



Installing and Configuring Licenses

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Information About Licenses

For detailed information about licenses, see the Overview section.

Licensing Guidelines and Limitations

Use the following guidelines and limitations when configuring the permanent licenses:

- If you modify a permanent license key file, it is invalidated.

- When you purchase permanent licenses, 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 a separate license key file for each of your VSMs.
- 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.
- 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*.
- If you are installing multiple permanent licenses for the same VSM, also called license stacking, each permanent license key filename must be unique.
- Licenses cannot be applied to a VEM unless there are sufficient licenses in the pool to cover all of its CPUs.
- 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 permanent license file, all default licenses are invalidated. Installing a permanent license file has no effect on evaluation licenses.

Default License Configuration Settings

Table 1: License Defaults

Parameter	Switch Edition
license filename	Default essential edition in case of fresh installation and advanced in case of upgrades.
volatile license	Disabled By default, the licenses are not returned to the VSM pool when a VEM is removed from the service.

Licensing Changes in the Current Release

You can install the licenses on the Cisco Nexus 1000V by using the **install license** command. When a module (VEM) comes up, it request licenses from the Cisco Nexus 1000V License Manager.

If the license checkout fails, the module is marked as unlicensed and the virtual Ethernet (veths) interfaces that are attached to that module are not allowed to come up. For the software upgrades from a pre-4.2(1)SV2(1.1) release to 4.2(1)SV2(1.1) release, if the switch is still in the default licensing period, it is extended for another 60 days from the software upgrade date.

License Expiry Warnings

Starting with Release 4.2(1)SV2(1.1), the license expiry warning log message informs users about the option to change the system to the Essential edition in addition to the option of installing more licenses. Messages are logged only when the switch is in the Advanced edition and the licenses are in use. Messages are logged every day starting from 4 weeks before the licenses are about to expire and every hour on the last day before the licenses expire.

The license expiry does not have any effect when the switch edition is the Essential edition. The Advanced edition functionality is the same as the current Cisco Nexus 1000V implementation. The existing modules and the interfaces continue to be operationally up and the switch continues to forward the traffic. If an interface or module flaps, it stays down until the valid licenses are installed or the switch is changed to the Essential edition. The new interfaces and the 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.

Licensing for New Software Installation

By default, the switch uses the Essential edition which can be deployed across 64 hosts with a maximum of 512 CPUs. Default licenses are valid for 60 days from the time of installation, during which time you are allowed to change the switch edition to Advanced and try out the advanced features. A maximum of 512 licenses (up to 64 hosts) are supported during the default license period for the Advanced edition.

The advanced features are available only when you change the switch edition to Advanced. 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

After you upgrade the software, the Cisco Nexus 1000V comes up in the configured switch edition. There is no impact to the license status of the modules after the upgrade. The current (pre-4.2(1)SV2(1.1)) installations of Cisco Nexus 1000V are considered to be operating in the Advanced edition. When you upgrade the software to Release 4.2(1)SV2(1.1) or later releases, the switch comes up in the same (Advanced) edition.

If the switch is in the default evaluation period at the time of the upgrade, the default evaluation period is reset to 60 days. You have a choice to move the switch to the Essential edition. This action checks in all the licenses that are currently being used back into the license pool.

The following table lists the default switch editions.

Table 2: Default Switch Editions

Current N1K Software Version	Action	Current Switch Edition	New Switch Edition
Pre-4.2(1)SV2(1.1) release	Upgrade to Release 4.2(1)SV2(1.1)	—	Advanced

Current N1K Software Version	Action	Current Switch Edition	New Switch Edition
None	Fresh Installation of Release 4.2(1)SV2(1.1)	—	Essential
Release 4.2(1)SV2(1.1)	Upgrade to post-4.2(1)SV2(1.1) release	Essential	Essential
		Advanced	Advanced

Configuring Switch Editions

Starting with Release 4.2(1)SV2(1.1), you can configure which switch edition to use (Advanced or Essential).

Procedure

Step 1 `n1000v(config)# svs switch edition essential | advanced`
Configures the Cisco Nexus 1000V switch edition. The command fails if you change the switch edition to Advanced but there are not enough licenses available for all the modules or if you change the switch edition to Essential but not all advanced features have been disabled. An error message appears when the command fails.

Step 2 `n1000v# show switch edition`

Example:

```
n1000v(config)# show switch edition
```

```
Switch Edition - Essential
```

```
Advanced Features
```

```
Feature Name           Feature State
```

```
-----
```

```
cts                    disabled
```

```
dhcp snooping         disabled
```

```
Licenses Available: 512
```

```
Licenses in Use: 0
```

```
License Expiry: Never
```

```
n1000v# show switch edition
```

```
Switch Edition - Advanced
```

```
Advanced Features
```

```
Feature Name           Feature State
```

```
-----
```

```
cts                    disabled
```

```
dhcp snooping         enabled
```

```
Licenses Available: 28
```

```
Licenses in Use: 4
```

```
License Expiry: 11 Dec 2012
```

Note The output displays the shortest expiry date if multiple licenses are installed.

This command displays the current edition of the Nexus 1000V switch along with the list of advanced features. The feature state (enabled or disabled) is also displayed. This information can be used to figure out what features need to be disabled to successfully change the switch mode from Advanced to Essential. The show output also includes the licensing information, for example, the number of licenses available, number of licenses in use, and the license expiry date, as displayed in the example.

Note The *Default Eval days left* field in the **show license usage NEXUS1000V_LAN_SERVICES_PKG** CLI command displays the number of default evaluation days that are remaining before the license expires, not including the present day.

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 Essential edition, the number of licenses in use is always 0. Any value other than 0 means that the license check in the process did not go through successfully. To recover from this situation, the license transfer command is used to transfer the licenses back to the license pool. In Essential edition, there is no license expiry as the switch is always licensed. In Advanced edition, if there are multiple license files installed, the license expiry displays the shortest expiration date.

Obtaining and Installing a License

This section describes how to obtain the license file that is required for each VSM and then install it. This section includes the following topics:

- Obtaining the License File
- Installing the License File on the VSM

Obtaining the License File

You can obtain a license file for a VSM.

- A license file is tied to each VSM by the host ID or the serial number 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.

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](#).

- You are logged in to the CLI in EXEC mode.
- In this procedure, you must copy a license file. This process requires that your username has a role 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*.

Procedure

-
- Step 1** Obtain the serial number, also called the host ID, for your VSM: **show license host-id**
- ```
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 [Software Download](#) site.
- Step 4** From the Software Download site, go to the [Product License Registration](#) site.
- Step 5** 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** The license key file is invalidated if you modify it.
- Step 6** Save your license to a SCP/SFTP/TFTP server.
- Step 7** 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#
```
-

Installing the License File on the VSM

You can install the license files on a VSM. Installing multiple licenses is called stacking.

Before You Begin

- Default licenses are invalidated when a permanent license file is installed. Make sure that the license file you are installing contains the number of licenses needed to cover all VEMs.
- This procedure installs the license file using the name, license_file.lic. You can specify a different name if needed.
- If you are installing multiple licenses for the same VSM, also called license stacking, make sure that each license key filename is unique.
- Repeat this procedure for each additional license file 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*.

Procedure

	Command or Action	Purpose
Step 1	switch# install license bootflash: <i>filename</i>	Installs the license from the active VSM console. Note If you specify a license filename, the file is installed with the specified name. Otherwise, the default filename is used. The license is installed on the VSM and each VEM automatically acquires a license for every CPU socket.
Step 2	switch# show license file <i>filename</i>	Verifies the license installation by displaying the license configured for the VSM.
Step 3	switch# show license usage <i>package_name</i>	Verifies the license installation by displaying it in the license usage table. Note If you already have VEMs installed, the output of this command shows installed VEMs and sockets.
Step 4	switch# copy running-config startup-config	(Optional) Saves the change persistently through reboots and restarts by copying the running configuration to the startup configuration.

This example shows how to install a license file and then display its contents and usage:

```
switch# install license bootflash:license_file.lic
Installing license ..done
switch# show license file license_file.lic
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 1.0 permanent 10 \
  HOSTID=VDH=1575337335122974806 \
  NOTICE="<LicFileID>license_file.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>PAK12345678</PAK>" SIGN=3AF5C2D26E1A
switch# show license usage NEXUS1000V_LAN_SERVICES_PKG
-----
Feature Usage Info
-----
    Installed Licenses : 10
    Default Eval Licenses : 0
    Max Overdraft Licenses : 16
    Installed Licenses in Use : 4
    Overdraft Licenses in Use : 0
    Default Eval Lic in Use : 0
    Default Eval days left : 0
    Licenses Available : 22
    Shortest Expiry : Never
-----
Application
-----
VEM 3 - Socket 1
VEM 4 - Socket 1
VEM 4 - Socket 2
VEM 5 - Socket 1
-----
switch#
```

**Note**

The *Default Eval days left* field in the **show license usage NEXUS1000V_LAN_SERVICES_PKG** CLI command displays the number of default evaluation days that are remaining before the license expires, not including the present day.

Verifying the License Configuration

To verify the license configuration, perform one of the following tasks:

Table 3: License Configuration Show Commands

Command	Purpose
show license	Displays the license filename for the VSM.
show license brief	Displays the license installed on the VSM.
show license file <i>filename</i>	Displays the contents of the license file installed on the VSM, including the license filename and the expiration date for evaluation licenses.
show license usage	Displays the total number of licenses in use on the VEMs.
show license usage <i>package_name</i>	Displays statistics about the number of evaluation and permanent licenses available, installed, and in use on the VSM.
show module vem [<i>module</i>] license-info	Displays the license mode and the usage of licenses by each module.

Transferring Licenses

This section includes the following topics that describe how to transfer licenses between VEMs and uninstall a license by transferring it from a VEM to the VSM license pool:

- Transferring Licenses Between VEMs
- Transferring Licenses to the License Pool
- Transferring Licenses from the License Pool to VEMs

Transferring Licenses Between VEMs

You can transfer licenses from one VEM to another, for example, after moving a VM from one host to another.

- 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.

Before You Begin

- You are logged 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
Step 1	switch# configure terminal	Enters global configuration mode.
Step 2	switch(config)# svs license transfer src-vem vem_no dst-vem vem_no	Transfers the licenses from one VEM to another. This command fails if switch is in essential edition.
Step 3	switch# show license usage package_name	Verifies the transfer by displaying the licenses in use on each VEM.

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

```
switch(config)# svs license transfer src-vem 3 dst-vem 5
switch(config)#
switch# show license usage NEXUS1000V_LAN_SERVICES_PKG
-----
Feature Usage Info
-----
    Installed Licenses : 29
    Default Eval Licenses : 0
    Max Overdraft Licenses : 16
    Installed Licenses in Use : 2
    Overdraft Licenses in Use : 0
    Default Eval Lic in Use : 0
    Default Eval days left : 0
    Licenses Available : 43
    Shortest Expiry : 01 Jul 2011
-----
Application
-----
VEM 5 - Socket 1
VEM 5 - Socket 2
-----
switch#
```

Transferring Licenses to the License Pool

You can transfer licenses from a VEM to the VSM license pool when, for example, removing a license from a VEM.

Before You Begin

- You are logged in to the CLI in EXEC mode.
- When you transfer its licenses to the VSM license pool, all virtual Ethernet interfaces on the VEM are removed from service.

Procedure

	Command or Action	Purpose
Step 1	switch# configure terminal	Enters global configuration mode.
Step 2	switch(config)# svs license transfer src-vem vem_no license_pool	Transfers the licenses from a VEM to the license pool.
Step 3	switch# show license usage package_name	Verifies the transfer by displaying the licenses in use on each VEM.

This example shows how to display the licenses in use on each VEM. Notice that the licenses on VEM 3 are no longer in use.

```
switch# show license usage NEXUS1000V_LAN_SERVICES_PKG
-----
Feature Usage Info
-----
    Installed Licenses : 10
    Default Eval Licenses : 0
    Max Overdraft Licenses : 16
    Installed Licenses in Use : 3
    Overdraft Licenses in Use : 0
    Default Eval Lic in Use : 0
    Default Eval days left : 0
    Licenses Available : 23
    Shortest Expiry : Never
-----
Application
-----
VEM 4 - Socket 1
VEM 4 - Socket 2
VEM 5 - Socket 1
-----
switch#
```

Transferring Licenses from the License Pool to VEMs

You can use this procedure to transfer licenses from a license pool to a VEM. The VEM will be licensed only if there are enough available licenses. For example, if the license request fails for a module, use the **svs license transfer license_pool dst-vem module** command to transfer the licenses from the license pool to the VEM.

When you transfer the licenses from the license pool to the VEM, the module will be licensed if there are enough licenses available and all the virtual Ethernet interfaces that were powered down will be powered up.

Before You Begin

You are logged in to the CLI in EXEC mode.

Procedure

	Command or Action	Purpose
Step 1	switch# configure terminal	Enters global configuration mode.
Step 2	switch(config)# svs license transfer license_pool dst-vem module	Transfers a license from the license pool to the VEM. This command fails if switch is in essential edition. The value of <i>module</i> can be from 3 to 66.
Step 3	switch# show module vem module license-info	Verifies the transfer by displaying the licenses in use on each VEM.

This example shows how to display the licenses in use on each VEM.

```
switch# show module vem 3 license-info
Licenses are Sticky
Mod      Socket Count      License Usage Count      License Version      License Status
---      -
3         1                  1                        1.0                  licensed
switch#
```

Configuring Volatile Licenses

This section provides information about enabling and disabling the volatile license feature and includes the following sections:

- Enabling Volatile Licenses
- Disabling 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.



Note

Service Disruption—Volatile licenses are removed from a VEM during a loss in connectivity and the system will try to get the required licenses when connectivity resumes. We recommend that the volatile licenses remain disabled and that you transfer unused licenses using the [Transferring Licenses to the License Pool](#), on page 10 section.

A volatile license is disabled by default. That is, by default, licenses are not returned to the VSM pool when a VEM is removed from service.

Before You Begin

You are logged in to the CLI in EXEC mode.

Procedure

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

This example shows how to enable a volatile license:

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

You are logged in to the CLI in EXEC mode.

Procedure

	Command or Action	Purpose
Step 1	switch# configure terminal	Enters global configuration mode.
Step 2	switch(config)# no svs license volatile	Disables volatile licenses in the running configuration.

	Command or Action	Purpose
Step 3	switch(config)# copy running-config startup-config	(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 svcs license volatile
switch(config)# copy running-config startup-config
switch(config)#
```

Changing the Serial Number in a License

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 virtual machines is dropped. This traffic flow is not resumed until you add a new VSM and new license file with the new host ID.

- A license file is tied to each VSM by the host ID, or the serial number, 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.

Before You Begin

- You have a copy of your existing license files with the host ID of the existing VSM.
- You are logged in to the CLI in EXEC mode.
- You must copy a license file. 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*.

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 E-mail the following information to licensing@cisco.com, requesting the license file be rehosted to the new host ID:

- The new host ID
- The new host ID

A new license key file, with the host ID of the new VSM, is sent to you in e-mail within 48 hours.

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

Step 3 Save your license to a SCP/SFTP/TFTP server.

Step 4 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#
```

Feature History for Licenses

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

Feature Name	Releases	Feature Information
Default license	4.2(1)SV2(1.1)	512 default licenses that are valid for 60 days are included in the software image.
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.
show license usage <i>package_name</i> command	4.0(4)SV1(2)	The show license usage <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.