

This section describes how to manage the issues with licensing. 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 supported, and enforced in Cisco MDS SAN-OS Release 1.3(1) and later.

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License Overview

Cisco SAN-OS requires licenses for advanced features. These licenses have two options:

- Feature-based licensing ? Features that are applicable to the entire switch. You need to purchase and install a license for each switch that uses the features you are interested in. The Enterprise license is an example of a feature-based license.
- Module-based licensing ? Features that require additional hardware modules. You need to purchase and install a license for each module that uses the features you are interested in. The SAN Extension over IP license is an example of a module-based license.

 **Note:** The Cisco MDS 9216i switch enables SAN Extension features on the two fixed IP services ports only. The features enabled on these ports are identical to the features enabled by the SAN Extension over IP license on the 14/2-port Multiprotocol Services (MPS-14/2) module. If you install

a module with IP ports in the empty slot on the Cisco MDS 9216i, a separate SAN Extension over IP license is required to enable related features on the IP ports of the additional module.

Chassis Serial Numbers

Licenses are created using the serial number of the chassis where the license file is to be installed. Once you order a license based on a chassis serial number, you cannot use this license on any other switch. If you use a license meant for another chassis, you may see the following system message:

Error Message LICMGR-3-LOG_LIC_INVALID_HOSTID: Invalid license hostid VDH=[chars for feature [chars].

Explanation The feature has a license with an invalid license host ID. This can happen if a supervisor module with licensed features for one switch is installed on another switch.

Recommended Action Reinstall the correct license for the chassis where the supervisor module is installed.

Grace Period

If you use a feature that requires a license but have not installed a license for that feature, you are given a 120-day grace period to evaluate the feature. You must purchase and install the number of licenses required for that feature before the grace period ends or Cisco SAN-OS will disable the feature at the end of the grace period. If you try to use an unlicensed feature, you may see the following system messages:

Error Message LICMGR-2-LOG_LIC_GRACE_EXPIRED: Grace period expired for feature[chars].

Explanation The unlicensed feature has exceeded its grace time period. Applications using this license will be shut down immediately.

Recommended Action Install the license file to continue using the feature.

Error Message LICMGR-3-LOG_LICAPP_NO_LIC: Application [chars] running without[chars] license, shutdown in [dec] days.

Explanation The application has not been licensed. The application will work for a grace period of [dec] days after which it will be shut down unless a license file for the feature is installed.

Recommended Action Install the license to continue using the feature.

Error Message LICMGR-3-LOG_LIC_LICENSE_EXPIRED: Evaluation license expired for feature [chars].

Explanation The feature has exceeded its evaluation time period. The feature will be shut down after a grace period.

Recommended Action Install the license to continue using the feature.

Error Message LICMGR-3-LOG_LIC_NO_LIC: No license(s) present for feature [chars].
Application(s) shutdown in [dec] days.

Explanation The feature has not been licensed. The feature will work for a grace period, after which the application(s) using the feature will shut down.

Recommended Action Install the license to continue using the feature.

Error Message LICMGR-6-LOG_LICAPP_EXPIRY_WARNING: Application [chars] evaluation license [chars] expiry in [dec] days.

Explanation The application will exceed its evaluation time period in the listed number of days and will be shut down unless a permanent license for the feature is installed.

Recommended Action Install the license file to continue using the feature.

License packages can contain several features. If you disable a feature during the grace period and there are other features in that license package that are still enabled, the clock does not stop for that license package. To suspend the grace period countdown for a licensed feature, you must disable every feature in that license package. Choose **Switches > Licenses** and select the **Usage** tab in Fabric Manager or use the **show license usage** CLI command to determine which features are enabled for a license package.

Initial Troubleshooting Checklist

Begin troubleshooting license issues by checking the following issues first:

Checklist	Checkoff
Verify the chassis serial number for all licenses ordered.	
Verify the platform or module type for all licenses ordered.	
Verify that the Product Authorization Key you used to order the licenses comes from the same chassis that you retrieved the chassis serial number on.	
Verify that you have installed all licenses on all switches that require the licenses for the features you enable.	

Displaying License Information Using Fabric Manager

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

1. Select **Switches > Licenses** from the Physical Attributes pane. You see the license information in the Information pane, one line per feature.
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 information about each of the License Key files installed on your switches.

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.

Displaying License Information Using Device Manager

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

1. Click **Admin > Licenses** from the menu. You see the License dialog box.
2. Click the **Features** tab to see the license information, including the feature package, the type of license, expiration date and grace period (if any), and any errors (such as a missing license). Click the **Files** tab to display information about each License Key file installed on the switch.
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 that you have installed.

Displaying License Information Using Fabric Manager Web Client

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

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

Displaying License Information Using the CLI

Use the **show license** commands to display all license information configured on this switch.

Example 6-1 Displays Information About Current License Usage

```
switch# show license usage
Feature                Installed    Lic      Status  Expiry Date  Comments
                    Count
-----
FM_SERVER_PKG          No          -        Unused  never        Grace 79D 16H
MAINFRAME_PKG          No          -        Unused  never        Grace expired
ENTERPRISE_PKG         Yes         -        InUse   never        -
DMM_FOR_SSM_PKG       No          0        Unused  never        -
SAN_EXTN_OVER_IP       No          0        Unused  never        -
PORT_ACTIVATION_PKG   No          0        Unused  never        -
SME_FOR_IPS_184_PKG   No          0        Unused  never        Grace 86D 5H
SAN_EXTN_OVER_IP_18_4 No          0        Unused  never        -
SAN_EXTN_OVER_IP_IPS2 Yes         1        Unused  never        1 license(s) missing
SAN_EXTN_OVER_IP_IPS4 No          0        Unused  never        -
10G_PORT_ACTIVATION_PKG No         0        Unused  never        -
SAN_EXTN_OVER_MPS_184_FIPS No         0        Unused  never        -
STORAGE_SERVICES_ENABLER_PKG Yes         1        Unused  never        1 license(s) missing
-----
```


Example 6-2 Displays the List of Features in a Specified Package

```
switch# show license usage ENTERPRISE_PKG
Application
-----
ivr
```

qos_manager

Example 6-3 Displays the Host ID for the License

```
switch# show license host-id  
License hostid: VDH=FOX0646S017
```

 **Note:** Use the entire ID that appears after the colon (:). The VHD is the Vendor Host ID.

Example 6-4 Displays All Installed License Key Files and Contents

```
switch# show license  
Permanent.lic:  
SERVER this_host ANY  
VENDOR cisco  
INCREMENT MAINFRAME_PKG cisco 1.0 permanent uncounted \  
    HOSTID=VDH=FOX0646S017 \  
    NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \  
    <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64  
Evaluation.lic:  
SERVER this_host ANY  
VENDOR cisco  
INCREMENT MAINFRAME_PKG cisco 1.0 30-Dec-2003 uncounted \  
    HOSTID=VDH=FOX0646S017 \  
    NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \  
    <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
```

Example 6-5 Displays a List of Installed License Key Files

```
switch# show license brief  
Enterprise.lic  
Ficon.lic  
FCIP.lic
```

Example 6-6 Displays the Contents of a Specified License Key File

```
switch# show license file Permanent.lic  
Permanent.lic:  
SERVER this_host ANY  
VENDOR cisco  
INCREMENT MAINFRAME_PKG cisco 1.0 permanent uncounted \  
    HOSTID=VDH=FOX0646S017 \  
    NOTICE="<LicFileID></LicFileID><LicLineID>0</LicLineID> \  
    <PAK>dummyPak</PAK>" SIGN=EE9F91EA4B64
```

Licensing Installation Issues

Common problems with licenses usually stem from incorrectly ordering the license file, installing the license file on an incorrect switch, or not ordering the correct number of licenses for your fabric.

One-Click License Install Fails or Cannot Connect to Licensing Website

The one-click license installation tries to open an HTTPS connection to the licensing website that matches the vendor you purchased your switch from.

Symptom One-click license install fails or cannot connect to the licensing website.

Table 6-1 One-Click License Install Fails or Cannot Connect to License Website

Symptom

Possible Cause

Solution

One-click license install fails or cannot connect to the licensing website.

License website uses HTTP, not HTTPS.

Edit <install directory>/bin/FabricManager.bat file to add the following lines to the JVMargs argument:

-Dhttp.proxyHost=HOSTADDRESS -Dhttp.proxyPort=HOSTPORT.

Fabric Manager communicating through a proxy server.

Edit <install directory>/bin/FabricManager.bat file to add the following lines to the JVMargs argument:

-Dhttps.proxyHost=HOSTADDRESS -Dhttps.proxyPort=HOSTPORT.


Java versions 1.4.2_01 and later do not have the right set of Certificate Authority (CA) certificates to validate the SSL certificates on the EMC server (HTTPS).

The license wizard cannot make an HTTPS connection to the EMC servers. If the License Wizard fails to fetch the license keys, saying the connection failed, the workaround is to install the latest 1.4(x) version of Java, preferably 1.4.2_04 or later.

Serial Number Issues

A common problem with licenses occurs from not using the correct chassis serial number when ordering your license. To obtain the correct chassis serial number using Fabric Manager, follow these steps:


-
1. Choose **Switches > Hardware** and select the **Inventory** tab.
 2. Copy down the SerialNo Primary field for the chassis that matches where you want to install a new license.
-

 **Note:** If you are ordering a module-based license, such as the SAN Extension over IP license package, you still use the chassis serial number for the chassis where the module resides, not the module serial number.

Use the **show license host-id** CLI command to obtain the correct chassis serial number for your switch using the CLI. When entering the chassis serial number during the license-ordering process, do not use the letter "O" in place of any zeros in the serial number.

RMA Chassis Errors or License Transfers 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>

Receiving Grace Period Warnings After License Installation

If the license installation does not proceed correctly, or if you are using a feature that exists in a license package that you have not installed, you will continue to get grace period warnings.

Symptom Receiving grace period warnings after a license installation.

Table 6-2 Receiving Grace Period Warnings After License Installation

Symptom

Possible Cause

Solution

Receiving grace period warnings after a license installation.

License file copied to switch but not installed.

Choose **Tools > Other > License Install** in Fabric Manager or use the license install CLI command to install the license.

License installation failed.

Check your logs for any system messages for a failed license installation. Choose **Switches > Licenses** and select the Usage tab in Fabric Manager or use the **show license usage** CLI command to determine what feature is in use without a license.

Not enough license files installed for a feature.

Some features require more than one license per chassis. Module-based licenses, such as SAN Extension over IP, require one license per module that uses these features. Choose **Switches > Licenses** and select the **Usage** tab in Fabric Manager or use the **show license usage** CLI command to determine which feature is in use without a license.

Incorrect Number of Licenses in Use for Multiple Modules

Module-based licenses require one license installed per module that uses a licensed feature. SAN Extension over IP is an example of a module-based license. If you install a SAN Extension over IP license while two FCIP instances from different modules are present, the system might return the following error message:

```
Installing license failed: Number of License in use is more than the number being installed.
```

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This error message is generated because the license grace period is only applicable when no licenses are installed. The installation of one license terminates the grace period and will arbitrarily cause the second module to shut down because this is not allowed by licensing.

The workaround for this scenario includes doing one of the following:

- Concatenate both licenses into one license file.
- Manually reduce the usage count by one.

To concatenate both licenses into one license file, follow these steps:

1. Open both license files using WordPad.
2. Copy both license files to one file:

Example

```
SERVER this_host ANY
VENDOR cisco
INCREMENT SAN_EXTN_OVER_IP_IPS2 cisco 1.0 permanent 1 \
VENDOR_STRING=<LIC_SOURCE>MDS_SWIFT</LIC_SOURCE><SKU>M9500EXT12EK9=</SKU> \
HOSTID=VDH=FOXYYYYYYYY \
NOTICE="<LicFileID>2005082204514XXXX</LicFileID><LicLineID>1</LicLineID> \
<PAK>MDS-1X-JAB-0F1A81</PAK>" SIGN=F0652E02XXXX
INCREMENT SAN_EXTN_OVER_IP_IPS2 cisco 1.0 permanent 1 \
VENDOR_STRING=<LIC_SOURCE>MDS_SWIFT</LIC_SOURCE><SKU>M9500EXT12EK9=</SKU> \
HOSTID=VDH=FOXYYYYYYYY \
NOTICE="<LicFileID>2005082204572XXXX</LicFileID><LicLineID>1</LicLineID> \
<PAK>MDS-1X-JAB-0F1AD1</PAK>" SIGN=D222AE4AXXXX
```

3. Save the new concatenated license file.
 4. Upload and install the concatenated license file on the MDS switch.
-

To reduce the usage count to one, follow these steps:

1. Bring down one of the modules manually to reduce the usage count by one.
 2. Reinsert the module after installing both licenses.
-

Grace Period Alerts

Cisco SAN-OS gives you a 120-day grace period. This grace period starts or continues when you are evaluating a feature for which you have not installed a license.

The grace period stops if you disable a feature you are evaluating, but if you enable that feature again without a valid license, the grace period countdown continues where it left off.

The grace period operates across all features in a license package. License packages can contain several features. If you disable a feature during the grace period and there are other features in that license package that are still enabled, the countdown does not stop for that license package. To suspend the grace period countdown for a license package, you must disable every feature in that license package. To disable the grace period countdown for Fabric Manager Server, you must explicitly check in the license using Device Manager. See the "Checking in the Fabric Manager Server License From Device Manager" section.

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The Cisco SAN-OS license counter keeps track of all licenses on a switch. If you are evaluating a feature and the grace 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 grace period. The following example uses the FICON feature. On January 30th, you enabled the FICON feature using the 120-day grace period. You will receive grace period ending messages as:

- Daily alerts from January 30th to May 21st.
- Hourly alerts from May 22nd to May 30th.

On May 31st, the grace period ends, and the FICON feature is automatically disabled. You will not be allowed to use FICON until you purchase a valid license.

 **Note:** You cannot modify the frequency of the grace period messages.

 **Note:** There is no grace period for licenses purchased for the On-Demand Port Activation license feature.

 **Caution:** After the final seven days of the grace period, the feature is turned off and your network traffic may be disrupted. Any future upgrade will enforce license requirements and the 120-day grace period.

Use the **show license usage** command to display grace period information for a switch.

```
switch# show license usage
Feature                               Ins  Lic  Status Expiry Date Comments
                                      Count
-----
FM_SERVER_PKG                         No  -   Unused          Grace 79D 16H
MAINFRAME_PKG                         No  -   Unused          Grace expired
ENTERPRISE_PKG                        Yes  -   Unused never     license missing
DMM_FOR_SSM_PKG                       No  0   Unused          -
SAN_EXTN_OVER_IP                      Yes 16   Unused never     -
PORT_ACTIVATION_PKG                   No  0   Unused          -
SME_FOR_IPS_184_PKG                   No  0   Unused          Grace 86D 5H
SAN_EXTN_OVER_IP_18_4                  No  0   Unused          -
SAN_EXTN_OVER_IP_IPS2                  Yes  1   Unused never     1 license(s) missing
SAN_EXTN_OVER_IP_IPS4                  No  0   Unused          -
10G_PORT_ACTIVATION_PKG                No  0   Unused          -
SAN_EXTN_OVER_MPS_184_FIPS             No  0   Unused          -
STORAGE_SERVICES_ENABLER_PKG          Yes  1   Unused never     1 license(s) missing
-----
**** WARNING: License file(s) missing. ****
ips-hacl#
```

Checking in the Fabric Manager Server License From Device Manager


If you evaluated Fabric Manager Server without a license, you can stop the grace period countdown and disable all features using the Fabric Manager Server license package using Device Manager.


To stop the Fabric Manager Server evaluation using Device Manager, follow these steps:

-
1. Choose **Admin > Licenses** and click the **Features** tab.

2. Select the features to check in. When you select a feature, you see the Check In FM button at the bottom of the dialog box.

3. Click **Check In FM**.

 **Note:** This button appears only when FM_SERVER_PKG is unlicensed.

 **Note:** Because of Caveat CSCeg23889, you might still receive Call Home or system messages for an unused FM_SERVER_PKG license. This caveat describes how extraneous messages are sent after a Fabric Manager Server license is checked in.

License Listed as Missing

After a license is installed and operating properly, it may show up as missing if you modify your system hardware or encounter a bootflash: issue.

Symptom License listed as missing.

Table 6-3 License Listed as Missing

Symptom

Possible Causes

Solutions

License listed as missing.

Supervisor module was replaced after license was installed.

Reinstall the license.

Supervisor bootflash: is corrupted.

See the "Corrupted Bootflash Recovery" section on page 2-14 to recover from corrupted bootflash:. Reinstall the license.

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