



## **Cisco MDS 9000 Series Licensing Guide, Release 8.x**

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# Licensing Cisco MDS 9000 Series NX-OS Software Features

Licenses are available for all switches in the Cisco MDS 9000 Series. Licensing allows you to access specified premium features on the switch after you install the appropriate license for that feature.

## Cisco MDS NX-OS Software Licenses

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

### Licensing Terminology

The following terms are used in this document:

**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.

**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 device using the device's unique host ID.

**Host IDs**

A unique chassis serial number that is specific to each device.

**Software license claim certificate**

A document entitling its rightful owner to use licensed features on one device as described in that document.

**Product Authorization Key (PAK)**

The PAK allows you to obtain a license key from one of the sites listed in the software license claim certificate document. After registering at the specified website, you will receive your license key file and installation instructions through e-mail.

**License key file**

A device-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.

**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 feature still works. You should reinstall the license as soon as possible.

**Evaluation license**

A temporary license. Evaluation licenses are time bound (valid for a specified number of days) and are tied to a host ID (device serial number).

**Permanent license**

A license that is not time bound is called a permanent license.

**Grace period**

The amount of time the features in a license package can continue functioning without a license.

**Support**

If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at this URL: [http://www.cisco.com/en/US/support/tsd\\_cisco\\_worldwide\\_contacts.html](http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html)

### Licensing Model

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

Feature-based licenses allow features that are applicable to the entire switch.



**Note**

- A SAN extension license is included in the base license for the Cisco MDS 9000 24/10-Port SAN Extension Module (DS-X9334-K9).

This table describes feature-based licenses.

**Table 1: Feature-Based Licenses**

Feature License	Features
Enterprise package (ENTERPRISE_PKG)	<ul style="list-style-type: none"><li>• FC Port security</li><li>• VSAN-based access control</li><li>• Fibre Channel Security Protocol (FC-SP) authentication</li><li>• Advanced traffic engineering—quality of service (QoS)</li><li>• IPsec and IKE for IPv4</li><li>• IKE digital certificates</li><li>• Enhanced VSAN routing inter-VSAN routing (IVR) over Fibre Channel</li><li>• IVR Network Address Translation (NAT) over Fibre Channel</li><li>• Zone-based traffic prioritizing</li><li>• Zone-based FC QoS</li><li>• Extended BB_Credits</li><li>• Fibre Channel write acceleration</li><li>• FCIP encryption</li><li>• Fabric binding for Fibre Channel</li><li>• SAN device virtualization</li><li>• Cisco TrustSec Fibre Channel Link Encryption</li></ul>

Feature License	Features
SAN Telemetry package SAN_TELEMETRY_PKG	

Feature License	Features
	<p>SAN Analytics</p> <p>The SAN Analytics feature is used to collect, store, and fetch the data of interest. This feature allows you to analyze data only on the switch.</p> <p><b>Note</b> The SAN_TELEMETRY_PKG license is a switch based license only.</p> <p>The following provides information about the licenses that are supported on Cisco switches and the release from which it supports these licenses:</p> <ul style="list-style-type: none"> <li>• Cisco MDS 9700 Series Multilayer Directors: Supports the SAN_ANALYTICS_PKG and SAN_TELEMETRY_PKG licenses from Cisco MDS NX-OS Release 8.2(1).</li> <li>• Cisco MDS 9396T 32-Gbps 96-Port Fibre Channel Fabric Switch: Supports only the SAN_ANALYTICS_PKG license from Cisco MDS NX-OS Release 8.4(1).</li> <li>• Cisco MDS 9148T 32-Gbps 48-Port Fibre Channel Fabric Switch: Supports only the SAN_ANALYTICS_PKG license from Cisco MDS NX-OS Release 8.4(1).</li> <li>• Cisco MDS 9132T 32-Gbps 32-Port Fibre Channel Fabric Switch: Supports only the SAN_ANALYTICS_PKG license from Cisco MDS NX-OS Release 8.3(1).</li> </ul> <p>If you have purchased the SAN_TELEMETRY_PKG license, you can continue to use it only to analyze data on your switch in Cisco MDS NX-OS Release 8.3(1) or later releases. However, we recommend that you upgrade to the SAN_ANALYTICS_PKG license that is available from Cisco MDS NX-OS Release 8.3(1) to analyze data not only on the switch but also on the Cisco Data Center Network Manager (DCNM) or supported third party devices or apps.</p> <p>To upgrade from SAN_TELEMETRY_PKG used in Cisco MDS NX-OS Release 8.2(1) to SAN_ANALYTICS_PKG that is available in Cisco MDS NX-OS Release 8.3(1), perform these steps:</p> <ol style="list-style-type: none"> <li>1. Use the <b>no feature analytics</b> command to disable the SAN analytics feature.</li> <li>2. Use the <b>clear license filename</b> to uninstall the SAN_TELEMETRY_PKG license. <p><b>Note</b> You can uninstall a license before or after upgrading the software as long as the license package is not in use.</p> </li> <li>3. Upgrade to Cisco MDS NX-OS Release 8.3(1).</li> <li>4. Use the <b>install license filename</b> to install the SAN_ANALYTICS_PKG license. <p><b>Note</b> If you have already purchased the SAN_TELEMETRY_PKG license, you can upgrade to the SAN_ANALYTICS_PKG license for free.</p> </li> </ol>

Feature License	Features
	<p><b>5.</b> Use the <b>feature analytics</b> command to enable the SAN analytics feature.</p> <p>This feature supports the following license models:</p> <ul style="list-style-type: none"> <li>• Grace-period license—If you do not have a license and enable the analytic feature using the <b>feature analytics</b> command, the feature functions for 120 days.</li> </ul> <p><b>Note</b> After 120 days of using the analytics feature, this feature will be disabled.</p> <ul style="list-style-type: none"> <li>• Term-based license—Term-based license for the SAN Analytics and Telemetry feature is a traditional license that is valid for a minimum of three years. A message will be displayed 90 days before the license expiry date as a reminder to renew the license. The message will continue to display on the 89th, 60th, 30th day, once every day for the last 28 days, and once every hour for the last 7 days of the license expiry date.</li> </ul> <p><b>Note</b> After the license expiry, the SAN Analytics feature will be disabled after you reload the switch, using the <b>reload</b> command.</p>

Feature License	Features
SAN Analytics package SAN_ANALYTICS_PKG	<p>SAN Analytics and SAN Telemetry Streaming</p> <p>The SAN Analytics and SAN Telemetry Streaming provides insights into your fabric by allowing you to monitor, analyze, identify, and troubleshoot performance issues. This solution allows you to analyze data not only on the switch but also on the Cisco Data Center Network Manager (DCNM) or supported third party devices or apps.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• The SAN_ANALYTICS_PKG license is a switch based license only.</li> <li>• For the SAN Analytics and SAN Telemetry Streaming feature to work on DCNM, you need to purchase the DCNM Advanced SAN Feature License and SAN Analytics license. For more information on the licensing information on DCNM, see the "Advanced SAN Feature Licenses" topic in the <a href="#">Cisco DCNM Licensing Guide</a>.</li> </ul> <p>This solution is supported from Cisco MDS Release 8.3(1) and later releases and supports the following license models:</p> <ul style="list-style-type: none"> <li>• Grace-period license—If you do not have a license and enable the analytics feature using the <b>feature analytics</b> command, the feature functions for 120 days.</li> </ul> <p><b>Note</b> After 120 days of using the analytics feature, this feature will be disabled.</p> <ul style="list-style-type: none"> <li>• Term-based license—Term-based license for the SAN Analytics and Telemetry feature is a traditional license that is valid for a minimum of three years. A message will be displayed 90 days before the license expiry date as a reminder to renew the license. The message will continue to display on the 89th, 60th, 30th day, once every day for the last 28 days, and once every hour for the last 7 days of the license expiry date.</li> </ul> <p><b>Note</b> After the license expiry, the SAN Analytics feature will be disabled after you reload the switch, using the <b>reload</b> command.</p>
Mainframe package (MAINFRAME_PKG)	<ul style="list-style-type: none"> <li>• Switch cascading</li> <li>• IBM TotalStorage Virtual Tape Server (VTS)</li> <li>• IBM TotalStorage XRC application</li> <li>• Port swap, block, prohibit</li> </ul>
DCNM-SAN License packages	For DCNM related licensing information, see the <a href="#">Cisco DCNM Licensing Guide</a> .



Feature License	Features
<p>On-demand Port Activation Licensing package (PORT_ACTIVATION_PKG) (M9220I-UPGK9=) (M9250IP20-16G=) (M9148T-PL8) (M9396T-PL16) (M9132T-PL8)</p> <p><b>Note</b> The license manager does not prevent installing more port licenses than the available physical ports on the switch. The extra licenses if installed, will not affect the normal behavior of the licensed ports.</p>	<ul style="list-style-type: none"> <li>On the Cisco MDS 9220i Switch: <ul style="list-style-type: none"> <li>Fibre Channel ports: Only the first 4 Fibre Channel ports out of the 12 ports are active by default. The FC_PORT_ACTIV_9220I_PKG enables additional 8 Fibre Channel ports.</li> <li>IPS ports: Only the first 2 IPS ports operating in 1-Gbps speed mode are active by default (IP Storage 1/1 and IP Storage 1/2). The IPS_PORT_ACTIV_9220I_PKG enables other speed modes.</li> </ul> </li> <li>Cisco MDS 9132T 32-Gbps 32-Port Fibre Channel Switches have 16 32-Gbps FC ports (FC1/1-16) in the base chassis and 16 32-Gbps FC ports on the LEM module (FC1/17-32). Port licenses are not movable between the base chassis and the LEM module.</li> </ul>
<p>Data Mobility Manager (DMM) (DMM_FOR_SSM_PKG) (M9250IDMMT6M)</p>	<ul style="list-style-type: none"> <li>Online migration of heterogenous arrays</li> <li>Simultaneous migration of multiple LUNs</li> <li>Unequal size LUN migration</li> <li>Rate adjusted migration</li> <li>Verification of migrated data</li> <li>Secure erasure of migrated data</li> <li>Dual fabric support</li> </ul>



**Note** License packages for Cisco DMM (Cisco Data Mobility Manager) and Cisco SME (Cisco Storage Media Encryption) are documented in the [Cisco MDS 9000 Series Data Mobility Manager Configuration Guide](#).

## Licensing High Availability

As with other Cisco NX-OS features, the licensing feature also maintains the following high-availability standards:

- Installing any license in the device is a nondisruptive process.
- Installing a license automatically saves a copy of permanent licenses to the chassis.
- If you have enabled the grace period feature, enabling a licensed feature that does not have a license key starts a counter on the grace period. You then have 120 days to install the appropriate license keys, disable the use of that feature, or disable the grace period feature. If at the end of the 120-day grace period the device does not have a valid license key for the feature, the Cisco NX-OS software automatically disables the feature and removes the configuration from the device.

Devices with dual supervisors 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.

## Grace Period Alerts

Until Cisco MDS Release 9.2(1) the Cisco NX-OS software 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 that you are evaluating, but if you enable that feature again without a valid license, the grace period countdown continues where it left off.



**Note** When you install the permanent license, to avoid service disruptions, do not disable the grace period by using the **no license grace-period** command. Instead, just install your new license. The license manager will automatically transition from grace licensing to the installed license.

Once the license manager is using your installed license, the grace period alerts will cease.

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.

The Cisco NX-OS license counter keeps track of all licenses on a device. 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. For example, if you enabled a licensed feature on January 30, you will receive grace period ending messages as follows:

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

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



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



**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 to Cisco NX-OS will enforce license requirements and the 120-day grace period.

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

## License Transfers Between Devices

A license is specific to the physical device for which it is issued and is not valid on any other physical device. The license cannot be transferred.

**Note**

- Cisco ONE Software license can be transferred from one device to another as a replacement.
- Return Material Authorization (RMA) certified devices need new license file and can be obtained from Technical Assistance Center (TAC) license team.
- If you have a single supervisor module on your Cisco NX-OS device and you replace the supervisor module, you must reinstall the license key file.

If you are evaluating a license when you replace the supervisor module, the grace period of the license is usually set to 120 days. On a dual supervisor system, the grace period of the license will be overwritten from the existing active supervisor module to the new stand-by supervisor module.

- If you purchased Cisco support through a Cisco reseller, contact the reseller directly. If you purchased support directly from Cisco, contact Cisco Technical Support at this URL: [http://www.cisco.com/en/US/support/tsd\\_cisco\\_worldwide\\_contacts.html](http://www.cisco.com/en/US/support/tsd_cisco_worldwide_contacts.html)
- If the supervisor modules are interchanged between two different Cisco MDS chassis, `license missing` message is displayed under the **show license usage** command. Use the **clear license filename** command to uninstall the license package and re-install the license files. However, the licensed features will continue to work.

## On-Demand Port Activation Licensing

This section describes how to use the on-demand port activation licensing feature on the Cisco MDS 9132T, Cisco MDS 9148T, switches.

### About On-Demand Port Activation Licensing

You can expand your SAN connectivity as needed by enabling users to purchase and install additional port licenses. By default, all ports are eligible for license activation.

#### Port-Naming Conventions

This table describes the port-naming conventions for the Cisco Fabric switches.

**Table 2: Port-Naming Conventions for Cisco Fabric Switches**

Cisco MDS 9132T Switch	Cisco MDS 9132T Switch
Cisco MDS 9148T Switch	fc1/1 through fc1/48
Cisco MDS 9220i Switch	fc1/1 through fc1/12 and IPS 1/1 through 1/6
Cisco MDS 9396T Switch	fc1/1 through fc1/96

## Port Licensing

### Cisco MDS 9250i Switch

On Cisco MDS 9250i Switch, 20 16-Gbps Fibre Channel ports are active by default. To enable the other 20 16-Gbps Fibre Channel ports, you must obtain a license. The 8 10-Gbps FCoE ports are active by default. The two fixed 10-Gbps IP storage services ports do not require additional license.

### Cisco MDS 9220i Switch

- Fibre Channel ports: Only the first 4 ports out of the 12 ports are active by default. However, you can move the default license from the first 4 ports to any of the other 8 ports. To enable the other 8 ports, you must obtain a license. The additional license will enable the extra 8 ports.
- IP Storage (IPS) ports: Only the first two ports that are operating in 1-Gbps speed mode are active by default (IPStorage 1/1 and IPStorage 1/2). You cannot move the default license from these ports to the other IPS ports such as IPStorage 1/3 through 1/6.

Default license for IPS ports is available only in the 1-Gbps speed mode. In any other speed mode (10 Gbps or 40 Gbps), ports need additional port activation license.

The port licenses for Fibre Channel and IPS ports are bundled into a single license. You need to install this license for enabling additional ports for both Fibre Channel and IPS ports.

The following example displays the license status on a Cisco MDS 9220i switch:

```
switch# show lic usage
Feature                               Ins  Lic  Status Expiry Date Comments
                                Count
-----
FM_SERVER_PKG                        No   -   Unused
ENTERPRISE_PKG                      No   -   In use
FC_PORT_ACTIV_9220I_PKG              Yes  12   In use never
IPS_PORT_ACTIV_9220I_PKG             Yes   4   In use never
IPS_1G_PORT_ACTIV_9220I_PKG          No    2   In use never
```

```
switch# show lic default
Feature                               Default License Count
-----
FM_SERVER_PKG                        -
ENTERPRISE_PKG                      -
FC_PORT_ACTIV_9220I_PKG              4
IPS_PORT_ACTIV_9220I_PKG             0
IPS_1G_PORT_ACTIV_9220I_PKG          2
```

```
switch# show port-license
Available FC port activation licenses are 0
Available IPS port activation licenses are 2
-----
Interface      Cookie      Port Activation License
-----
fc1/1          16777216    acquired
fc1/2          16781312    acquired
fc1/3          16785408    acquired
fc1/4          16789504    acquired
fc1/5          16793600    acquired
fc1/6          16797696    acquired
fc1/7          16801792    acquired
fc1/8          16805888    acquired
```

fc1/9	16809984	acquired
fc1/10	16814080	acquired
fc1/11	16818176	acquired
fc1/12	16822272	acquired
fcip1	167772160	eligible
fcip3	167772162	eligible
IPStorage1/1	33554432	acquired
IPStorage1/2	33558528	acquired
IPStorage1/3	33562624	acquired
IPStorage1/4	33566720	acquired
IPStorage1/5	33570816	eligible
IPStorage1/6	33574912	ineligible

### Default Configuration

The following example shows the default port license configuration for the Cisco MDS 9132T Switch:

```
switch# show port-license
Available port activation licenses are 8
-----
Interface Cookie      Port Activation License
-----
fc1/1      16777216   acquired
fc1/2      16781312   acquired
fc1/3      16785408   acquired
fc1/4      16789504   acquired
fc1/5      16793600   acquired
fc1/6      16797696   acquired
fc1/7      16801792   acquired
fc1/8      16805888   acquired
fc1/9      16809984   eligible
fc1/10     16814080   eligible
fc1/11     16818176   eligible
fc1/12     16822272   eligible
fc1/13     16826368   eligible
fc1/14     16830464   eligible
fc1/15     16834560   eligible
fc1/16     16838656   eligible
fc1/17     16842752   acquired
fc1/18     16846848   acquired
fc1/19     16850944   acquired
fc1/20     16855040   acquired
fc1/21     16859136   acquired
fc1/22     16863232   acquired
fc1/23     16867328   acquired
fc1/24     16871424   acquired
fc1/25     16875520   acquired
fc1/26     16879616   acquired
fc1/27     16883712   acquired
fc1/28     16887808   acquired
fc1/29     16891904   acquired
fc1/30     16896000   acquired
fc1/31     16900096   acquired
fc1/32     16904192   acquired
```



**Note**

The cookie is used to acquire a license. Use the **show license usage PORT\_ACTIV\_8132U\_PKG** command to show the cookies for acquired licenses.

```
switch# show license usage poRT_ACTIV_9132U_PKG
Application
```

```
-----
Port Manager (fc1/1)
Port Manager (fc1/2)
Port Manager (fc1/3)
Port Manager (fc1/4)
Port Manager (fc1/5)
Port Manager (fc1/6)
Port Manager (fc1/7)
Port Manager (fc1/8)
-----
```

The following example shows the default port license configuration for the Cisco MDS 9250i Switch:

```
switch# show port-license
```

```
Available port activation licenses are 20
```

Interface	Cookie	Port Activation License
fc1/1	16777216	acquired
fc1/2	16781312	acquired
fc1/3	16785408	acquired
fc1/4	16789504	acquired
fc1/5	16793600	acquired
fc1/6	16797696	acquired
fc1/7	16801792	acquired
fc1/8	16805888	acquired
fc1/9	16809984	acquired
fc1/10	16814080	acquired
fc1/11	16818176	acquired
fc1/12	16822272	acquired
fc1/13	16826368	acquired
fc1/14	16830464	acquired
fc1/15	16834560	acquired
fc1/16	16838656	acquired
fc1/17	16842752	acquired
fc1/18	16846848	acquired
fc1/19	16850944	acquired
fc1/20	16855040	acquired
fc1/21	16859136	eligible
fc1/22	16863232	eligible
fc1/23	16867328	eligible
fc1/24	16871424	eligible
fc1/25	16875520	eligible
fc1/26	16879616	eligible
fc1/27	16883712	eligible
fc1/28	16887808	eligible
fc1/29	16891904	eligible
fc1/30	16896000	eligible
fc1/31	16900096	eligible
fc1/32	16904192	eligible
fc1/33	16908288	eligible
fc1/34	16912384	eligible
fc1/35	16916480	eligible
fc1/36	16920576	eligible
fc1/37	16924672	eligible
fc1/38	16928768	eligible
fc1/39	16932864	eligible
fc1/40	16936960	eligible



---

**Note** The cookie is used to acquire a license. Use the **show license usage PORT\_ACTIV\_20P** command to show the cookies for acquired licenses.

---

```
switch# show license usage PORT_ACTIV_20P
Application
```

```
-----
Port Manager (fc1/1)
Port Manager (fc1/2)
Port Manager (fc1/3)
Port Manager (fc1/4)
Port Manager (fc1/5)
Port Manager (fc1/6)
Port Manager (fc1/7)
Port Manager (fc1/8)
Port Manager (fc1/9)
Port Manager (fc1/10)
Port Manager (fc1/11)
Port Manager (fc1/12)
Port Manager (fc1/13)
Port Manager (fc1/14)
Port Manager (fc1/15)
Port Manager (fc1/16)
Port Manager (fc1/17)
Port Manager (fc1/18)
Port Manager (fc1/19)
Port Manager (fc1/20)
```

The following example shows the default port license configuration for the Cisco MDS 9396S Switch:

```
switch# show port-license
```

```
Available port activation licenses are 0
```

```
-----
Interface    Cookie      Port Activation License
-----
fc1/1        16777216    acquired
fc1/2        16781312    acquired
fc1/3        16785408    acquired
fc1/4        16789504    acquired
fc1/5        16793600    acquired
fc1/6        16797696    acquired
fc1/7        16801792    acquired
fc1/8        16805888    acquired
fc1/9        16809984    acquired
fc1/10       16814080    acquired
fc1/11       16818176    acquired
fc1/12       16822272    acquired
fc1/13       16826368    acquired
fc1/14       16830464    acquired
fc1/15       16834560    acquired
fc1/16       16838656    acquired
fc1/17       16842752    acquired
fc1/18       16846848    acquired
fc1/19       16850944    acquired
fc1/20       16855040    acquired
fc1/21       16859136    acquired
fc1/22       16863232    acquired
fc1/23       16867328    acquired
fc1/24       16871424    acquired
```

fc1/25	16875520	acquired
fc1/26	16879616	acquired
fc1/27	16883712	acquired
fc1/28	16887808	acquired
fc1/29	16891904	acquired
fc1/30	16896000	acquired
fc1/31	16900096	acquired
fc1/32	16904192	acquired
fc1/33	16908288	acquired
fc1/34	16912384	acquired
fc1/35	16916480	acquired
fc1/36	16920576	acquired
fc1/37	16924672	acquired
fc1/38	16928768	acquired
fc1/39	16932864	acquired
fc1/40	16936960	acquired
fc1/41	16941056	acquired
fc1/42	16945152	acquired
fc1/43	16949248	acquired
fc1/44	16953344	acquired
fc1/45	16957440	acquired
fc1/46	16961536	acquired
fc1/47	16965632	acquired
fc1/48	16969728	acquired
fc1/49	16973824	eligible
fc1/50	16977920	eligible
fc1/51	16982016	eligible
fc1/52	16986112	eligible
fc1/53	16990208	eligible
fc1/54	16994304	eligible
fc1/55	16998400	eligible
fc1/56	17002496	eligible
fc1/57	17006592	eligible
fc1/58	17010688	eligible
fc1/59	17014784	eligible
fc1/60	17018880	eligible
fc1/61	17022976	eligible
fc1/62	17027072	eligible
fc1/63	17031168	eligible
fc1/64	17035264	eligible
fc1/65	17039360	eligible
fc1/66	17043456	eligible
fc1/67	17047552	eligible
fc1/68	17051648	eligible
fc1/69	17055744	eligible
fc1/70	17059840	eligible
fc1/71	17063936	eligible
fc1/72	17068032	eligible
fc1/73	17072128	eligible
fc1/74	17076224	eligible
fc1/75	17080320	eligible
fc1/76	17084416	eligible
fc1/77	17088512	eligible
fc1/78	17092608	eligible
fc1/79	17096704	eligible
fc1/80	17100800	eligible
fc1/81	17104896	eligible
fc1/82	17108992	eligible
fc1/83	17113088	eligible
fc1/84	17117184	eligible
fc1/85	17121280	eligible
fc1/86	17125376	eligible
fc1/87	17129472	eligible



fc1/88	17133568	eligible
fc1/89	17137664	eligible
fc1/90	17141760	eligible
fc1/91	17145856	eligible
fc1/92	17149952	eligible
fc1/93	17154048	eligible
fc1/94	17158144	eligible
fc1/95	17162240	eligible
fc1/96	17166336	eligible




---

**Note** The cookie is used to acquire a license. Use the **show license usage PORT\_ACTIV\_9396S\_PKG** command to show the cookies for acquired licenses.

---

```
switch# show license usage PORT_ACTIV_9396S_PKG
Application
```

```
-----
Port Manager (fc1/1)
Port Manager (fc1/2)
Port Manager (fc1/3)
Port Manager (fc1/4)
Port Manager (fc1/5)
Port Manager (fc1/6)
Port Manager (fc1/7)
Port Manager (fc1/8)
Port Manager (fc1/9)
Port Manager (fc1/10)
Port Manager (fc1/11)
Port Manager (fc1/12)
Port Manager (fc1/13)
Port Manager (fc1/14)
Port Manager (fc1/15)
Port Manager (fc1/16)
Port Manager (fc1/17)
Port Manager (fc1/18)
Port Manager (fc1/19)
Port Manager (fc1/20)
Port Manager (fc1/21)
Port Manager (fc1/22)
Port Manager (fc1/23)
Port Manager (fc1/24)
Port Manager (fc1/25)
Port Manager (fc1/26)
Port Manager (fc1/27)
Port Manager (fc1/28)
Port Manager (fc1/29)
Port Manager (fc1/30)
Port Manager (fc1/31)
Port Manager (fc1/32)
Port Manager (fc1/33)
Port Manager (fc1/34)
Port Manager (fc1/35)
Port Manager (fc1/36)
Port Manager (fc1/37)
Port Manager (fc1/38)
Port Manager (fc1/39)
Port Manager (fc1/40)
Port Manager (fc1/41)
Port Manager (fc1/42)
Port Manager (fc1/43)
Port Manager (fc1/44)
```

Port Manager (fc1/45)  
Port Manager (fc1/46)  
Port Manager (fc1/47)  
Port Manager (fc1/48)

---

## License Status Definitions

This table defines the port activation license status terms.

**Table 3: Port Activation License Status Definitions**

Port Activation License Status	Definition
acquired	The port is licensed and active.
eligible	The port is eligible to receive a license but does not yet have one.
ineligible	The port is not allowed to receive a license.

By default, when you install additional port license activation packages, the activation status of ports changes from "eligible" to "acquired." If you prefer to accept the default behavior, no further action is required.



---

**Note** You can uninstall licenses for ports not in use; however, you cannot uninstall default licenses.

---

This table describes the port license assignments for the Cisco MDS 9148S Switch.

**Table 4: Default Port License Assignments for Cisco MDS 9148S Switch**

License Package (PORT_ACTIV_9148S_PKG)	Assigned to Ports on the Cisco MDS 9148S Switch
Default	1–12
PORT_ACTIV_9148S_PKG	13–48

You can use the **show license usage** command to view any licenses assigned to a switch. If a license is in use, the status displayed is In use. If a license is installed but features or ports have acquired the license, then the status displayed is Unused.

The default license package for the Cisco MDS 9148S Switch is as follows:

```
switch# show license usage
```

Feature	Ins	Lic	Status	Expiry	Date	Comments
		Count				
FM_SERVER_PKG	Yes	-	Unused	never		-
ENTERPRISE_PKG	No	-	Unused			Grace expired
PORT_ACTIV_9148S_PKG	No	12	In use	never		-

---

This example displays the output when you do not have port licenses and try to activate a port license:

```

switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
switch(config)# interface fc1/50
switch(config-if)# shutdown
switch(config-if)# port-license acquire
fc1/50: (error) port activation license not available
switch(config-if)# no shutdown
switch(config-if)# end
switch# show interface fc1/50
fc1/50 is down (SFP not present)
  Hardware is Fibre Channel
  Port WWN is 20:32:8c:60:4f:0d:27:70
  Admin port mode is F, trunk mode is off
  snmp link state traps are enabled
  Port vsan is 1
  Receive data field Size is 2112
  Beacon is turned off
  Logical type is Unknown(0)
  5 minutes input rate 0 bits/sec,0 bytes/sec, 0 frames/sec
  5 minutes output rate 0 bits/sec,0 bytes/sec, 0 frames/sec
    0 frames input,0 bytes
    0 discards,0 errors
    0 invalid CRC/FCS,0 unknown class
    0 too long,0 too short
  0 frames output,0 bytes
    0 discards,0 errors
    0 input OLS,0 LRR,0 NOS,0 loop inits
    0 output OLS,0 LRR, 0 NOS, 0 loop inits
  Last clearing of "show interface" counters : never

switch# show running-config interface fc1/50

!Command: show running-config interface fc1/50
!Time: Mon Apr 17 11:47:08 2017

version 8.1(1)

interface fc1/50
  switchport mode F
  no shutdown

switch# show port-license | i 1/50
fc1/50      16977920      eligible

```

This table describes the port license assignments for the Cisco MDS 9250i Switch.

**Table 5: Default Port License Assignments for Cisco MDS 9250i Switch**

License Package (PORT_ACTIV_20P)	Assigned to Ports on the Cisco MDS 9250i Switch
Default	1–20
PORT_ACTIV_20P	21–40

You can use the **show license usage** command to view any licenses assigned to a switch. If a license is in use, the status displayed is In use. If a license is installed but no ports have acquired a license, then the status displayed is Unused.

The default license package for the Cisco MDS 9250i Switch is as follows:

```

switch# show license usage
Feature                               Ins  Lic  Status Expiry Date Comments

```

		Count		
DMM_9250	No	0	Unused	-
IOA_9250	No	0	Unused	-
XRC_ACCL	No	-	Unused	-
FM_SERVER_PKG	Yes	-	Unused never	-
MAINFRAME_PKG	No	-	Unused	-
ENTERPRISE_PKG	No	-	Unused	-
PORT_ACTIV_20P	No	20	In use never	-

This table describes the port license assignments for the Cisco MDS 9396S Switch.

**Table 6: Default Port License Assignments for Cisco MDS 9396S Switch**

License Package (PORT_ACTIV_9396S_PKG)	Assigned to Ports on the Cisco MDS 9396S Switch
Default	1-48
First PORT_ACTIV_9396S_PKG	49-60
Second PORT_ACTIV_9396S_PKG	61-72
Third PORT_ACTIV_9396S_PKG	73-84
Fourth PORT_ACTIV_9396S_PKG	85-96

You can use the **show license usage** command to view any licenses assigned to a switch. If a license is in use, the status displayed is In use. If a license is installed but features or ports have acquired the license, then the status displayed is Unused.

The default license package for the Cisco MDS 9396S Switch is as follows:

```
switch# show license usage
```

Feature	Ins	Lic	Status	Expiry Date	Comments
		Count			
FM_SERVER_PKG	No	-	Unused		-
ENTERPRISE_PKG	No	-	In use		Grace 24D 0H
PORT_ACTIV_9396S_PKG	No	48	In use never		-

## Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at <https://tools.cisco.com/bugsearch/> and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [Feature History for Smart Software Licensing](#) table.

# Information About Smart Software Licensing

## Smart Software Licensing Overview

Smart Software Licensing is a cloud-based licensing model that consists of tools and processes to authorize you the usage and reporting of your Cisco products. This feature captures your order and communicates with the Cisco Cloud License Service through the Smart Call Home transport media to complete product registration and authorization at the corresponding performance and technology levels.

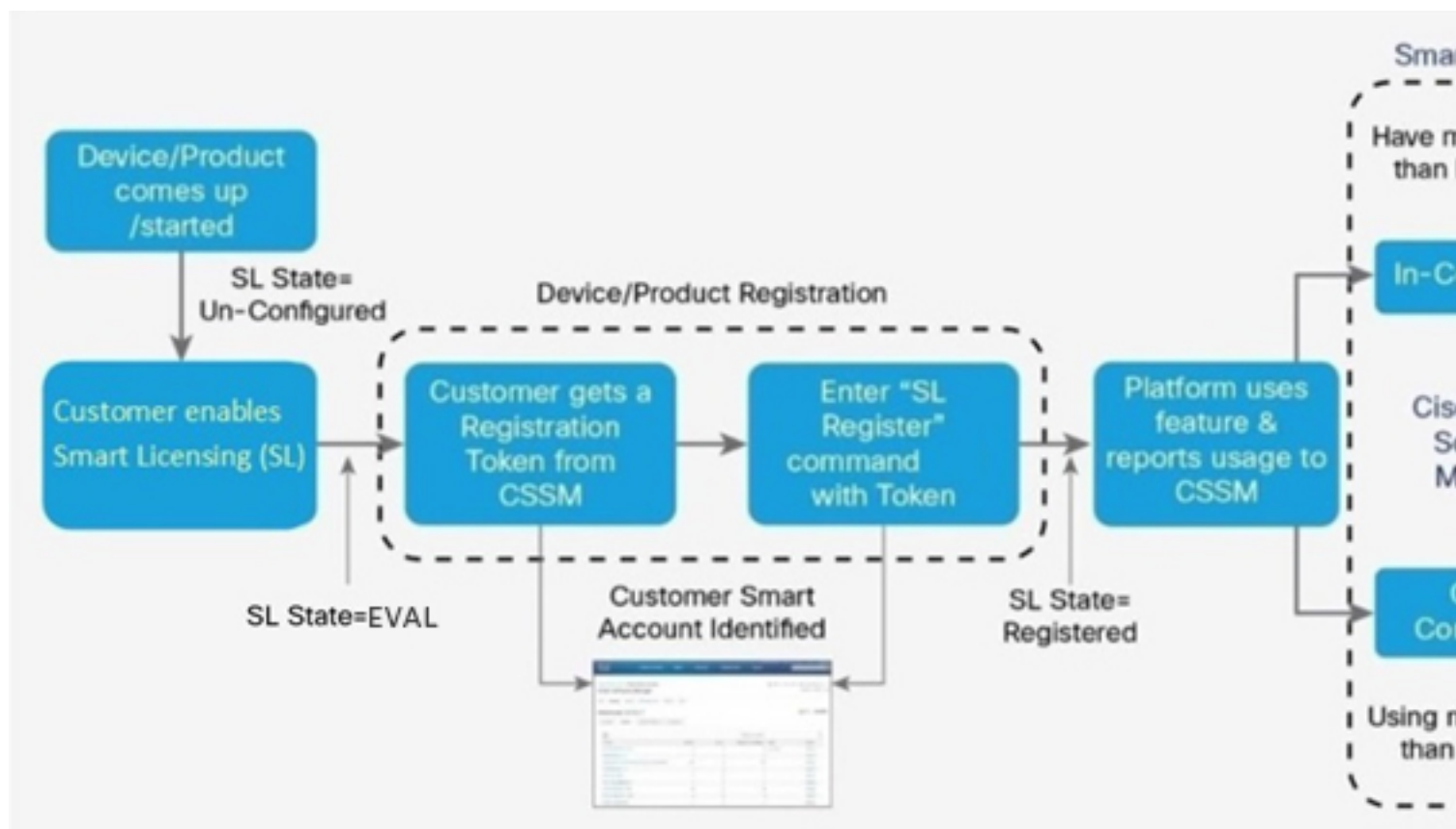
In the Smart Software Licensing model, you can activate licensed products without the use of a special software key or upgrade license file. You can activate the new functionalities using the appropriate product commands or configurations. Note that a software reboot may or may not be required depending on the product capabilities and requirements.

Similarly, downgrading or removing an advanced feature, performance, or functionality requires the removal of configurations or commands. After either of these actions is taken, the change in license state is noted by the Smart Software Manager during the next synchronization and an appropriate action is taken.

Starting from Cisco NX-OS 8.4(2), subscription-based licensing is available on Cisco MDS 9000 Series switches. This enables the customer to purchase licenses for a period of time.

Smart Software Licensing provides a single, standardized licensing solution for your Cisco products.

**Figure 1: Smart Licensing Workflow**



## Traditional Licensing Overview

Traditional licensing at Cisco is a legacy licensing model based on Product Activation Keys (PAK) and Unique Device Identifiers (UDI). On most devices, bandwidth needs are assessed prior to obtaining and installing a .tar file on switches to retrieve the UDI. Customers place an order for a PAK, and the PAK is emailed to the user. A combination of them. UDI and PAK is used to receive a license file that is installed in the boot directory of the switch to complete the installation of the Cisco NX-OS software.

The License Registration Portal (LRP) is available to help migrate traditional licenses to smart licenses. To access the LRP, obtain training, and manage licenses, go to <http://tools.cisco.com/SWIFT/LicensingUI/Home>.

You can convert the traditional license to a smart license in the following ways:

- [Converting a Traditional License to a Smart License Through GUI, on page 28](#)
- [Converting a Traditional License to a Smart License Through CLI, on page 29](#)

## Comparing Licensing Models

Two types of licensing models are used for the Cisco MDS 9000 Series Switches—traditional licensing and Smart Software Licensing.

**Table 7: Comparison Between Traditional Licensing and Smart Software Licensing**

Description	Traditional Licensing	Smart Software Licensing
License instance node locked to the product instance	Yes	No
Product registration upon configuration	No	Yes
Offers tools to report, monitor, own, and consume	No	Yes
Requires Smart Call Home	No	Yes

## Smart Software Licensing Model

The Smart Software licensing model that is defined for the Cisco MDS product line has the following options:

- Subscription-based licenses
  - Advantage (A)  
License contains Cisco Nexus Dashboard Fabric Controller (formerly DCNM) and Enterprise license of Cisco MDS 9000 series.
  - Premier (P)  
License contains Cisco Nexus Dashboard Fabric Controller (formerly DCNM), SAN Analytics, and Enterprise license of Cisco MDS 9000 series.
- Enterprise Agreement (EA) licenses

The license naming convention is as follows: M91XK9-A-1Y

- M91XK9 - Cisco MDS 9000 series
- A or P - License type
- NY - License Duration in years.

This table provides PIDs for subscription-based licenses.

**Table 8: PIDs for Subscription-Based Licenses**

PIDs	License Type	Duration (years)
M91XK9-DCNM-1Y	Subscription	1
M92XK9-DCNM-1Y	Subscription	1
M93XK9-DCNM-1Y	Subscription	1
M97XK9-DCNM-1Y	Subscription	1
M91XK9-DCNM-3Y	Subscription	3
M92XK9-DCNM-3Y	Subscription	3
M93XK9-DCNM-3Y	Subscription	3
M97XK9-DCNM-3Y	Subscription	3
M91XK9-DCNM-5Y	Subscription	5
M92XK9-DCNM-5Y	Subscription	5
M93XK9-DCNM-5Y	Subscription	5
M97XK9-DCNM-5Y	Subscription	5
M91XK9-ENT-1Y	Subscription	1
M92XK9-ENT-1Y	Subscription	1
M93XK9-ENT-1Y	Subscription	1
M97XK9-ENT-1Y	Subscription	1
M91XK9-ENT-3Y	Subscription	3
M92XK9-ENT-3Y	Subscription	3
M93XK9-ENT-3Y	Subscription	3
M97XK9-ENT-3Y	Subscription	3
M91XK9-ENT-5Y	Subscription	5
M92XK9-ENT-5Y	Subscription	5
M93XK9-ENT-5Y	Subscription	5
M97XK9-ENT-5Y	Subscription	5
L1-D-M91S-AXK9	Time Based	1

<b>PIDs</b>	<b>License Type</b>	<b>Duration (years)</b>
L-D-M91S-AXK9	Time Based	3
L5-D-M91S-AXK9	Time Based	5
L1-D-M93S-AXK9	Time Based	1
L-D-M93S-AXK9	Time Based	3
L5-D-M93S-AXK9	Time Based	5
L1-D-M97S-AXK9	Time Based	1
L-D-M97S-AXK9	Time Based	3
L5-D-M97S-AXK9	Time Based	5
M91XK9-A-1Y	Subscription	1
M91XK9-A-3Y	Subscription	3
M91XK9-A-5Y	Subscription	5
M93XK9-A-1Y	Subscription	1
M93XK9-A-3Y	Subscription	3
M93XK9-A-5Y	Subscription	5
M97XK9-A-1Y	Subscription	1
M97XK9-A-3Y	Subscription	3
M97XK9-A-5Y	Subscription	5
M91XK9-P-1Y	Subscription	1
M91XK9-P-3Y	Subscription	3
M91XK9-P-5Y	Subscription	5
M93XK9-P-1Y	Subscription	1
M93XK9-P-3Y	Subscription	3
M93XK9-P-5Y	Subscription	5
M97XK9-P-1Y	Subscription	1
M97XK9-P-3Y	Subscription	3
M97XK9-P-5Y	Subscription	5
M91XK9-SD-1Y	Subscription	1
M91XK9-SD-3Y	Subscription	3
M91XK9-SD-5Y	Subscription	5
M93XK9-SD-1Y	Subscription	1
M93XK9-SD-3Y	Subscription	3
M93XK9-SD-5Y	Subscription	5



PIDs	License Type	Duration (years)
M97XK9-SD-1Y	Subscription	1
M97XK9-SD-3Y	Subscription	3
M97XK9-SD-5Y	Subscription	5

This table provides PIDs for EA licenses.

**Table 9: PIDs for EA Licenses**

PIDs	Term
E2N-MDS9100-G-A	3 or 5 Year
E2N-MDS9100-B-A	3 or 5 Year
E2N-MDS9100-G-P	3 or 5 Year
E2N-MDS9100-B-P	3 or 5 Year
E2N-MDS9300-G-A	3 or 5 Year
E2N-MDS9300-B-A	3 or 5 Year
E2N-MDS9300-G-P	3 or 5 Year
E2N-MDS9300-B-P	3 or 5 Year
E2N-MDS9700-G-A	3 or 5 Year
E2N-MDS9700-B-A	3 or 5 Year
E2N-MDS9700-G-P	3 or 5 Year
E2N-MDS9700-B-P	3 or 5 Year

## Guidelines and Limitations for Smart Software Licensing

- You cannot use both traditional licensing and Smart Software Licensing at the same time on the Cisco MDS 9000 Series Switches.
- Smart Software Licensing is not supported on Cisco NPV devices in Cisco MDS NX-OS Release 9.2(1) or earlier.

## Smart Accounts and Virtual Accounts

- A Smart account provides you with a single location for all smart-account enabled products and licenses. It assists you in speedy procurement, deployment, and maintenance of your Cisco software.

If you are requesting a Smart account on behalf of an organization, you must have the authority to represent the requesting organization when creating a Smart account. After submitting the request, the request goes through an approval process before you are provided with access to your Smart account.

Go to <http://software.cisco.com> to learn about, set up, and manage a Smart account.

- A virtual account is a subaccount within a Smart account. You can define the virtual account's structure based on organizational layout, business function, geography, or any defined hierarchy. Virtual accounts can be created and maintained only by Smart account administrators.

## Smart Software Manager Overview

Smart Software Manager enables the management of software licenses and Smart accounts from a single portal. The interface allows you to activate your product, manage entitlements, renew, and upgrade software. An active Smart account is required to complete the registration process. To access the Smart Software Manager, go to <http://www.cisco.com/web/ordering/smart-software-manager/index.html>.

You must add the following information in the Smart Software Manager:

- Trusted Unique Identifier—This is the device ID (Secure Unique Device Identifier (SUDI)).
- Organizational Identifier—This is a numerical format to associate a product with a Smart account or Virtual account.
- Licenses consumed—Allows the Smart Software Manager to understand the license type and the level of consumption.

## Smart Call Home Overview

Use the Smart Call Home feature to communicate with the Smart Software Manager. Smart Call Home is enabled automatically when you configure Smart Software Licensing. On Cisco MDS 9000 Series Switches, Smart Software Licensing is not enabled by default.

The Smart Call Home (SCH) server runs on the Cisco Smart Software Manager (CSSM) satellite by default. You can access this service using the following URL:

`https://<CSSM satellite IP:443>/Transportgateway/services/DeviceRequestHandler`

Provide this URL as part of Smart Call Home configuration so that the device registration works with the CSSM satellite. For a sample configuration, see [Configuration Examples for Smart Software Licensing](#).

The associated Smart Call Home messages are sent to the Smart Software Manager only after enabling Smart Call Home. For switches in which Smart Software Licensing is enabled by default, Smart Call Home is also enabled by default, along with the associated messages.

To disable Smart Software Licensing, see [Disabling Smart Software Licensing](#).

## Smart Software Manager Satellite

Smart Software Manager satellite is a component of Smart Software Licensing and works in conjunction with the Smart Software Manager to manage software licenses. You can intelligently manage product licenses and get near real-time visibility and reports pertaining to the Cisco licenses you purchased and consumed.

If you do not want to manage your installed base using a direct Internet connection, the Smart Software Manager satellite will be installed on your premises to provide a subset of the Smart Software Manager functionality. You can download the satellite application, deploy it, and register it with the Smart Software Manager.

You can perform the following functions using the satellite application on your premises:

- Activate or register a license

- Get visibility to your company's licenses
- Transfer licenses between company entities

To learn more about the Smart Software Manager satellite, go to <http://www.cisco.com/go/smartsatellite>.

## Requesting a Smart Account

Requesting a Smart account is a one-time process. Subsequent management of users is a capability provided through the tool.

### Before you begin

Ensure that you have a Cisco Employee Connection (CEC) ID.

### Procedure

---

**Step 1** Go to <http://software.cisco.com>, and log in to your account.

**Step 2** Click the **Request a Smart Account** link in the **Administration** section.

**Step 3** Perform one of the following tasks to select the Account Approver:

- To select yourself as the approver, click **Yes, I will be the Approver for the account** option.
- To select a different person as the approver, click **No, the person specified below will be the Approver for the account** option and specify the person's email ID.

**Note** The specified approver must have the authority to enter legal agreements. The approver serves as the primary owner and nominates account administrators.

**Step 4** Depending on the approver type, perform one of the following procedures:

- If you are the approver, perform the following tasks:
  - a. Enter **Account Name**, **Company/Organization Name**, **Country**, and **State/Province/Region** information.
  - b. (Optional) Click **Edit**.
  - c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier** and **Contact Phone Number**, and click **OK**.

**Note** The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

- d. Click **Continue** to select the legal address to be linked to your Smart account.

- If you are not the approver, perform the following procedure:
  - a. Enter the **Account Name** and an optional **Message** to the approver.
  - b. (Optional) Click **Edit**.
  - c. In the **Edit Account Identifier** window, enter a valid **Proposed Domain Identifier**, and click **OK**.

**Note** The default domain identifier is the approver's email domain. If you edit the domain identifier, the change goes through a manual approval process.

- d. Click **Continue**.
- e. Follow the instructions in the email that is sent to you to complete the request.

---

## Adding a User to a Smart Account

Smart account user management is available in the **Administration** section of [Cisco Software Central](#).

### Procedure

---

- Step 1** Go to <http://software.cisco.com>, and log in to your account.
  - Step 2** Click the **Manage Smart Account** link in the **Administration** section.
  - Step 3** Click the **Users** tab.
  - Step 4** Click **New User**.
  - Step 5** Provide the required information in the **New User** section.  
(Define roles to manage the entire Smart account or specific virtual accounts.)
  - Step 6** Click **Continue**.
- 

## Converting a Traditional License to a Smart License Through GUI

Traditional licenses associated with Product Activation Keys (PAK) can be converted to Smart Licenses. Access Traditional licenses through the License Registration Portal by clicking the **PAKs/Tokens** tab, and then use the information provided in this section to convert PAKs to smart licenses.

### Procedure

---

- Step 1** Go to <http://software.cisco.com>, and log in to your account.
- Step 2** Click the **Traditional Licensing** link in the **License** section.  
You will be redirected to the **LRP** window.
- Step 3** Click the **PAKs/Tokens** tab under **Manage**, if it is not already selected.
- Step 4** Check the **PAK/Token ID** check box.
- Step 5** Select **Convert to Smart Entitlements** from the **Actions** drop-down menu.
- Step 6** Select a smart account from the **Smart Account** drop-down list.  
**Note** You can view only the smart accounts that are assigned to you.
- Step 7** Select a virtual account from the **Virtual Account** drop-down list.  
**Note** You can view only the virtual accounts that are assigned to you.

- Step 8** Click **Assign**.  
The selected PAK will be converted to a smart license.
- 

## Converting a Traditional License to a Smart License Through CLI

Traditional licenses associated with Product Activation Keys (PAK) can be converted to smart licenses using CLI.

### Before you begin

- Ensure that Smart Software Licensing is enabled.
- Ensure that you have a valid smart account.
- Ensure that you have valid user rights for the smart account.

### Procedure

---

**Step 1** switch# **license smart conversion start**

Starts a manual conversion of a traditional license to a smart license. The conversion takes place in the background. After the conversion succeeds or fails, a system log message is displayed on the switch console.

**Step 2** (Optional) switch# **license smart conversion stop**

Stops the manual conversion.

**Step 3** (Optional) switch# **show license status**

Displays the license conversion status. If you run this command from an active device in an high availability (HA) configuration, this will display the status of all the devices in the HA configuration.

---

### Converting a Traditional License to a Smart License Through CLI

The following example shows how to convert a traditional license to a smart license using the CLI:

```
switch# license smart conversion start
```

```
Smart License Conversion process is in progress. Use the 'show license status' command to  
check the progress and result.
```

The following example shows how to stop the process of converting a traditional license to smart license using the CLI:

The following example shows the status of the license conversion for a standalone device:

```
switch# license smart conversion stop  
stop manual conversion failed:  
Some Smart Licensing Conversion jobs stopped successfully.
```

The following example shows the status of line conversion for a standalone device:

```
switch# show license status
```

```
Smart Licensing is ENABLED.
Registration:
Status: REGISTERED
Smart Account: Big-U University
Virtual Account: Physics
Export-Controlled Functionality: Not Allowed
Initial Registration: SUCCEEDED on Feb 24 23:30:12 2014 PST
Last Renewal Attempt: SUCCEEDED on Feb 24 23:30:12 2014 PST
Next Renewal Attempt: Aug 24 23:30:12 2014 PST
Registration Expires: Feb 24 23:30:12 2015 PST
```

**!The following show output is applicable from Cisco NX-OS Release 8.2(1) onwards!**

**Smart License Conversion:**

**Automatic Conversion Enabled: False**

**Status: SUCCEEDED on Jan 1 00:00:00 1970 UTC**

**License Authorization:**

**Status: AUTHORIZED on Aug 31 17:04:56 2017 UTC**

**Last Communication Attempt: SUCCEEDED on Aug 31 17:04:56 2017 UTC**

**Next Communication Attempt: Sep 30 17:04:56 2017 UTC**

**Communication Deadline: Nov 29 16:58:31 2017 UTC**

## Configuring Smart Software Licensing

### Configuring a DNS Client



---

**Note** To avoid any issues during configuring a DNS client, ensure to check if the name server is reachable before you configure a DNS client.

---

#### Procedure

---

- |               |  |
|---------------|--|
| <b>Step 1</b> | <code>switch# configure terminal</code><br>Enters global configuration mode.   |
| <b>Step 2</b> | <code>switch(config)# ip domain-lookup</code><br>Enables DNS-based address translation.  |
| <b>Step 3</b> | <code>switch(config)# ip domain-name name</code><br>Defines the default domain name that Cisco NX-OS uses to resolve unqualified host names.<br><br>Cisco NX-OS appends the default domain name to any hostname that does not contain a complete domain name before starting a domain-name lookup. |
| <b>Step 4</b> | <code>switch(config)# ip name-server address1 [address2... address6]</code><br>Defines up to six name servers. The address can be either an IPv4 address or an IPv6 address.   |
-

## Enabling Smart Software Licensing

### Procedure

---

- Step 1**     switch# **configure terminal**.  
Enters global configuration mode.
- Step 2**     Use one of the following commands to enable Smart Software Licensing:
- switch(config)# **license smart enable**
  - switch(config)# **feature license smart**
- Enables Smart Software Licensing.
- 

## Disabling Smart Software Licensing

### Procedure

---

- Step 1**     switch# **configure terminal**.  
Enters global configuration mode.
- Step 2**     Use one of the following commands to disable Smart Software Licensing:
- switch(config)# **no license smart enable**
  - switch(config)# **no feature license smart**
- Disables Smart Software Licensing.
- 

## Registering a Device

### Before you begin

- Ensure that Smart Software Licensing is enabled.
- Ensure that you have the token to be used to register your device to the smart account.

### Procedure

switch# **license smart register idtoken** *token* [**force**]  
Registers your device to the smart account using the token.

## Renewing Device Registration

### Procedure

```
switch# license smart renew ID
```

Renews the device registration.

## Renewing Device Authorization

### Procedure

```
switch# license smart renew auth
```

Renews the device authorization.

## Unregistering a Device

### Procedure

```
switch# license smart deregister
```

Unregisters a device.

# Configuring Smart Call Home for Smart Software Licensing

## Viewing a Smart Call Home Profile

### Procedure

```
switch# show callhome smart-licensing
```

Displays the Smart Call Home profile.

## Enabling Smart Call Home Data Privacy

### Procedure

---

**Step 1**      switch# **configure terminal**

Enters global configuration mode.

**Step 2**      switch(config)# **callhome**

Enters Call Home configuration mode.

**Step 3**      switch(config-callhome)# **data-privacy hostname**

Enables Call Home data privacy.

---



## Verifying Smart Software Licensing

Verify Smart Software Licensing using the following commands:

Commands	Purpose
<b>show license</b>	Displays the contents of all the license files.
<b>show license all</b>	Displays all smart license agent information.
<b>show license brief</b>	Displays a list of license files.
<b>show license status</b>	Displays the smart license agent status.
<b>show license summary</b>	Displays a summary of the smart license agent status.
<b>show license tech support</b>	Gathers information for troubleshooting.
<b>show license udi</b>	Displays device UDI information.
<b>show license usage</b>	Displays show license usage table information.
<b>show tech-support license</b>	Displays licensing technical support information.

## Configuration Examples for Smart Software Licensing

This example shows how to register your device with the Cisco portal and enable Smart Software Licensing:



---

**Note** To avoid any issues during registering your device, ensure to check if the name server is reachable before registering your device.

---

```
switch# configure terminal
switch(config)# ip domain-lookup
switch(config)# ip domain-name cisco.com
switch(config)# ip name-server 171.70.168.183
switch(config)# callhome
switch(config-callhome)# dest xml trans http
switch(config-callhome)# dest xml email sl-sch-test@cisco.com
switch(config-callhome)# dest xml http https://tools.cisco.com/its/service/oddce/services/DDCEService
switch(config-callhome)# enable
switch(config-callhome)# exit
switch(config)# feature license smart
```

This example shows how to disable Smart Software Licensing:

```
switch# configure terminal
switch(config)# no feature license smart
```

This example shows how to register a device:

```
switch# configure terminal
switch(config)# license smart register idtoken sampletokenID
register status: Registration process is in progress. Use the 'show license status' command to check the progress
and result
```

This example shows how to unregister a device:

```
switch# license smart deregister
```

This example shows how to provide the URL for CSSM satellite as part of smart call home configuration:

```
switch(config-callhome)# destination-profile xml email-addr example@cisco.com
alert-group Add alert group
email-addr Add email addr
http Add http or https url
transport-method Callhome message sending transport-method
destination-profile xml http https://tools.cisco.com/its/service/oddce/services/DDCEService
services/DeviceRequestHandler*
```



---

**Note** \* The IP address should have the format: https://<CSSM satellite IP:443>/Transportgateway/services/DeviceRequestHandler

---

## Verification Examples for Smart Software Licensing

These examples show how to verify Smart Software Licensing:

```
switch# show license status
```

Smart Licensing is ENABLED

Registration:

```
Status: REGISTERED
Smart Account: MDS-9148S
Virtual Account: Default
Export-Controlled Functionality: Allowed
Initial Registration: SUCCEEDED on Apr 18 08:20:47 2017 UTC
Last Renewal Attempt: None
Next Renewal Attempt: Oct 15 08:20:46 2017 UTC
Registration Expires: Apr 18 08:17:43 2018 UTC
```

License Authorization:

```
Status: AUTHORIZED on Apr 18 08:25:08 2017 UTC

Last Communication Attempt: SUCCEEDED on Apr 18 08:25:08 2017 UTC
Next Communication Attempt: May 18 08:25:08 2017 UTC
Communication Deadline: Jul 17 08:22:07 2017 UTC
```

```
switch# show callhome smart-licensing
```

Current smart-licensing transport settings:

```
Smart-license messages: enabled
Profile: CiscoTAC-1 (status: ACTIVE)
```

```
switch# show license summary
```

Smart Licensing is ENABLED

Registration:

```

Status: REGISTERED
Smart Account: Cisco Systems, Inc.
Virtual Account: NexusSmartLicensing_Test
Export-Controlled Functionality: Allowed

License Authorization:
  Status: AUTHORIZED on Dec 14 10:43:48 2016 UTC

  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Jan 13 10:43:47 2017 UTC
  Communication Deadline: Dec 14 08:07:20 2017 UTC

switch# show license all

Smart Licensing Status
=====
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Systems, Inc.
  Virtual Account: NexusSmartLicensing_Test
  Export-Controlled Functionality: Allowed
  Initial Registration: SUCCEEDED on Dec 14 10:43:33 2016 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 12 10:43:32 2017 UTC
  Registration Expires: Dec 14 08:07:20 2017 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED on Dec 14 10:43:48 2016 UTC
  Next Communication Attempt: Jan 13 10:43:48 2017 UTC
  Communication Deadline: Dec 14 08:07:21 2017 UTC

License Usage
=====

Product Information
=====
UDI: SN:JAF1428DTAH

Agent Version
=====
Smart Agent for Licensing: 1.6.6_rel/88

```

The **show tech-support license** command displays information about the license installed on the device.

```

switch# show license udi

UDI: SN:JAF1428DTAH

switch# show license usage
License Authorization:
  Status: AUTHORIZED on Apr 18 08:25:08 2017 UTC

(ENTERPRISE_PKG):
  Description: This entitlement tag was created via Alpha Extension application
  Count: 1
  Version: 1.0
  Status: AUTHORIZED

```

```
(PORT_ACTIV_9148S_PKG):  
  Description: This entitlement tag was created via Alpha Extension application  
  Count: 48  
  Version: 1.0  
  Status: AUTHORIZED
```

```
switch# show running-config callhome
```

```
!Time: Thu Dec 15 08:55:26 2016
```

```
version 8.0(1)  
callhome  
  email-contact sch-smart-licensing@cisco.com  
  destination-profile xml transport-method http  
  destination-profile xml http https://tools.cisco.com/its/service/oddce/  
services/DDCEService  
  transport http use-vrf management  
  enable
```

## Use Cases for Smart Software Licensing

### Scenario 1

1. Configure and order a with licenses and select the release that will be preinstalled on the hardware prior to shipment.



---

**Note**

To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart Account set up, and then convert the licenses by going to the [License Registration Portal](#).

---

2. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. This will convert all the licenses that are preinstalled on the switch to smart licenses. Note that this task must be performed for each switch that you want to convert to smart license.
3. The service will validate if license Stock Keeping Units (SKUs) on the switch have been mapped to smart licenses before proceeding with the conversion.
4. Enable smart mode on the switch and start using the smart licenses.

### Scenario 2

1. Configure and order a with licenses and select the release that will be preinstalled in the hardware prior to shipment.
2. Upgrade the switch to .



---

**Note**

To convert the preinstalled licenses on the hardware to smart licenses, you must have a Smart account set up and then perform the conversion by going to the [License Registration Portal](#).

---

3. Click the **Devices** tab under the **Manage** section. Click the corresponding Device ID, and choose **Convert to Smart Entitlements** from the Device ID drop-down list. This will convert all the licenses that are preinstalled on the switch to smart licenses. Note that this task must be performed for each switch that you want to convert to smart license.

4. The service will validate if license SKUs on the switch are mapped to smart licenses before proceeding with the conversion.
5. You enable smart mode on the switch and start using the smart licenses.

### Scenario 3

1. Order a spare license SKU and do not associate a Smart account to the order in Cisco Commerce Workspace (CCW).



---

**Note** You must have a Smart account set up before using Smart Software Licensing.

---

2. Get a PAK delivered to yourself and load it to your Smart account.
3. License Registration Portal service will validate if a spare license SKU is mapped to a smart license.
4. The Smart Software Manager (SSM) will notify you via email that your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.
5. Specify the PAKs as smart licenses in SSM.
6. Ensure that is installed on the switch, enable smart mode, and start using the smart entitlements.

### Scenario 4

1. Order a spare license SKU and assign a Smart account to the order in CCW.
2. The existing License Registration Portal service will auto deposit the PAK to the LRP Smart account.
3. License Registration Portal service will validate if the spare license SKU has been mapped to smart entitlements. If the spare license SKU are mapped to smart entitlements, the service sends out a confirmation notification to CSSM.
4. The Smart Software Manager will notify you via email that your Smart Account has licenses that can be fulfilled as traditional licenses or smart licenses.
5. Specify the PAKs as Smart Software Licenses in SSM.
6. Ensure that is installed on the switch, enable smart mode, and start using the smart licenses.

## Additional References for Smart Software Licensing

**Table 10: Technical Assistance**

Description	Link
-------------	------

<p>Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>
License Registration Port (LRP) documentation	<a href="https://www.cisco.com/web/fw/tools/swift/xui/html/help.html">https://www.cisco.com/web/fw/tools/swift/xui/html/help.html</a>

## Feature History for Smart Software Licensing

Feature Name	Release	Feature Information
Smart Software Licensing	8.4(2)	<p>Smart Software Licensing is a standardized licensing platform that simplifies the Cisco software experience and helps you understand how Cisco software is used across your network. Smart Software Licensing is the next generation licensing platform for Cisco MDS 9000 Series Switches.</p> <p>The following commands were introduced in this feature:</p> <ul style="list-style-type: none"> <li>• <b>feature license smart</b></li> <li>• <b>license smart deregister</b></li> <li>• <b>license smart enable</b></li> <li>• <b>license smart register</b></li> <li>• <b>license smart renew</b></li> <li>• <b>show license all</b></li> <li>• <b>show license status</b></li> <li>• <b>show license summary</b></li> <li>• <b>show license tech support</b></li> <li>• <b>show license udi</b></li> <li>• <b>show license usage</b></li> </ul>

## Related Documentation

The documentation set for the Cisco MDS 9000 Series includes the following documents. To find a document online, use the Cisco MDS NX-OS Documentation Locator at:

[http://www.cisco.com/en/US/docs/storage/san\\_switches/mds9000/roadmaps/doclocator.htm](http://www.cisco.com/en/US/docs/storage/san_switches/mds9000/roadmaps/doclocator.htm)

Cisco DCNM documentation is available at the following URL:

[http://www.cisco.com/en/US/products/ps9369/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/ps9369/tsd_products_support_series_home.html)

## **Release Notes**

- *Cisco MDS 9000 Series Release Notes for Cisco MDS NX-OS Releases*
- *Cisco MDS 9000 Series Release Notes for MDS SAN-OS Releases*
- *Cisco MDS 9000 Series Release Notes for Storage Services Interface Images*
- *Cisco MDS 9000 Series Release Notes for Cisco MDS 9000 EPLD Images*
- *Cisco Data Center Network Manager Release Notes*

## **Regulatory Compliance and Safety Information**

*Regulatory Compliance and Safety Information for the Cisco MDS 9000 Series*

## **Compatibility Information**

- *Cisco Data Center Interoperability Support Matrix*
- *Cisco MDS 9000 NX-OS Hardware and Software Compatibility Information and Feature Lists*
- *Cisco MDS NX-OS Release Compatibility Matrix for Storage Service Interface Images*
- *Cisco MDS 9000 Series Switch-to-Switch Interoperability Configuration Guide*
- *Cisco MDS NX-OS Release Compatibility Matrix for IBM SAN Volume Controller Software for Cisco MDS 9000*

## **Hardware Installation**

- *Cisco MDS 9700 Director Hardware Installation Guide*
- *Cisco MDS 9500 Series Hardware Installation Guide*
- *Cisco MDS 9250i Multiservice Switch Hardware Installation Guide*
- *Cisco MDS 9200 Series Hardware Installation Guide*

## **Software Installation and Upgrade**

- *Cisco MDS 9000 Series Storage Services Interface Image Install and Upgrade Guide*
- *Cisco MDS 9000 Series Storage Services Module Software Installation and Upgrade Guide*
- *Cisco MDS 9000 NX-OS Release 4.1(x) and SAN-OS 3(x) Software Upgrade and Downgrade Guide*

## **Cisco NX-OS**

- *Cisco MDS 9000 Series NX-OS Fundamentals Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Licensing Guide*

- *Cisco MDS 9000 Series NX-OS System Management Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Interfaces Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Fabric Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Quality of Service Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Security Configuration Guide*
- *Cisco MDS 9000 Series NX-OS IP Services Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Intelligent Storage Services Configuration Guide*
- *Cisco MDS 9000 Series NX-OS High Availability and Redundancy Configuration Guide*
- *Cisco MDS 9000 Series NX-OS Inter-VSAN Routing Configuration Guide*

## **Command-Line Interface**

*Cisco MDS 9000 Series Command Reference*

## **Intelligent Storage Networking Services Configuration Guides**

- *Cisco MDS 9000 I/O Acceleration Configuration Guide*
- *Cisco MDS 9000 Series SANTap Deployment Guide*
- *Cisco MDS 9000 Series Data Mobility Manager Configuration Guide*
- *Cisco MDS 9000 Series Storage Media Encryption Configuration Guide*
- *Cisco MDS 9000 Series Secure Erase Configuration Guide*
- *Cisco MDS 9000 Series Cookbook for Cisco MDS SAN-OS*

## **Troubleshooting and Reference**

- *Cisco NX-OS System Messages Reference*
- *Cisco MDS 9000 Series NX-OS Troubleshooting Guide*
- *Cisco MDS 9000 Series NX-OS MIB Quick Reference*
- *Cisco MDS 9000 Series NX-OS SMI-S Programming Reference*
- *Cisco DCNM for SAN Database Schema Reference*

## **Communications, Services, and Additional Information**

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