Obtaining and Installing Licenses

Licensing functionality is available in all switches in the Cisco MDS 9000 Family. This functionality allows you to access specified premium features on the switch after you install the appropriate license for that feature. Licenses are sold, supported, and enforced in Cisco MDS 9000 Family Cisco MDS SAN-OS Release 1.3(1) and later.

This chapter contains information related to licensing types, options, procedures, installation, and management for the Cisco MDS SAN-OS software.

This chapter includes the following sections:

Licensing Terminology

The following terms are used in this chapter:

- 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 switch.

- License expiry—The time span during which a licensed feature is valid. The software tracks all licenses and sends periodic alerts before shutting down the licensed feature.

- Counted license—The number of usage instances for a licensed feature.

- Licensed application—A software feature that requires a license to be used.

- License enforcement—A mechanism that prevents a feature from being used without first obtaining a license.

- Node-locked license—A license that can only be used on a particular switch using the switch's unique host ID.

- Host IDs—A unique chassis serial number that is specific to each Cisco MDS switch.

- Proof of purchase—A document entitling it's rightful owner to use licensed feature(s) on one Cisco MDS switch as described in that document. Also known as the claim certificate.

- Product Authorization Key (PAK)—The PAK allows you to obtain a license key from one of the sites listed in the proof of purchase document. After registering at the specified website, you will receive your license key file and installation instructions through e-mail.

- License key file—A switch-specific unique file that specifies the licensed features. Each file contains digital signatures to prevent tampering and modification. License keys are required to use a licensed feature. License keys are enforced within a specified time span.

    – License keys are required if your switch is running Cisco MDS SAN-OS Release 1.3 or later.

    – License keys are not enforced for features in Cisco MDS SAN-OS Release 1.2 or earlier.

- Counted license—The number of licenses issued for a single feature (for example, FCIP). You can increase counted licenses (incremental licenses) should a need arise in the future.

- Incremental license—An additional licensed feature that was not in the initial license file. License keys are incremental—if you purchase some features now and others later, the license file and the software detect the sum of all features for the specified switch.

- Evaluation license—A temporary license. Evaluation licenses are time bound (valid for a specified number of days) and are not tied to a host ID (switch serial number).

- Permanent license—A license that is not time bound (does not have an expiry date) is called a permanent license.

- Grace period—The amount of time the features in a license package can continue functioning without a license. The grace period is set to 120 days, and the countdown starts when either of the following two situations occur:

    – You are evaluating a feature for which you have not purchased a license.

    – You purchased a license that has reached its expiry date.

  License packages can contain several features. If you disable a feature during the grace period, the clock does not stop for that feature, or for the other features in that license package. To suspend the grace period countdown for a licensed feature, you must disable every feature in that licence package.

- Support—If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL: http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Licensing Model

The licensing model defined for the Cisco MDS product line has two options:

- Feature-based licensing: features that are applicable to the entire switch. The cost varies based on a per-switch usage. Table 9-1 lists the feature-based license packages.

- Module-based licensing: features that require additional hardware modules. An example is the IPS-8 or IPS-4 module using the FCIP feature.

> **Note** Each module requires its own separate license. If you replace a module that requires a license with a module of the same type (such as replacing a Storage Services Module (SSM) with another SSM), the existing license will support the new module.

> **Note** Any feature that is not included in a license package is bundled with the Cisco MDS 9000 Family switches and provided at no charge to the user.

Table 9-1   Feature-Based Licenses

Feature License	Features

Enterprise package
(ENTERPRISE_PKG)
	• Enhanced security features:
	  – LUN zoning
	  – Read-only zones
	  – Port security
	  – VSAN-based access control
	  – Fibre Channel Security Protocol (FC-SP) authentication
	  – IP Security Protocol (IPsec) for iSCSI and FCIP using the MPS-14/2 module or Cisco MDS 9216i Switch
	• Advanced traffic engineering—Quality of Service (QoS)
	• Enhanced VSAN routing—inter-VSAN routing
	Note IVR over FC is bundled with the Cisco MDS 9216i switch and does not require the SAN extension over IP package.
	• IVR Network Address Translation
	• Zone-based traffic prioritizing
	• Extended credits using the MPS-14/2 module or the Cisco MDS 9216i Multilayer Fabric Switch
	• Zone-based QoS
	• Extended Credits
	• Fibre Channel write acceleration
	• SCSI flow statistics

Table 9-1   Feature-Based Licenses (continued)

Feature License	Features
SAN extension over IP (SAN_EXTN_OVER_IP)	SAN extension license are available for the IPS-8, IPS-4 and MPS-14/2. • FCIP protocol • FCIP compression • FCIP write acceleration • FCIP tape acceleration • SAN extension tuner features • IVR over FCIP **Note** IVR over FC is bundled with the Cisco MDS 9216i switch and does not require the SAN extension over IP package. • IVR NAT • Hardware-based FCIP compression using the MPS-14/2 module or the Cisco MDS 9216i Multilayer Fabric Switch
Mainframe (MAINFRAME_PKG)	• FICON protocol and CUP management • FICON VSAN and intermixing • Switch cascading • Fabric binding • IBM TotalStorage Virtual Tape Server (VTS) • IBM TotalStorage XRC application

Table 9-1 *Feature-Based Licenses (continued)*

Feature License	Features
Fabric Manager Server (FM_SERVER_PKG)	• Multiple physical fabric management • Centralized fabric discovery services • Continuous MDS health and event monitoring • Long term historical Fibre Channel performance monitoring • Performance reports and charting for hotspot analysis • Web-based operational view • Fabric Manager Web Client for operational view • Performance Thresholds • Fabric Manager server proxy services

Storage Services Enabler	• Provides the underlying infrastructure and programmatic interface to enable network-based storage applications when used with the Advanced Services Modules (ASMs) and Storage Services Modules (SSMs).
	• The network-based storage applications running on the ASM and SSM that require the SSE license are as follows:
	    – VERITAS STorage Foundation for Networks
	• The intelligent fabric applications running on the SSM that require the SSE license are as follows:
	    – SANTap
	    – Network-Accelerated Serverless Backup (NASB)
	    – Third-party partner applications

Licensing High Availability

As with other Cisco MDS SAN-OS features, the licensing feature also maintains the following high availability standards for all switches in the Cisco MDS 9000 Family:

• Installing any license in any switch is a nondisruptive process.

• Installing a license automatically saves a copy of permanent licenses to the chassis in all switches.

• Enabling a license feature without a license key starts a counter on the grace period. You then have 120 days to install the appropriate license keys or disable the use of that feature. If at the end of the 120 day grace period the switch does not have a valid license key for the feature, the feature is automatically disabled by the switch.

Directors in the Cisco MDS 9500 Series have the following additional high availability features:

• The license software runs on both supervisor modules and provides failover protection.

• The license key file is mirrored on both supervisor modules. Even if both supervisor modules fail, the license file continues to function from the version that is available on the chassis.

Options to Install a License

Licenses are installed on the switch using TFTP. If you have purchased a new switch through either your reseller or through Cisco Systems, you can:

- Obtain a factory-installed license (only applies to new switch orders).
- Perform a manual license Installation (applies to existing switches).

Obtaining a Factory-Installed License

You can obtain factory-installed licenses for a new switch.

To obtain a factory-installed license for a new Cisco MDS switch, follow these steps.

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

> ✎
> **Note**   If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL:
> http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Your switch is shipped with the required licenses installed in the system. The proof of purchase document is sent along with the switch.

**Step 2**   Obtain the host ID from the proof of purchase for future use.

Step 3   Start to use the switch and the licensed features.

Performing a Manual Installation

If you have existing switches or if you wish to install the licenses on your own, you must first obtain the license key file and then install that file in the switch (see Figure 9-1).

Figure 9-1   **Obtaining a License Key File**
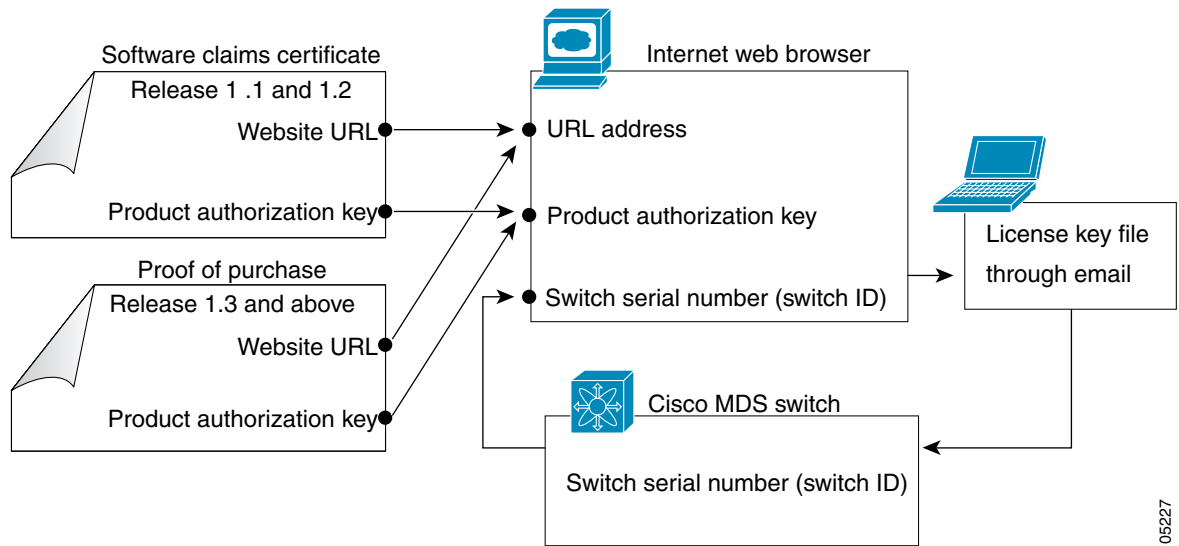
Obtaining the License Key File

To obtain new or updated license key files, follow these steps.

Step 1   Obtain the serial number for your switch. The host ID is also referred to as the switch serial number.

Step 2   Obtain either your claim certificate or your proof of purchase document. This document accompanies every Cisco MDS switch.

Step 3   Get the product authorization key (PAK) from either the claim certificate or the proof of purchase document.

Step 4   Locate the website URL from either the claim certificate or the proof of purchase document.

Step 5   Access the specified URL that applies to your switch and enter the switch serial number and the PAK.

The license key file is sent to you by e-mail. The license key file is digitally signed to only authorize use on the requested switch. The requested features are also enabled once the Cisco MDS SAN-OS software on the specified switch accesses the license key file.

⚠
Caution   Install the license key file in the specified MDS switch without making any modifications.

A license is either permanent or it expires on a fixed date. If you do not have a license, the grace period for using that license starts from the first time you start using a feature offered by that license (see the "License Expiry Alerts" section on page 9-13).

Installing the License Key File

Tip   If you need to install multiple licenses in any switch in the Cisco MDS 9000 Family, be sure to provide unique file names for each license key file.

If you have purchased a new switch through either your reseller or through Cisco, you can have the licenses pre-installed in the factory, or you can install the licenses yourself. If you already have an existing switch, you install the licenses yourself. The best way to install licenses on the switches in your fabric is to use the License Wizard provided in Fabric Manager. You can also use Device Manager to install licenses on each switch individually.

Note   You do not need a license to access a switch with Fabric Manager. See the "Licensing Model" section on page 9-2 for a list of features requiring licenses.

You can install licenses two ways:

*   Using the Fabric Manager License Wizard
*   Using Device Manager

Installing Licenses Using Fabric Manager License Wizard

To install licenses using the Fabric Manager License Wizard, follow these steps:

Step 1   Log into a switch in the fabric containing the switches for which you want to install licenses.

To install licenses on multiple switches, you do not need to log into each switch; however, the switches must be in the fabric you are viewing.

Step 2   Start the License Wizard by clicking the **License Install Wizard** icon in the Fabric Manager toolbar (see Figure 9-2). Or you can select **Switches > Licenses** from the Physical Attributes pane. You see the license information in the Information pane, one line per feature. Click the **Keys** tab, and then click the **License Install Wizard** icon in the toolbar.

Figure 9-2   License Install Wizard Icon
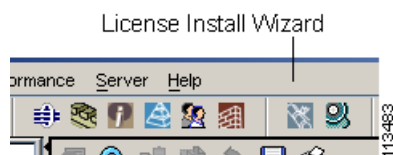
You see the initial screen of the License Wizard.

Step 3   If you have already obtained the license key files, click that radio button and proceed to Step 6.

Step 4   Click **I have the Product Authorization Key (PAK)** if you have the authorization key.

Step 5   Select the vendor from which you purchased your switch.

The License Server URL changes depending on the vendor you select. If your URL is different, or if you select **Other** as the vendor, enter the correct license server URL.

> ✎
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> **Note**   In some cases, license validation from Cisco partners requires Java version 1.4.2_04 or higher. If you cannot install licenses from a Cisco partner, check to make sure your Java version is at least 1.4.2_04.

Step 6   Click **Next** to continue to the next screen.

Step 7   Select the switches for which you have PAKs or license key files.

When you check the checkbox for a switch, the PAK or license file name field for that switch becomes editable. The VDH=<serial number> for each switch is shown in the Host ID column.

Step 8   Enter the PAK or license file name for each switch you have selected in the appropriate column. If you have the license files on your PC, you can double-click on the License File Name text area to bring up a dialog box and browse for the license files.

You can install multiple licenses on the same switch using different PAKs. To do this, enter the PAKs separated by commas.

Step 9   Click **Finish** to transfer the licenses from the host to the switches.

Fabric Manager accesses the appropriate license site and installs the licenses onto each switch. The status of each installation is displayed in the Status column, as follows:

- success—Install or uninstall operation completed successfully.
- inProgress—License install or uninstall operation is in progress.
- corruptedLicenseFile—License file content is Invalid/Corrupted.
- targetLicenseFileAlreadyExist—Target license file name already exists.
- invalidLicenseFileName—License file does not exist.
- duplicateLicense—License file is already installed.
- generalLicensingFailure—General error from License Manager.
- none—No install operation is performed.
- licenseExpiryConflict—License exist with a different expiration date for the feature.
- invalidLicenseCount—License count is invalid for the feature.

Step 10   Click the **Close** button to close the wizard. To install more licenses at this point, you must close the wizard and launch it again.

Viewing License Information in Fabric Manager

To view license information in Fabric Manager, follow these steps:

Step 1   Select **Switches > Licenses** from the Physical Attributes pane. You see the license information in the Information pane, one line per feature.

Step 2   Click the **Feature Usage** tab to see the switch, name of the feature package, the type of license installed, the number of licenses used (Installed Count), the expiration date, the grace period (if you do not have a license for a particular feature), and any errors (for example, if you have a missing license). Click the **Keys** tab to display the information about each of the License Key files installed on your switches.

> ⚠
>
> **Caution**   Once an expiration period has started, notifications about license expiration appear in the Fabric Manager's Events pane on a daily basis. During the last seven days of the expiration period, these messages are displayed hourly. After the final seven days of the expiration period, the feature is turned off and your network traffic may be disrupted.

Step 3   Click the **Usage** tab to see the applications using the feature package on each switch. Use this tab to determine which applications depend on each license you have installed.

Viewing Licenses Using Fabric Manager Web Services

Fabric Manager Release 2.1(2) or later supports viewing license use across the fabric from Fabric Manager Web Services. This view summarizes the licenses used on all switches in the fabric.

To view licenses using Fabric Manager Web Services, choose **Inventory > Licenses**.

Installing or Updating Licenses Using Device Manager

To install a license on your switch using Device Manager, follow these steps:

Step 1   Select **Licenses** from the Admin menu.

You see the Licenses dialog box.

Step 2   Click the **Install** tab to display the Install fields.

The HostId shows the "VDH=" portion of the serial number. The rest of the number is filled in when you complete Steps 3 through 5.

Step 3   Enter the uniform resource identifier (URI) from which the license file will be retrieved for installation.

You should already have copied the license file provided by Cisco.com or by some other means (for example, through the CLI) to this location.

Step 4   Enter the target filename in the **Target Filename** field with which the license file will be installed.

Step 5   Click **Install** if you are installing, or **Update** if you are updating.

You see the status of the installation at the bottom of the dialog box, as follows:

- success—Install or uninstall operation completed successfully.
- inProgress—License install/uninstall operation is in progress.
- corruptedLicenseFile—License file content is Invalid/Corrupted.
- targetLicenseFileAlreadyExist—Target license file name already exists.
- invalidLicenseFileName—License file does not exist.
- duplicateLicense—License file is already installed.

- generalLicensingFailure—General error from license Manager.

- none—No install operation is performed.

- licenseExpiryConflict—License exist with a different expiration date for the feature.

- invalidLicenseCount—License count is invalid for the feature.

- notThisHost—License host-id in the license file doesn't match.

- licenseInGraceMore—Number of licenses in grace period is more than the number in install license file.

- licenseFileNotFound—License file not found, for install/uninstall/update operation.

- licenseFileMissing—A previously installed license file is found missing.

- invalidLicenseFileExtension—License file does not have a .lic extension.

- invalidURI—Invalid license file URI, specified for install operation.

- noDemoLicenseSupport—Demo license not supported.

- invalidPlatform—Invalid Platform.

Step 6   Repeat Steps 3 through 5 to install another license, or click **Close** to close the License Manager dialog box.

Viewing License Information in Device Manager

To view license information in Device Manager, follow these steps:

Step 1   Select **Licenses** from the Admin menu. You see the Licenses dialog box.

Step 2   Click the **Features** tab to see the name of the feature package, the type of license, the expiration date, the grace period (if you do not have a license for a particular feature), and any errors, such as a missing license. Click the **Files** tab to display the information about each of the License Key files installed on your switch. Click the **Install** tab to install or update a license file. Click the **Usage** tab to see the applications that are using the features on the switch.

Uninstalling Licenses

You can only uninstall a permanent license that is not in use. If you try to delete a permanent license that is currently being used, the software rejects the request and issues an error message. Uninstalling an unused license causes the grace period to come into effect. The grace period is counted from the first use of the feature without a license and is reset when a valid license file is installed.

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

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

Caution   Uninstalling a license requires the related features to first be disabled.

To uninstall the licenses, follow these steps:

Step 1   Log into the switch. If you are using Fabric Manager to remove licenses from multiple switches, you do not need to log in to each switch; however, the switches must be in the fabric you are viewing.

Step 2   From Fabric Manager, select **Switches > Licenses** from the Physical Attributes pane. You see the license information in the Information pane, one line per feature.

From Device Manager, select **Licenses** from the Admin menu. You see the Licenses dialog box.

Step 3   In Fabric Manager, click the **Keys** tab. You see the list of License Key files. Click the name of the license you want to remove, and press the **Delete** key or click the **Delete Row** icon in the toolbar.

In Device Manager, click **Uninstall**, and enter the name of the License Key file you want to remove. Click **Apply** to remove the License Key file, and click **Close** to close the dialog box.

Note   To delete a license, you must disable the features enabled by that license. The delete procedure fails if the license is in use, and an error message is displayed.

Updating Licenses

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

Note   If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL:
http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

To update a license, follow these steps:

Step 1   Obtain the updated license file using the procedure described in the "Obtaining the License Key File" section on page 9-7.

Step 2   Save your running configuration to a remote server.

Step 3   Verify the name of the file to be updated.

Step 4   Follow the procedure for updating a license, described in the "Installing or Updating Licenses Using Device Manager" section on page 9-10.

License Expiry Alerts

The Cisco MDS SAN-OS license counter keeps track of all licenses on a switch. Once an expiry period has started, you will receive console messages, SNMP traps, system messages, and Call Home messages on a daily basis.

Beyond that, the frequency of these messages become hourly during the last seven days of the expiry time span. The following example uses the FICON license feature.

Your FICON license feature is scheduled to expire in 60 days. If today is December 1st, the license expires on January 30th. In this case, you will receive:

- Daily alerts from December 1st to January 23rd.
- Hourly alerts from January 24th to January 29th.
- From January 30th, the FICON feature runs without a license for a grace period of 120 days.
- From January 30th to May 21st, you receive daily alerts about the grace period usage.
- From May 22nd to May 30th, you receive hourly alerts about the grace period ending.
- On May 31st, the FICON feature is automatically turned off.

Note   License expiry alerts cannot be configured.

Caution   After the final seven days of the grace period, the feature is turned off and your network traffic may be disrupted. The grace period also applies to licensed features in Cisco MDS 9000 Family Cisco MDS SAN-OS Release 1.2(x). While Cisco MDS SAN-OS Release 1.2(x) did not enforce licenses, any future upgrade will enforce license requirements and the 120-day grace period.

Moving Licenses Between Switches

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

Note   If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco Systems, contact Cisco Technical Support at this URL:
http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Fabric Manager Server Licensing

When you install Fabric Manager, the a basic version of the Fabric Manager Server (FMServer) is installed with it. To get the enhanced features, such as Performance Manager and remote client support) you will need to buy and install the Cisco MDS 9000 Family Fabric Manager Server license package.

However, trial use of these enhanced features is available. To enable the 120-day trial, you simply use the feature as you would if you had purchased the license. You see a dialog box explaining that this is a demo version, enabled for a limited time.

If you are evaluating Fabric Manager Server features and want to stop the evaluation period for that feature, you can do that using Device Manager.

To stop the evaluation, follow these steps:

Step 1   From Device Manager, select **Admin > Licenses**.

You see the Licenses dialog box.

Step 2   In the **Features** tab, select the feature you want to check in.

When you select the feature, you see a **Check In FM** button at the bottom of the dialog box.

Step 3   Click **Check In FM** to stop the demo period timer.