# **transport http use-vrf** *vrf-name*	Configures the VRF used to send email and other Smart Call Home messages over HTTP.

Enabling Smart Software Licensing

Step 1 switch# **configure terminal**.

Enters global configuration mode.

Step 2 Use one of the following commands to enable Smart Software Licensing:

- switch(config)# **license smart enable**
- switch(config)# **feature license smart**

Enables Smart Software Licensing.

Disabling Smart Software Licensing

Step 1 switch# **configure terminal**.

Enters global configuration mode.

Step 2 Use one of the following commands to disable Smart Software Licensing:

- switch(config)# **no license smart enable**
- switch(config)# **no feature license smart**

Disables Smart Software Licensing.

Registering a Device

Before you begin

- Ensure that Smart Software Licensing is enabled.

• Ensure that you have the token to be used to register your device to the smart account.

switch# **license smart register idtoken** *token* [**force**]

Registers your device to the smart account using the token.

Renewing Device Registration

switch# **license smart renew ID**

Renews the device registration.

Renewing Device Authorization

switch# **license smart renew auth**

Renews the device authorization.

Unregistering a Device

switch# **license smart deregister**

Unregisters a device.

Configuring Smart Call Home for Smart Software Licensing

Viewing a Smart Call Home Profile

switch# **show callhome smart-licensing**

Displays the Smart Call Home profile.

Enabling Smart Call Home Data Privacy

Step 1   switch# **configure terminal**

Enters global configuration mode.

Step 2   switch(config)# **callhome**
Enters Call Home configuration mode.

Step 3   switch(config-callhome)# **data-privacy hostname**
Enables Call Home data privacy.

Verifying Smart Software Licensing

Verify Smart Software Licensing using the following commands:

Commands	Purpose
show license all	Displays all smart license agent information.
show license status	Displays the smart license agent status.
show license summary	Displays a summary of the smart license agent status.
show license tech support	Gathers information for troubleshooting.
show license udi	Displays device UDI information.
show license usage	Displays show license usage table information.
show tech-support license	Displays licensing technical support information.

Configuration Examples for Smart Software Licensing

This example shows how to register your device with the Cisco portal and enable Smart Software Licensing:

Note   To avoid any issues during registering your device, ensure to check if the name server is reachable before registering your device.

```
switch# configure terminal
switch(config)# ip domain-lookup
switch(config)# ip domain-name cisco.com
switch(config)# ip name-server 171.70.168.183 use-vrf management
switch(config)# vrf context management
switch(config-vrf)# ip domain-name cisco.com
switch(config-vrf)# ip name-server 171.70.168.183
```

```
switch(config-vrf)# exit
switch(config)# callhome
switch(config-callhome)# transport http use-vrf management
switch(config-callhome)# exit
switch(config)# feature license smart
```

This example shows how to disable Smart Software Licensing:

```
switch# configure terminal
switch(config)# no feature license smart
```

This example shows how to register a device:

```
switch# configure terminal
switch(config)# license smart register idtoken sampletokenID
register status: Registration process is in progress. Use the 'show license status' command
 to check the progress and result
```

This example shows how to unregister a device:

```
switch# license smart deregister
```

This example shows how to provide the URL for CSSM satellite as part of smart call home configuration:

```
switch(config-callhome)# destination-profile CiscoTAC-1 ?
alert-group Add alert group
email-addr Add email addr
http Add http or https url
transport-method Callhome message sending transport-method
destination-profile CiscoTAC-1 http https://10.83.111.51/Transportgateway/
services/DeviceRequestHandler*
```

Note * The IP address should have the format: https://<CSSM satellite IP>/Transportgateway/services/DeviceRequestHandler

Verification Examples for Smart Software Licensing

These examples show how to verify Smart Software Licensing:

```
switch# show license status

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Dec 14 10:43:33 2016 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 12 10:43:32 2017 UTC
  Registration Expires: Dec 14 08:07:20 2017 UTC

License Authorization:
  Status: AUTHORIZED on Dec 14 10:43:48 2016 UTC

  Last Communication Attempt: SUCCEEDED on Dec 14 10:43:48 2016 UTC
  Next Communication Attempt: Jan 13 10:43:47 2017 UTC
```

```
                        Communication Deadline: Dec 14 08:07:20 2017 UTC


switch# show callhome smart-licensing

Current smart-licensing transport settings:
 Smart-license messages: enabled
 Profile: CiscoTAC-1 (status: ACTIVE)


switch# show license summary

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed

License Authorization:
  Status: AUTHORIZED on Dec 14 10:43:48 2016 UTC

  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Jan 13 10:43:47 2017 UTC
  Communication Deadline: Dec 14 08:07:20 2017 UTC


switch# show license all

Smart Licensing Status
======================
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Dec 14 10:43:33 2016 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 12 10:43:32 2017 UTC
  Registration Expires: Dec 14 08:07:20 2017 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED on Dec 14 10:43:48 2016 UTC
  Next Communication Attempt: Jan 13 10:43:48 2017 UTC
  Communication Deadline: Dec 14 08:07:21 2017 UTC

License Usage
=============

Product Information
===================
UDI: SN:JAF1428DTAH

Agent Version
=============
Smart Agent for Licensing: 1.6.6_rel/88


switch# show license tech support

Smart Licensing Status
======================
```

```
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Dec 14 10:43:33 2016 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 12 10:43:32 2017 UTC
  Registration Expires: Dec 14 08:07:20 2017 UTC

License Authorization:
  Status: AUTHORIZED on Dec 14 10:43:48 2016 UTC

  Last Communication Attempt: SUCCEEDED on Dec 14 10:43:48 2016 UTC
  Next Communication Attempt: Jan 13 10:43:47 2017 UTC
  Communication Deadline: Dec 14 08:07:20 2017 UTC

Evaluation Period:
  Evaluation Mode: Not In Use
  Evaluation Period Remaining:  89 days, 23 hours, 59 minutes, 7 seconds

License Usage
=============

Product Information
===================
UDI: SN:JAF1428DTAH

Agent Version
=============
Smart Agent for Licensing: 1.6.6_rel/88

Upcoming Scheduled Jobs
=======================
Current time: Dec 15 08:44:44 2016 UTC
IdCert Expiration Warning: Oct 15 08:07:20 2017 UTC (303 days, 23 hours, 22 minu
tes, 36 seconds remaining)
Daily: Dec 15 10:26:50 2016 UTC (1 hours, 42 minutes, 6 seconds remaining)
Certificate Renewal: Jun 12 10:43:32 2017 UTC (179 days, 1 hours, 58 minutes, 48
 seconds remaining)
Reservation configuration mismatch between nodes in HA mode: Not Available
Certificate Expiration Check: Dec 14 08:07:20 2017 UTC (363 days, 23 hours, 22 m
inutes, 36 seconds remaining)
Authorization Renewal: Jan 13 10:43:47 2017 UTC (29 days, 1 hours, 59 minutes, 3
 seconds remaining)
Authorization Expiration Check: Dec 14 08:07:20 2017 UTC (363 days, 23 hours, 22
 minutes, 36 seconds remaining)
Init Flag Check: Not Available
Register Period Expiration Check: Not Available
Ack Expiration Check: Not Available

License Certificates
====================
Production Cert: True
PIID: 27dc6a49-9745-4c7c-86de-d1dbd31e58ac

Licensing Certificated:

    Id certificate Info:
        Start Date: Dec 14 08:07:22 2016 UTC
        Expiry Date: Dec 14 08:07:22 2017 UTC
        Version Number: 3
```

```
                    Serial Number: 727430
                    Common Name: 9c172927d1806d05694c1f434b40ec0fbef93abb::2

            Signing certificate Info:
                    Start Date: Sep 11 19:05:34 2013 UTC
                    Expiry Date: Dec  7 07:00:15 2069 UTC
                    Version Number: 3
                    Serial Number: 3
                    Common Name: MMI Signer

            Sub CA Info:
                    Start Date: Sep 11 19:06:30 2013 UTC
                    Expiry Date: Dec  7 07:00:15 2069 UTC
                    Version Number: 3
                    Serial Number: 2
                    Common Name: Smart Licensing CA

            Root Cert Info:
                    Start Date: May 30 19:48:47 2013 UTC
                    Expiry Date: Dec  7 07:00:15 2069 UTC
                    Version Number: 3
                    Serial Number: 1
                    Common Name: Cisco Licensing Root CA

HA Info
==========
RP Role: Active
Chassis Role: Active
Behavior Role: Active
RMF: True
CF: True
CF State: Stateless

Other Info
==========
Software ID: regid.2015-09.com.cisco.Nexus_7000,1.0_6e2b6ed8-fe9b-48e0-a71f-74ea
f1bcc991
Agent State: authorized
TS enable: True
Transport: Callhome
Locale: C
Debug flags: 0x7
Privacy Send Hostname: True
Privacy Send IP: True
Build type:: Production
sizeof(char)  : 1
sizeof(int)   : 4
sizeof(long)  : 4
sizeof(char *): 4
sizeof(time_t): 4
sizeof(size_t): 4
Endian: Little
Write Erase Occurred: False
XOS version: 0.11.0.0
Reservation enable: False
Reservation in progress: False
Reservation type: None
Reservation request code: <empty>
Reservation authorization code: <empty>
Reservation return code: <empty>
Config Persist Received: True
Message Version: 1.1
```

The **show tech-support license** command displays information about the license installed on the device.

```
switch# show license udi

UDI: SN:JAF1428DTAH


switch# show license usage

License Authorization:
  Status: AUTHORIZED on Dec 15 08:45:50 2016 UTC

(LAN_ENTERPRISE_SERVICES_PKG):
  Description: LAN license for Nexus 7000,7700 Platforms
  Count: 1
  Version: 1.0
  Status: AUTHORIZED


switch# show running-config callhome

!Time: Thu Dec 15 08:55:26 2016

version 8.0(1)
callhome
  email-contact sch-smart-licensing@cisco.com
  destination-profile CiscoTAC-1 transport-method http
  destination-profile CiscoTAC-1 http https://tools.cisco.com/its/service/oddce/
services/DDCEService
  transport http use-vrf management
  enable
```

Use Cases for Smart Software Licensing

Scenario 1

1. Configure and order a Cisco Nexus 7000 Series Switch with licenses and select the Cisco NX-OS release that will be preinstalled on the hardware prior to shipment.

> ✎
>
> **Note**   To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart Account set up, and then convert the licenses by going to the License Registration Portal.

2. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. This will convert all the licenses that are preinstalled on the switch to smart licenses. Note that this task must be performed for each switch that you want to convert to smart license.

3. The service will validate if license Stock Keeping Units (SKUs) on the switch have been mapped to smart licenses before proceeding with the conversion.

4. Enable smart mode on the switch and start using the smart licenses.

Scenario 2

1. Configure and order a Cisco Nexus 7000 Series Switch with licenses and select the Cisco NX-OS release that will be preinstalled in the hardware prior to shipment.

2. Upgrade the switch to Cisco NX-OS Release 8.0(1).

   ✎

   Note   To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart account set up and then perform the conversion by going to the License Registration Portal.

3. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. This will convert all the licenses that are preinstalled on the switch to smart licenses. Note that this task must be performed for each switch that you want to convert to smart license.

4. The service will validate if license SKUs on the switch are mapped to smart licenses before proceeding with the conversion.

5. You enable smart mode on the switch and start using the smart licenses.

Scenario 3

1. Order a spare license SKU and do not associate a Smart account to the order in Cisco Commerce Workspace (CCW).

   ✎

   Note   You must have a Smart account set up before using Smart Software Licensing.

2. Get a PAK delivered to yourself and load it to your Smart account.

3. License Registration Portal service will validate if a spare license SKU is mapped to a smart license.

4. The Smart Software Manager (SSM) will notify you via email that your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.

5. Specify the PAKs as smart licenses in SSM.

6. Ensure that Cisco NX-OS Release 8.0(1) is installed on the switch, enable smart mode, and start using the smart entitlements.

Scenario 4

1. Order a spare license SKU and assign a Smart account to the order in CCW.

2. The existing License Registration Portal service will auto deposit the PAK to the LRP Smart account.

3. License Registration Portal service will validate if the spare license SKU has been mapped to smart entitlements. If the spare license SKU are mapped to smart entitlements, the service sends out a confirmation notification to CSSM.

4. The Smart Software Manager will notify you via email that your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.

5. Specify the PAKs as Smart Software Licenses in SSM.

6. Ensure that Cisco NX-OS Release 8.0(1) is installed on the switch, enable smart mode, and start using the smart licenses.

Additional References for Smart Software Licensing

Table 2: Technical Assistance

Description	Link
Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html
License Registration Port (LRP) documentation	https://www.cisco.com/web/fw/tools/swift/xui/html/help.html

Feature History for Smart Software Licensing

Feature Name	Release	Feature Information
Smart Software Licensing with Satellite	8.4(2)	This feature was introduced.
Converting a Traditional License to a Smart License—CLI Version	8.2(1)	This feature was introduced.
Subscription-based Licensing	8.2(1)	This feature was introduced.

Feature Name	Release	Feature Information

Smart Software Licensing	8.0(1)	Smart Software Licensing is a standardized licensing platform that simplifies the Cisco software experience and helps you understand how Cisco software is used across your network. Smart Software Licensing is the next generation licensing platform for Cisco Nexus 7000 Series Switches.
		
		The following commands were introduced in this feature:
		
		    • **feature license smart**
		    • **license smart deregister**
		    • **license smart enable**
		    • **license smart register**
		    • **license smart renew**
		    • **show license all**
		    • **show license status**
		    • **show license summary**
		    • **show license tech support**
		    • **show license udi**
		    • **show license usage**

Smart Software Licensing for Cisco Nexus 3000 and 9000 Series Switches

This chapter provides an overview of Smart Software Licensing and describes the tools and processes required to complete the registration and authorization for Cisco Nexus 3000 and 9000 Series Switches.

Setting Up Smart Accounts

This section provides information on requesting a Smart account and adding users to the account.

Requesting a Smart Account

Requesting a Smart account is a one-time process. Subsequent management of users is a capability provided through the tool.

Before you begin

Ensure that you have a Cisco login.

Step 1   Go to http://software.cisco.com, and log in to your account.

Step 2   Click the **Request a Smart Account** link in the **Administration** section.

Step 3   Perform one of the following tasks to select the Account Approver:

- To select yourself as the approver, click **Yes, I will be the Approver for the account** option.

- To select a different person as the approver, click **No, the person specified below will be the Approver for the account** option and specify the person's email ID.

Note The specified approver must have the authority to enter legal agreements. The approver serves as the primary owner and nominates account administrators.

Step 4 Depending on the approver type, perform one of the following procedures:

- If you are the approver, perform the following tasks:

   a. Enter **Account Name**, **Company/Organization Name**, **Country**, and **State/Province/Region** information.

   b. (Optional) Click **Edit**.

   c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier** and **Contact Phone Number**, and click **OK**.

      Note The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

   d. Click **Continue** to select the legal address to be linked to your Smart account.

- If you are not the approver, perform the following procedure:

   a. Enter the **Account Name** and an optional **Message** to the approver.

   b. (Optional) Click **Edit**.

   c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier**, and click **OK**.

      Note The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

   d. Click **Continue**.

   e. Follow the instructions in the email that is sent to you to complete the request.

Adding a User to a Smart Account

Smart account user management is available in the **Administration** section of Cisco Software Central.

Step 1 Go to http://software.cisco.com, and log in to your account.

Step 2 Click the **Manage Smart Account** link in the **Administration** section.

Step 3 Click the **Users** tab.

Step 4 Click **New User**.

Step 5 Provide the required information in the **New User** section.

(Define roles to manage the entire Smart account or specific virtual accounts.)

Step 6 Click **Continue**.

Converting a Traditional License to a Smart License

Traditional licenses associated with Product Activation Keys (PAKs) can be converted to smart licenses using the License Registration Portal (LRP). Access traditional licenses by clicking the **PAKs/Tokens** tab. Then use the information in this section to convert PAKs to smart licenses.

Note Alternatively, you can convert traditional licenses to smart licenses using one of the following methods:

- Access the Smart Software Manager and follow the instructions in the "Convert to Smart Licensing" section.

- Contact Cisco Global Licensing Operations (GLO) or TAC. You need to provide your PAK and device details as well as the smart account where you want the licenses to be deposited.

Step 1 Go to http://software.cisco.com, and log in to your account.

Step 2 Click the **Traditional Licensing** link in the **License** section.
You are redirected to the **LRP** window.

Step 3 Click the **PAKs/Tokens** tab under **Manage**, if it is not already selected.

Step 4 Check the **PAK/Token ID** check box.

Step 5 Select **Convert to Smart Entitlements** from the **Actions** drop-down menu.

Step 6 Select a smart account from the **Smart Account** drop-down list.

  Note You can view only the smart accounts that are assigned to you.

Step 7 Select a virtual account from the **Virtual Account** drop-down list.

  Note You can view only the virtual accounts that are assigned to you.

Step 8 Click **Assign**.
The selected PAK is converted to a smart license.

Converting a Traditional License to a Smart License—DLC (Device Led Conversion)

Traditional licenses associated with Product Activation Keys (PAK) can be converted to smart licenses using CLI.

This type of conversion is also known as a Device Led Conversion (DLC).

✎

| Note | When migrating from traditional licensing model to Smart Licensing Using a Policy (10.2(1)), license conversion takes place automatically. Manual conversion of Traditional License to Smart License-DLC is no longer supported. |

Before you begin

- Ensure that Smart Software Licensing is enabled.

- Ensure that you have a valid smart account.

- Ensure that you have valid user rights for the smart account.

Step 1   switch# **license smart conversion start**

Starts a manual conversion of a traditional license to a smart license. The conversion takes place in the background. After the conversion succeeds or fails, a system log message is displayed on the switch console.

Step 2   (Optional) switch# **license smart conversion stop**

Stops the manual conversion.

Step 3   (Optional) switch# **show license status**

Displays the license conversion status. If you run this command from an active device in a high availability (HA) configuration, this will display the status of all the devices in the HA configuration.

Converting a Traditional License to a Smart License—DLC

The following example shows how to convert a traditional license to a smart license using the CLI:

```
switch# license smart conversion start

Smart License Conversion process is in progress. Use the 'show license status' command to
check the progress and result.
```

The following example shows how to stop the process of converting a traditional license to smart license using the CLI:

The following example shows the status of the license conversion for a standalone device:

```
switch# license smart conversion stop
stop manual conversion failed:
Some Smart Licensing Conversion jobs stopped successfully.
```

The following example shows the status of line conversion for a standalone device:

```
switch# show license status

Smart Licensing is ENABLED.
Registration:
Status: REGISTERED
Smart Account: Big-U University
Virtual Account: Physics
Export-Controlled Functionality: Not Allowed
```

```
Initial Registration: SUCCEEDED on Feb 24 23:30:12 2020 PST
Last Renewal Attempt: SUCCEEDED on Feb 24 23:30:12 2020 PST
Next Renewal Attempt: Apr 24 23:30:12 2020 PST
Registration Expires: Dec 24 23:30:12 2020 PST
```

The following show output is applicable from Cisco NX-OS Release 9.3(5) onwards:

```
Smart License Conversion:
Automatic Conversion Enabled: False
Status: SUCCEEDED on Jan 1 00:00:00 2020 UTC

License Authorization:
Status: AUTHORIZED on Mar 31 17:04:56 2020 UTC
Last Communication Attempt: SUCCEEDED on Mar 31 17:04:56 2020 UTC
Next Communication Attempt: Apr 30 17:04:56 2020 UTC
Communication Deadline: Nov 29 16:58:31 2020 UTC
```

Configuring Smart Call Home for Smart Software Licensing

Make sure that Smart Call Home is enabled on the switch before configuring Smart Software Licensing. For more information, see the "Configuring Smart Call Home" chapter of the *System Management Configuration Guide, Release 9.3(x)* for your specific Cisco Nexus 3000 or 9000 Series switch.

Configuring a DNS Client

Before you begin

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

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **ip domain-lookup**	Enables DNS-based address translation.
Step 3	switch(config)# **ip domain-name** *name* [**use-vrf** *vrf-name*]	Defines the default domain name that Cisco NX-OS uses to resolve unqualified host names. You can also define a virtual routing and forwarding (VRF) that Cisco NX-OS uses to resolve this domain name if it cannot be resolved in the VRF under which you configured this domain name.
		Cisco NX-OS appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup.
Step 4	switch(config)# **ip name-server** *address1* [*address2... address6*] [**use-vrf** *vrf-name*]	Defines up to six name servers. The address can be either an IPv4 or IPv6 address.
		You can optionally define a VRF that Cisco NX-OS uses to reach this name server if it cannot be reached in the VRF under which you configured this name server.

	Command or Action	Purpose
Step 5	switch(config)# **vrf context** *vrf-name*	Creates a VRF and enters VRF configuration mode.
Step 6	switch(config-vrf)# **ip domain-name** *name* [**use-vrf** *vrf-name*]	Defines the default domain name that Cisco NX-OS uses to complete unqualified host names. You can optionally define a VRF that Cisco NX-OS uses to resolve this domain name if it cannot be resolved in the VRF under which you configured this domain name. Cisco NX-OS appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup.
Step 7	switch(config-vrf)# **ip name-server** *address1* [*address2... address6*] [**use-vrf** *vrf-name*]	Defines up to six name servers. The address can be either an IPv4 or IPv6 address. You can also define a VRF that Cisco NX-OS uses to reach this name server if it cannot be reached in the VRF under which you configured this name server.

Configuring a VRF To Send a Message Using HTTP

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **callhome**	Enters Call Home configuration mode.
Step 3	switch(config-callhome)# **transport http use-vrf** *vrf-name*	Configures the VRF used to send email and other Smart Call Home messages over HTTP.

Viewing a Smart Call Home Profile

Procedure

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

Configuring Smart Software Licensing

Follow the instructions in this section to enable Smart Software Licensing, register your device to use a Smart account, and renew device registration and authorization.

Note	Starting with 10.2(1) release, Smart Licensing using a Policy is enabled by default. Traditional Licensing and Smart Licensing models will no longer be supported. Please refer to the Cisco Nexus 9000 and 3000 Series NX-OS Smart Licensing Using Policy User Guide.

Enabling or Disabling Smart Software Licensing

Procedure

	Command or Action	Purpose
Step 1	switch# **configure terminal**.	Enters global configuration mode.
Step 2	Use one of the following commands to enable Smart Software Licensing: • switch(config)# [**no**] **license smart enable** • switch(config)# [**no**] **feature license smart**	Enables Smart Software Licensing and disables traditional licensing. All license requests now go through the CSSM. The [**no**] version of this command disables Smart Software Licensing.

Registering a Device

You can register your device to use a Smart account. You need to register each device only once.

Before you begin

• Make sure that Smart Software Licensing is enabled.

• Make sure that you have the token to register your device to the Smart account.

Procedure

	Command or Action	Purpose
Step 1	switch# **license smart register idtoken** *token* [**force**]	Registers your device to the Smart account using the token. The CSSM automatically renews the registration information with Cisco every 30 days. **Note** To unregister a device, use the **license smart deregister** command.

Renewing Device Registration and Authorization

Procedure

	Command or Action	Purpose
Step 1	switch# **license smart renew id**	Renews the device registration.

	Command or Action	Purpose
Step 2	switch# **license smart renew auth**	Renews the device authorization.

Verifying Smart Software Licensing

Verify Smart Software Licensing using the following commands:

Commands	Purpose
show license all	Displays all smart licensing information.
show license status	Displays the smart licensing status.
show license summary	Displays a summary of the registration, authorization, and entitlement for smart licenses.
show license tech support	Displays smart licensing technical support information.
show license udi	Displays the device identifier used by the smart license.
show license usage	Displays authorization, entitlement, version, and status information for smart licenses.

Note System messages for traditional licensing might appear when the device is using Smart Software Licensing. If your device is using Smart Software Licensing, you can ignore messages such as the following: "LIC_MISSING_WARNING: A feature that requires *license-name* license is not installed."

Verification Examples for Smart Software Licensing

These examples show how to verify Smart Software Licensing:

```
switch# show license status

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Nov 12 10:43:33 2019 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 16 10:43:32 2019 UTC
  Registration Expires: Nov 12 08:07:20 2019 UTC

License Authorization:
  Status: AUTHORIZED on Nov 12 10:43:48 2019 UTC

  Last Communication Attempt: SUCCEEDED on Nov 12 10:43:48 2019 UTC
```

```
         Next Communication Attempt: Jun 16 10:43:47 2019 UTC
         Communication Deadline: Nov 12 08:07:20 2019 UTC


switch# show license summary

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed

License Authorization:
  Status: AUTHORIZED on Dec 14 10:43:48 2019 UTC

  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Jun 16 10:43:47 2019 UTC
  Communication Deadline: Nov 12 08:07:20 2019 UTC


switch# show license all

Smart Licensing Status
======================
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Nov 12 10:43:33 2019 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 16 10:43:32 2019 UTC
  Registration Expires: Nov 12 08:07:20 2019 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED on Nov 12 10:43:48 2019 UTC
  Next Communication Attempt: Jun 16 10:43:48 2019 UTC
  Communication Deadline: Nov 12 08:07:21 2019 UTC

License Usage
=============

Product Information
===================
UDI: SN:AB123456789

Agent Version
=============
Smart Agent for Licensing: 1.6.6_rel/88


switch# show license tech support

Smart Licensing Status
======================
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
```

```
     Virtual Account: NexusSmartLicensing_Test
     Export-Controlled Functionality: Allowed
     Initial Registration: SUCCEEDED on Nov 12 10:43:33 2019 UTC
     Last Renewal Attempt: None
     Next Renewal Attempt: Jun 16 10:43:32 2019 UTC
     Registration Expires: Nov 12 08:07:20 2019 UTC

   License Authorization:
     Status: AUTHORIZED on Nov 12 10:43:48 2019 UTC

     Last Communication Attempt: SUCCEEDED on Nov 12 10:43:48 2019 UTC
     Next Communication Attempt: Jun 16 10:43:47 2019 UTC
     Communication Deadline: Nov 12 08:07:20 2019 UTC

   Evaluation Period:
     Evaluation Mode: Not In Use
     Evaluation Period Remaining:  89 days, 23 hours, 59 minutes, 7 seconds

   License Usage
   =============

   Product Information
   ===================
   UDI: SN:AB123456789

   Agent Version
   =============
   Smart Agent for Licensing: 1.6.6_rel/88

   Upcoming Scheduled Jobs
   =======================
   Current time: Nov 12 08:44:44 2019 UTC
   IdCert Expiration Warning: Oct 15 08:07:20 2019 UTC (303 days, 23 hours, 22 minu
   tes, 36 seconds remaining)
   Daily: Oct 15 10:26:50 2019 UTC (1 hours, 42 minutes, 6 seconds remaining)
   Certificate Renewal: Jun 16 10:43:32 2019 UTC (179 days, 1 hours, 58 minutes, 48
    seconds remaining)
   Reservation configuration mismatch between nodes in HA mode: Not Available
   Certificate Expiration Check: Nov 12 08:07:20 2019 UTC (363 days, 23 hours, 22 m
   inutes, 36 seconds remaining)
   Authorization Renewal: Jun 16 10:43:47 2019 UTC (29 days, 1 hours, 59 minutes, 3
    seconds remaining)
   Authorization Expiration Check: Nov 12 08:07:20 2019 UTC (363 days, 23 hours, 22
    minutes, 36 seconds remaining)
   Init Flag Check: Not Available
   Register Period Expiration Check: Not Available
   Ack Expiration Check: Not Available

   License Certificates
   ====================
   Production Cert: True
   PIID:

   Licensing Certificated:

       Id certificate Info:
           Start Date: Nov 12 08:07:22 2019 UTC
           Expiry Date: Nov 12 08:07:22 2019 UTC
           Version Number: 3
           Serial Number: 123456
           Common Name: 9c172927d1806d05694c1f434b40ec0fbef93abb::2

       Signing certificate Info:
           Start Date: Aug 11 19:05:34 2019 UTC
```

```
            Expiry Date: Nov 12 07:00:15 2069 UTC
            Version Number: 3
            Serial Number: 3
            Common Name: MMI Signer

        Sub CA Info:
            Start Date: Sep 11 19:06:30 2019 UTC
            Expiry Date: Dec 7 07:00:15 2069 UTC
            Version Number: 3
            Serial Number: 2
            Common Name: Smart Licensing CA

        Root Cert Info:
            Start Date: Jun 30 19:48:47 2019 UTC
            Expiry Date: Dec 7 07:00:15 2069 UTC
            Version Number: 3
            Serial Number: 1
            Common Name: Cisco Licensing Root CA

HA Info
==========
RP Role: Active
Chassis Role: Active
Behavior Role: Active
RMF: True
CF: True
CF State: Stateless

Other Info
==========
Software ID: regid.2015-09.com.cisco.Nexus_9000,1.0_6e2b6ed8-fe9b-48e0-a71f-74ea
f1bcc991
Agent State: authorized
TS enable: True
Transport: Callhome
Locale: C
Debug flags: 0x7
Privacy Send Hostname: True
Privacy Send IP: True
Build type:: Production
sizeof(char)  : 1
sizeof(int)   : 4
sizeof(long)  : 4
sizeof(char *): 4
sizeof(time_t): 4
sizeof(size_t): 4
Endian: Little
Write Erase Occurred: False
XOS version: 0.11.0.0
Reservation enable: False
Reservation in progress: False
Reservation type: None
Reservation request code: <empty>
Reservation authorization code: <empty>
Reservation return code: <empty>
Config Persist Received: True
Message Version: 1.1


switch# show license udi

UDI: SN:AB123456789
```

```
switch# show license usage

License Authorization:
  Status: AUTHORIZED on Nov 12 08:45:50 2019 UTC

(LAN_ENTERPRISE_SERVICES_PKG):
  Description: LAN license for Nexus 9000 Platforms
  Count: 1
  Version: 1.0
  Status: AUTHORIZED


switch# show running-config callhome

!Time: Thu Nov 12 08:55:26 2019

version 9.3(3)
callhome
  email-contact sch-smart-licensing@cisco.com
  destination-profile CiscoTAC-1 transport-method http
  destination-profile CiscoTAC-1 http https://tools.cisco.com/its/service/oddce/
services/DDCEService
  transport http use-vrf management
  enable
```

Configuration Examples for Smart Software Licensing

This example shows how to register your device with the Cisco portal and enable Smart Software Licensing:

Note To avoid any issues when registering your device, make sure that the name server is reachable before registering your device.

```
switch# configure terminal
switch(config)# ip domain-lookup
switch(config)# ip domain-name cisco.com
switch(config)# ip name-server 171.70.168.183 use-vrf management
switch(config)# vrf context management
switch(config-vrf)# ip domain-name cisco.com
switch(config-vrf)# ip name-server 171.70.168.183
switch(config-vrf)# exit
switch(config)# callhome
switch(config-callhome)# transport http use-vrf management
switch(config-callhome)# exit
switch(config)# feature license smart
```

This example shows how to disable Smart Software Licensing:

```
switch# configure terminal
switch(config)# no feature license smart
```

This example shows how to register a device:

```
switch# configure terminal
switch(config)# license smart register idtoken sampletokenID
register status: Registration process is in progress. Use the 'show license status' command
```

```
 to check the progress and result
```

This example shows how to unregister a device:

```
switch# license smart deregister
```

This example shows how to provide the URL for CSSM On-Prem as part of the Smart Call Home configuration:

```
callhome
  contract-id <contract-id>
  customer-id <customer-id>
  site-id <site-id>
  email-contact <email>
  phone-contact <phone>
  streetaddress <street address>
  destination-profile CiscoTAC-1 transport-method http
  destination-profile CiscoTAC-1 index 1 http
https://<CSSM-On-Prem-IP>/Transportgateway/services/DeviceRequestHandler
  transport http use-vrf management
  enable
```

Use Cases for Smart Software Licensing

Scenario 1

1. Configure and order a Cisco Nexus 3000 or 9000 Series switch with licenses and select the Cisco NX-OS release that will be preinstalled on the hardware prior to shipment.

   Note To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart Account set up and then convert the licenses by going to the License Registration Portal.

2. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. Doing so converts all the licenses that are preinstalled on the switch to smart licenses. This task must be performed for each switch that you want to convert to smart licensing.

3. The service validates if license Stock Keeping Units (SKUs) on the switch have been mapped to smart licenses before proceeding with the conversion.

4. Enable smart mode on the switch and start using the smart licenses.

Scenario 2

1. Configure and order a Cisco Nexus 3000 or 9000 Series switch with licenses and select the Cisco NX-OS release that will be preinstalled in the hardware prior to shipment.

2. Upgrade the switch to Cisco NX-OS Release 9.3(3) or a later release.

   Note To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart account set up and then perform the conversion by going to the License Registration Portal.

3. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. Doing so converts all the licenses that are preinstalled on the switch to smart licenses. This task must be performed for each switch that you want to convert to smart licensing.

4. The service validates if license SKUs on the switch are mapped to smart licenses before proceeding with the conversion.

5. Enable smart mode on the switch and start using the smart licenses.

Scenario 3

1. Order a spare license SKU and do not associate a Smart account to the order in Cisco Commerce Workspace (CCW).

> ✎
>
> **Note**   You must have a Smart account set up before using Smart Software Licensing.

2. Order a PAK and load it to your Smart account.

3. The License Registration Portal service validates if the spare license SKU is mapped to a smart license.

4. The Smart Software Manager (SSM) notifies you through email when your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.

5. Specify the PAKs as smart licenses in SSM.

6. Ensure that Cisco NX-OS Release 9.3(3) or a later release is installed on the switch, enable smart mode, and start using the smart entitlements.

Scenario 4

1. Order a spare license SKU and assign a Smart account to the order in CCW.

2. The existing License Registration Portal service deposits the PAK to the LRP Smart account.

3. The License Registration Portal service validates if the spare license SKU has been mapped to smart entitlements. If the spare license SKUs are mapped to smart entitlements, the service sends out a confirmation notification to CSSM.

4. The Smart Software Manager notifies you through email when your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.

5. Specify the PAKs as Smart Software Licenses in SSM.

6. Ensure that Cisco NX-OS Release 9.3(3) or a later release is installed on the switch, enable smart mode, and start using the smart licenses.

Additional References for Smart Software Licensing

Table 3: Technical Assistance

Description	Link
License Registration Portal (LRP) documentation	https://www.cisco.com/web/fw/tools/swift/xui/html/help.html
Smart accounts and smart licensing	https://www.cisco.com/c/dam/en_us/buy/collateral/smart-licensing-faq-for-cisco-partners.pdf
Training and resources	https://community.cisco.com/t5/smart-licensing-enterprise/software-on-demand-training-resources-for-customers/ta-p/3639797

Feature History for Smart Software Licensing

Feature Name	Release	Feature Information
Smart Licensing Using a Policy	10.2(1)	Cisco Nexus 9000 Series NX-OS Smart Licensing Using Policy Guide
Converting a Traditional License to a Smart License—DLC (Device Led Conversion)	9.3(5)	Introduced support for Device Device Led Conversion (DLC) to convert a traditional license to a Smart License.
Smart Software Licensing	9.3(3)	Introduced this feature for Cisco Nexus 3000 and 9000 Series switches.