



*Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)*



## **Cisco Virtual Security Gateway for Nexus 1000V Series Switch License Configuration Guide, Release 4.2(1)VSG1(1)**

July 3, 2013

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

Text Part Number: OL-23836-01

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

*Cisco Virtual Security Gateway for Nexus 1000V Series Switch License Configuration Guide, Release 4.2(1)VSG1(1)*  
©2011 Cisco Systems, Inc. All rights reserved.

*Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com).*



**Preface** v

Audience v

Organization vi

Document Conventions vi

Related Documentation vii

viii

Obtaining Documentation and Submitting a Service Request viii

**Overview** 1-1

Information About Licenses 1-1

Types of Licenses 1-1

Permanent Licenses 1-1

Default Licenses 1-2

Evaluation Licenses 1-2

Overdraft Licenses 1-3

Pool of Available Licenses 1-3

Licensing and High Availability 1-3

License Volatility 1-4

**Installing and Configuring Licenses** 2-1

Information About Installing Licenses 2-1

Prerequisites for Installing and Configuring Licenses 2-2

Guidelines and Limitations 2-2

Default Settings 2-3

Obtaining and Installing a License 2-3

Flow Chart: Obtaining and Installing a License 2-4

Obtaining the License File 2-4

Installing the License File on the VSM 2-6

Examples 2-7

Transferring Licenses 2-7

Transferring Licenses Between VEMs 2-8

Transferring Licenses to the License Pool 2-9

Uninstalling a License 2-10

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com).***

Configuring Nonvolatile Licenses	2-13
Enabling Nonvolatile Licenses	2-13
Disabling Nonvolatile Licenses	2-14
Verifying the License Configuration	2-15
Examples for the Show Commands	2-16
Changing the Serial Number in a License	2-17
Flow Chart: Changing the Serial Number in a License	2-17
Obtaining a License File for Rehosting	2-18
Feature History for Licenses	2-19
<b>Licensing Terminology</b>	<b>3-1</b>

---

**INDEX**



## Preface

---

The *Cisco Virtual Security Gateway for Nexus 1000V Series Switch License Configuration Guide, Release 4.2(1)VSG1(1)* describes how to install and configure a software license for your Virtual Security Gateway (VSG) on a Nexus 1000V Series switch VSM.

This preface describes the audience, organization, conventions, and documentation for the *Cisco Virtual Security Gateway for Nexus 1000V Series Switch License Configuration Guide, Release 4.2(1) VSG1(1)*, and includes the following sections:

- [Audience, page v](#)
- [Organization, page vi](#)
- [Document Conventions, page vi](#)
- [Related Documentation, page vii](#)
- [Obtaining Documentation and Submitting a Service Request, page viii](#)

## Audience

This publication is for the following professionals with an understanding of virtualization and experience using VMware tools to create virtual machines:

- Security Administrators—Define and administer security policies and rules.
- Network Administrators—Manage and associate the security policies to particular port profiles.
- ESX Server Administrators—Select the appropriate port-group (Cisco Nexus 1000V equivalent port-profile) for the particular virtual machines (VM).

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Organization

This guide is organized as follows:

Chapter and Title	Description
<a href="#">Chapter 1, “Overview”</a>	Provides an overview of licensing for the Cisco Virtual Security Gateway for the Cisco Nexus 1000V Series Switch, Release 4.2(1)VSG1(1).
<a href="#">Chapter 2, “Installing and Configuring Licenses”</a>	Describes how to do the following: <ul style="list-style-type: none"> <li>• Obtain a VSG license file and then install it on the VSM.</li> <li>• Transfer a license between Virtual Ethernet Modules (VEMs).</li> <li>• Release a license from a VEM.</li> <li>• Enable and disable volatile licenses.</li> <li>• Uninstall a license.</li> <li>• Change the serial number/host ID in a license.</li> </ul>
<a href="#">Chapter 3, “Licensing Terminology”</a>	Defines license terminology.

## Document Conventions

This document uses the following conventions:



### Note

Means reader *take note*. Notes contain helpful suggestions or references to material not covered in the manual.



### Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



### Tip

Means *the following information will help you solve a problem*.

## Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)

Command descriptions use these conventions:

Convention	Description
<b>boldface font</b>	Commands and keywords are in boldface.
<i>italic font</i>	Arguments for which you supply values are in italics.
[ ]	Elements in square brackets are optional.
[ x   y   z ]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Screen examples use these conventions:

screen font	Terminal sessions and information that the switch displays are in screen font.
<b>boldface screen font</b>	Information that you must enter is in boldface screen font.
<i>italic screen font</i>	Arguments for which you supply values are in italic screen font.
< >	Non-printing characters, such as passwords, are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or number sign (#) at the beginning of a line of code indicates a comment line.

## Related Documentation

This section contains information about the documentation available for Cisco Virtual Security Gateway and related products.

### Cisco Virtual Security Gateway Documentation

The following Cisco Virtual Security Gateway for the Nexus 1000V Series Switch documents are available on Cisco.com at the following url:

[http://www.cisco.com/en/US/products/ps13095/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps13095/tsd_products_support_series_home.html)

- *Cisco Virtual Security Gateway for Nexus 1000V Series Switch Release Notes, Release 4.2(1)VSG1(1)*
- *Cisco Virtual Security Gateway, Release 4.2(1)VSG1(1) and Cisco Virtual Network Management Center, Release 1.0.1 Installation Guide*
- *Cisco Virtual Security Gateway for Nexus 1000V Series Switch License Configuration Guide, Release 4.2(1)VSG1(1)*
- *Cisco Virtual Security Gateway for Nexus 1000V Series Switch Configuration Guide, Release 4.2(1)VSG1(1)*
- *Cisco Virtual Security Gateway for Nexus 1000V Series Switch Command Reference, Release 4.2(1)VSG1(1)*

**Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)**

- *Cisco Virtual Security Gateway for Nexus 1000V Series Switch Troubleshooting Guide, Release 4.2(1)VSG1(1)*

## Cisco Virtual Network Management Center Documentation

The following Cisco Virtual Network Management Center documents are available on Cisco.com at the following url:

[http://www.cisco.com/en/US/products/ps11213/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps11213/tsd_products_support_series_home.html)

- *Release Notes for Cisco Virtual Network Management Center, Release 1.0.1*
- *Cisco Virtual Security Gateway, Release 4.2(1)VSG1(1) and Cisco Virtual Network Management Center, Release 1.0.1 Installation Guide*
- *Cisco Virtual Network Management Center CLI Configuration Guide, Release 1.0.1*
- *Cisco Virtual Network Management Center GUI Configuration Guide, Release 1.0.1*
- *Cisco Virtual Network Management Center XML API Reference Guide, Release 1.0.1*

## Cisco Nexus 1000V Series Switch Documentation

The Cisco Nexus 1000V Series Switch documents are available on Cisco.com at the following url:  
[http://www.cisco.com/en/US/products/ps9902/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps9902/tsd_products_support_series_home.html)

## Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.



# CHAPTER 1

## Overview

---

This chapter describes licensing for the Cisco Virtual Security Gateway for Nexus 1000V Series Switch Release 4.2(1) VSG1(1) software.

This chapter includes the following sections:

- [Information About Licenses, page 1-1](#)
- [Pool of Available Licenses, page 1-3](#)
- [Licensing and High Availability, page 1-3](#)
- [License Volatility, page 1-4](#)

## Information About Licenses

Cisco VSG licenses are delivered in a Software License Claim Certificate by e-mail. The number of licenses that you request depends on the number of Virtual Ethernet Modules (VEMs) and the number of CPU sockets on each VEM that are using VSG services.

One license is needed for each installed server CPU on every VEM, and the VSG license packages are installed and configured on the Virtual Supervisory Module (VSM).

To understand more fully the terms associated with the VSG and licensing, see [Licensing Terminology, page 3-1](#)

## Types of Licenses

This section includes the following topics:

- [Permanent Licenses, page 1-1](#)
- [Default Licenses, page 1-2](#)
- [Evaluation Licenses, page 1-2](#)
- [Overdraft Licenses, page 1-3](#)

## Permanent Licenses

You can purchase permanent licenses for a fixed number of VEM CPU sockets. Permanent licenses do not expire. The number of licenses is specified in the license file that you have purchased.

## Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)

When you subsequently 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 your installed CPUs in all of your VEMs. Before licenses are applied to a VEM, enough licenses must be available to cover all of the CPUs in that VEM. If you are lacking one CPU, then no licenses are applied to the VEM.



### Note

If your license does not have the capacity to cover all CPUs in a particular VEM, then any licenses that could have been applied to that VEM are, instead, placed into a pool of available licenses on the VSM to be used as needed. The VEM remains unlicensed until enough licenses are available to cover all CPUs in the VEM. For more information about the this pool, see [Pool of Available Licenses, page 1-3](#).

After you purchase a license package, you then install the package on your VSM. The license package shown in [Table 1](#) shows the license package names.

**Table 1 License Package**

License Package	Description
NEXUS1000V_LAN_SERVICES_PKG	Virtual Ethernet Module (VEM)
NEXUS_VSG_SERVICES_PKG	VEM to use VSG services

For more information, see [Chapter 2, “Installing and Configuring Licenses.”](#)

After installing permanent licenses, if your evaluation licenses are no longer used, you can remove the evaluation license file from the pool. For more information, see the [“Uninstalling a License” section on page 2-10](#).

## Default Licenses

Sixteen VSG default licenses (NEXUS\_VSG\_SERVICES\_PKG) are preinstalled in your Cisco Nexus 1000V software and are good for 60 days from the date of installation. These default licenses enable you to use the VSG for a 60-day trial period before you must purchase permanent licenses.

Default licenses are invalidated when one of the following occurs:

- You install a permanent license file or an evaluation license file.  
Because permanent licenses invalidate default licenses, make sure that your license file has enough capacity for all VEMs that are covered by your VSM.
- 60 days have passed since the installation of the VSM.



### Caution

The vEthernet interfaces on unlicensed VEMs cannot use VSG services. If you need additional licenses to cover all VEM CPU sockets, then you must obtain either permanent licenses or evaluation licenses from Cisco.com. For more information, see the [“Evaluation Licenses” section on page 1-2](#).

## Evaluation Licenses

Evaluation licenses are available from Cisco.com in packages of 16 licenses that are valid for 60 days to enable you to evaluate the Cisco VSG before you purchase permanent licenses.

## ***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

The 60-day 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.

Evaluation licenses expire when the license file reaches its expiration date.

**Caution**

---

If your evaluation licenses expire, your VEMs are unlicensed. The vEthernet interfaces on unlicensed VEMs cannot use VSG services.

---

After installing permanent licenses, if your evaluation licenses are no longer used, you can remove them from the pool. For more information, see the [“Uninstalling a License” section on page 2-10](#).

## **Overdraft Licenses**

Overdraft licenses can prevent losing VSG security services if you exceed the number of permanent or evaluation licenses that are specified in your license file. The number of overdraft licenses provided is based on the number of licenses that you ordered.

## **Pool of Available Licenses**

If you have licenses that are unused, the VSM stores these licenses in a pool of available licenses. If your license does not have the capacity to cover all CPUs in a particular VEM, then any licenses that could have been applied to that VEM are, instead, placed into the pool to be used as needed. If a VEM is no longer used, its licenses are returned to the pool. Before you can uninstall a license, you must first return all licenses from their VEMs to the pool.

If any licensed VEM is offline during a renegotiation of licenses, its licenses are returned to the VSM license pool. Once the VEM comes back online, it acquires its licenses from the VSM if any virtual machine on the VEM has VSG service enabled.

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

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

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 as needed when it comes back online.

## **Licensing and High Availability**

Licensing in a high-availability environment has the following configuration guidelines and limitations:

- License installation is a nondisruptive process.
- The license file is shared by both VSMs in an HA pair.

## ***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

- If your system has dual supervisors, the licensed software runs on both supervisor modules and provides failover protection.
- Uninstalling a license file results in a loss of VSG security service. For more information, see the [“Uninstalling a License” section on page 2-10](#).

## License Volatility

The volatile license feature automatically captures unused licenses when a VEM is taken out of service or when there are no VMs using any VSG services on the VEM and adds them to the VSM license pool so that they can be reused by another VEM. When you enable this feature, any time a VEM is taken out of service, either automatically or manually, its licenses are returned to the VSM license pool.

If its licenses are nonvolatile, the VEM does not release them when you take the VEM out of service.

**Note**

---

For the Cisco VSG, the licenses are by default volatile. We recommend that you leave the VSG license configuration to be volatile by default.

---

**Note**

---

The volatile licenses feature is disabled by default for the Cisco Nexus 1000V Series Switch. That is, the licenses in VEMs are nonvolatile and are not released when a VEM is removed from service.

---

For more details, see [Chapter 2, “Installing and Configuring Licenses.”](#)



## CHAPTER 2

# Installing and Configuring Licenses

---

This chapter describes how to install and configure licenses.

This chapter includes the following sections:

- [Information About Installing Licenses, page 2-1](#)
- [Prerequisites for Installing and Configuring Licenses, page 2-2](#)
- [Guidelines and Limitations, page 2-2](#)
- [Default Settings, page 2-3](#)
- [Obtaining and Installing a License, page 2-3](#)
- [Transferring Licenses, page 2-7](#)
- [Uninstalling a License, page 2-10](#)
- [Configuring Nonvolatile Licenses, page 2-13](#)
- [Verifying the License Configuration, page 2-15](#)
- [Changing the Serial Number in a License, page 2-17](#)
- [Feature History for Licenses, page 2-19](#)

## Information About Installing Licenses

The Cisco VSG software is available for download at the following URL:

[http://www.cisco.com/en/US/products/ps13095/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps13095/tsd_products_support_series_home.html)

When you download the software from the above location, you are prompted to fill in the online form. When the form has been completed appropriately, you will receive an email that contains the software license claim certificate. The number of licenses you receive depends on how many VEMs you indicate you have and how many CPU sockets you indicate are available on those VEMs.

For detailed information about licenses, see [Chapter 1, “Overview.”](#)

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Prerequisites for Installing and Configuring Licenses

License installation and configuration has the following prerequisites:

- You have a copy of your existing license file(s) with the host ID of the existing VSM.
- 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 that you 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 the configuration procedures for each license file.

## Guidelines and Limitations

Permanent licenses have the following guidelines and limitations:

- If you modify a permanent license key file, the license key file 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 that you 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, Release 4.2(1)SV1(4)*.
- 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 enough 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. For more detailed information on licenses, see the [“Information About Licenses” section on page 1-1](#).

*Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)*

## Default Settings

Table 2-1 lists the default settings for the Cisco Virtual Security Gateway license configuration.

**Table 2-1**      *Default License Parameters*

Parameter	Default
volatile license	Enabled  Licenses are returned to the VSM pool when a VEM has no VM that has VSG service configured or the VEM is out of service.  16 evaluation licenses are available for 60 days.

## 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:

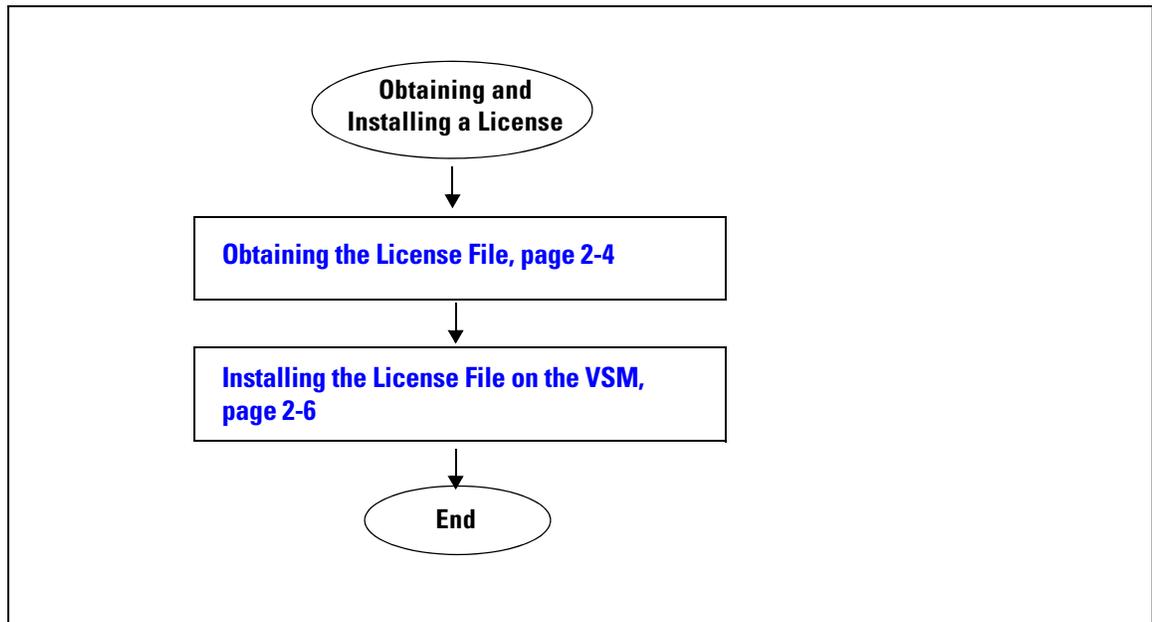
- [Flow Chart: Obtaining and Installing a License, page 2-4](#)
- [Obtaining the License File, page 2-4](#)
- [Installing the License File on the VSM, page 2-6](#)
- [Verifying the License Configuration, page 2-15](#)

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Flow Chart: Obtaining and Installing a License

Use the flow chart in [Figure 1](#) to guide you through the process of installing a license on a VSM. After completing a procedure, return to the flow chart to make sure that you complete all procedures in the correct sequence.

**Figure 1** Flow Chart: Obtaining and Installing a License



## Obtaining the License File

Use the following procedure to obtain a license file for a VSM.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- A license file is tied to each VSM by the host ID or the serial number that is associated with the VSM device.
- Make sure that you have your product authorization key (PAK). The PAK is found 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, which means that your username must have a role that is equivalent to that of 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, Release 4.2(1)SV1(4)*.

## Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)

### PROCEDURE

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

```
n1000v# 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. You will need the host ID in [Step 5](#).

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

You will need the PAK in [Step 5](#).

**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 site, 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 TFTP server.

**Step 7** Copy your license to bootflash on the VSM.

```
n1000v@ 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

n1000v@
```

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Installing the License File on the VSM

Use the following procedure to install the license file(s) on a VSM. Installing multiple licenses is called stacking.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- 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. For more information on default licenses, see the “Default Licenses” section on page 1-2.
- 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, Release 4.2(1)SV1(4)*.

### SUMMARY STEPS

1. **install license bootflash:** *filename*
2. **show license file** *filename*
3. **show license usage** *package\_name*
4. **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<b>install license bootflash:</b> <i>filename</i>  <b>Example:</b> n1000v# install license bootflash:license_file.lic Installing license ..done n1000v#	Installs the license from the active VSM console.  <b>Note</b> 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	<b>show license file</b> <i>filename</i>  <b>Example:</b> n1000v# show license file license_file.lic	Verifies the license installation by displaying the license configured for the VSM.

## *Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)*

	Command	Purpose
Step 3	<b>show license usage</b> <i>package_name</i>  <b>Example:</b> n1000v# show license usage NEXUS_VSG_SERVICES_PKG	Verifies the license installation by displaying it in the license usage table.  <b>Note</b> If you already have VEMs using VSG services, the output of this command shows VEMs and sockets.
Step 4	<b>copy running-config startup-config</b>  <b>Example:</b> n1000v(config)# copy running-config startup-config	(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

## Examples

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

```
n1000v# install license bootflash:license_file.lic
Installing license ..done
n1000v# show license file license_file.lic
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS_VSG_SERVICES_PKG cisco 1.0 permanent 10 \
    HOSTID=VDH=1575337335122974806 \
    NOTICE="<LicFileID>license_file.lic</LicFileID><LicLineID>0</LicLineID> \
    <PAK>PAK12345678</PAK>" SIGN=3AF5C2D26E1A
n1000v# show license usage NEXUS_VSG_SERVICES_PKG
-----
Feature Usage Info
-----
    Installed Licenses : 10
    Default Eval Licenses : 0
    Max Overdraft Licenses : 16
    Installed Licenses in Use : 2
    Overdraft Licenses in Use : 0
    Default Eval Lic in Use : 0
    Licenses Available : 24
    Shortest Expiry      : Never
-----
Application
-----
VEM 3 - Socket 1
VEM 3 - Socket 2
-----
```

## Transferring Licenses

You can use the following procedures in this section to transfer licenses between VEMs and uninstall a license by transferring it from a VEM to the VSM license pool:

- [Transferring Licenses Between VEMs, page 2-8](#)
- [Transferring Licenses to the License Pool, page 2-9](#)

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Transferring Licenses Between VEMs

Use the following procedure to transfer licenses from one VEM to another. For example, you might transfer licenses between VEMs after moving a VM from one host to another.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- 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.
- Licenses cannot be transferred to a VEM unless there are enough licenses in the pool to cover all of its CPUs.
- When licenses are successfully transferred from one VEM to another, the virtual machines on the source VEM can no longer use VSG services and the virtual machines on the destination VEM can now use VSG services.
- For detailed information about the fields in the output of these commands, see the *Cisco Nexus 1000V Command Reference, Release 4.2(1)SV1(4)*.

### SUMMARY STEPS

1. **vsg license transfer src-vem *vem\_no* dst-vem *vem\_no***
2. **show license usage *package\_name***

### DETAILED STEPS

	Command	Purpose
Step 1	<b>vsg license transfer src-vem <i>vem_no</i> dst-vem <i>vem_no</i></b>  <b>Example:</b> n1000v# vsg license transfer src-vem 3 dst-vem 5 n1000v(config)#	Transfers the licenses from one VEM to another.
Step 2	<b>show license usage <i>package_name</i></b>  <b>Example:</b> n1000v# show license usage	Verifies the transfer by displaying the licenses in use on each VEM.

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## EXAMPLES

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

```
n1000v# vsg license transfer src-vem 3 dst-vem 5
n1000v(config)#
n1000v# show license usage NEXUS_VSG_SERVICES_PKG
-----
Feature Usage Info
-----
          Installed Licenses :    10
             Eval Licenses :     0
        Max Overdraft Licenses :   16
  Installed Licenses in Use :     4
  Overdraft Licenses in Use :     0
             Eval Licenses in Use :     0
          Licenses Available :    22
-----
Application
-----
VEM 4 - Socket 1
VEM 4 - Socket 2
VEM 5 - Socket 1
VEM 5 - Socket 2
-----
```

## Transferring Licenses to the License Pool

Use the following procedure to transfer licenses from a VEM to the VSM license pool. For example, you might remove a license from a VEM and transfer it to the VSM license pool.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.
- When you transfer its licenses to the VSM license pool, all VMs on the VEM can no longer use the VSG service.
- For detailed information about the fields in the output of these commands, see the *Cisco Nexus 1000V Command Reference, Release 4.2(1)SV1(4)*.

### SUMMARY STEPS

1. **vsg license transfer src-vem *vem no* license\_pool**
2. **show license usage *package\_name***

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## DETAILED STEPS

	Command	Purpose
Step 1	<b>vsg license transfer src-vem</b> <i>vem_no</i> <b>license_pool</b>  <b>Example:</b> n1000v# vsg license transfer src-vem 3 license_pool n1000v(config)#	Transfers the licenses from a VEM to the license pool. All virtual machines on the VEM can no longer use the VSG service.
Step 2	<b>show license usage</b> <i>package_name</i>  <b>Example:</b> n1000v# show license usage	Verifies the transfer by displaying the licenses in use on each VEM.

## EXAMPLES

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.

```
n1000v# show license usage NEXUS_VSG_SERVICES_PKG
-----
Feature Usage Info
-----
          Installed Licenses :    10
             Eval Licenses  :     0
    Max Overdraft Licenses :    16
Installed Licenses in Use :     2
Overdraft Licenses in Use :     0
             Eval Licenses in Use :     0
          Licenses Available :    24
-----
Application
-----
VEM 4 - Socket 1
VEM 4 - Socket 2
-----
```

# Uninstalling a License

Use the following procedure to uninstall a license that is not in use.

## BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:



### Caution

When you uninstall a license file from a VSM, the VMs on the VEMs can no longer use VSG services, which could cause a service disruption in your network.

- You are logged in to the CLI in EXEC mode.
- If a license is in use, you cannot delete it. This procedure includes instructions for transferring all licenses from the VEMs to the VSM license pool before uninstalling the license file.

## ***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

- Only users with the network-admin role can uninstall licenses. For information on user accounts and roles, see the *Cisco Nexus 1000V Security Configuration Guide, Release 4.2(1)SV1(4)*.
- For detailed information about the fields in the output of these commands, see the *Cisco Nexus 1000V Command Reference, Release 4.2(1)SV1(4)*.

### SUMMARY STEPS

1. **copy running-configure terminalftp://server/path/filename**
2. **show license brief**
3. **show license usage package\_name**
4. **vsg license transfer src-vem vem no license\_pool**
5. Repeat Step 4 for each VEM.
6. **clear license license\_name**
7. **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<b>copy running-configure terminalftp://server/path/filename</b>  <b>Example:</b> n1000v# copy running-configure terminalftp: n1000v(config)#	Copies the VSM running configuration to a remote server.
Step 2	<b>show license brief</b>  <b>Example:</b> n1000v# show license brief Enterprise.lic n1000v#	Identifies the name of the license file to uninstall.

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

	<b>Command</b>	<b>Purpose</b>
<b>Step 3</b>	<p><b>show license usage</b> <i>package_name</i></p> <p><b>Example:</b>  n1000v# show license usage  NEXUS_VSG_SERVICES_PKG  -----  Feature Usage Info  -----  Installed Licenses : 10  Eval Licenses : 0  Max Overdraft Licenses : 16  Installed Licenses in Use : 4  Overdraft Licenses in Use : 0  Eval Licenses in Use : 0  Licenses Available : 22  -----  Application  -----  VEM 3 - Socket 1  VEM 3 - Socket 2  VEM 4 - Socket 1  VEM 4 - Socket 2  -----  n1000v#</p>	<p>Displays the licenses in use on each VEM so that you can transfer them back to the VSM license pool before uninstalling the license file.</p>
<b>Step 4</b>	<p><b>vsg license transfer src-vem</b> <i>vem_no</i>  <b>license_pool</b></p> <p><b>Example:</b>  n1000v# vsg license transfer src-vem 3  license_pool  n1000v#</p>	<p>Transfers the licenses from the VEM back to the VSM license pool.</p> <p>As the licenses are transferred from a VEM, the VMs on the VEM can no longer use the VSG service.</p>
<b>Step 5</b>	<p>Repeat <a href="#">Step 4</a> for each VEM until all licenses in use have been transferred back to the VSM license pool.</p>	
<b>Step 6</b>	<p><b>clear license</b> <i>license_name</i></p> <p><b>Example:</b>  n1000v# clear license Enterprise.lic  Clearing license Enterprise.lic:  SERVER this_host ANY  VENDOR cisco  Do you want to continue? (y/n) y  Clearing license ..done</p>	<p>Begins the uninstall of the named license file.</p> <p>In this example, the Enterprise.lic file is uninstalled.</p>
<b>Step 7</b>	<p><b>copy running-config startup-config</b></p> <p><b>Example:</b>  n1000v(config)# copy running-config  startup-config</p>	<p>(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.</p>

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## EXAMPLES

This example shows how to uninstall a license that is no longer in use. In this example, the file to uninstall is the Enterprise.lic file.

```
n1000v# show license brief
Enterprise.lic
n1000v#
n1000v# show license usage NEXUS_VSG_SERVICES_PKG
-----
Feature Usage Info
-----
          Installed Licenses :    10
            Eval Licenses :     0
      Max Overdraft Licenses :    16
Installed Licenses in Use :     4
Overdraft Licenses in Use :     0
            Eval Licenses in Use :     0
          Licenses Available :    22
-----
Application
-----
VEM 3 - Socket 1
VEM 3 - Socket 2
VEM 4 - Socket 1
VEM 4 - Socket 2
-----
n1000v# vsg license transfer src-vem 3 license_pool
n1000v# clear license Enterprise.lic
Clearing license Enterprise.lic:
SERVER this_host ANY
VENDOR cisco
Do you want to continue? (y/n) y
Clearing license ..done
n1000v(config)# copy running-config startup-config
```

# Configuring Nonvolatile Licenses

This section provides information about enabling and disabling the nonvolatile license feature and includes the following topics:

- [Enabling Nonvolatile Licenses, page 2-13](#)
- [Disabling Nonvolatile Licenses, page 2-14](#)

## Enabling Nonvolatile Licenses

Use the following procedure to enable nonvolatile licenses so that whenever a VEM is taken out of service, it keeps its license and does not return the license to the VSM pool of available licenses.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.

## Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)

- A nonvolatile license is disabled by default. The licenses are returned to the VSM pool when a VEM is removed from service or no VMs use VSG service on the VEM.

### SUMMARY STEPS

1. **configure terminal**
2. **no vsg license volatile**
3. **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> n1000v# configure terminal n1000v(config)#	Places you into global configuration mode.
Step 2	<b>no vsg license volatile</b>  <b>Example:</b> n1000v(config)# no vsg license volatile n1000v(config)#	Enables nonvolatile licenses in the running configuration.
Step 3	<b>copy running-config startup-config</b>  <b>Example:</b> n1000v(config)# copy running-config startup-config	(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

## Disabling Nonvolatile Licenses

Use the following procedure to disable nonvolatile licenses so that when a VEM is taken out of service, its licenses are returned to the VSM pool of available licenses.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- You are logged in to the CLI in EXEC mode.
- A volatile license is disabled by default. Licenses are not returned to the VSM pool when a VEM is removed from service.
- For detailed information about the fields in the output of these commands, see the *Cisco Nexus 1000V Command Reference, Release 4.2(1)SVI(4)*.

### SUMMARY STEPS

1. **configure terminal**
2. **vsg license volatile**
3. **copy running-config startup-config**

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> n1000v# configure terminal n1000v(config)#	Places you into global configuration mode.
Step 2	<b>vsg license volatile</b>  <b>Example:</b> n1000v(config)# vsg license volatile n1000v(config)#	Disables nonvolatile licenses in the running configuration.
Step 3	<b>copy running-config startup-config</b>  <b>Example:</b> n1000v(config)# copy running-config startup-config	(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

## Verifying the License Configuration

To display the license configuration, do one of the following tasks:

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 and the expiration date for evaluation licenses.
<b>show license usage</b>	Displays the total number of licenses in use on the VEMs.
<b>show license usage <i>package_name</i></b>	Displays statistics about the number of evaluation and permanent licenses available, installed, and in use on the VSM.

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Examples for the Show Commands

The following example shows how to use the **show license usage** command to display the license usage:

```
n1000v# show license usage NEXUS_VSG_SERVICES_PKG
-----
Feature Usage Info
-----
      Installed Licenses : 10
      Default Eval Licenses : 0
      Max Overdraft Licenses : 16
      Installed Licenses in Use : 2
      Overdraft Licenses in Use : 0
      Default Eval Lic in Use : 0
      Licenses Available : 24
      Shortest Expiry      : 25 May 2010
-----
Application
-----
VEM 3 - Socket 1
VEM 4 - Socket 1
-----
```

The following example shows how to use the **show license brief** command to display the license name:

```
n1000v# show license brief
Enterprise.lic
n1000v#
```

The following example shows how to use the **show license file** command to display the evaluation license parameters:

```
n1000v# show license file eval.lic
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS1_VSG_SERVICES_PKG cisco 1.0 1-dec-2010 16 \
  HOSTID=VDH=0871396331270074457 \
  NOTICE="<LicFileID>eval.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=E08A38544DBE
```

The following example shows how to use the **show license file** command to display the evaluation license parameters:

```
n1000v# show license file Enterprise.lic
SERVER this_host ANY
VENDOR cisco
INCREMENT NEXUS_VSG_SERVICES_PKG cisco 1.0 permanent 16 \
  HOSTID=VDH=0871396331270074457 \
  NOTICE="<LicFileID>Enterprise.lic</LicFileID><LicLineID>0</LicLineID> \
  <PAK>dummyPak</PAK>" SIGN=E08A38544DBE
```

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Changing the Serial Number in a License

Use the following procedure to 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.

This section includes the following topics:

- [Flow Chart: Changing the Serial Number in a License, page 2-17](#)
- [Obtaining the License File, page 2-4](#)
- [Installing the License File on the VSM, page 2-6](#)
- [Verifying the License Configuration, page 2-15](#)



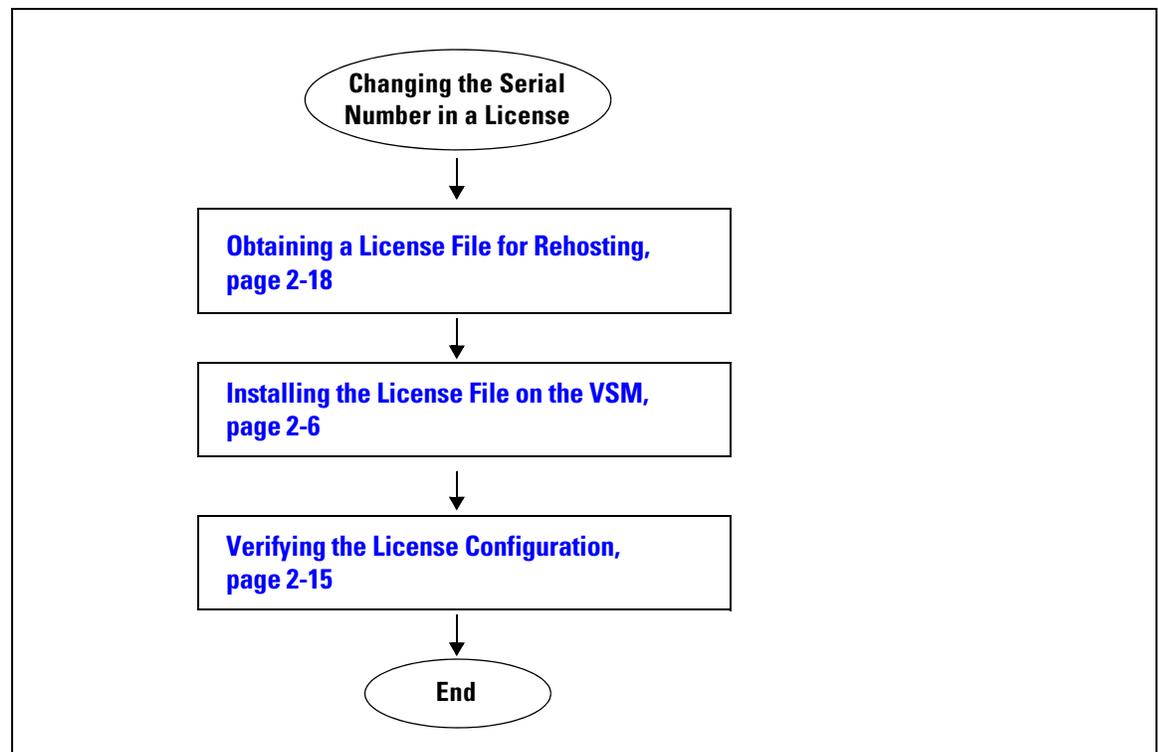
### Caution

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

## Flow Chart: Changing the Serial Number in a License

Use the flow chart in [Figure 2](#) to guide you through the process required to change the serial number, or host ID, in an existing license. After completing a procedure, return to the flow chart to make sure you complete all procedures in the correct sequence.

**Figure 2** *Flow Chart: Changing the Serial Number in a License*



***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Obtaining a License File for Rehosting

Use the following procedure to obtain a license file for a new VSM host, if the old VSM host is lost or destroyed.

### BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- A license file is tied to each VSM by the host ID, or the VSM serial number.
- 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, Release 4.2(1)SVI(4)*.

### PROCEDURE

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

```
n1000v# 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. You will need the host ID in [Step 5](#).

**Step 2** E-mail the following information to [licensing@cisco.com](mailto:licensing@cisco.com), requesting the license file be rehosted to the new host ID:

- The new host ID
- A copy of the existing license file from the old VSM

A new license key file, with the host ID of the new VSM, is sent to you in an 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 TFTP server.

**Step 4** Copy your license to bootflash on the VSM.

```
n1000v@ 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
n1000v@
```

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

## Feature History for Licenses

This section provides the release history for the license feature.

Feature Name	Releases	Feature Information
Evaluation license	4.0(4)SV1(3)	16 evaluation licenses that are good 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 must be installed.
<b>show license usage</b> <i>package_name</i> command	4.0(4)SV1(2)	The <b>show license usage</b> <i>filename</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.

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***



# CHAPTER 3

## Licensing Terminology

Table 3-1 describes the terminology used in Cisco VSG and Cisco Nexus 1000V licensing.

**Table 3-1**      *Licensing Terminology*

Term	Definition
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.
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 be used only on a particular device using the unique host ID for the device.
Permanent license	A license that is not time bound is called a permanent license.

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com)***

**Table 3-1**      **Licensing Terminology (continued)**

<b>Term</b>	<b>Definition</b>
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 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, for example VSM.
Software license claim certificate	A document entitling 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	<p>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.</p> <p>In contrast, if its licenses are nonvolatile, then 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.</p> <p>Volatile licenses are disabled by default. That is, the licenses in VEMs are nonvolatile and are not released when a VEM is removed from service.</p>



## INDEX

---

### C

changing VSM serial number [2-16](#)  
claim certificate, definition [3-2](#)  
claim certificate for software license [2-1](#)  
commands  
    clear license [2-11](#)  
    copy to bootflash [2-4, 2-17](#)  
    install license bootflash [2-5](#)  
    show license [2-14](#)  
    show license brief [2-10, 2-14](#)  
    show license file [2-5, 2-14](#)  
    show license usage [2-6, 2-7, 2-9, 2-11, 2-14](#)  
    svs license transfer src-vem license\_pool [2-9, 2-11](#)  
    svs license volatile [2-13](#)  
    vsg license transfer src-vem [2-7](#)

---

### D

default licenses, about [1-2](#)  
documentation  
    related documents [1-vi](#)

---

### E

evaluation license, definition [3-1](#)  
evaluation licenses, about [1-2](#)

---

### F

flow chart  
    obtaining and installing a license [2-3](#)

---

### H

high availability [1-3](#)  
host ID  
    definition [3-1](#)  
    obtaining [2-3, 2-17](#)  
host ID, changing in license [2-16](#)

---

### I

incremental license, definition [3-1](#)  
install license bootflash command [2-5](#)

---

### K

key, product authorization [2-3, 2-17](#)

---

### L

license  
    terminology [3-1](#)  
license key  
    definition [3-1](#)  
    installing [2-5](#)  
    obtaining [2-3, 2-17](#)  
license types  
    default [1-2](#)  
    evaluation [1-2](#)  
    overdraft [1-3](#)  
    permanent [1-1](#)

***Send document comments to [vsg-docfeedback@cisco.com](mailto:vsg-docfeedback@cisco.com).***

---

## O

overdraft licenses, about [1-3](#)

---

## P

PAK

definition [3-2](#)

obtaining [2-3, 2-17](#)

permanent licenses, about [1-1](#)

---

## R

rehosting

definition [3-2](#)

process [2-16](#)

related documents [1-vii](#)

---

## S

serial number, changing in license [2-16](#)

show license brief command [2-14](#)

show license command [2-14](#)

show license file command [2-14](#)

show license usage command [2-14](#)

software download site, link to [2-4](#)

software license claim certificate [2-1](#)

definition [3-2](#)

using to locate PAK [2-3, 2-17](#)

stacking

definition [3-2](#)

procedure [2-5](#)

svs license transfer src-vem license\_pool command [2-9](#)

svs license volatile command [2-13](#)

between VEMs [2-7](#)

to the license pool [2-8](#)

types of licenses

default [1-2](#)

evaluation [1-2](#)

overdraft [1-3](#)

permanent [1-1](#)

---

## U

uninstalling a license [2-9](#)

---

## V

VEM licenses, displaying [2-14](#)

verifying licenses [2-14](#)

volatile license

configuring [2-12](#)

definition [3-2](#)

disabling [2-13](#)

enabling [2-12](#)

vsg license transfer src-vem command [2-7](#)

---

## T

transferring a license