Installing and Configuring Licenses

This chapter contains the following sections:

Licensing Guidelines and Limitations

Licensing has the following configuration guidelines and limitations:

- If you modify a 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 socket on each VEM, but you do not need a license for the VSM itself.

- A VSM can have more than one license file depending on the number of CPU sockets on each VEM.

- 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, 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 to a new software release, all previously installed licenses remain in effect.

The license expiry warning messages are logged even when the expiring licenses are not in use.

Default License Configuration Settings

Configuration Option	Description
license filename	`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 use the Advanced edition by default.
volatile/nonvolatile licensing license type	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.

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 (vEth) interfaces that are attached to that module are not allowed to come up. For the software upgrades, 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

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.

Licensing for New Software Installation

By default, the switch uses the Essential edition license, which can be deployed across 128 hosts with a maximum of 512 CPUs. 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. A maximum of 1024 licenses (up to 128 hosts) are supported during the default license period for the Advanced edition.

The advanced features are available only when you install the Advanced edition license on the switch.

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 uses tier-based licensing.

- If you are upgrading from a version of the Cisco Nexus 1000V software that includes tier-based licensing, 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 software default is reset to the Advanced edition and the license (socket) count is doubled to 1024 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.

Configuring Switch Editions

Before You Begin

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

Procedure

	Command or Action	**Purpose**
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **svs switch edition**{*essential* | *advanced*}	Configures the Cisco Nexus 1000V switch edition. 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.
Step 3	switch(config)# **show switch edition**	(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 the Advanced edition, if there are multiple permanent license files installed, the license expiry displays the shortest expiration date.
Step 4	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 display the current switch edition, change to the Advanced edition, and then confirm the change by showing the switch edition:

```
switch# configure terminal
switch configure terminal switch(config)# show switch edition
   Switch Edition - Essential
   Advanced Features
   Feature Name            Feature State
    ----------------------------------------
cts
dhcp snooping
vxlan-gateway
Licenses Available: 512
Licenses in Use: 0
License Expiry: Never
disabled
disabled
disabled
switch(config)# svs switch edition advanced switch(config)# show switch edition
    Switch Edition - Advanced
    Advanced Features
    Feature Name            Feature State
    ---------------------------------------
cts
dhcp snooping
vxlan-gateway
Licenses Available: 508
Licenses in Use: 4
```

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 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 located at 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/n1kv_license.lic bootflash:
Enter vrf (If no input, current vrf 'default' is considered):
user@linux-box.cisco.com's password:
n1kv_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, 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
Step 1	switch# **install license bootflash:** *filename*	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.
Step 2	switch# **show license file** *filename*	Verifies the license installation by displaying the license configured for the VSM.
Step 3	switch# **show license usage** *package_name*	Verifies the license installation by displaying it in the license usage table.
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:n1kv_license.lic
Installing license ..done
switch# show license file n1kv_license.lic
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1000V_LAN_SERVICES_PKG cisco 1.0 permanent 10 \
        HOSTID=VDH=1575337335122974806 \
        NOTICE="<LicFileID>n1kv_license.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
---------------------------------------
```

Note The **Default Eval days** left field 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, use one of the following 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 *filename*	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.
show license usage	Displays the total number of licenses in use on the VEMs.
show license usage *package_name*	Displays statistics about the number of evaluation and permanent licenses available, installed, and in use on the VSM. When you use this command, the **Default Eval days** left field displays the number of default evaluation days that are remaining before the license expires, not including the present day.
show module vem [*module*] **license-info**	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
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.
Step 3	switch# **show license usage** *package_name*	Verifies the transfer by displaying the licenses in use on each VEM.
Step 4	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 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 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(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**
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(config)# **show module vem** *module* **license-info**	(Optional) Verifies the transfer by displaying the licenses in use on the VEM.
Step 4	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 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
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. The *module* argument range is from 3 to 66.
Step 3	switch(config)# **show module vem** *module* **license-info**	Verifies the transfer by displaying the licenses in use on each VEM.
Step 4	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 transfer licences to the CPU sockets on VEM 3 and verify that these licenses have been applied:

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

Before You Begin

Log 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 volatile licensing:

```
switch# configure terminal
switch(config)# svs 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
Step 1	switch# **configure terminal**	Enters global configuration mode.
Step 2	switch(config)# **no svs license volatile**	Disables 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 disable a volatile license:

```
switch# configure terminal
switch(config)# no svs 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 re-hosting 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 (VMs) 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 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 re-host 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 site located at www.cisco.com/go/license.

Step 3   From the Product License Registration website, choose **Transfer > License for Transfer - Initiate**, select the license source, and enter the Host ID of the new VM.
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/n1kv_license.lic bootflash:
Enter vrf (If no input, current vrf 'default' is considered):
user@linux-box.cisco.com's password:
n1kv_license.lic                              100%  252     0.3KB/s   00:00
switch#
```

What to Do Next

Install the license file on the VSM.

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
Multi Hypervisor Licensing	4.2(1)SV2(2.2)	This feature was introduced.
VXLAN gateway	4.2(1)SV2(2.1)	The **show switch edition** 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.

Feature Name	Releases	Feature Information
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.
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 *package_name* command	4.0(4)SV1(2)	The **show license usage** *package_name* 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.