



Software Activation Configuration Guide, Cisco IOS XE Gibraltar 16.11.x (Cisco NCS 520 Series)

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CHAPTER 1

Cisco IOS Software Activation Conceptual Overview

The Cisco IOS Software Activation feature is an orchestrated collection of processes and components to activate Cisco software feature sets by obtaining and validating Cisco software licenses. With this feature, you can enable licensed features and register licenses in these ways:

- By using the Cisco Product License Registration portal.
- By entering Cisco EXEC commands on the device.
- By using Cisco License Manager to register, obtain, and install licenses in a bulk fashion for network-wide deployments.

This document provides an overview of the Cisco software licensing processes and describes the role of the Cisco IOS Software Activation feature in those processes.

- [Finding Feature Information, on page 1](#)
- [Information About the Cisco Software Licensing Process, on page 2](#)
- [Additional References, on page 7](#)
- [Glossary, on page 7](#)

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and 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 information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information About the Cisco Software Licensing Process

Cisco Software Licensing Concepts

Cisco Product License Registration Portal

Use the Cisco Product License Registration portal at <http://www.cisco.com/go/license> to perform these licensing operations:

- Get a license through product authorization key (PAK) registration
- Register for a return merchandise authorization (RMA) replacement license
- Manage a license (look up a license and upload a rehost ticket)
- Migrate a license

You must have a Cisco.com account before you can access the portal.

Product Authorization Key

Interaction with the Cisco Product License Registration portals might require a PAK, which is provided when you order and purchase the right to use a feature set for a particular platform. The PAK serves as a receipt and is an important component in the process to obtain and upgrade a license.

You can also purchase a bulk PAK to fulfill multiple licenses on a device.

Unique Device Identifier

Cisco software performs license verification checks by comparing a stored unique device identifier (UDI)--a unique and unchangeable identifier assigned to all Cisco hardware devices--with the UDI of the device.

The UDI has two main components: the product ID (PID) and the serial number (SN). For most Cisco hardware devices, the UDI is printed on a label located on the back of the device and can be displayed by using the **show license udi** command.



Note When registering a license, you must use the correct UDI.

Cisco Software License Validation

Cisco software licensing uses a system of validation keys to provide a simple mechanism for deploying new feature sets that offers Cisco customers increased functionality for upgrading and maintaining their software.

Some feature sets on a Cisco device might need the license key before they can be enabled. You obtain the license key by using the Cisco licensing portal. The portal issues a license key for a specific Cisco software feature set, and the license is locked to the device UDI. (This is known as a node-locked license.)

Cisco License Manager

The Cisco License Manager, a client/server-based application that is available free to Cisco customers, can automatically discover Cisco devices on a network and can simplify the task of collecting the license key.

For more information, see the *User Guide for Cisco License Manager* at this URL:
http://www.cisco.com/en/US/products/ps7138/products_user_guide_list.html .

Software End-User License Agreement

As part of the licensing process, you must accept terms and conditions set forth in the end-user license agreement. You implicitly accept the agreement when you first use a new device. However, you must explicitly accept the agreement before a feature set can be activated for evaluation and extension temporary licenses.

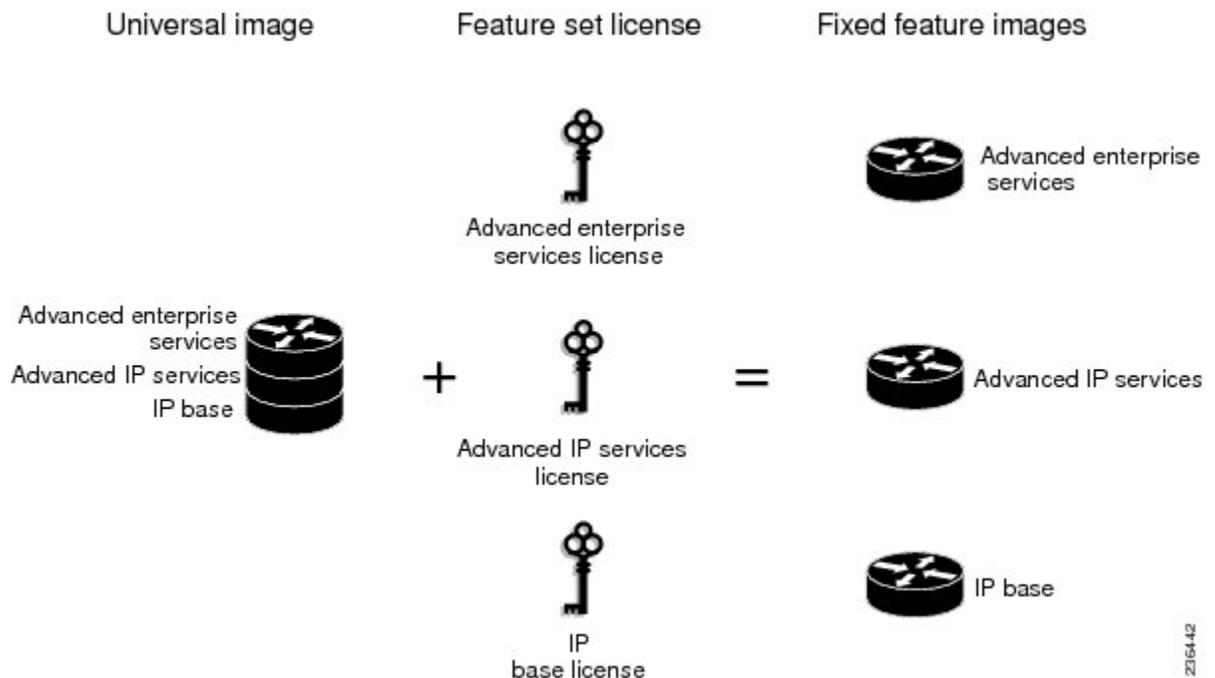
You can read the terms and conditions of the end-user license agreement at this URL:
http://www.cisco.com/en/US/docs/general/warranty/English/EU1KEN_.html .

License Models for Images and Features

Cisco IOS Universal Image-Based Licenses

The Cisco IOS universal image contains *all* fixed feature images in one image. You can access the required functionality based on the license installed on the device. A higher-level feature-set license inherits the content of the lower-level feature sets it contains. The figure below shows an example of the feature sets and fixed feature images that can make the universal image.

Figure 1: Example of Universal Image Components



A platform can have a single universal image, which is a superset of all fixed feature images. Fixed feature images are an older packaging form in which the image contains only part of a systems capabilities. The fixed

feature images supported by platform are predetermined and vary between platforms. A particular fixed feature image functionality is enabled based on license availability.

The software packaging simplifies the image selection process by consolidating the total number of packages and by using consistent package names across all hardware products.

The image-based license is used to help bring up all the subsystems that correspond to the image-level license that you purchase. Image licenses are enforced only during boot time.

The feature sets available for upgrading Cisco devices are listed on the Cisco IOS Software Packaging web page at this URL: <http://www.cisco.com/en/US/products/sw/iosswrel/ps5460/index.html>.

Feature-Based Licenses

Once the image-based license is used and the appropriate subsystems are activated, individual feature licenses are used to activate individual features.

License keys enable or disable individual features. Features check for their licenses before enabling themselves and adjust their behavior based on the following:

- Activation of a permanent license
- Expiration of a time-limited evaluation license
- Validity of a subscription license

License Types

Permanent Licenses

Permanent licenses are perpetual; that is, no usage period is associated with them. Once permanent licenses are installed, they provide all the permissions needed to access features in the software image. All permanent licenses are node locked and validated by the Cisco licensing infrastructure during software installation. Once a permanent license is installed, you do not need to upgrade for subsequent releases.

Cisco manufacturing preinstalls the appropriate permanent license on the ordered device for the purchased feature set. No customer interaction with the software activation processes is required to enable a license on new hardware.

Temporary Licenses

Temporary licenses are limited to a specific usage period (for example, 60 days). You must accept the end-user license agreement before the temporary licenses can be activated.

There are three types of temporary licenses: those embedded in Cisco images, evaluation licenses obtained from the Cisco Product License Registration portal, and extension licenses that are obtained from the Cisco Technical Assistant Center (TAC).

Although the embedded license can also be used for evaluation purposes, we recommend that you use the embedded license for emergency use only and obtain an evaluation license from the self-serve Cisco Product Licensing Registration portal.

These sections further define the types of temporary licenses:

Built-in Licenses for Emergencies

To avoid network downtime in the event of device failure and if the replaced device does not have the same licenses as the failed device, you can use a built-in license (an evaluation license) in the software image. Using it ensures that you can configure the needed features without requiring a license key. However, you must still accept an end-user license agreement and must acknowledge that there is a 60-day usage limit for this type of license.



Note You must go to the Cisco Product License Registration portal to obtain a permanent RMA replacement license.

Evaluation Licenses

Evaluation licenses are also temporary, and you use them to evaluate a feature set on new hardware.

You obtain evaluation licenses from the Cisco licensing portal: [Licensing Portal for Demo Licenses](#)



Note You must go to the Cisco Product License Registration portal prior to the expiration of the evaluation license to upgrade the license status.

Extension Licenses

When the time allowed for an evaluation licenses expires, you can work with TAC to obtain an extension license. Similar to an evaluation license, extension licenses are node locked and valid for a specific period (for example, 60 days) based on usage.



Note You must obtain approval to use an extension license.

Uncounted or Counted Licenses

Feature-based licenses are either uncounted licenses or counted licenses. Uncounted licenses do not have any count. Counted licenses have an attribute to fulfill for a certain number of counts. In other words, a count is associated with them that indicates the instances of that feature available for use in the system.

Pay as You Grow Model

The pay-as-you-grow model allows you to upgrade your hardware and software capacity by using a license key. You need not complete an RMA to add new hardware. You can purchase the upgrade, have it electronically delivered, and use the license key to enable increased capacity. The Cisco wireless controller is one example in which you can dynamically increase to 12, 25, 50, 100, or 250 access points for wireless services.

Subscription Licenses

The subscription license provides software enforcement for licensed features for a calendar period.

These node-locked license types are supported in a subscription license:

- Evaluation subscription license

- Extension subscription license
- Paid subscription license

Software Activation Processes

Software activation enables the various feature sets on a device by using license keys.



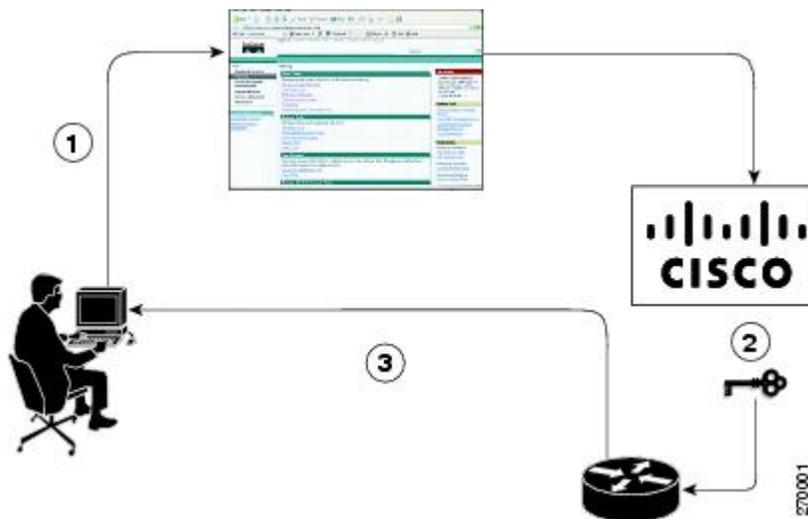
Note

You can apply feature or maintenance upgrades to the software at any time. Maintenance upgrades do not require any interaction with the software activation process.

Manufacturing Preinstalled Licenses

The figure below shows the overall license work flow for manufacturing preinstalled licenses.

Figure 2: Manufacturing Preinstalled License Work Flow



The work flow for manufacturing preinstalled licensing involves these steps:

1. You place an order for a Cisco device through the Cisco sales ordering tool.
2. Manufacturing information technology systems pick up the order information and build the device. Manufacturing also retrieves a license key for the device being assembled by contacting a license server and then installing the code on the device. The device is shipped to you.
3. You install and configure the device, and place the device in production. There is no requirement to activate or register the software prior to use. A new device is ready for deployment upon receipt.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	<i>Master Commands List, All Releases</i>
Software activation commands	<i>Software Activation Command Reference</i>
Software activation configuration	"Configuring the Cisco IOS Software Activation Feature" module

MIBs

MIB	MIBs Link
CISCO-LICENSE-MGMT-MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use the Cisco MIB Locator at this URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Glossary

Cisco License Manager —Software tool that provides a GUI to track and manage licenses.

license file —File generated by Cisco licensing tools, which is used to install a license on a product. The license file contains one or more license lines.

license key —A unique value that enables usage and entitlement for a set of Cisco software features.

license line —Characters arranged in a particular format that hold the license for a single feature within it. A line has all the necessary fields and attributes that make it a valid, tamperproof, and complete license. A single line can exist independently.

license manager —An application used to track and manage licenses for customers.

license server —Software tool at the hardware manufacturing site that generates product licenses.

license storage —File that stores a collection of license lines. A license file exists on a licensed device. This file exists in permanent storage.

node locked —The explicit binding of a unique license to a unique hardware platform. Node-locked licenses are locked to one of the UDIs in the system. Non-node locked licenses are not locked to any UDI.

PAK —Product authorization key, which is provided to you when you order and purchase the right to use a feature set for a particular platform. The PAK serves as a receipt and is used as part of the process to obtain a license.

permission ticket file —File generated by Cisco licensing that is used to get a rehost ticket during a manual rehosting process. The permission ticket file contains one or more adding and removing license operations for rehosting.

perpetual license —License where use rights are permanent. These licenses can be used as long as required.

persistence storage —File that lives for the lifetime of the device that has a license and survives image changes. This file should exist in a write once storage area. The persistence file holds the license history for that device, along with certain information about license removals, expiries, rehost, and so on.

rehost —Process where a valid license is transferred from one platform to another. This implies the license is no longer valid on the original platform.

removable storage —Portable device such as compact flash or USB used to store and access data.

RMA —Return Merchandise Authorization, which is the process whereby you can return a defective product.

signature server —Generates the licenses for products and is found at Cisco manufacturing sites. Also called a permission file generator.

SKU —Stock keeping unit. A unique, individual part number used to track and monitor inventory. A Cisco software licensing SKU maps to one or more software features.

stack —A switch stack is a set of up to nine Catalyst 3750 switches connected through their StackWise ports.

subscription-based licenses —Time-based license that requires the subscriber to periodically renew or the license will expire after an agreed-upon time.

SWIFT —Software Infrastructure and Fulfillment Technology. The Cisco licensing infrastructure that is accessed through HTTPS over the Internet. The Cisco License Manager application interacts with the Cisco licensing infrastructure on behalf of many devices. You can interact directly with the Cisco licensing infrastructure service by using Cisco software commands.

UDI —Unique device identifier, which is a Cisco-wide schema to identify products. The UDI contains a product ID, version ID, and a serial number. The UDI does not change during deployment in the field. Note that when the term UDI is used in the context of licensing, it typically refers to only the product ID and serial number.

universal image —A single software image containing all Cisco functionality levels. These levels can be enabled by installing the appropriate license.



CHAPTER 2

Configuring the Cisco IOS Software Activation Feature

This document describes the tasks used to activate software by using the Cisco IOS Software Activation feature, license keys, and Cisco EXEC commands. When you activate software from a Cisco device, you can license software without the need for additional application software.

- [Finding Feature Information, on page 9](#)
- [Restrictions for Cisco IOS Software Activation, on page 9](#)
- [Information About the Cisco IOS Software Activation, on page 10](#)
- [How to Activate Software from a Cisco IOS Device, on page 10](#)
- [Configuring Examples for Software Licensing, on page 18](#)
- [Additional References, on page 23](#)

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and 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 information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Restrictions for Cisco IOS Software Activation

Not all Cisco hardware platforms can use the Cisco IOS Software Activation feature. Use the Cisco Feature Navigator at <http://www.cisco.com/go/cfn> and the table in the Feature Information for Cisco IOS Software Activation section to determine which platforms and images support the Cisco IOS Software Activation feature.

For the stackable switches that support the Cisco IOS Software Activation feature, one switch must act as primary and the others as secondaries. The primary switch performs management and administrative operations on itself as well as on the secondary switches.

Information About the Cisco IOS Software Activation

License Activation MIB Support

The Cisco IOS Software Activation feature introduces the CISCO-LICENSE-MGMT-MIB to allow SNMP-based license management and administrative tasks. A description of this MIB can be found by using tools at this URL: <http://tools.cisco.com/ITDIT/MIBS/servlet/index>

Use the MIB Locator tool and the Search for MIB selection box to select [CISCO-LICENSE-MGMT-MIB](#).

The unique device identifier (UDI) is also associated with the Entity Name and Product Description data elements for the management information base (MIB) system. The MIB nomenclature for Entity Name is entPhysicalName and for Product Description is entPhysicalDescr.

How to Activate Software from a Cisco IOS Device

Installing and Upgrading Licenses by Using Software Activation Commands

Before you begin

Read and understand the license activation process concepts in the in the “Cisco IOS Software Activation Conceptual Overview” module.

To install or upgrade a license by using the **license install** command, you must have already received the license file from the Cisco Product License Registration portal at <http://www.cisco.com/go/license> (or you already backed up the license by using the **license save** command).

If you use Microsoft Entourage and receive the license file from Cisco in an e-mail attachment, the license file will contain UTF-8 marking. These extra bytes in the license file cause it to be unusable during license installation. To work around this issue, you can use a text editor to remove the extra characters and then install the license file. For more information about UTF-8 encoding, go to this URL: <http://www.w3.org/International/questions/qa-utf8-bom>.



Note The installation process does not install duplicate licenses. This message appears when duplicate licenses are detected:

```
Installing...Feature:xxx-xxx-xxx...Skipped:Duplicate
```



Note A standby device reboots twice when there is a mismatch of licenses.

SUMMARY STEPS

1. Obtain the PAK.

2. **enable**
3. **show license udi**
4. Convert the PAK to a license by entering the PAK and the UDI into the Cisco Product License Registration portal: <http://www.cisco.com/go/license>
5. **license install stored-location-url**
6. **configure terminal**
7. **write memory**
8. **reload**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Obtain the PAK.	The PAK is provided to you when you order or purchase the right to use a feature set for a particular platform. <ul style="list-style-type: none"> • The PAK serves as a receipt and is used as part of the process to obtain a license.
Step 2	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 3	show license udi Example: Device# show license udi	Displays all the UDI values that can be licensed in a system. <ul style="list-style-type: none"> • You need the UDI of the device as part of the process to obtain a license.
Step 4	Convert the PAK to a license by entering the PAK and the UDI into the Cisco Product License Registration portal: http://www.cisco.com/go/license	After entering the appropriate information, you will receive an e-mail containing the license information that you can use to install the license: <ul style="list-style-type: none"> • Copy the license file received from the Cisco Product License Registration portal to the appropriate file system on the device. <p>or</p> <ul style="list-style-type: none"> • Click the Install button on the web page.
Step 5	license install stored-location-url Example: Device# license install tftp://infra-sun/<user>/license/5400/38a.lic	Installs the license. <ul style="list-style-type: none"> • Accept the end-user license agreement if prompted.
Step 6	configure terminal Example: Device# configure terminal	Enters the global configuration mode.

	Command or Action	Purpose
Step 7	write memory Example: Device# write memory	Saves the running configuration to NVRAM.
Step 8	reload Example: Device# reload	(Optional) Restarts the device to enable the new feature set. Note A reload is not required when moving from an evaluation license to a permanent license of the same license level.

Managing Licenses by Using Software Activation Commands

Adding a Comment to a License File

SUMMARY STEPS

1. enable
2. license comment add *feature-name comment* [switch *switch-num*]
3. show license file [switch *switch-num*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	license comment add <i>feature-name comment</i> [switch <i>switch-num</i>] Example: Device# license comment add gsmamrnb-codec-pack "Use this permanent license"	Adds or deletes information about a specific license. <ul style="list-style-type: none"> • (Only on Cisco Catalyst 3750-E switch platforms) If a switch number is specified, this command is executed on the specified switch. • When the license is present in license storage and multiple license lines are stored, you are prompted to select a license line. To select the license, type the number at the Select Index to Add Comment prompt.
Step 3	show license file [switch <i>switch-num</i>] Example: Device# show license file	Displays comments added to a Cisco software license file. <ul style="list-style-type: none"> • If the device is a switch, this command obtains statistics from the specified switch.

Saving All Licenses to a Specified Storage Area

SUMMARY STEPS

1. `enable`
2. `license save file-sys://lic-location [switch switch-num]`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p>Example:</p> <pre>Device> enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<p><code>license save file-sys://lic-location [switch switch-num]</code></p> <p>Example:</p> <pre>Device# license save flash:all_licenses.lic</pre>	<p>Saves copies of all licenses in a device and stores them in a format required by the command in the specified storage location. Saved licenses are restored by using the license install command.</p> <ul style="list-style-type: none"> • <i>lic-location</i> : The license storage location can be a directory or a URL that points to a file system. Use the <code>?</code> command to see the storage locations supported by your device. • (Optional) switch switch-num: sends this request to a specific switch in a switch stack.

Saving License Credential Information Associated with a Device to a Specified Storage Area

Before you begin

Before you can start the rehost or resend process, a device credential is required. Cisco software licensing requires that the license files generated by the Cisco back-end licensing system for its devices be secure and tamper-resistant. Security features are in place to authenticate a license by means of encrypted license credentials. If it becomes necessary to transfer a license from one device to another (which is called rehosting), a permission ticket is required. To generate the permission ticket, the Cisco back-end licensing system requires the device credential information.

SUMMARY STEPS

1. `enable`
2. `license save credential file-sys://lic-location [switch switch-num]`

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p>Example:</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
	Device> enable	
Step 2	<p>license save credential <i>file-sys://lic-location</i> [switch <i>switch-num</i>]</p> <p>Example:</p> <pre>Device# license save credential flash:cred.lic</pre>	<p>Saves credential information associated with a device to a specified URL.</p> <ul style="list-style-type: none"> • <i>lic-location</i> : The license storage location can be a directory or a URL that points to a file system. Use the ? command to see the storage locations supported by your device. • (Optional)switch <i>switch-num</i>: sends this request to a specific switch in a switch stack.

Displaying All Licenses in a Device

SUMMARY STEPS

1. enable
2. show license all

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example:</p> <pre>Device> enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<p>show license all</p> <p>Example:</p> <pre>Device# show license all</pre>	<p>Displays information about all licenses in the device.</p>

Displaying Detailed Information about Licensed Features

SUMMARY STEPS

1. enable
2. show license detail [*feature-name*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example:</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
	Device> enable	
Step 2	show license detail [<i>feature-name</i>] Example: Device# show license detail	Displays detailed information about all licensed features or the specified licensed feature.

Displaying Licensed Feature Sets Available in an Image

SUMMARY STEPS

1. enable
2. show license feature

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	show license feature Example: Device# show license feature	Displays a list of licensed features available in an image.

Removing Licenses by Using Software Activation Commands

Removing a License Entry from a Permanent License File



Note

- The **license clear** command lists all licenses, but some licenses, such as built-in licenses, cannot be cleared.
- Only licenses that have been added by using the **license install** command are removed. Evaluation licenses are not removed.
- If a license is not in use, the **license clear** command displays all the licenses related to this feature and prompts you to make a selection. Different prompts are displayed, depending upon whether single or multiple licenses are available in the device. The selected licenses are removed from the device.
- If a license is in use, the **license clear** command might fail. However, depending on the application policy using the license, some licenses might be cleared.
- When a switch is specified, the **license clear** command is issued on that switch. When a mixed stack platform is used, the primary switch must have installed the minimum licensing features required to support the licensing operations of the secondary switches. When this command is issued from a primary switch, the switch number is required to clear a license on that switch.

SUMMARY STEPS

1. **enable**
2. **license clear** *feature-name* [**switch** *switch-num*]
3. **show license detail**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	license clear <i>feature-name</i> [switch <i>switch-num</i>] Example: Device# license clear gsmamrnb-codec-pack	Removes a license entry from license storage once it has been verified that the license line is valid and was explicitly installed. <ul style="list-style-type: none"> • The optional switch <i>switch-num</i> keyword and argument send this request to a specific switch in a switch stack. • You must select the index number of the license to clear. Enter the number at the Select Index to Clear prompt.
Step 3	show license detail Example:	Verifies that the license has been cleared.

	Command or Action	Purpose
	Device# show license detail	

Rehosting (Revoking and Transferring) a License

Before you begin

Read and understand the license transfer between devices concepts in the “Cisco IOS Software Activation Conceptual Overview” module.

Cisco software licensing requires that the license files generated by the Cisco back-end licensing system for its devices be secure and tamper-resistant. Security features are in place to authenticate a license by means of encrypted license credentials. Rehosting requires a permission ticket. To generate the permission ticket, the Cisco back-end licensing system requires the device credential information. Use the **license save credential** command to save device credential information to a specified file system.

SUMMARY STEPS

1. **enable**
2. **license revoke revoke** *permission-file-url* *output-rehost-ticket-url*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	license revoke revoke <i>permission-file-url</i> <i>output-rehost-ticket-url</i> Example: Device# license revoke tftp://infra-sun/ramanp/pt.lic flash:rt.lic	Revokes and transfers a license by using the permission ticket provided by the Cisco back-end licensing system. It removes the original, permanent license from the device and provides a license for the new device. <ul style="list-style-type: none"> • An end-user license agreement is displayed for all grace-period licenses in the permission ticket. • You must read and accept the agreement. If you do not accept the agreement, the rehost operation stops.

Troubleshooting License Operations by Using Software Activation Commands

SUMMARY STEPS

1. **enable**
2. **show license file** [**switch** *switch-num*]
3. **show license statistics**
4. **show license status** [**switch** *switch-num*]

5. `debug license {all | core | errors | events}`
6. `no debug license {all | core | errors | events}`

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	show license file [switch <i>switch-num</i>] Example: Device# show license file	Displays license entries and license details stored in a Cisco software license file. If the device is a switch, this command obtains statistics from the specified switch.
Step 3	show license statistics Example: Device# show license statistics	Displays license statistics information. The display includes relevant statistics for error counts and is useful for troubleshooting licensing-related problems.
Step 4	show license status [switch <i>switch-num</i>] Example: Device# show license status	Displays the status of licenses in the system. If the device is a switch, this command obtains status from the specified switch.
Step 5	debug license {all core errors events} Example: Device# debug license errors	Enables controlled software license debugging activity on a device.
Step 6	no debug license {all core errors events} Example: Device# no debug license errors	Disables license debugging activity on a device.

Configuring Examples for Software Licensing

Example: Installing and Upgrading Licenses

The following example shows how to use the `license install` command to install a license saved in TFTP on the device. The display is truncated for easier readability:

```
Device# license install tftp://infra-sun/<user>/license/5400/38a.lic
Installing licenses from "tftp://infra-sun/<user>/license/5400/38a.lic"
Loading <user>/license/5400/38a.lic from 172.19.211.47 (via GigabitEthernet0/0): !
```

```
[OK - 1192 bytes]
Extension licenses are being installed in the device with UDI "AS54XM-AC-RPS:JAE0948QXKD"
for the following features:
  Feature Name: gsmamrnb-codec-pack
PLEASE READ THE FOLLOWING TERMS CAREFULLY. . .
ACCEPT? [yes/no]: yes
Issue 'license feature gsmamrnb-codec-pack' command to enable the license
Installing...Feature:gsmamrnb-codec-pack...Successful:Supported
```

Example: Adding a Comment to a License File

The following example shows how to use the **license comment** command to add or delete information about a specific license. The command checks that a license associated with the specified feature is present in license storage. If a switch number is specified, this command is executed on the specified switch.

As the example shows, when the license is present and multiple license lines are stored, you are prompted to select a license line. This action helps to distinguish licenses. Type the number at the Select Index to Add Comment prompt to select the license.

```
Device# license comment add gsmamrnb-codec-pack "Use this permanent license"
Feature: gsmamrnb-codec-pack
  1 License Type: Evaluation
  License State: Inactive
    Evaluation total period: 20 hours 0 minute
    Evaluation period left: 20 hours 0 minute
  License Addition: Additive
  Comment:
  Store Index: 0
  Store Name: Primary License Storage
  2 License Type: Permanent
  License State: Active, Not in Use
  License Addition: Exclusive
  Comment:
  Store Index: 1
  Store Name: Primary License Storage
Select Index to Add Comment [1-2]: 2
% Success: Adding comment "Use this permanent license" succeeded
Device# show license file
License Store: Primary License Storage
  Store Index: 0
    License: 11 gsmamrnb-codec-pack 1.0 LONG TRIAL DISABLED 20 DISABLED STANDALONE
    ADD INFINITE_KEYS INFINITE_KEYS NEVER NEVER NiL SLM_CODE CL_
    ND_LCK NiL *1YCHJRBMWKZAED2400 NiL NiL NiL 5_MINS <UDI><PID>AS54X
    M-AC-RPS</PID><SN>JAE0948QXKD</SN></UDI> ,Jx8qaVf:iXWaH9PsXjkVnmz
    7gWh:cxdf9nUkzY6o8fRuQbu,7wTUz237Cz6g9VjfrCk,0a2Pdo,Ow6LWxcCRFL:x
    cTxwnffn9i,4,aUWv8rL50opDUDAsFnxLsvoFRkcAfm$<WLC>AQEBIQAB//9NA+lm
    Uwfs/1D0dmdF9kyX8wDrua1TZhnnAy6Mxs1dTboIcRaahKxJJdj40i1w3wscqvPiA
    mWSaEmUT56rstk6gvmj+EQKRfD9A0ime1czrdKxfILTOLaXT416nwmfp92Tya6vIQ
    4Fn1BdqJ1sMzXeSq8PmVcTU9A4o9hil9vKur8N9F885D9GVF0bJHciT5M=</WLC>
    Comment: Use this permanent license.
    Hash: E1WjIQo4qs19g8cpnpooP/0DeY=
Device#
```

Example: Saving All Licenses to a Specified Storage Area

The following example shows how to use the **license save** command to save copies of all licenses to the flash file system:

```
Device# license save flash:all_licenses.lic
license lines saved ..... to flash:all_licenses.lic
```

Example: Removing Licenses

The following examples shows how to use the **license clear** command to remove a license entry from license storage once it has been verified that the license line is valid and was explicitly installed.

You must select the index number of the license to clear. Type the number at the Select Index to Clear prompt as shown in this example.

```
Device# license clear standard
Feature: standard
  1 License Type: Evaluation
    License State: Inactive
      Evaluation total period: 20 hours 0 minute
      Evaluation period left: 20 hours 0 minute
    License Addition: Additive
    Comment:
    Store Index: 0
    Store Name: Primary License Storage
  2 License Type: Permanent
    License State: Active, Not in Use
    License Addition: Exclusive
    Comment:
    Store Index: 1
    Store Name: Primary License Storage
Select Index to Clear [1-2]: 1
Are you sure you want to clear? (yes/[no]): yes
Device# show license detail
Feature: premium          Period left: 1 hour 0 minute
Index: 1      Feature: premium          Version: 1.0
      License Type: Evaluation
      License State: Active, Not in Use, EULA not accepted
        Evaluation total period: 1 hour 0 minute
        Evaluation period left: 1 hour 0 minute
      License Count: Non-Counted
      License Priority: None
      Store Index: 0
      Store Name: Evaluation License Storage
```

Example: Rehosting (Revoking and Transferring) a License

The following example shows how to use the **license revoke** command to revoke a license stored in TFTP and how to transfer it to a license stored in flash memory. You might need to read and accept the terms and conditions of the license type being transferred. The following example is truncated for readability:

```
Device# license revoke tftp://infra-sun/ramanp/pt.lic flash:rt.lic
Following Permanent license(s) will be revoked from this device
  Feature Name: gsmamrnb-codec-pack
Following Extension license(s) will be installed in this device
  Feature Name: gsmamrnb-codec-pack
PLEASE READ THE FOLLOWING TERMS CAREFULLY. . .
ACCEPT? [yes/no]: yes
Issue 'license feature gsmamrnb-codec-pack' command to enable the license
Rehost ticket saved ..... to flash:rt.lic
```

Example: Generic Command Enhanced with Licensing Information

The generic commands described in the following sections are enhanced with licensing information:

reload

The **reload** command shows the expired licenses, followed by expiring licenses sorted by the period left and end date:

```
Device# reload
The following license(s) are expiring or have expired.
Features with expired licenses may not work after Reload.
Feature: uc,Status: expiring, Period Left: 7 wks 5 days
Proceed with reload? [confirm]
```

show running-config

The **show running-config** command displays the unique device identifier (UDI) of a device. If the configuration file was copied from a different device, a warning is displayed upon reload. A UDI mismatch warning is also displayed during reload if the startup-config file has a different UDI than the platform UDI.

```
Device# show running-config
Building configuration...
Current configuration : 4772 bytes
!
version 12.4
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
!
hostname csl-xfr-enhance-2951
!
...
...
license udi pid CISCO2951 sn FHH1211P037
license boot module c2951 technology-package securityk9 disable
license boot module c2951 technology-package uc
license boot module c2951 technology-package data
license call-home url https://tools-stage.cisco.com/SWIFT/Licensing
license agent listener http plaintext /lic-agent authenticate none
!
!
archive
  log config
  hidekeys
!
.
.
.
```

show tech-support

The **show tech-support** command displays the output of the **show license udi**, **show license file**, **show license detail**, **show license status**, and the **show license statistics** commands.

```
Device# show tech-support
```

```

----- show license udi -----
Device#   PID                SN                UDI
-----
*0        CISCO2951           FHH1211P037      CISCO2951:FHH1211P037
-----
----- show license feature -----
Feature name      Enforcement  Evaluation  Subscription  Enabled
ipbasek9         no          no          no             no
securityk9       yes         yes         no             no
uc               yes         yes         no             yes
data             yes         yes         no             no
gatekeeper       yes         yes         no             no
LI               yes         no          no             no
SSL_VPN          yes         yes         no             no
ios-ips-update   yes         yes         yes            no
SNASw           yes         yes         no             no
-----
----- show license file -----
License Store: Primary License Storage
License Store: Evaluation License Storage
Store Index: 0
License: 11 securityk9 1.0 LONG TRIAL DISABLED 1440 DISABLED STANDALONE AD
D INFINITE_KEYS INFINITE_KEYS NEVER NEVER NiL SLM_CODE DEMO NiL N
iL Ni NiL NiL 5_MINS NiL GT5YVbrMadt0NY50UcKGfvLTjQ17P2o3g84hE8Tq
sOfu3Xph0N:2AmMdpMNxxKXSVG$<WLC>AQEBIQAB//+FugzZgqFJn/XhIxoyelg63
YJD++i6Qx6vVp0MVqrX2EinbufbTfGzc7/GHNZaDZgRqWInXo3s+nsLU7rOtdOxoI
xYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr
10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XCy=</WLC>
Comment:
Hash: CLWUVZgY84BMRT03JIlYmIqwAQA=
----- show license detail -----
Index: 1          Feature: SNASw                      Version: 1.0
License Type: Evaluation
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Lock type: Non Node locked
Vendor info:
License Addition: Additive
License Generation version: 0x8100000
License Count: Non-Counted
License Priority: None
Store Index: 5
Store Name: Evaluation License Storage
----- show license status -----
License Type Supported
permanent          Non-expiring node locked license
extension          Expiring node locked license
evaluation         Expiring non node locked license
paid subscription Expiring node locked subscription license
with valid end date
extension subscription Expiring node locked subscription license
evaluation subscription Expiring node locked subscription license
...
----- show license statistics -----
Administrative statistics
Install success count: 0
Install failure count: 0
Install duplicate count: 0
Comment add count: 0
Comment delete count: 0
Clear count: 0
Save count: 0
Save cred count: 1
Client statistics

```

```

Request success count: 1
Request failure count: 3
Release count: 0
Global Notify count: 4

```

show version

The **show version** command displays the license UDI information:

```

Device> show version
Cisco IOS Software, C2951 Software (C2951-UNIVERSALK9-M), Experimental Version
12.4(20090326:052343)
 [rifu-xformers_3_25_130]
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Thu 26-Mar-09 21:49 by rifu
ROM: System Bootstrap, Version 12.4(20090303:092436)
[BLD-xformers_dev.XFR_20090303-20090303_0101-53
 107], DEVELOPMENT SOFTWARE
csl-xfr-enhance-2951 uptime is 3 days, 4 hours, 28 minutes
System returned to ROM by reload at 18:48:45 PST Mon Nov 26 1956
System image file is "flash0:c2951-universalk9-mz.SSA"
Last reload reason: Reload Command
...
...
Cisco C2951 (revision 1.0) with 1005568K/43008K bytes of memory.
Processor board ID FHH1211P037
3 Gigabit Ethernet interfaces
1 terminal line
1 cisco Special Services Engine(s)
DRAM configuration is 72 bits wide with parity enabled.
255K bytes of non-volatile configuration memory.
250880K bytes of ATA System CompactFlash 0 (Read/Write)
License Info:
License UDI:
-----
Device#      PID                      SN
-----
*0          CISCO2951                FHH1211P037
Technology Package License Information for Module:'c2951'
-----
Technology   Technology-package      Technology-package
              Current             Type                   Next reboot
-----
ipbase       ipbasek9                None                    ipbasek9
security     disable                  None                    disable
uc           uc                       Evaluation              uc
data         None                     None                     None
Configuration register is 0x0

```

Additional References

Related Documents

Related Topic	Document Title
Cisco License Manager application	<i>User Guide for Cisco License Manager</i>
Software activation conceptual overview	“Cisco IOS Software Activation Conceptual Overview” module

Related Topic	Document Title
Software activation commands	<i>Software Activation Command Reference</i>
Cisco IOS commands	<i>Master Commands List, All Releases</i>
Integrated Services Routers licensing	<i>Software Activation on Cisco Integrated Services Routers</i>

MIBs

MIB	MIBs Link
CISCO-LICENSE-MGMT-MIB	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html



CHAPTER 3

Flexi License

Flexi license allows you to select the port of your choice . When you buy a chassis few ports are enabled for free of charge (4*1G ports are enabled by default). With this license in place, you can choose the ports of your choice to activate additional 4*10G ports on the chassis.

By deactivating the enabled port, you can activate other ports of your choice.



Note Flexi Licensing is applicable for 10G ports only.



Note This license upgrade will not disturb the existing port state.

- [Prerequisites for Flexi Licensing, on page 25](#)
- [Flexi license restrictions for dual rate ports, on page 25](#)
- [Information about Flexi Licensing, on page 26](#)

Prerequisites for Flexi Licensing

Before activating this license, you must obtain and install the license. For information on obtaining and installing licenses, see [Configuring the Cisco IOS Software Activation Feature](#).

Flexi license restrictions for dual rate ports

- If 10G license is installed for a dual rate port and SFP is inserted in that port, the interface will come up in 1G mode.
- If 10G license is installed for a dual rate port and SFP+ is inserted in that port, the interface will come up in 10G mode.
- If 10G license is **not** installed for particular port and SFP is inserted, the interface will come up in 1G mode.
- If there is a 10G license and SFP+ is inserted in the chassis(for the ports Te0/0/4–Te0/0/7), Te0/0/4–Te0/0/7 will come up in 10G mode.

- If sufficient 10G licenses are not available for a port and an SFP+ is inserted, the 10G mode is not enabled. The interface will be in 'link down state' and the following system warning message will be generated.
Warning: SFP+ inserted at port X tengig license not in use

Information about Flexi Licensing

With this license, you can choose the ports of your choice to activate 4 ports on the chassis.

Below table displays the details of the licensed and non licensed ports on different models of the Cisco NCS 520 series.

Cisco NCS 520 Series models	1G ports	10G ports
N520-4G4Z-A N520-X-4G4Z-A N520-X-4G4Z	All 4 ports will operate in 1G mode by default and no license is required to activate these ports.	4 SFP + will operate in 10G mode depending on the license count. License count 1: Any 2 SFP+ will operate in 10G mode. License count 2: All 4 SFP+ (ports 4-7) will operate in 10G mode.



CHAPTER 4

Licensing 1G and 10G Ports on the Cisco ASR 920 Series Routers

The Cisco Software License Activation feature is a set of processes and components to activate Cisco IOS-XE software feature sets by obtaining and validating fee-based Cisco software licenses.

For information on software license activation and concepts, see the [Cisco IOS Software Activation Conceptual Overview](#).

Refer the following link for the License Registration Portal: <https://slexui.cloudapps.cisco.com/SWIFT/LicensingUI/Quickstart>

- [Finding Feature Information, on page 27](#)
- [Prerequisites for Port Upgrade Licensing, on page 27](#)
- [Restrictions for Port Upgrade Licensing, on page 28](#)
- [Port Upgrade License, on page 28](#)
- [Configuring Ports Using Port Upgrade License, on page 29](#)
- [Verifying Port Upgrade Licensing, on page 30](#)
- [Additional References, on page 31](#)

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and 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 information table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for Port Upgrade Licensing

Before activating the Port Upgrade and Bulk Port license, you must obtain and install the license. For information on obtaining and installing licenses, see [Configuring the Cisco IOS Software Activation Feature](#).

Restrictions for Port Upgrade Licensing



Note Port Upgrade Licensing is applicable for 10G ports only.

- If 10G license is installed and activated for a dual rate port and an SFP is inserted in that port, the interface will come up in 1G mode.
- If 10G license is installed and activated for a dual rate port and an SFP+ is inserted in that port, the interface will come up in 10G mode.
- If 10G license is **not** installed for particular port and SFP is inserted, the interface will come up in 1G mode.
- If there is no license and a 1G SFP is inserted in the chassis, ports Te0/0/4-Te0/0/7 will be administratively down.
If there is a license and a 1G SFP is inserted in the chassis, ports Te0/0/4-Te0/0/7 will come up in 1G mode only.
- If sufficient 10G licenses are not available or not activated for a port and an SFP+ is inserted, the 10G mode is not enabled. The interface will be in 'link down state' and the following system warning message will be generated. `Warning: SFP+ inserted at port X tengig license not in use`
- If an activated 10G license is uninstalled or deactivated for a particular port with SFP+, the interface is initialized to 1G mode and 10G interfaces will be in administratively down state.

Port Upgrade License

Port upgrade license is available in pay-as-you-grow model. Few ports in the router are enabled by default. However, you must purchase the licenses to enable other ports.

10 GigabitEthernet Upgrade License (**N520-10G-2**)—10G ports are bundled as a group of two ports. You must purchase one license bundle to enable two 10G ports.

The Cisco NCS 520 routers support dual rate 10G ports. Initially all the 10G ports operate in 1G mode. You must purchase 10G Upgrade license to operate in 10G mode.

Table 1: Cisco NCS 520 Models Licensed and Non-licensed Ports

Cisco NCS 520 Series Models	1G ports	10G ports
N520-4G4Z-A N520-X-4G4Z-A N520-X-4G4Z	<p>There are 4*1G ports. These ports are grouped as:</p> <ul style="list-style-type: none"> • Two copper ports • Two SFP ports <p>All the four ports (Gi0/0/0 - Gi0/0/3) are non-licensed ports and all are enabled by default</p>	<p>There are 4*10G ports and they are disabled by default. All the 10G ports work in 1G mode by default. Upon installing one 10G license, two ports which are enabled first by using the "no shut" command, are enabled to work in 10G mode. Upon installing the second 10G license, all the four ports work in 10G mode.</p>

Table 2: Cisco NCS 520 Series Models Ports Behavior

Cisco NCS 520 Series Models	1G ports	10G ports
N520-4G4Z-A N520-X-4G4Z-A N520-X-4G4Z	<p>Without License: The ports Gi0/0/0 - Gi0/0/3 operate in 1G mode.</p>	<p>Without License: The licensed ports Te0/0/4-Te0/0/7 operate in 1G mode.</p> <p>With license, all the 10G ports work in 1G mode by default. Upon installing one 10G license, two ports which are enabled first by using the "no shut" command, are enabled to work in 10G mode. Upon installing the second 10G license, all the four ports work in 10G mode.</p>

Configuring Ports Using Port Upgrade License

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **license install** *licensefilelocation:licensefilename*
4. **interface range** **Te0/0/4-7**
5. **no shut**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example: Router> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: Router# configure terminal	Enters global configuration mode.
Step 3	license install licensefilelocation:licensefilename Example: <pre>Router(config)# license install bootflash:10G.lic Installing licenses from "bootflash:10G.lic" Installing...Feature:10GEupgradelicense...Successful:Supported 1/1 licenses were successfully installed 0/1 licenses were existing licenses 0/1 licenses were failed to install</pre>	Installs the 10G Port Upgrade license and enables the associated ports. Note Upon installing one 10G license, two ports which are enabled first by using the "no shut" command, are enabled to work in 10G mode. Upon installing the second 10G license, all the four ports work in 10G mode.
Step 4	interface range Te0/0/4-7 Example: Router (config) # interface range Te0/0/4-7	Enter the interface mode.
Step 5	no shut Example: Router (config-if-range) # no shut	Activates the 10G Port Upgrade license.

Verifying Port Upgrade Licensing

Verifying the installed license

This example shows only license installed but not activated.

```
Router# show license all
License Store: Primary License Storage
StoreIndex: 1  Feature: 10GEupgradelicense          Version: 1.0
License Type: Permanent
License State: Active, In Use
License Count: 2/2/0 (Active/In-use/Violation)
License Priority: Medium
License Store: Built-In License Storage
StoreIndex: 0  Feature: metroaccess                Version: 1.0
License Type: Evaluation
License State: Active, Not in Use, EULA not accepted
Evaluation total period: 8 weeks 4 days
Evaluation period left: 8 weeks 4 days
Period used: 0 minute 0 second
License Count: Non-Counted
License Priority: None
```

Uninstalling the 10GigabitEthernet Port Upgrade License

```
Router# license clear 10GEupgradelicense
```

```

Feature: 10GEupgradelicense
  1 License Type: Permanent
    License State: Active, Not in Use
    License Addition: Exclusive
    License Count: 2
    Comment:
    Store Index: 1
    Store Name: Primary License Storage

```

Are you sure you want to clear? (yes/[no]): **yes**

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/mcl/allreleasemcl/all-book.html

Standards and RFCs

Standard/RFC	Title
No specific Standards and RFCs are supported by the features in this document.	—

MIBs

MB	MIBs Link
—	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
<p>The 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), the 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>	http://www.cisco.com/cisco/web/support/index.html

