



## **Cisco Nexus 1000V Multi-Hypervisor License Configuration Guide**

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## CONTENTS

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### CHAPTER 1

#### Overview 1

Cisco Nexus 1000V Multi-Hypervisor Licensing 1

License Editions and Versions 1

Essentials License Edition 2

Advanced Edition License 2

Licensing and High Availability 5

Types of Licenses 5

Default Licenses 5

Evaluation Licenses 5

Permanent Licenses 6

Overdraft Licenses 6

Pool of Available Licenses 6

Monitoring Licensing Usage 7

License Expiry Warnings 8

---

### CHAPTER 2

#### Installing and Configuring Licenses 9

Information About Installing and Upgrading Licenses 9

Licensing for New Software Installations 9

Licensing for Software Upgrades 10

Licensing Guidelines and Limitations 10

Default License Configuration Settings 11

Obtaining and Installing a License 12

Obtaining the License File 12

Installing the License File on the VSM 13

Verifying the License Configuration 14

Transferring Licenses 15

Transferring Licenses Between VEMs 15

Transferring Licenses to the License Pool 16

Transferring Licenses from the License Pool to a VEM 17

Configuring Volatile Licenses 18

    Enabling Volatile Licenses 18

    Disabling Volatile Licenses 19

Rehosting a License on a Different VSM 19

Configuring the License Edition on the Switch 20

Feature History for Licenses 22

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**CHAPTER 3**

**Licensing Terminology 25**

Licensing Terminology 25



## Overview

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This chapter contains the following sections:

- [Cisco Nexus 1000V Multi-Hypervisor Licensing, page 1](#)
- [License Editions and Versions, page 1](#)
- [Licensing and High Availability, page 5](#)
- [Types of Licenses, page 5](#)
- [Pool of Available Licenses, page 6](#)
- [Monitoring Licensing Usage, page 7](#)
- [License Expiry Warnings, page 8](#)

## Cisco Nexus 1000V Multi-Hypervisor Licensing

The Cisco Nexus 1000V uses a multi-hypervisor licensing approach, which allows you to migrate a license from one Cisco Nexus 1000V switch platform type to another. For example, you can migrate the license from a Cisco Nexus 1000V for VMware switch to a Cisco Nexus 1000V for Microsoft Hyper-V switch. Likewise, you can migrate the license from a Cisco Nexus 1000V for KVM to a Cisco Nexus 1000V for VMware.

You can swap editions at any time as long as you have the appropriate licenses available for the Advanced edition. All modules must use either the Essential edition or the Advanced edition. You cannot mix the two and have some modules use the Essential edition while others use the Advanced edition.

You can use the **show switch edition** command to display the current switch edition and other licensing information.

## License Editions and Versions

The Cisco Nexus 1000V supports Essential and Advanced license editions. Beginning with Cisco Nexus NX-OS 5.2(1)SV3(1.1), Cisco Nexus NX-OS Release 5.2(1)SK3(1.1), and Cisco Nexus NX-OS Release 5.2(1)SM3(1.1), the Advanced license supports license versioning.

## Essentials License Edition

Essentials is the default license edition that comes with the Cisco Nexus 1000V software. All basic features are available and all Virtual Ethernet Modules (VEMs) are automatically licensed to use these basic features. No additional license is required to use these basic features.

The Essentials Edition comes with a 60-day trial for the Advanced Edition.

Essentials Edition supports the following number of resources:

Switch	Software Release	Number of Hosts	Number of Virtual Ports
Cisco Nexus 1000V for VMware	4.2(1)SV2(2.2) and lower	128	4096
Cisco Nexus 1000V for KVM	5.2(1)SK3(1.1)	20	4096
Cisco Nexus 1000V for Microsoft	5.2(1)SM3(1.1)	64	4096

## Advanced Edition License

The Advanced Edition license package name is NEXUS\_1000V\_LAN\_SERVICES\_PKG. An Advanced Edition license is required for each CPU socket on each VEM in order to use the advanced features. To license VEM hosts, you must purchase a license package and then install the package on your Virtual Supervisor Module (VSM).

The Advanced Edition license supports the following versions:

- Advanced Edition 1.0 (Nexus1000V\_LAN\_SERVICES\_PKG 1.0)—Any license file that was generated for Release 4.2(1)SV2(2.2) software or earlier has the Advanced 1.0 version.
- Advanced 3.0 (Nexus1000V\_LAN\_SERVICES\_PKG 3.0)— If you purchased Cisco Nexus 1000V Release 5.2(1)SK3(2.2) software or Cisco Nexus 1000V Release 5.2(1)SM3(1.1) software, you must install the Advanced 3.0 license. If you have Cisco Nexus 1000V Release 4.2(1)SV2(2.2) software or earlier and have the Advanced 1.0 license installed, you must upgrade to the Advanced 3.0 license either by installing it directly or by upgrading to it using an Advanced 3.0 upgrade license. If you have the Advanced 3.0 license already installed, using the **switch edition advanced** command configures the switch with the Advanced 3.0 Edition license. When the Advanced license is installed, the switch immediately acquires the appropriate licenses from the license pool.



### Note

Cisco Nexus 1000V Multi-Hypervisor License, version 1.0 can not co-exist with version 3.0 license. Make sure that you have enough license count to cover all the physical CPU sockets of all the Cisco Nexus 1000V VEM modules before replacing version 1.0 license with version 3.0 license.

The following table provides additional details about each license version.

Table 1: Advanced 1.0 and 3.0 License Features for Cisco Nexus 1000V for VMware

License Version	Minimum Software Release	Features	Maximum Resources
Advanced 1.0 <sup>1</sup>	4.2(1)SV2(1.1)	<ul style="list-style-type: none"> <li>• Cisco TrustSec</li> <li>• DHCP snooping</li> <li>• Dynamic ARP Inspection</li> <li>• IP Source Guard</li> <li>• VXLAN Gateway</li> </ul> <p><b>Note</b> Starting with Release 5.2(1)SV3(1.15), Cisco Nexus 1000V for VMware vSphere does not support the VXLAN Gateway feature. The VXLAN gateway feature is still supported on earlier releases.</p> <p><b>Note</b> The Cisco Virtual Security Gateway (VSG) is also available with this license. When you purchase Cisco VSG, you can install it and begin using it. No separate or additional license is required.</p>	<p>Advanced 1.0 supports the following number of resources:</p> <ul style="list-style-type: none"> <li>• 128 hosts</li> <li>• 4096 virtual ports</li> </ul>
Advanced 3.0 <sup>2</sup>	5.2(1)SV3(1.1)	<ul style="list-style-type: none"> <li>• VXLAN BGP Control Plane</li> <li>• BPDU Guard</li> </ul> <p><b>Note</b> Starting with Release 5.2(1)SV3(1.15), Cisco Nexus 1000V for VMware vSphere does not support the VXLAN Gateway feature. The VXLAN gateway feature is still supported on earlier releases.</p> <p><b>Note</b> The Cisco VSG is also available with this license. When you purchase Cisco VSG, you can install it and begin using it. No separate or additional license is required.</p>	<p>Advanced 3.0 supports the following number of resources:</p> <ul style="list-style-type: none"> <li>• 256 hosts</li> <li>• 12,288 virtual ports</li> </ul>

<sup>1</sup> Advanced 1.0 supports all of the features in the Essential edition plus the listed features.

<sup>2</sup> Advanced 3.0 supports all of the features in the Essential and Advanced 1.0 editions plus the listed features.

**Table 2: Advanced 3.0 License Features for Cisco Nexus 1000V for KVM**

License Version	Minimum Software Release	Features	Maximum Resources
Advanced 3.0 <sup>3</sup>	5.2(1)SK3(2.2)	<ul style="list-style-type: none"> <li>• Cisco Virtual Security Gateway</li> <li>• Layer 3 Forwarding</li> </ul>	Advanced 3.0 supports the following number of resources: <ul style="list-style-type: none"> <li>• 128 hosts</li> <li>• 8192 virtual ports</li> </ul>

<sup>3</sup> Advanced 3.0 supports all of the features in the Essential edition plus the listed features.

**Table 3: Advanced 3.0 License Features for Cisco Nexus 1000V for Microsoft**

License Version	Minimum Software Release	Features	Maximum Resources
Advanced 3.0 <sup>4</sup>	5.2(1)SM3(1.1)	<ul style="list-style-type: none"> <li>• DHCP Snooping</li> <li>• Dynamic ARP Inspection</li> <li>• IP Source Guard</li> </ul>	Advanced 3.0 supports the following number of resources: <ul style="list-style-type: none"> <li>• 128 hosts</li> <li>• 8192 virtual ports</li> </ul>

<sup>4</sup> Advanced 3.0 supports all of the features in the Essential edition plus the listed feature.

This example shows how to display the output for the Advanced 1.0 license:

```
switch# show license
nlkv_license_1_0.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 1.0 permanent 16 \
  HOSTID=VDH=7647652151359566304 \
  NOTICE="<LicFileID>nlkv_license_1_0.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=5BC8912C52AC
```

This example shows how to display the output for the Advanced 1.0 to 3.0 upgrade license:

```
switch# show license
upgrade_3_0.lic:
SERVER this_host ANY
VENDOR cisco
UPGRADE NEXUS1000V_LAN_SERVICES_PKG cisco 1.0 3.0 permanent 16 \
  HOSTID=VDH=7647652151359566304 \
  NOTICE="<LicFileID>upgrade_3_0.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=3A919916D30C
```

This example shows how to display the output for the Advanced 3.0 license:

```
switch# show license
nlkv_license_3_0.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 3.0 permanent 16 \
  HOSTID=VDH=7647652151359566304 \
  NOTICE="<LicFileID>nlkv_license_3_0.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=5BC8912C52AC
```



# Licensing and High Availability

- License installation is a nondisruptive process.
- The license file is shared by both Virtual Supervisor Modules (VSMs) in an HA pair.
- If your system has dual supervisors, the licensed software runs on both supervisor modules and provides failover protection.
- Uninstalling a license file might cause a service disruption.

## Types of Licenses

### Default Licenses

There are 1024 default licenses pre-installed with the Cisco Nexus 1000V for Microsoft Hyper-V software that allow you to try the Advanced Edition before purchasing permanent licenses. You need one license for each CPU socket on each VEM.

There are 1024 default licenses preinstalled with the Cisco Nexus 1000V software that are valid for 60 days from the date of VSM installation. These default licenses allow you to use the Cisco Nexus 1000V Advanced Edition license for a 60-day trial period before you must purchase permanent licenses.

**Note**

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The trial period and other licensing information are only relevant to the Advanced Edition license. The Essential Edition license is free and valid forever.

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Default licenses are invalidated when one of the following occurs:

- You install a permanent license file.
- You install an evaluation license file.
- The license trial period expires.

**Caution**

---

Service Disruption—Even though virtual Ethernet (vEthernet) interfaces are not dropped on unlicensed VEMs, the following events might affect the vEthernet interfaces:

- New vEthernet interfaces are not brought up.

---

If you need additional licenses to cover all VEM CPU sockets, you must obtain either permanent licenses or evaluation licenses from Cisco.com. For additional licensing information, contact your Cisco representative or visit [www.cisco.com/go/license](http://www.cisco.com/go/license).

### Evaluation Licenses

Evaluation licenses allow you to try the Cisco Nexus 1000V switch before you purchase permanent licenses.

The evaluation period starts when you install the evaluation license file. Unlike default licenses, an evaluation license is not invalidated when you install a permanent license. Instead, evaluation licenses expire only when the license file reaches its expiration date. The validity period might vary and the expiration date is mentioned in the license file.

**Caution**

Service Disruption—Even though vEthernet interfaces are not dropped on unlicensed VEMs, the following events might affect the vEthernet interfaces:

- Any new vEthernet interfaces are not brought up.
- vEthernet interfaces remain down with a “VEM Unlicensed” reason if there is a reattach due to a configuration change, module flap, or port flap.

After installing permanent licenses, you can remove the evaluation license file from the pool if desired.

Evaluation license packs are available from [Cisco.com](https://www.cisco.com).

## Permanent Licenses

Cisco Nexus 1000V permanent licenses do not expire. You can purchase permanent licenses for a fixed number of VEM CPU sockets. You need one license for each CPU socket on each VEM. The license file specifies the number of licenses that you have purchased.

When you upgrade to a new software release, all previously installed permanent licenses remain in effect.

When you purchase permanent licenses, make sure to request enough licenses to cover all of the CPU sockets in the CPUs in all of your VEMs. If you do not have enough licenses available to cover all of the CPU sockets on a particular VEM, no licenses are applied to that VEM. The entire VEM remains unlicensed until sufficient licenses become available to cover all of its CPU sockets.

Any extra licenses are placed into a pool of available licenses on the VSM to be used as needed.

After installing permanent licenses, you can remove the evaluation license file from the pool if desired.

## Overdraft Licenses

Overdraft licenses are used when the installed licenses are used up. Overdraft licenses can prevent a service disruption if you exceed the number of permanent or evaluation licenses specified in your license file.

The number of overdraft licenses provided is based on the number of licenses that you installed. If you installed 64 or more licenses, the number of overdraft licenses provided is 30 percent of the installed licenses. If you installed less than 64 licenses, the number of overdraft licenses is 16.

The expiration of an overdraft license is tied to the expiration date of the installed license.

## Pool of Available Licenses

If you have licenses that are unused, the VSM stores these unused licenses in a pool of available licenses. Before you can uninstall a license file, you must first return all licenses from its VEMs to the pool.

Once a license has been assigned to the VEM, you can configure how the system treats that license if the VEM goes out of service for any reason.

### Nonvolatile Licensing

The Cisco Nexus 1000V switch uses nonvolatile licensing as the default licensing method. With nonvolatile licensing, once a license has been assigned to a VEM, it remains checked out to that VEM even if the VEM is offline. If you want to decommission a VEM, you must manually return its licenses to the pool using the **license transfer** and **no vem** commands or the licenses remain unavailable to any other VEMs in the system. For more information about these commands, see the *Cisco Nexus 1000V Command Reference*.

Keeping the license checked out allows the VEM to return to service immediately after it comes back online. The VEM does not have to wait while acquiring new licenses.

### Volatile Licensing

With volatile licensing, when any VEM goes offline, its licenses are immediately returned to the VSM license pool. Once the VEM comes back online, it must acquire new licenses from the license pool.

The following events trigger a renegotiation and synchronization of licenses between the VSM and its VEMs:

- Clock change in the VSM system clock
- VSM reload
- Installing a new license file
- Clearing an existing license file
- Evaluation license expiration

During the license renegotiation process, system messages alert you if licenses are returned to the VSM pool for a VEM that is offline. This process requires no action on your part because the licenses are returned to the VEM when it comes back online.



#### Caution

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Service Disruption—Volatile licenses are removed from a VEM during a loss in connectivity and must be reassigned when connectivity resumes. We recommend that you use nonvolatile licensing and you transfer unused licenses as described in [Transferring Licenses to the License Pool](#), on page 16.

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## Monitoring Licensing Usage

A system message similar to the following is generated when more licenses are being used than are installed. This message indicates that you should add more permanent licenses:

```
%LICMGR-2-LOG_LIC_USAGE: Feature
NEXUS1000V_LAN_SERVICES_PKG NEXUS1000V_LAN_SERVICES_PKG is using 17 licenses,
only 16 licenses are installed. Please contact your Cisco account team or partner to
purchase Licenses or downgrade to Essential Edition. To activate your purchased licenses,
click on www.cisco.com/go/license.
```

A system message similar to the following is generated if there are not enough licenses available for a particular VEM:

```
%VEM_MGR_UNLICENSED: License for VEM 7 could not be obtained. Please contact your Cisco
account team or partner to purchase Licenses or downgrade to Essential Edition. To activate
your purchased licenses, click on www.cisco.com/go/license.
```

A system message similar to the following is generated every hour with a list of modules that are unlicensed:

```
%VEM_MGR_UNLICENSED_MODS: Modules are not licensed. This will result in network connectivity issues. Please contact your Cisco account team or partner to purchase Licenses or downgrade to Essential Edition. To activate your purchased licenses, click on www.cisco.com/go/license.
```

## License Expiry Warnings

As the evaluation license expiration date approaches, the license expiry warning log message informs Advanced edition users about the need to install permanent licenses or change the system to the Essential edition before the evaluation license expiration date. When the Advanced edition is active, messages are logged every day starting from 4 weeks before the license expiry date and every hour on the last day before the licenses expire.

After the expiration date, the existing modules and the interfaces continue to operate and the switch continues to forward the traffic, but if an interface or module flaps, it stays down until the valid licenses are installed or the switch is changed to the Essential edition. In addition, any new interfaces or modules come up in the unlicensed state.

You can disable the advanced features and change the switch edition to Essential even after the licenses have expired.



# Installing and Configuring Licenses

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This chapter contains the following sections:

- [Information About Installing and Upgrading Licenses, page 9](#)
- [Licensing Guidelines and Limitations, page 10](#)
- [Default License Configuration Settings, page 11](#)
- [Obtaining and Installing a License, page 12](#)
- [Transferring Licenses, page 15](#)
- [Configuring Volatile Licenses, page 18](#)
- [Rehosting a License on a Different VSM, page 19](#)
- [Configuring the License Edition on the Switch, page 20](#)
- [Feature History for Licenses, page 22](#)

## Information About Installing and Upgrading Licenses

### Licensing for New Software Installations

By default, the switch uses the Essential edition license. Default licenses are valid for 60 days from the time of installation. During this time, you are allowed to change the license edition to Advanced and try out the advanced features.

When you install the evaluation or permanent licenses at any time during the default license period, the switch stops using the default licenses and starts using the installed licenses. When the default or the installed licenses expire, if the switch edition is Advanced, it remains in the Advanced edition. You can change the switch edition to the Essential edition even after the license has expired.

## Licensing for Software Upgrades

When you upgrade the Cisco Nexus 1000V software, the default edition depends on whether your current software version supports Essential and Advanced editions.

- If you are upgrading from a version of the Cisco Nexus 1000V software that supports Essential and Advanced editions, the upgraded Cisco Nexus 1000V software defaults to the same edition as your existing system.
- If you are upgrading from a version of the Cisco Nexus 1000V software that does not include tier-based licensing, the upgraded Cisco Nexus 1000V software defaults to the Advanced edition.
- If you are upgrading from any version of the Cisco Nexus 1000V software during the default evaluation period, the trial period is reset to the Advanced edition and the license (socket) count is doubled after the upgrade.

At any time, if you change from the Advanced edition to the Essential edition, the software checks in any licenses that it has checked out of the license pool.

## Licensing Guidelines and Limitations

Licensing has the following configuration guidelines and limitations:

### Licensing Guidelines and Limitations for All Cisco Nexus 1000V Switches

- If you modify a license key file, it is invalidated.
- A license file contains the number of licenses ordered for your VSM. One license is required for each CPU socket on each VEM, but you do not need a license for the VSM itself.
- You must have a role equivalent to that of network-admin to install, uninstall, or copy a permanent license file. For information about user accounts and roles, see the *Cisco Nexus 1000V Security Configuration Guide* for your platform.
- If you are installing multiple licenses for the same VSM, which is also called license stacking, each license key filename must be unique.
- Licenses cannot be applied to a VEM unless sufficient licenses are in the pool to cover all of its CPU sockets.
- If a license is in use, you cannot delete its license file. You must first transfer all licenses from the VEMs to the VSM license pool before uninstalling the license file.
- When you install a license file, the default licenses are invalidated.
- When you upgrade the Cisco Nexus 1000V on Hyper-V from the 5.2(1)SM1(5.2) software release, the Advanced and Essential license modes have the following guidelines:
  - 1 You must install the Hyper-V based licenses (Evaluation or Permanent) before you upgrade the software to the 5.2(1)SM1(5.2) software release.
  - 2 If you try to upgrade the software with the default license, then the upgrade will fail.
  - 3 Platform specific licenses are checked in and the Multi-Hypervisor Licenses are checked out only after the VSM upgrade.

- 4 The upgrade from the 5.2(1)SM1(5.2) software release is supported in an Essential edition, when the default license is in use.
  - 5 After a successful upgrade, the License Socket count is changed to 1024 with the evaluation period changed to 60 days.
- When you upgrade to a new software release, all previously installed licenses remain in effect. If the switch is still in the default licensing period, that period is extended for another 60 days from the software upgrade date.
  - The license expiry warning messages are logged even when the expiring licenses are not in use.
  - After you install a license on a VSM, the VEMs that are attached to that VSM request licenses from the Cisco Nexus 1000V License Manager when they come up. If the request for licenses fails, the VEM is marked as unlicensed and the virtual Ethernet (vEth) interfaces that are attached to that VEM are not allowed to come up.
  - If you have more than 4,096 vEthernet interfaces and want to change the license edition from Advanced to Essentials, you must reduce the number of virtual interfaces by migrating the virtual machines from the Cisco Nexus 1000V DVS to the vSwitch or DVS.

#### Licensing Guidelines and Limitations for Cisco Nexus 1000V for VMware Only

- When you purchase permanent licenses, the license key file is sent to you in an e-mail. It authorizes use on only the host ID device.
- For the Cisco Nexus 1000V for VMware, the Cisco VSG is included with the Advanced Edition 1.0 license. A separate license for Cisco VSG is no longer required for using Cisco VSG. If you try to install a Cisco VSG license (that you purchased earlier) on a Cisco Nexus 1000V Release 5.2(1)SV3(1.1) or later, the installation will fail with the following message:

```
Installing license failed: VSG license is no longer required.
VSG feature is now included in Nexus 1000V Advanced Edition.
To activate VSG, please ensure system is in Advanced Edition
and a valid license for NEXUS1000V_LAN_SERVICES_PKG is installed.
```

## Default License Configuration Settings

Configuration Option	Description
license package name	NEXUS1000V_LAN_SERVICES_PKG
switch edition	New installs use the Essential edition by default. Upgrades use the same edition as the previous install, if one was configured. If not, upgrades (for example, from versions older than 4.2(1)SV2(1.1) use the Advanced edition by default.
volatile/nonvolatile licensing	The Cisco Nexus 1000V uses nonvolatile licensing by default, which maintains the link between a license and its assigned VEM until you manually transfer that license, even if the VEM goes out of service.

# Obtaining and Installing a License

## Obtaining the License File

License files have the following characteristics:

- A license file is tied to each VSM by the host ID or the serial number that is associated with the VSM device.
- A license file contains the number of licenses ordered for your VSM. One license is required for each CPU socket on each VEM, but no license is required for the VSM itself.

### Before You Begin

- Make sure that you have your product authorization key (PAK), which is in your software license claim certificate.

If you cannot locate your software license claim certificate, contact [Cisco Technical Support](#).

- Log in to the CLI in EXEC mode.
- Your username must have a role that is equivalent to that of the network-admin role which allows you to copy files. For information about user accounts and roles, see the *Cisco Nexus 1000V Security Configuration Guide* for your platform.

### Procedure

---

**Step 1** Obtain the serial number, also called the host ID, for your VSM.

```
switch# show license host-id
License hostid: VDH=1280389551234985805
```

**Note** The host ID includes everything that appears after the equal sign (=). In this example, the host ID is 1280389551234985805.

**Step 2** From your software license claim certificate, locate the product authorization key (PAK).

**Step 3** Go to the Product License Registration site at [www.cisco.com/go/license](http://www.cisco.com/go/license).

**Step 4** From the Product License Registration website, follow the instructions for registering your VSM license. The license key file is sent to you in an e-mail. The license key authorizes use on only the host ID device. You must obtain separate license key file(s) for each of your VSMs.

**Caution** Modifying the license key file in any way invalidates it. Make sure that you keep the file intact and unchanged.

**Step 5** Save your license to a SCP/SFTP/TFTP server.

**Step 6** Copy your license to bootflash on the VSM.

```
switch# copy scp://user@linux-box.cisco.com/home/user/nlkv_license.lic bootflash:
Enter vrf (If no input, current vrf 'default' is considered):
user@linux-box.cisco.com's password:
nlkv_license.lic                               100% 252      0.3KB/s   00:00
```

---



## Installing the License File on the VSM

### Before You Begin

- Make sure that the license file you are installing contains the number of licenses needed to cover all CPU sockets on all VEMs.
- Know that this procedure installs the license file using the name `n1kv_license.lic`. You can specify a different name if needed.
- If you are installing multiple licenses for the same VSM, which is also called license stacking, make sure that each license key filename is unique.
- Repeat this procedure for each additional license file that you are installing, or stacking, on the VSM.
- You are logged in to the CLI in EXEC mode.
- You must have a role with privileges equivalent to that of the `network-admin` role to install a license. For information about user accounts and roles, see the *Cisco Nexus 1000V Security Configuration Guide* for your platform.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<code>switch# install license bootflash: <i>filename</i></code>	Installs the license from the active VSM console. The license is installed on the VSM and each VEM automatically acquires a license for every CPU socket.
<b>Step 2</b>	<code>switch# show license file <i>filename</i></code>	Verifies the license installation by displaying the license configured for the VSM.
<b>Step 3</b>	<code>switch# show license usage <i>package_name</i></code>	Verifies the license installation by displaying it in the license usage table.
<b>Step 4</b>	<code>switch# copy running-config startup-config</code>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to install the Advanced Edition 1.0 license file and then display its contents and usage:

```
switch# install license bootflash:n1kv_license.lic
Installing license ..done
switch# show license file n1kv_license.lic
n1kv_license.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 1.0 permanent 12 \
  HOSTID=VDH=7647652151359566304 \
  NOTICE="<LicFileID>new_3_0_12/<LicFileID><LicLineID>0/<LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=4130C2806DF4
switch# show license usage NEXUS1000V_LAN_SERVICES_PKG
```

```

Feature                               Ver Ins Lic  Status Expiry Date Comments
                               Count
-----
NEXUS1000V_LAN_SERVICES_PKG         1.0 Yes   10  In use Never      -
-----
Feature                               Description
-----
NEXUS1000V_LAN_SERVICES_PKG         NEXUS1000V Advanced services pkg
-----
Note: Licenses are not required for Essential Edition
-----

```

This example shows how to install the Advanced Edition 3.0 license file and display its contents and usage:

```

switch# install license bootflash:nlkv_license.lic
Installing license ..done
switch# show license file nlkv_license.lic
nlkv_license.lic:
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 3.0 permanent 16 \
  HOSTID=VDH=7647652151359566304 \
  NOTICE="<LicFileID>test_3_0.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=C8824134C5F4

switch# show license usage NEXUS1000V_LAN_SERVICES_PKG
Feature                               Ver Ins Lic  Status Expiry Date Comments
                               Count
-----
NEXUS1000V_LAN_SERVICES_PKG         3.0 Yes   16  In use Never      -
-----
Feature                               Description
-----
NEXUS1000V_LAN_SERVICES_PKG         NEXUS1000V Advanced services pkg
-----
Note: Licenses are not required for Essential Edition
-----

```

## Verifying the License Configuration

To verify the license configuration, use one of the following commands:

Command	Purpose
<b>show license</b>	Displays the license filename for the VSM.
<b>show license brief</b>	Displays the license installed on the VSM.
<b>show license file <i>filename</i></b>	Displays the contents of the license file installed on the VSM, including the license filename, license package name, and the expiration date for evaluation licenses.
<b>show license usage</b>	Displays the total number of licenses in use on the VEMs.

Command	Purpose
<code>show license usage <i>package_name</i></code>	Displays statistics about the number of evaluation and permanent licenses available, installed, and in use on the VSM.  When you use this command, the <b>Default Eval days</b> left field displays the number of default evaluation days that are remaining before the license expires, not including the present day.
<code>show module vem [<i>module</i>] license-info</code>	Displays the license mode and the usage of licenses by each module.

## Transferring Licenses

### Transferring Licenses Between VEMs

You can transfer licenses from one VEM to another, for example, when one VEM is removed from service.

- Licenses cannot be transferred to a VEM unless there are sufficient licenses in the pool to cover all of its CPUs.
- When licenses are successfully transferred from one VEM to another, the virtual Ethernet interfaces on the source VEM are removed from service, and the virtual Ethernet interfaces on the destination VEM are brought into service. The licenses on the source VEM are checked in regardless of any failure that might occur while the destination module is being licensed.
- The VEM can operate independent of VSM. This mode of operation is called headless mode. In headless mode, the VEM uses that last known licensing information.

#### Before You Begin

- Log in to the CLI in EXEC mode.
- You know the VEM that you want to transfer licenses from and the number of licenses it has.
- You know the VEM that you are transferring licenses to and the number of licenses required.
- You know the number of CPUs installed on the destination VEM.

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<code>switch# configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<code>switch(config)# svs license transfer src-vem <i>vem_no</i> dst-vem <i>vem_no</i></code>	Transfers the licenses from one VEM to another.

	Command or Action	Purpose
<b>Step 3</b>	switch# <b>show license usage</b> <i>package_name</i>	Verifies the transfer by displaying the licenses in use on each VEM.
<b>Step 4</b>	switch(config)# <b>copy running-config startup-config</b>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to transfer a license from VEM 3 to VEM 5 and verify the transfer in the license usage:

```
switch# configure terminal
switch(config)# svs license transfer src-vem 3 dst-vem 5
switch(config)# show license usage NEXUS1000V_LAN_SERVICES_PKG
Feature                               Ver  Ins  Lic  Status  Expiry  Date  Comments
                               Count
-----
NEXUS1000V_LAN_SERVICES_PKG          1.0  Yes   12   In use  Never   -
-----
Feature                               Description
-----
NEXUS1000V_LAN_SERVICES_PKG          NEXUS1000V Advanced services pkg
-----

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

## Transferring Licenses to the License Pool

You can transfer licenses from a VEM to the VSM license pool. This procedure must be performed in the following cases:

- If you want to uninstall a license file that contains one or more licenses currently assigned to a VEM.
- If you are using nonvolatile licensing and you want to take a VEM out of service.



### Note

When you transfer its licenses to the VSM license pool, all virtual Ethernet interfaces on the VEM are removed from service.

### Before You Begin

Log in to the CLI in EXEC mode.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	switch# <b>configure terminal</b>	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 2</b>	switch(config)# <b>svs license transfer src-vem <i>vem_no</i> license_pool</b>	Transfers the licenses from a VEM to the license pool.
<b>Step 3</b>	switch(config)# <b>show module vem <i>module</i> license-info</b>	(Optional) Verifies the transfer by displaying the licenses in use on the VEM.
<b>Step 4</b>	switch(config)# <b>copy running-config startup-config</b>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to transfer a license from VEM 3 to the license pool:

```
switch# configure terminal
switch(config)# svs license transfer src-vem 3 license_pool
switch(config)# copy running-config startup-config
```

## Transferring Licenses from the License Pool to a VEM

### Before You Begin

- Configure the switch to use the Advanced edition.
- Log in to the CLI in EXEC mode.
- Verify that there are enough available licenses for all CPU sockets on the VEM. If the license request fails for a module, enter the **svs license transfer license\_pool dst-vem *module*** command to transfer the licenses from the license pool to the VEM.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	switch# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	switch(config)# <b>svs license transfer license_pool dst-vem <i>module</i></b>	Transfers a license from the license pool to the VEM. The <i>module</i> argument range is from 3 to 66.
<b>Step 3</b>	switch(config)# <b>show module vem <i>module</i> license-info</b>	Verifies the transfer by displaying the licenses in use on each VEM.
<b>Step 4</b>	switch(config)# <b>copy running-config startup-config</b>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to transfer licences to the CPU sockets on VEM 3 and verify that these licenses have been applied:

```
switch# configure terminal
switch(config)# svcs license transfer license_pool dst-vem 3
switch(config)# show module vem 3 license-info
Licenses are Sticky
Mod      Socket Count      License Usage Count      License Version      License Status
---      -
3        2                  2                          1.0                  licensed
switch(config)# copy running-config startup-config
```

## Configuring Volatile Licenses

### Enabling Volatile Licenses

You can enable volatile licenses so that whenever a VEM is taken out of service, its licenses are returned to the VSM pool of available licenses.



#### Caution

Service Disruption—Volatile licenses are removed from a VEM during a loss in connectivity and must be reassigned when connectivity resumes. We recommend that you use nonvolatile licensing and you transfer unused licenses as described in [Transferring Licenses to the License Pool](#), on page 16.

#### Before You Begin

Log in to the CLI in EXEC mode.

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	switch# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	switch(config)# <b>svcs license volatile</b>	Enables volatile licenses in the running configuration.
<b>Step 3</b>	switch(config)# <b>copy running-config startup-config</b>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to enable volatile licensing:

```
switch# configure terminal
switch(config)# svcs license volatile
switch(config)# copy running-config startup-config
```

## Disabling Volatile Licenses

You can disable volatile licenses so that whenever a VEM is taken out of service, its licenses are not returned to the VSM pool of available licenses.



### Note

By default, the licenses are nonvolatile (sticky) in nature, which is the recommended configuration. This configuration ensures that the licenses are reserved for a VEM. Even after a period of brief connectivity loss between the VEM and the VSM, the VEM is guaranteed to get the needed licenses.

### Before You Begin

Log in to the CLI in EXEC mode.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	switch# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	switch(config)# <b>no svl license volatile</b>	Disables volatile licenses in the running configuration.
<b>Step 3</b>	switch(config)# <b>copy running-config startup-config</b>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to disable a volatile license:

```
switch# configure terminal
switch(config)# no svl license volatile
switch(config)# copy running-config startup-config
```

## Rehosting a License on a Different VSM

You can change the serial number, or host ID, associated with a license. This process is also called rehosting and is required if you replace a VSM in your network with a new VSM.



### Caution

Service Disruption—When you remove a VSM from your network, the vEthernet interfaces on the VEMs are removed from service and the traffic flowing to them from the virtual machines (VMs) is dropped. This traffic flow is not resumed until you add a new VSM and a new license file with the new host ID.

- A license file is tied to each VSM by the host ID associated with the VSM device.
- A license file contains the number of licenses ordered for your VSM. One license is required for each CPU on each VEM.

- A VSM can have more than one license file depending on the number of installed VEM CPUs.
- If you have multiple license files stacked on your VSM, repeat this process for each license file.
- You can rehost a license across hypervisor platforms.

### Before You Begin

- You have a copy of your existing license files with the host ID of the existing VSM.
- Log in to the CLI in EXEC mode.
- Your username must have the network-admin role that allows you to copy files. For information about user accounts and roles, see the *Cisco Nexus 1000V Security Configuration Guide* for your platform.

### Procedure

**Step 1** Obtain the serial number, also called the host ID, for your new VSM:

```
switch# show license host-id
License hostid: VDH=1280389551234985805
```

**Note** The host ID number appears after the equal sign (=). In this example, the host ID is 1280389551234985805.

**Step 2** Go to the Product License Registration website at [www.cisco.com/go/license](http://www.cisco.com/go/license).

**Step 3** From the Product License Registration website, click **Continue to Product License Registration**. Click **Licenses**, check the check box for the appropriate license file, click **Actions**, click **Rehost/Transfer**, and enter the host ID of the new VSM.

A new license key file, with the host ID of the new VSM, is sent to you in an e-mail.

**Note** Do not modify the license key file. The license key file is invalidated if you modify it.

**Step 4** Save your license to a SCP/SFTP/TFTP server.

**Step 5** Copy your license to bootflash on the VSM.

```
switch# copy scp://user@linux-box.cisco.com/home/user/nlkv_license.lic bootflash:
Enter vrf (If no input, current vrf 'default' is considered):
user@linux-box.cisco.com's password:
nlkv_license.lic                               100% 252      0.3KB/s   00:00
switch#
```

### What to Do Next

Install the license file on the VSM.

## Configuring the License Edition on the Switch

You can configure the license edition that your switch uses.

### Before You Begin

If you are changing from the Essential to the Advanced license edition, make sure that you have sufficient licenses installed for all CPU sockets in the VEMs associated with the VSM.



If you are changing from the Advanced to the Essential license edition, make sure that you have turned off all advanced features.

Ensure that you are familiar with the licensing guidelines and limitations.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<code>switch# configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<code>switch(config)# svs switch edition {essential   advanced}</code>	Configures the Cisco Nexus 1000V switch edition.  If you have the Essentials Edition license already installed, using the <b>switch edition advanced</b> command configures the switch with the Advanced 1.0 or Advanced 3.0 Edition license, whichever one you have purchased. If you have the Advanced 1.0 Edition license already installed, using the <b>switch edition advanced</b> command configures the switch with the Advanced 3.0 Edition license.  The command fails if you change the switch edition to Advanced and not enough licenses are available for all the modules, or if you change the switch edition to Essential but not all advanced features have been disabled. The software displays an error message if the command fails.
<b>Step 3</b>	<code>switch(config)# show switch edition</code>	(Optional) Displays the current edition of the Cisco Nexus 1000V switch, license usage and availability information, expiration dates, and the list of advanced features with their status.  The number of available licenses is the number of default or installed licenses available (including overdraft licenses) minus the number of licenses in use. In the Essential edition, the number of licenses in use is always 0.  With an Advanced edition, if there are multiple permanent license files installed, the license expiry displays the shortest expiration date.
<b>Step 4</b>	<code>switch(config)# copy running-config startup-config</code>	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to validate that the current switch edition is Essential and change to the Advanced Edition 1.0:

```
switch# configure terminal
switch(config)# show switch edition
Switch Edition: ESSENTIAL
```

```
Feature Status
Name State Licensed In version
-----
cts disabled Y 1.0
dhcp-snooping disabled Y 1.0
vxlan-gateway disabled Y 1.0
bgp disabled Y 3.0
bpduguard disabled Y 3.0
```

```

License Status
Edition Available In Use Expiry Date
-----
Essential 0 0 Never

Scale Support
Edition Modules Virtual Ports
-----
Essential 128 4096
switch(config)# svs switch edition
Switch Edition: ADVANCED (3.0)

Feature Status
Name State Licensed In version
-----
vxlan-gateway disabled Y 1.0

License Status
Edition Available In Use Expiry Date
-----
Advanced 119 380 Never

Scale Support
Edition Modules Virtual Ports
-----
Advanced 128 8192

```

## Feature History for Licenses

This table includes only the updates for those releases that have resulted in additions or changes to the feature.

**Table 4: Licensing Feature Updates in Cisco Nexus 1000V for VMware Releases**

Feature Name	Release	Feature Information
License Versioning	5.2(1)SV3(1.1)	License versioning feature was introduced.
Advanced 3.0 License	5.2(1)SV3(1.1)	The Advanced 3.0 license version was introduced.
Multi Hypervisor Licensing	4.2(1)SV2(2.2)	This feature was introduced.
VXLAN gateway	4.2(1)SV2(2.1)	The <b>show switch edition</b> displays the VXLAN gateway as an Advanced edition feature.
Licensing for new software installation	4.2(1)SV2(2.1)	The Essential edition is updated to be deployed across 124 hosts and the Advanced edition is updated to support a maximum of maximum of 1024 licenses.
Default license	4.2(1)SV2(1.1)	512 default licenses are included for the Essential edition in the software image. In addition, 512 default licenses are also available for the Advanced edition that are valid for 60 days from the date of installation.

Feature Name	Release	Feature Information
Evaluation license	4.0(4)SV1(3)	16 evaluation licenses that are valid for 60 days are included in the software image. More evaluation licenses of varied durations can be downloaded from Cisco.com and installed separately.
Evaluation license	4.0(4)SV1(2)	Evaluation licenses are part of the software installation or upgrade. A separate evaluation license file no longer needs to be installed.
<b>show license usage</b> <i>package_name</i> command	4.0(4)SV1(2)	The <b>show license usage</b> <i>package_name</i> command output is updated to show statistics about the number of evaluation and permanent licenses available, installed, and in use on the VSM.
License	4.0(4)SV1(1)	This feature was introduced.

**Table 5: Licensing Feature Updates in Cisco Nexus 1000V for KVM Software Releases**

Feature Name	Release	Feature Information
Layer 3 Forwarding	5.2(1)SK3(2.2)	This feature was added to the Advanced Edition license.
Cisco Virtual Security Gateway	5.2(1)SK3(2.2)	This feature was added to the Advanced Edition license.
License Versioning	5.2(1)SK3(1.1)	License versioning was introduced.
Advanced 3.0 License	5.2(1)SK3(1.1)	The Advanced 3.0 license version was introduced.
License	5.2(1)SK3(1.1)	This feature was introduced.

**Table 6: Licensing Feature Updates in Cisco Nexus 1000V for Microsoft Software Releases**

Feature Name	Release	Feature Information
License Versioning	5.2(1)SM3(1.1)	License versioning was introduced.
Advanced 3.0 License	5.2(1)SM3(1.1)	The Advanced 3.0 license version was introduced.
License	5.2(1)SM1(5.1)	This feature was introduced.





## Licensing Terminology

This chapter contains the following sections:

- [Licensing Terminology, page 25](#)

### Licensing Terminology

Term	Definition
Advanced Features	Features that are available only in the Advanced edition.
Default license	A license bundled with the software that is installed automatically when you install the software.
Edition	Essential and Advanced switch editions.
Evaluation license	A temporary license. Evaluation licenses are valid for a specified number of days and are tied to a host ID (device serial number).
Host ID	A unique chassis serial number that is specific to each device.
Incremental license	A license for additional CPU sockets that were not included in the initial license file. License keys are incremental—If you purchase some CPU sockets now and others later, the license file and the software detect the sum of all sockets for the specified device.
License enforcement	A mechanism that prevents a feature from being used without first obtaining a license.
License key file	A file that specifies the total licensed CPU sockets for your system. Each file is uniquely named and is specific to a VSM. The file contains digital signatures to prevent tampering and modification. License keys are required to use the product and are enforced within a specified time span.

Term	Definition
Licensed application	A software application or component that requires a license to be used.
Licensed feature	Permission to use a particular feature through a license file, a hardware object, or a legal contract. This permission is limited to the number of users, number of instances, time span, and the implemented device.
Missing license	If the bootflash has been corrupted or a supervisor module replaced after you have installed a license, that license shows as “missing.” The product still works. You should reinstall the license as soon as possible.
Node locked license	A license that can only be used on a particular device that uses the unique host ID for the device.
Overdraft license	Overdraft licenses are used when the installed licenses are used up. Overdraft licenses can prevent a service disruption if you exceed the number of permanent or evaluation licenses specified in your license file.  The number of overdraft licenses provided is based on the number of licenses ordered.
Permanent license	A license that is not time bound is called a permanent license.
Product Authorization Key (PAK)	A unique code, provided in the software license claim certificate, that allows you to obtain a license key. You use this key at a website to register for your license. After you register, your license key file and installation instructions are sent to you in an e-mail.
Rehosting	The process of changing a license to reflect a different device serial number or host ID. A host ID is unique to each device.
Software license claim certificate	A document that entitles its rightful owner to use licensed features on one device as described in that document. This document provides the product authorization key (PAK).
Support	If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact <a href="#">Cisco Technical Support</a> .
Stacking	The process of adding multiple license files on a single VSM.
Volatile licenses	A feature that automatically captures unused licenses when a VEM is taken out of service and adds them to the VSM license pool so that they can be reused by another VEM.  In contrast, if its licenses are nonvolatile, the VEM does not release them during a loss in network connectivity with the VSM. When connectivity is returned, the VEM can resume normal activity without further interruption.  Volatile licenses are disabled by default. The licenses in VEMs are nonvolatile and are not released when a VEM is removed from service.