Software Activation Configuration Guide, Cisco IOS XE Release 3.2S

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Cisco IOS Software Activation Conceptual Overview

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

- By using the Cisco Product License Registration portal.
- By entering Cisco IOS 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 in This Module

Your software release might not support all the features documented in this module. For the latest feature information and caveats, see 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 for Cisco IOS Software Activation" section on page 14.

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

Contents

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

> **Note** 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). The UDI is printed on a label located on the right front corner of the router and can be display by using the software.

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

Cisco IOS 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 router or switch 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 IOS 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. You can manage Cisco ASR 1001 routers by using Cisco License Manager Release 3.0 and later.

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. Figure 1 shows an example of the feature sets and fixed feature images that can make the universal image.

Figure 1   ***Example of Universal Image Components***
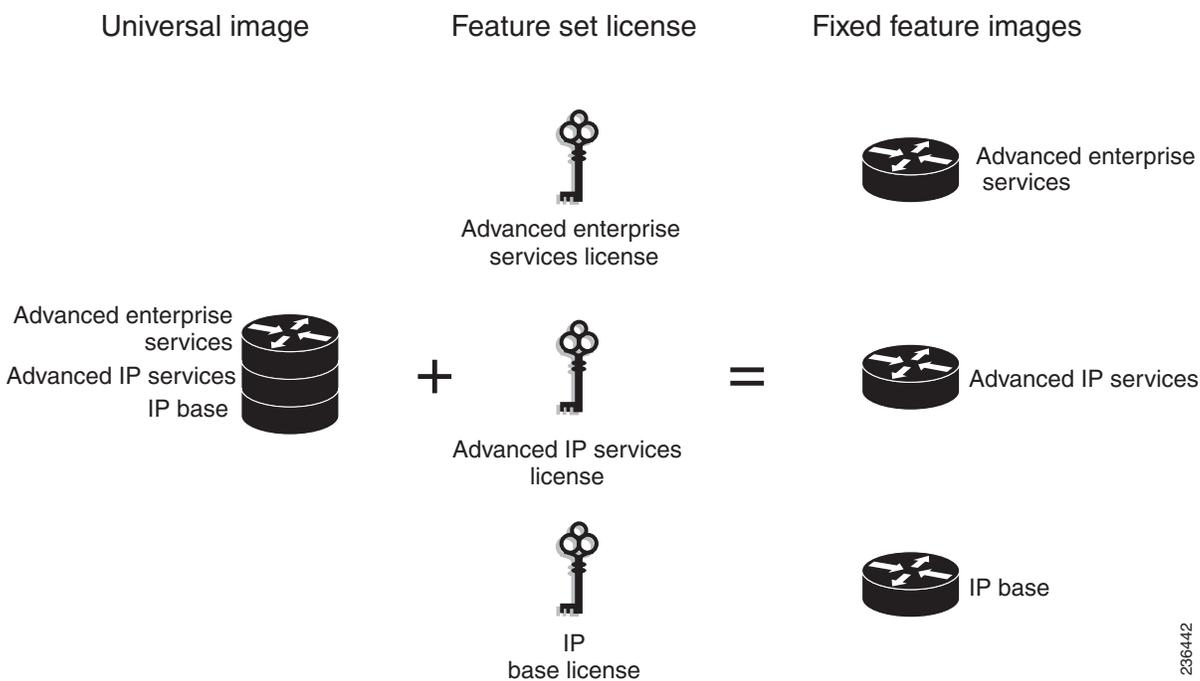
Note   The Cisco ASR 1001 router supports these Cisco IOS images: universal, universalk9, universalk9_npe.

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 routers and switches 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
- 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 IOS 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 Cisco IOS Software Activation processes is required to enable a license on new hardware. For more details, see the "Software Activation Processes" section on page 7.

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 IOS 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.

The following 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:
https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y

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

For restrictions about evaluation licenses, see the "Restrictions for Cisco IOS Software Activation" section in the *Configuring the Cisco IOS Software Activation Feature* module.

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.

For restrictions about counted licenses, see the "Restrictions for Cisco IOS Software Activation" section in the *Configuring the Cisco IOS Software Activation Feature* module.

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 5500 Series wireless controller is one example in which you can dynamically increase to 12, 25, 50, 100, or 250 access points for wireless services.

✎
Note   The "pay as you grow" model is a future consideration for the Cisco ASR 1000 series routers.

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

For restrictions about subscription licenses, see the "Restrictions for Cisco IOS Software Activation" section in the *Configuring the Cisco IOS Software Activation Feature* module.

Software Activation Processes

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

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Note   You can apply feature or maintenance upgrades to the software at any time. Maintenance upgrades do not require any interaction with the Cisco IOS Software Activation process.

The following sections describe software activation processes:

- Manufacturing Preinstalled Licenses, page 7
- Automated Software Activation by Using Cisco License Manager, page 8
- License Software Activation by Using EXEC Commands, page 9

Manufacturing Preinstalled Licenses

Figure 2 shows the overall license work flow for manufacturing preinstalled licenses.

Figure 2   *Manufacturing Preinstalled License Work Flow*
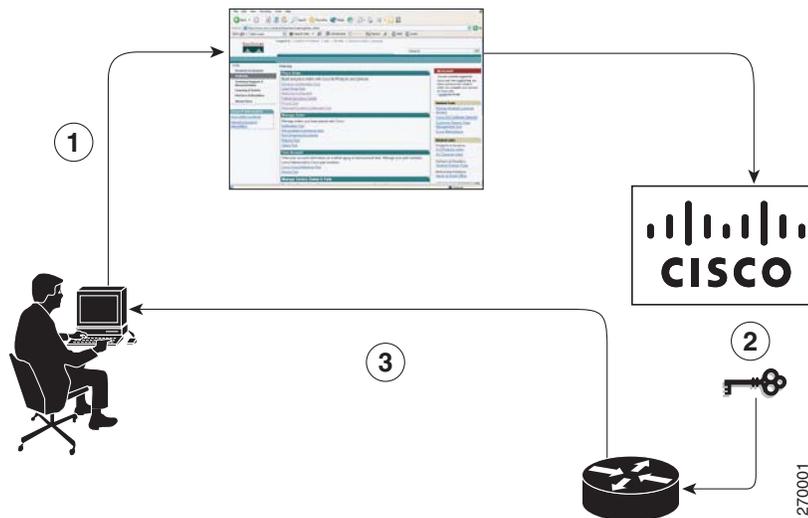
The work flow for manufacturing preinstalled licensing involves these steps:

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.

Automated Software Activation by Using Cisco License Manager

Cisco License Manager transparently interacts with the Cisco Product Licensing Registration portal for many devices. With the Cisco License Manager application deployed, you can automate many of the steps for upgrading and registering software licenses. For example, you can enter the PAK and select the device on which to install the license.

For a network-wide deployment, the Cisco License Manager can automate all license-related work flows by securely communicating to the licensing back-end fulfillment systems at Cisco.com and by deploying the obtained licenses to managed devices on a network-wide basis. The application also keeps an inventory of deployed licenses and generates license reports.

Figure 3 shows the license upgrade work flow for automated upgrades through Cisco License Manager.

Figure 3   *License Upgrade Work Flow for Automated Upgrades through Cisco License Manager*
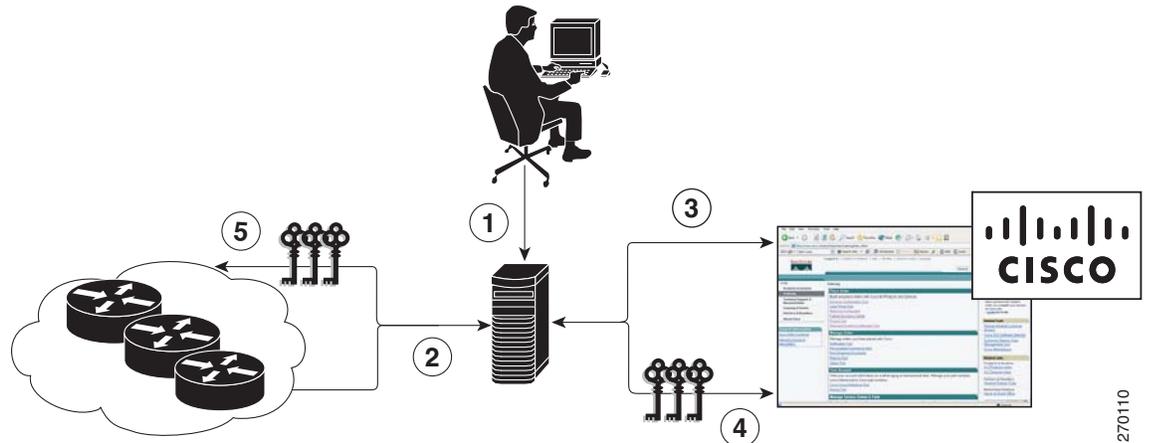
The workflow for license upgrades for automated license transfers involves these steps:

1. Cisco License Manager identifies the source and destination devices and stock keeping units (SKUs) to transfer.

2. Cisco License Manager automatically determines the device credentials of the source device.

3. Cisco License Manager automatically communicates with Cisco.com to obtain the permissions ticket, which is used to start the rehost process. It applies the permissions ticket to the source device to obtain the rehost ticket.

4. Cisco License Manager automatically sends the rehost ticket along with the destination device UDI to automatically obtain the license keys from the Cisco Product Licensing Registration portal.

5. Cisco License Manager automatically installs the license key on the destination device.

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

License Software Activation by Using EXEC Commands

The Cisco IOS Software Activation feature includes Cisco IOS EXEC commands that allow these basic licensing tasks from the command line:

*   Store a license file.

*   Install a license.

*   Control image level precedence (boot the configured license level)

*   Add an evaluation license.

*   Add a comment to a license.

*   Save license credentials.

*   Back up a license.

*   Remove unused licenses.

*   Rehost (revoke and transfer) a license.

*   Troubleshoot license messages.

*   Verify software image feature sets.

For commands-based license fulfillment, you install the license by using Cisco IOS commands after receiving your license key electronically through e-mail or through paper and mail delivery.

Figure 4 shows the license upgrade process work flow for manual license fulfillment.

Figure 4   License Upgrade Work Flow for Manual License Fulfillment
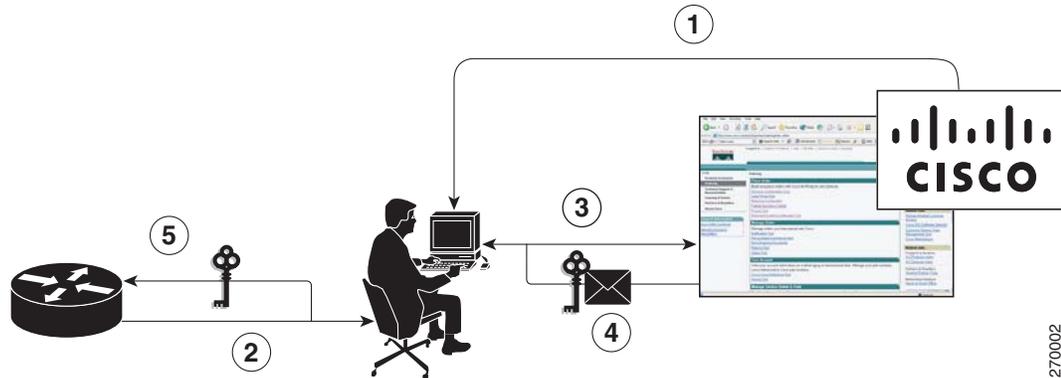
The license upgrade process work flow for manual license fulfillment involves these steps:

1. You purchase the required PAKs for the desired type of license. Some licenses do not require a PAK, but they might need a contract instead.

2. You obtain the UDI from the device.

3. You enter the UDI and PAK into the Cisco Product License Registration portal. If it is a contract license, follow the links to non-PAK-based licenses and submit the UDI of the device.

4. The portal retrieves the SKUs associated with the PAK. You then select the SKU and enter the UDI, a unique and unchangeable identifier of the device where the license should be installed. A license key is then e-mailed to you, and you use that key to install the license.

5. You install the license file returned from the license portal to the device by using Cisco IOS commands.

License Transfer Between Devices

Cisco supports two scenarios to transfer licenses between devices:

1. The first scenario has both the source and destination devices active and functional. In this scenario, the license is revoked on the source device, and a new permanent license is issued for the destination device.

2. The second is a failure scenario in which one of the devices is unavailable. In this scenario, the license from the failed device is transferred to the RMA or to the replaced device by using the RMA License Transfer process on the Cisco Product License Registration portal.

These scenarios are described in the following sections:

License Transfer Between Two Working Devices

Cisco supports fully automated, customer-initiated, no-questions-asked transfer of licenses. Transferring a license between two working devices is accomplished by using a process known as *rehosting*. The rehosting process transfers a license from one UDI to another by revoking the license from the source device and installing it on a new device.

You perform a license transfer (rehosting) by using one of the following:

- Cisco Product License Registration portal
- Cisco License Manager application

Figure 5 shows the processes involved for rehosting a license.

Figure 5   *License Transfer Work Flow*
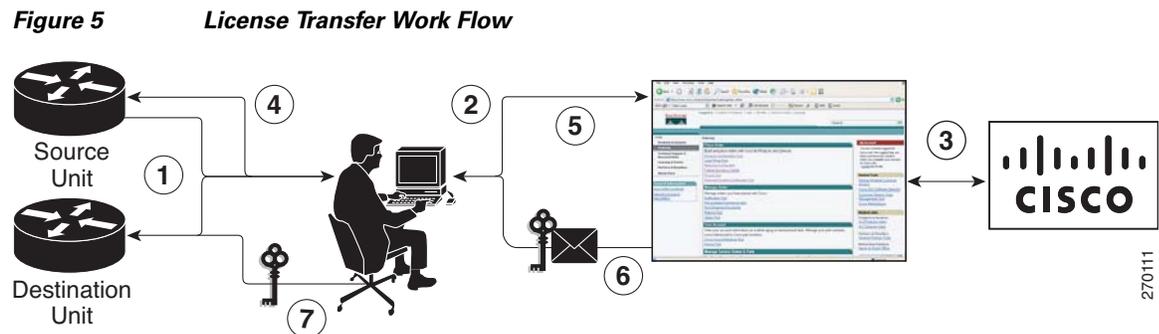
The following summary is for a license transfer process by using the Cisco Product License Registration portal:

1. You obtain the UDI and device credentials from the source and destination devices by using Cisco IOS commands. For more information, see the *Configuring the Cisco IOS Software Activation Feature* module.

2. You contact the Product License Registration page on Cisco.com, and you enter the source device credentials and the UDI into the license transfer portal tool.

3. The portal displays licenses that can be transferred from the source device.

   Select the licenses that need to be transferred. A permission ticked is issued. You can use this permission ticket to start the rehost process by using Cisco IOS commands.

4. You apply the permissions ticket to the source device by using the **license revoke** command as described in the *Configuring the Cisco IOS Software Activation Feature* module. The source device then provides a rehost ticket indicating proof of revocation. A 60-day grace period license is also installed on the device to allow enough time to transfer the licenses to the destination device.

5. You enter the rehost ticket into the license transfer portal tool on Cisco.com along with the destination device UDI.

6. You receive the license key through e-mail.

7. You install the license key on the destination device.

By using Cisco License Manager, you can select the source and destination devices from a GUI wizard for automated processing.

RMA License Transfer Between a Failed and a Working Device

Before you can transfer a software license from a failed device to a new device, you must enter UDI information from both devices into the Cisco Product License Registration portal. The portal issues the RMA replacement licenses (http://www.cisco.com/go/license).

If you need assistance to obtain a license, contact Cisco technical support at: http://www.cisco.com/cisco/web/support/index.html.

Figure 6 shows the license transfer work flow for RMA replacement licenses.

Figure 6 License Transfer Work Flow for RMA Replacement Licenses
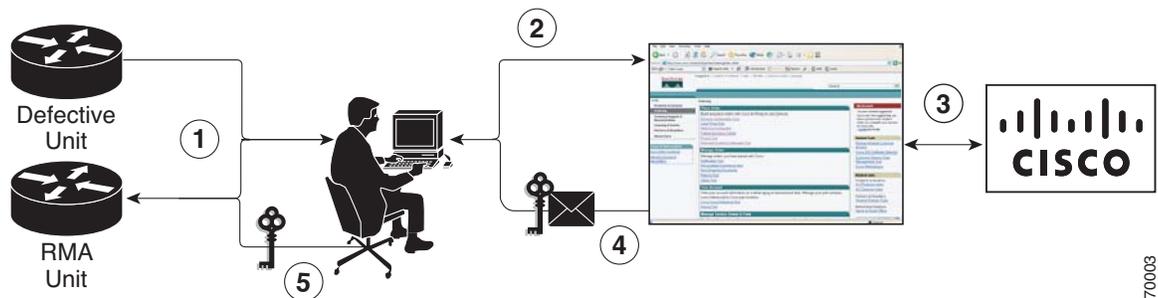
The RMA replacement license process involves these steps:

1. You obtain the UDI of the defective and RMA devices.

2. You enter the UDI into the RMA license portal tool on Cisco.com.

3. The license portal determines licenses associated with the defective device.

4. The license portal issues replacement licenses.

5. You install the new license on the new device.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
Cisco IOS Software Activation Command Reference	*Cisco IOS Software Activation Command Reference*
Configuring the Cisco IOS Software Activation feature	*Configuring the Cisco IOS Software Activation Feature* module

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	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

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Cisco IOS Software Activation

Table 1 lists the features in this module and provides links to specific configuration information.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1 lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1   Feature Information for Cisco IOS Software Activation

Feature Name	Releases	Feature Information
Cisco IOS Software Activation	Cisco IOS XE Release 3.2S	The Cisco IOS Software Activation feature supports basic licensing processes. This feature module provides information about Cisco Software Activation: • *Configuring the Cisco IOS Software Activation Feature* module

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 of 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 such as a router. 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.

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 IOS 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 IOS functionality levels. These levels can be enabled by installing the appropriate license.

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 in This Module

Your software release might not support all the features documented in this module. For the latest feature information and caveats, see 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 for Cisco IOS Software Activation" section on page 21.

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

Contents

Restrictions for Cisco IOS Software Activation

- Not all Cisco router and switch 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 on page 21 to determine which platforms and images support the Cisco IOS Software Activation feature.

- Cisco IOS Software Activation is supported only on the Cisco ASR 1001 router with Cisco IOS XE Release 3.2S. This feature is not supported on other Cisco ASR routers.

- The ASR1001 router does *not* support these software activation items in Cisco IOS XE Release 3.2S:

  - Evaluation, counted, and subscription licenses

  - The **license agent** configuration commands (including **clear** and **show** commands)

  - The Cisco License Call Home feature

- Some licensing operations (such as installation, upgrade, and rehosting) might affect the state of licensing on the router. When this type of license operation is completed, the ASR 1001 router (the license agent daemon) tries to update its status at a Cisco-supplied Java servlet HttpListenServlet that is used by Cisco License Manager. This servlet is unreachable by the router, and the status update does not occur. As a result, the status of license operation (install, revoke, clear, annotate) will not be updated by Cisco License Manager. The Cisco License Manager user must manually start a license poll operation to update the current state.

How to Activate Software from a Cisco IOS Device

- Installing and Upgrading Licenses by Using Software Activation Commands, page 2 (required)
- Managing Licenses by Using Software Activation Commands, page 4 (optional)
- Removing Licenses by Using Software Activation Commands, page 8 (optional)
- Troubleshooting License Operations by Using Software Activation Commands, page 12 (optional)

Installing and Upgrading Licenses by Using Software Activation Commands

Use this task to install or upgrade a license by using the software activation commands.

Prerequisites

Read and understand the concepts in the "License Activation Processes" section of the *Cisco IOS Software Activation Conceptual Overview* module.

You can perform this task to install or upgrade a license by using the Cisco IOS **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 Cisco IOS **license save** command).

> **Note** 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.

Restrictions

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

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

SUMMARY STEPS

1. Obtain the product authorization key (PAK).

2. **enable**

3. **show license udi**

4. Convert the PAK to a license by entering the PAK and the unique device identifier (UDI) into the Cisco Product License Registration portal: http://www.cisco.com/go/license.

5. **license install file** *stored-location-url*

6. **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. • The PAK serves as a receipt and is used as part of the process to obtain a license.
Step 2	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 3	**show license udi** **Example:** Router# show license udi	Displays all the UDI values that can be licensed in a system. • 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: • Copy the license file received from the Cisco Product License Registration portal to the either bootflash or to usb0 on the device. or • Click the **Install** button on the web page.
Step 5	**license install file** *stored-location-url* **Example:** Router# license install file bootflash:throughput-license	Installs the license. • Accept the end-user license agreement if prompted.
Step 6	**reload** **Example:** Router# reload	Restarts the device to enable the new feature set.

Managing Licenses by Using Software Activation Commands

- Adding a Comment to a License File, page 5 (optional)
- Saving All Licenses to a Specified Storage Area, page 5 (optional)
- Saving License Credential Information Associated with a Device to a Specified Storage Area, page 6 (optional)
- Displaying All Licenses in a Device, page 7 (optional)
- Displaying Detailed Information about Licensed Features, page 7 (optional)
- Displaying Licensed Feature Sets Available in an Image, page 8 (optional)

Adding a Comment to a License File

Perform this task to add comments to a license file.

SUMMARY STEPS

1. **enable**
2. **license comment add feature** *feature-name comment*
3. **show license file**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

Step 2	**license comment add feature** *feature-name comment*
	
	Example:
	`Router# license comment add feature throughput`
	`"Use this permanent license"`
		Adds information about a specific license.
		
		• 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** **Example:** `Router# show license file`	Displays comments added to a Cisco software license file.

Saving All Licenses to a Specified Storage Area

Perform this task to save copies of all licenses to a specified storage area. Saved licenses are restored by using the **license install** command.

SUMMARY STEPS

1. **enable**
2. **license save file** *file-sys:filename*

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`license save file` *file-sys:filename*
	
	Example:
	`Router# license save file`
	`bootflash:all_licenses.lic`
		Saves copies of all licenses in a device to the specified file system with the specified name.

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

Perform this task to save license credential information associated with a device to a specified storage area.

Prerequisites

Before you can start the rehost or resend process, a device credential is required. Cisco IOS 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** *file-sys:filename*

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`license save credential file` *file-sys:filename*
	
	Example:
	`Router# license save credential file`
	`bootflash:cred.lic`
		Saves credential information associated with a device to the specified file system with the specified name.

Displaying All Licenses in a Device

Perform this task to display all licenses in a device.

SUMMARY STEPS

1. **enable**
2. **show license all**
3. **show version**
4. **show logging**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show license all** **Example:** Router# show license all	Displays information about all licenses in the device. • If there are no licenses in the router, this command displays nothing. Use the **show version** command instead.
Step 3	**show version** **Example:** Router# show version	Displays information about the currently loaded software, including licensing information and the current license level.
Step 4	**show logging** **Example:** Router# show logging	(Optional) Displays the status of the throughput license feature. • The status of the throughput feature license is also provided in the log files at bootup; for example: `*Oct 19 13:25:23.241 EDT: %CMRP-6-THROUGHPUT_LICENSE: R0/0: cmand: Throughput license found, throughput set to 5G`

Displaying Detailed Information about Licensed Features

Perform this task to display detailed information about licensed features.

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`show license detail` [*feature-name*] **Example:** `Router# show license detail`	Displays detailed information about all licensed features or the specified licensed feature.

Displaying Licensed Feature Sets Available in an Image

Perform this task to display the 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:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`show license feature`
	
	Example:
	`Router# 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

Perform this task to remove a license entry from a permanent license file.

Restrictions

- The **license clear** command clears all licenses that are *not* "in-use." To remove an "in-use" license, see the "Removing an "In-Use" License" section on page 9.
- 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 router.
- If a license is "in-use," the **license clear** command will fail.

SUMMARY STEPS

1. **enable**
2. **license clear** *feature-name*
3. **show license detail**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		- Enter your password if prompted.

Step 2	`license clear` *feature-name* **Example:** `Router# license clear gsmamrnb-codec-pack`	Removes a license entry from license storage. - 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:
	`Router# show license detail`
		Verifies that the license has been cleared.

Removing an "In-Use" License

Perform this task to remove an "in-use" license.

Restrictions

Only image-level "in-use" licenses can be removed on the ASR 1001 router in Cisco IOS XE Release 3.2S. Once the throughput feature license is "in-use," it cannot be cleared.

SUMMARY STEPS

1. **enable**
2. **show license all**
3. **configure terminal**
4. **license boot module** *module-name* **group** {**all** | **feature**} **level** *license-level*
5. **exit**
6. **reload**
7. **enable**
8. **show license all**
9. **license clear** *feature-name*
10. **show license all**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show license all** **Example:** Router# show license all	Displays the status of all licenses. • If the license that you want to remove is "not in-use," see the "Removing a License Entry from a Permanent License File" section on page 9. • If the license that you want to remove is "in-use," go to the next step.
Step 3	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 4	**license boot module** *module-name* **group** {**all** | **feature**} **level** *license-level* **Example:** Router(config)# license boot module asr1001 group all level ipbase	Boots the router at a level that is different than the current one.
Step 5	**exit** **Example:** Router(config)# exit	Returns to privileged EXEC mode
Step 6	**reload** **Example:** Router# reload	Reloads the router.

	Command or Action	Purpose

Step 7	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 8	`show license all`
	
	Example:
	`Router# show license all`
		Displays the status of all licenses.
		
		• Verifies that the router loaded the specified level and that the license to be removed is no longer "in-use."

Step 9	`license clear` *feature-name* **Example:** `Router# license clear advipservices`	Removes a license entry from license storage • You must select the index number of the license to clear. Enter the number at the Select Index to Clear prompt.

Step 10	`show license all`
	
	Example:
	`Router# show license all`
		Displays the status of all licenses in the system.
		
		• Verifies that the license you cleared is removed from the system.

Rehosting (Revoking and Transferring) a License

Perform this task to rehost (revoke and transfer) a license. The **license revoke** command removes the original, permanent license from the device and provides a license for the new device.

Prerequisites

Read and understand the concepts in the "License Transfer between Devices" section of the *Cisco IOS Software Activation Conceptual Overview* module.

> **Note** Cisco IOS 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** *permission-file-url output-rehost-ticket-url*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**license revoke** *permission-file-url output-rehost-ticket-url* **Example:** Router# license revoke bootflash:ramanp/pt.lic bootflash:rt.lic	Revokes and transfers a license by using the permission ticket provided by the Cisco back-end licensing system. • 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

Perform this task to troubleshoot license operations.

SUMMARY STEPS

1. **enable**
2. **show license file**
3. **show license status**
4. **debug license** {**core** {**all** | **errors** | **events**} | **errors** | **ipc**}
5. **request platform software trace rotate all**
6. **no debug license** {**core** {**all** | **errors** | **events**} | **errors** | **ipc**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show license file** **Example:** Router# show license file	Displays license entries and license details stored in a Cisco software license file.
Step 3	**show license status** **Example:** Router# show license status	Displays the status of licenses in the system.

	Command or Action	Purpose
Step 4	**debug license {core {all | errors | events} | errors | ipc}** **Example:** Router# debug license errors	Enables controlled Cisco IOS software license debugging activity on a device.
Step 5	**request platform software trace rotate all** **Example:** Router# request platform software trace rotate all	Puts the output from the **debug license** command into standard IOS format and makes it available on bootflash. • Examine the output in the log files in the bootflash:tracelogs directory.
Step 6	**no debug license {core {all | errors | events} | errors | ipc}** **Example:** Router# 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 from the bootflash system on the Cisco ASR 1001 router:

```
Router# license install file bootflash:1ru_bu2-throughput-license
Installing...Feature:throughput...
1/1 licenses were successfully installed
0/1 licenses were existing licenses
0/1 licenses failed to install
```

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.

```
Router# license comment add feature throughput "the latest one"
Feature: throughput
    1  License Type: Permanent
       License State: Active, In Use
       License Addition: Exclusive
       License Count: Non-Counted
       Comment: --
       Store Name: Primary License Storage

% Success: Updating comment "--" with "the latest one" succeeded

Router#
*Aug 16 13:29:38.351 EDT: %LICENSE-6-ANNOTATED: R0/0: licensed: License for feat
ure throughput 1.0 has been annotated, UDI=ASR1001:JAE14020AT5, StoreIndex=0:Pri
mary License Storage, Comment=the latest one

Router# show license file

License Store: Primary License Storage
  Store Index: 0
    License: 11 throughput 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFIN
             ITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *12MDFXFBE6TEQR54
             00 NiL NiL NiL 5_MINS <UDI><PID>ASR1001</PID><SN>JAE14020AT5</SN>
             </UDI> :0oy5aopCvhfLBBk3:l0fBb4Kr3EwMLaYAHDV93ClpLXhJGOUE1ZuBusC,
             0B2QIQLvo6eUrKn27faF3zOYTTyjLRCGA8UMkemMyqmvjcg0Jhfm$<WLC>AQEBIQA
             B//8szae77QGOnFBXBoP02Obx6Fq2XtGPUJnh5pGplTkDzw9J5aqkkUjTNkuO4sv4
             FYORqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVb
             hoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XC
             Y=</WLC>
    Comment: the latest one
       Hash: ZJJz5MveEOPePQA3ATs6+OxF4bw=
  Store Index: 1
    License: 11 adventerprisek9 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS
             INFINITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *12MDFXFBE6T
             EQR5400 NiL NiL NiL 5_MINS <UDI><PID>ASR1001</PID><SN>JAE14020AT5
             </SN></UDI> dFCG4MGqCj5nRQGYuTNELNjulmgkdTIxsGBaysKmB1f8it6t76IbU
             1nDky:q5h843EeHBw9JMwZWcMfbveX8j93UWZckXYU8gSablS79TVo5Vg$<WLC>AQ
             EBIQAB///Y5fwUA9AySxZ1dkpw8MgMeMEbPYi4rEAcdDnsmUIwbp0xMUblmtUwhaC
             QMd/pCaGRqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21M
             NUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5
             Ko8XCY=</WLC>
    Comment:
       Hash: 7AlBc9W0+DqIdv/3EgOMsXW19Xs=
Router#
```

Example: Saving All Licenses to a Specified Storage Area

The following example shows how to use the **license save** command to save a license named throughput-license to bootflash:

```
Router# license save file bootflash:throughput-license
license lines saved ..... to bootflash/throughput-license
```

Example: Removing a "Not In-Use" License

The following example shows how to display the installed licenses on an ASR 1001 router and how to clear the throughput license, which is "not in-use." Note that active, in-use licenses cannot be cleared:

```
Router# show license all

License Store: Primary License Storage
StoreIndex:  0  Feature: throughput                    Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period:  4 weeks  2 days
            Evaluation period left:  0 minute   0 second
        License Count: Non-Counted
        License Priority: Low


Router# license clear throughput
Feature: throughput
    1  License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period:  4 weeks  2 days
            Evaluation period left:  0 minute   0 second
        License Addition: Additive
        License Count: Non-Counted
        Comment:
        Store Name: Primary License Storage


Are you sure you want to clear? (yes/[no]): yes
Router#
```

Example: Removing an "In-Use" License

The following example shows how to display the installed licenses on an ASR 1001 router and remove the advipservices license that is "in-use." To remove the "in-use" license, the router is configured to boot the ipbase level after reloading, which means that the advipservices license is no longer "in-use." The following example is truncated for readability:

```
Router# show license all

License Store: Primary License Storage
StoreIndex:  0  Feature: advipservices                 Version: 1.0
  License Type: Permanent
  License State: Active, In Use
  License Count: Non-Counted
  License Priority: Medium
License Store: Primary License Storage
StoreIndex:  1  Feature: adventerprise                  Version: 1.0
  License Type: Permanent
  License State: Active, Not in Use
  License Count: Non-Counted
  License Priority: Medium
Router# license clear advipservices
Feature: advipservices
    1 License Type: Permanent
  License State: Active, In Use
  License Addition: Exclusive
  License Count: Non-Counted
  Comment:
  Store Name: Primary License Storage
```

```
Are you sure you want to clear? (yes/[no]): yes
%Clear failed due to license in use
Router# configure terminal
Router(config)# license boot module asr1001 group all level ipbase
Router(config)# exit
Router# reload
.
.
.
Router> enable
Router# show license all

License Store: Primary License Storage
StoreIndex:  0  Feature: advipservices                    Version: 1.0
  License Type: Permanent
  License State: Active, Not in Use
  License Count: Non-Counted
  License Priority: Medium
License Store: Primary License Storage
StoreIndex:  1  Feature: adventerprise                    Version: 1.0
  License Type: Permanent
  License State: Active, Not in Use
  License Count: Non-Counted
  License Priority: Medium
Router# license clear advipservices
Feature: advipservices
    1 License Type: Permanent
  License State: Active, Not in Use
  License Addition: Exclusive
  License Count: Non-Counted
  Comment:
  Store Name: Primary License Storage


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

Router#
*Oct 13 11:31:58.844 EDT: %LICENSE-6-REMOVE: R0/0: licensed: Feature advipservices 1.0 was
removed from this device,
UDI=ASR1001:JAE14140D8L, StoreIndex=0:Primary License Storage

Router# show license all
License Store: Primary License Storage
StoreIndex:  1  Feature: adventerprise                    Version: 1.0
  License Type: Permanent
  License State: Active, In Use
  License Count: Non-Counted
  License Priority: Medium
```

Example: Rehosting (Revoking and Transferring) a License

The following example shows how to use the **license revoke** command to revoke a license stored in flash memory and transfer it to another location 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:

```
Router# license revoke bootflash:/ramanp/pt.lic bootflash:rt.lic

Following Permanent license(s) will be revoked from this device
    Feature Name: standard

Following Extension license(s) will be installed in this device
    Feature Name: standard

PLEASE  READ THE  FOLLOWING TERMS  CAREFULLY. . .

ACCEPT? [yes/no]: yes
Issue 'license feature standard' command to enable the license
Rehost ticket saved ..... to bootflash:rt.lic
```

Example: Generic Commands Enhanced with Licensing Information

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

- show tech-support, page 17
- show version, page 18

show tech-support

The **show tech-support** command displays the output of the **show license udi** and **show license image-levels** commands. The display is truncated to focus on only these sections:

```
Router# show tech-support

License Info:

License UDI:
Device# PID                      SN                     UDI
--------------------------------------------------------------------------------
*0     ASR1001                   JAE14020AT5            ASR1001:JAE14020AT5


License Package Information for Module:'asr1001'


Module name    Image level          Priority   Configured    Valid license

asr1001        adventerprise        1          NO            adventerprise
               advipservices        2          YES           advipservices
               ipbase               3          NO            ipbase

Current License Level: ipbase

cisco ASR1001 (1RU) processor with 3869710K/6147K bytes of memory.
4 Gigabit Ethernet interfaces
1 Ten Gigabit Ethernet interface
32768K bytes of non-volatile configuration memory.
8388608K bytes of physical memory.
7782399K bytes of eUSB flash at bootflash:.
```

```
78085207K bytes of SATA hard disk at harddisk:.

Configuration register is 0x0
```

show version

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

```
Router# show version

Cisco IOS Software, IOS-XE Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Experimen
tal Version 15.1(20100825:030133) [mcp_dev-BLD-BLD_MCP_DEV_LATEST_20100825_01011
7-ios 132]
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 24-Aug-10 21:21 by mcpre


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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.


ROM: IOS-XE ROMMON

1ru_bu2 uptime is 1 day, 46 minutes
Uptime for this control processor is 1 day, 47 minutes
System returned to ROM by reload
System image file is "bootflash:asr10001ru-universalk9.BLD_MCP_DEV_LATEST_201008
25_01"
Last reload reason: Reload Command



This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
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to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.


License Info:
License UDI:
Device# PID                     SN                      UDI
-----------------------------------------------------------------------------
*0      ASR1001                 JAE14020AT5             ASR1001:JAE14020AT5


License Package Information for Module:'asr1001'
```

```
Module name    Image level        Priority   Configured   Valid license

asr1001        adventerprise      1          NO           adventerprise
               advipservices      2          YES          advipservices
               ipbase             3          NO           ipbase

Current License Level: ipbase

cisco ASR1001 (1RU) processor with 3869710K/6147K bytes of memory.
4 Gigabit Ethernet interfaces
1 Ten Gigabit Ethernet interface
32768K bytes of non-volatile configuration memory.
8388608K bytes of physical memory.
7782399K bytes of eUSB flash at bootflash:.
78085207K bytes of SATA hard disk at harddisk:.

Configuration register is 0x0
Router#
```

Additional References

Related Documents

Related Topic	Document Title
Cisco License Manager application	*User Guide for Cisco License Manager*
Cisco IOS Software Activation conceptual overview	*Cisco IOS Software Activation Conceptual Overview*
Cisco IOS Software Activation Command Reference	*Cisco IOS Software Activation Command Reference*
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	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

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. 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. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Cisco IOS Software Activation

Table 1 lists the features in this module and provides links to specific configuration information.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

> **Note** Table 1 lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1   *Feature Information for Cisco IOS Software Activation*

Feature Name	Releases	Feature Information
Cisco IOS Software Activation	Cisco IOS XE Release 3.2S	Cisco IOS Software Activation EXEC commands support basic licensing processes. These sections provide information about this feature: • Installing and Upgrading Licenses by Using Software Activation Commands, page 2 • Managing Licenses by Using Software Activation Commands, page 4 • Removing Licenses by Using Software Activation Commands, page 8 • Troubleshooting License Operations by Using Software Activation Commands, page 12 These commands were introduced or modified by this feature: **debug license**, **license boot module**, **license clear**, **license comment**, **license install**, **license modify priority**, **license revoke**, **license save**, **license save credential**, **show license**.