



# 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. The Cisco IOS Software Activation feature provides the following ways to enable licensed features and register licenses:

- Using the Cisco Product License Registration portal.
- Directly on the device using the Cisco IOS EXEC commands.
- 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 the Cisco IOS Software Activation feature plays in those processes.

## Finding Feature Information in This Module

Your software release may 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.

Please also refer to your platform documentation for the latest details on licensing.

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

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- [Feature Information for Cisco IOS Software Activation, page 14](#)
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## Information About the Cisco Software Licensing Process

To use the Cisco IOS Software Activation solutions, you should understand the following concepts:

- [Cisco Software Licensing Concepts, page 2](#)
- [License Models, page 4](#)
- [License Types, page 5](#)
- [Uncounted/Counted Licenses, page 6](#)
- [Software Activation, page 7](#)
- [License Transfer, page 10](#)
- [License Resend Request, page 12](#)

## Cisco Software Licensing Concepts

Information in the following sections describes concepts that you should understand about Cisco software licensing:

- [Cisco Product Licensing Registration Portal, page 2](#)
- [Product Authorization Key, page 3](#)
- [Universal Device Identifier, page 3](#)
- [Cisco IOS Software License Validation, page 3](#)
- [Cisco License Manager, page 3](#)
- [MIB Support, page 3](#)
- [End User License Agreement, page 3](#)

## Cisco Product Licensing Registration Portal

These services are provided at the portals: (*Requires CCO account*)

- License fulfillment and PAK registration.  
(<http://www.cisco.com/go/license>)
- Return Merchandise Authorization (RMA) replacement licenses.  
(<https://tools.cisco.com/SWIFT/Licensing/LicenseAdminServlet/rmaLicenseTransfer>)
- License resend operations.
- License revocation and transfer operations.  
(<https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y>)
- License migration.

## Product Authorization Key

Interaction with the Cisco licensing portals may require a Product Authorization Key (PAK), 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 an important component in the process to obtain and upgrade a license.

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

## Universal Device Identifier

Cisco software performs license verification checks by comparing a stored Universal Device Identifier (UDI)—a unique and unchangeable identifier assigned to all Cisco hardware devices—with that 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 back of most Cisco hardware devices, and can be viewed via software.



**Note**

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

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## 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 may need the license key before they can be enabled. The customer obtains the license key using Cisco's licensing portal, or by using an EXEC command, or by using the Cisco License Manager application. A license key is issued for a specific Cisco IOS feature set and 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 simplify the task of collecting the license key. See the *User Guide for Cisco License Manager* (<http://www.cisco.com/en/US/products/ps7138/index.html>), for more information about this application.

## MIB Support

The Cisco IOS Software Activation feature defines CISCO-ENHANCED-LICENSING-MIB, to allow SNMP-based license management and administrative tasks. The UDI is associated with the Entity Name and Product Description data elements from the CISCO-ENHANCED-LICENSING-MIB.

The management information base (MIB) system nomenclature for Entity Name is entPhysicalName and for Product Description is entPhysicalDescr. A description of this MIB can be found using tools at the following URL: <http://tools.cisco.com/ITDIT/MIBS/servlet/index> Use the MIB Locator tool and the Search for MIB selection box, to select **CISCO-ENHANCED-LICENSING-MIB**.

## End User License Agreement

As part of the licensing process, you must accept terms and conditions set forth in the End User License Agreement. The agreement is accepted implicitly when a customer first uses a new device, but must be explicitly accepted 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](http://www.cisco.com/en/US/docs/general/warranty/English/EU1KEN_.html) online at the following URL:  
[http://www.cisco.com/en/US/docs/general/warranty/English/EU1KEN\\_.html](http://www.cisco.com/en/US/docs/general/warranty/English/EU1KEN_.html)

## License Models

The following sections describe the models of Cisco software licenses:

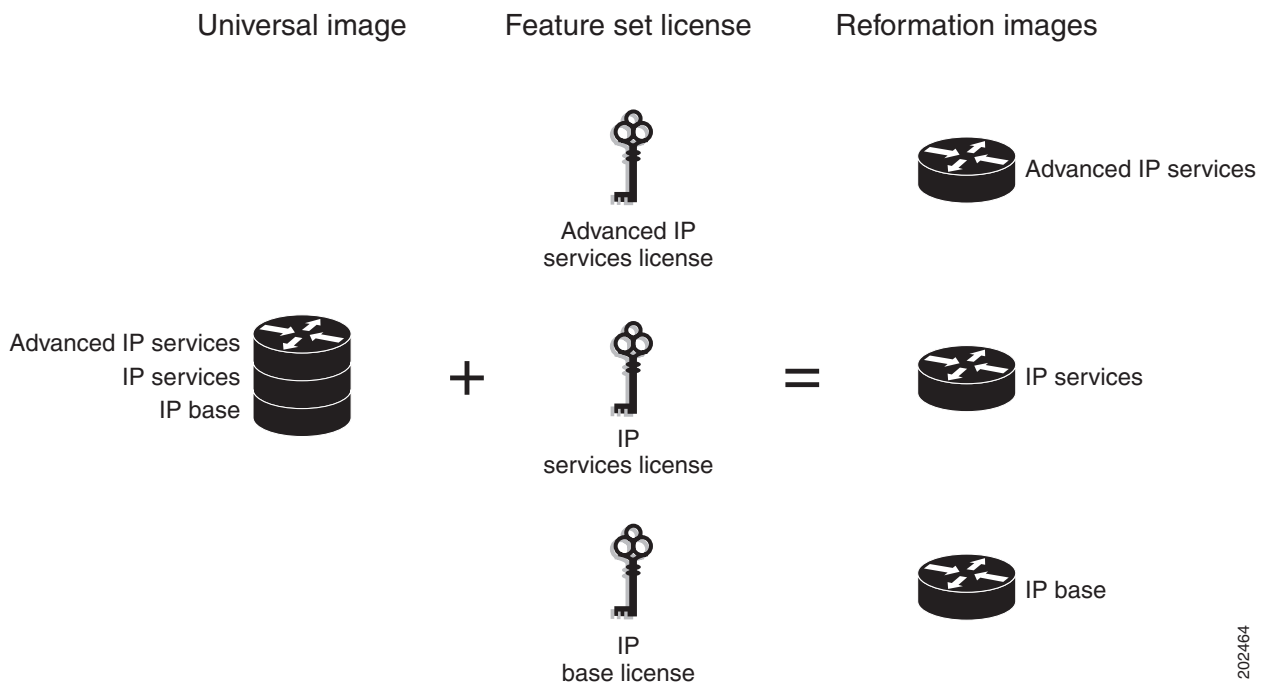
- [Cisco IOS Universal Image-Based License, page 4](#)
- [Feature-Based License, page 5](#)

### Cisco IOS Universal Image-Based License

A platform can have a single universal image, which is a super-set of all reformation feature sets. The reformation feature sets supported by a platform are predetermined and vary between platforms. A particular reformation feature set functionality is enabled, based on license availability.

The Cisco IOS universal image contains *all* individual packages in one image. you can access their required functionality based on the license that they installed on their 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 reformation images that can make up the universal image.

**Figure 1** An Example of Universal Image Components



The feature sets available for upgrading Cisco routers and switches are listed on the Cisco IOS Software Packaging web page at the following URL:

<http://www.cisco.com/en/US/products/sw/iosswrel/ps5460/index.html> The Cisco IOS software packaging simplifies the image selection process by consolidating the total number of packages and using consistent package names across all hardware products.

## Feature-Based License

Individual features can be enabled or disabled by license keys. 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

This section describes the following Cisco software license types:

- [Permanent License, page 5](#)
- [Temporary Licenses, page 5](#)
- [Uncounted/Counted Licenses, page 6](#)
- [Subscription License, page 6](#)

## Permanent License

Permanent licenses are perpetual; that is, they do not have any usage period 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 IOS licensing infrastructure during software installation and once a permanent license is installed, it is not necessary to upgrade for subsequent releases.

Cisco manufacturing pre-installs 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. Please see the “Software Activation” section for more details.

## Temporary Licenses

Temporary licenses are limited to a specific usage period (for example, 60-days) and an End User License Agreement must be accepted before they 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 TAC.

Although the embedded license may also be used for evaluation purposes, it is highly recommended that Cisco customers utilize the embedded license for emergency use only and obtain an evaluation license from the self-serve Cisco Product Registration portal.

**Note**

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You must accept Cisco end-user licensing agreement before temporary licenses can be activated.

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The following sections further define the types of temporary licenses:

- [Emergency License, page 6](#)
- [Evaluation License, page 6](#)

- [Extension License, page 6](#)

## Emergency License

In the event of device failure and if the replaced device does not have the same licenses as the failed device, to avoid network down time, you can use an evaluation license embedded in their software image, which ensures that needed features can be configured without requiring a license key. However, the customer 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

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You must go to Cisco's licensing portal to obtain a permanent RMA replacement license.

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## Evaluation License

Evaluation licenses are also temporary and are used to evaluate a feature set on new hardware.

Evaluation Licenses can be obtained from the Cisco licensing portal at this URL:  
<https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y>



### Note

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The customer must go to the Cisco licensing portal prior to expiration of the evaluation license to upgrade the license status.

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## Extension License

When the time allowed for an evaluation licenses is used up, the customer 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

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The customer must obtain approval to use an extension license.

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## Uncounted/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 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 hardware and software capacity using a license key. You do not need to do a remote material authorization (RMA) to add new hardware. You can purchase the upgrade, have it electronically delivered, and use the license key to enable increased capacity. Cisco 5500 Series wireless controllers is one example where you can dynamically increase 12, 25, 50, 100 or 250 access points for wireless services.

## Subscription License

The subscription license provides software enforcement for licensed features for a calendar period. The following node-locked license types are supported in Subscription License:

- Evaluation subscription license
- Extension subscription license
- Paid subscription license

## Software Activation

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



### Note

The customer 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.

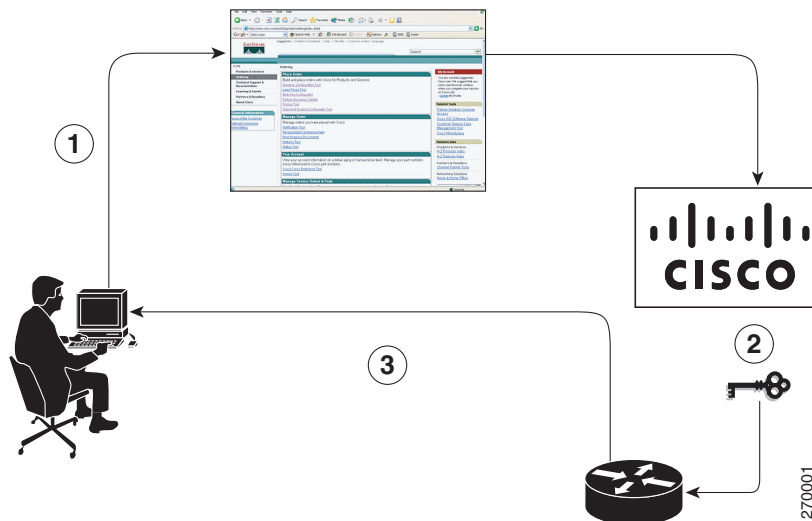
This section describes the following software activation processes:

- [Manufacturing Pre-Installed Licenses, page 7](#)
- [Automated Software Activation Using Cisco License Manager, page 8](#)
- [License Software Activation Using EXEC Commands, page 8](#)
- [License Software Activation Using License Call Home, page 9](#)

## Manufacturing Pre-Installed Licenses

Figure 2 shows the overall license work flow for manufacturing pre-installed licenses.

**Figure 2** *Manufacturing Pre-Installed License Work Flow*



The work flow for manufacturing pre-installed licensing involves the following:

1. The customer places an order for a Cisco device via the Cisco sales ordering tool.
2. The order is entered into the ordering system. 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 installs the code on the device. The device is tested and shipped to the customer.

- The customer installs and configures the device, and places the device in production. There is no requirement to activate or register the software prior to use. A new device is ready for deployment straight out of the box.

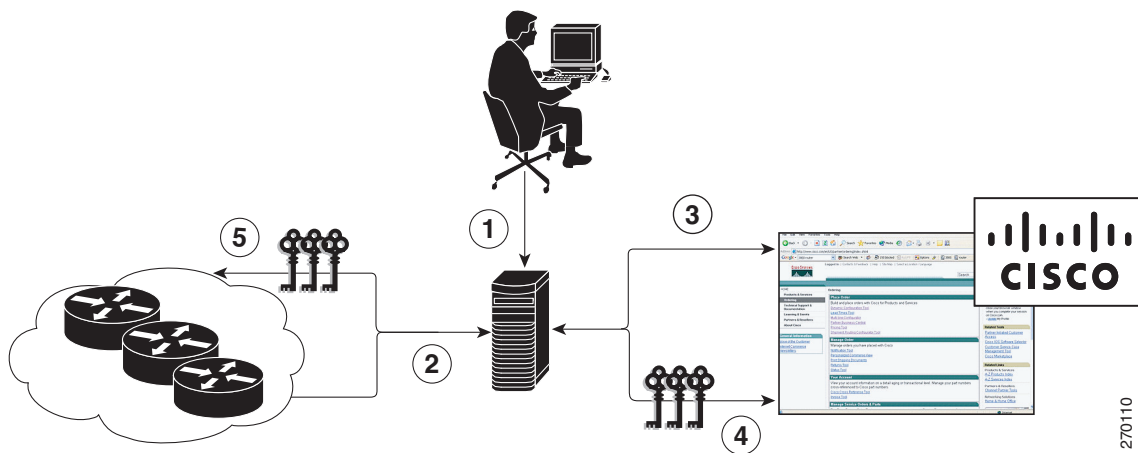
## Automated Software Activation Using Cisco License Manager

Cisco License Manager interacts with the Cisco Product License Registration portal transparently on behalf of many devices. With the Cisco License Manager application deployed, many of the steps for upgrading and registering software licenses can be automated. For example, the customer 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 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 work flows for the license upgrade process for automated upgrades using Cisco License Manager.

**Figure 3** License Upgrade Work Flow via Cisco License Manager



The automated license transfer process involves the following steps:

- Identify the source and destination devices and SKUs to transfer
- CLM automatically determines the Device Credentials of the source device
- CLM automatically communicates to Cisco.com to obtain the permissions ticket and applies it to the source device to obtain the rehost ticket
- CLM automatically sends rehost ticket along with destination device UDI to automatically obtain the license keys
- CLM automatically installs the license key on the destination device

See the *User Guide for Cisco License Manager* document for more information about Cisco License Manager.

## License Software Activation Using EXEC Commands

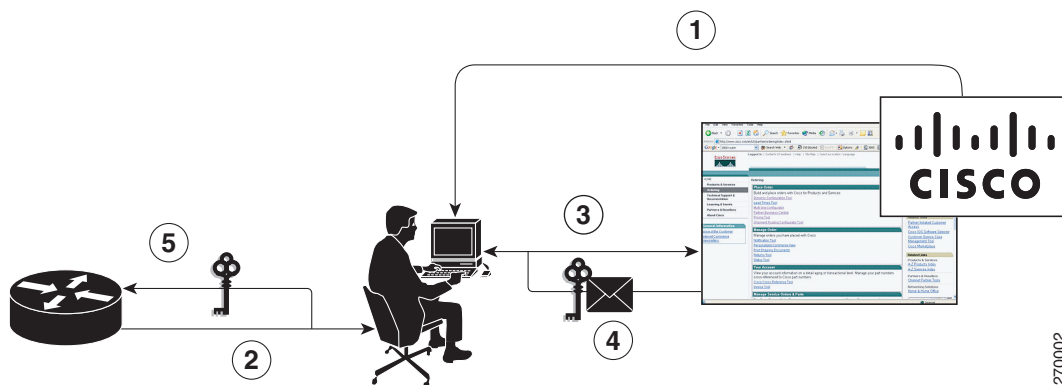
The Cisco IOS Software Activation feature includes Cisco IOS EXEC commands that allow the following basic licensing tasks from the command line:

- Store a license file.
- Install a license.
- 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, the customer enters the PAK as part of the command, which retrieves the Stock Keeping Units (SKUs) associated with the PAK. The customer selects the SKUs and enters the UDI of the device where the license should be installed. A license key is then delivered to the customer either electronically via e-mail or via paper and mail delivery. The customer can then install the license using Cisco IOS commands.

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

**Figure 4** Manual License Upgrade Work Flow



The work flow for manufacturing-installed licensing involves the following:

1. Customer purchases required PAKs (Product Authorization Key)
2. UDI is obtained from the device
3. The UDI and PAK are entered into to Cisco's licensing portal
4. License file is sent to customer via E-mail
5. Customer installs licenses on the devices

## License Software Activation Using License Call Home

You can interact directly with the Cisco Product License Registration portal using the Cisco License Call Home interface included with the Cisco IOS Software Activation feature and described in the [Cisco IOS Software Activation Tasks and Commands](#) document. The License Call Home feature works as a client/server model. Each transaction requires a separate connection to the Cisco licensing infrastructure. The License Call Home feature is interactive in that it displays prompts to the customer

to obtain required information, convert that information into a defined data structure, and then connect to the Cisco licensing back end to interact with the Cisco licensing infrastructure. A request is always initiated by a License Call Home EXEC command, and the response is always provided by the Cisco licensing infrastructure.

The following tasks can be performed using Cisco License Call Home commands once a PAK has been purchased:

- Install or upgrade a license.
- Transfer a license.
- Request that a license be resent.

## Installing and Upgrading Licenses

A license is obtained and installed following these basic steps:

- Purchase PAK for the desired type of license. Some licenses do not require PAK, they may need a contract instead.
- Submit the PAK code and UDI of the switch to Cisco's online license portal. If it is a contract license, follow the links to non PAK based licenses and submit the UDI of the device.
- Install the license file returned from license portal to the device using Cisco IOS commands. This step can also be done using the Cisco License Manager application, which can be downloaded at <http://www.cisco.com/go/clm>.
- Reboot the device (if required). The new feature set is enabled.

Perform this task to manually install or upgrade a license using the Cisco IOS install license command. The license file must have already been received from Cisco's licensing portal or have been backed up using the Cisco IOS license save command.

## License Transfer

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 where one of the devices is unavailable. In this scenario, license from the failed device is transferred to the RMA or replaced device using the RMA License Transfer portal.

## License Transfer Between Two Working Devices

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

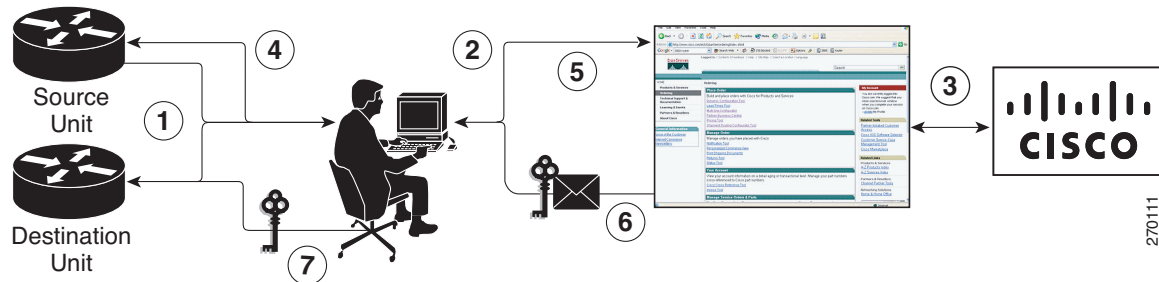
Perform a license transfer (rehosting) using the following three methods:

- Using the Cisco Product License Registration portal.

- Using the Cisco IOS License Call Home commands.
- Using the Cisco License Manager application.

Figure 5 shows the processes involved for rehosting (transferring) a license.

**Figure 5 License Transfer Work Flow**



Following is a summary of license transfer processing using the Cisco Product License Registration portal:

1. Obtain UDI and device credentials from the source and destination devices using IOS CLI commands. (For more information, see the [Cisco IOS Software Activation Tasks and Commands](#) document.)
2. Contact the Product License Registration page on Cisco.com and enter the source Device Credentials and UDI into the license transfer portal tool.
3. The portal will display licenses that can be transferred from the source device. Select the licenses that need to be transferred. A permission ticket is issued. You can use this permission ticket to start the rehost process using Cisco IOS commands.
4. Apply the permissions ticket to the source device using the **license revoke** command as described in the [Cisco IOS Software Activation Tasks and Commands](#) document. The source device will then provide a rehost ticket indicating proof of revocation. A sixty day grace period license is also installed on the device to allow enough time to transfer the licenses to destination device.
5. Enter the rehost ticket into the license transfer portal tool on Cisco.com along with destination device UDI.
6. Receive the license key via E-mail
7. Install the license key on the destination device.

Using the **license call-home resend** command, source device contacts the Cisco license portal and obtains a license key for the destination device after revoking it from the source device. The license key stored on the source device can then be installed on the destination device to complete the transfer.

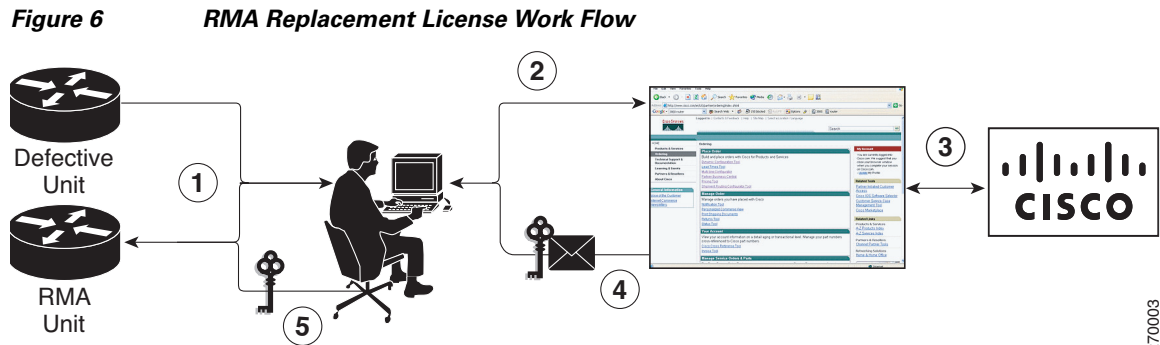
Using Cisco License Manager, the customer can simply select the source and destination devices from a GUI wizard and the process is automated.

## RMA License Transfer

When you need to transfer a software license from a failed device to a new device, they should interact with the Cisco licensing portal at

<https://tools.cisco.com/SWIFT/Licensing/LicenseAdminServlet/rmaLicenseTransfer> to initiate an RMA replacement license. If assistance obtaining a license is required, the customer can work with Cisco technical support at the following URL: <http://www.cisco.com/techsupport>.

Figure 6 shows the RMA replacement license process.



The RMA replacement license process involves these steps:

1. Determine the UDI of the defective and RMA devices
2. Enter the UDI into the RMA License portal tool on cisco.com
3. License portal determines licenses associated with defective device
4. Replacement licenses issued
5. Customer installs new license on the new device

## License Resend Request

If an original license is lost or misplaced, the customer can enter EXEC commands to request that all licenses for a specific UDI be resent. The command will also store the received license lines in a location specified by the customer. See the “Requesting a License Resend Using License Call Home, page 18” section in the *Cisco IOS Software Activation Tasks and Commands* document for more information about license resend operation.

Cisco License Manager also allows the customer to perform this function with an easy to use graphical user interface.



### Note

You must have Internet access to place a license resend request.

## Where to Go Next

This document provides an overview of Cisco IOS Software Activation, an orchestrated group of processes that span multiple Cisco platforms and device types. The “Related Documents” section lists other documents that describe some aspect of the Cisco IOS Software Activation process.

## Additional References

The following sections provide references related to the Cisco IOS Software Activation feature.

## Related Documents

Related Topic	Document Title
Cisco IOS Software Activation Commands	<i>Cisco IOS Software Activation Tasks and Commands</i>

## Standards

Standard	Title
None	—

## MIBs

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

## RFCs

RFC	Title
None	—

## 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>	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

# Feature Information for Cisco IOS Software Activation

Table 8 lists the release history for this feature.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS 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 8 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

**Table 8** Feature Information for Cisco IOS Software Activation

Feature Name	Releases	Feature Information
Cisco IOS Software Activation	12.4(15)XZ 12.4(20)T 15.0(1)M	The Cisco IOS Software Activation feature supports basic licensing processes. This feature is platform-independent. The following feature module provides information about Cisco Software Activation: <ul style="list-style-type: none"> <li>• <i>Cisco IOS Software Activation</i></li> </ul>

## Glossary

**Cisco License Manager**—Software tool that provides a graphical user interface (GUI) to track and manage licenses.

**license file**—File generated by Cisco licensing tools, which is used to install a license on 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 IOS 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, tamper-proof, and complete license. A single line can exist independently.

**license manager**—An application used to keep 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 or a switch. 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 customers when they 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 tools, which is used to get a rehost ticket during 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**—This is a file that lives for the lifetime of the device that has a license and survives image changes. This file should ideally 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 used to store and access data such as compact Flash or USB.

**RMA**—Return Merchandise Authorization, which is the process whereby a customer returns 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 licenses that require 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 via HTTPS over the Internet. The Cisco License Manager application interacts with the Cisco licensing infrastructure on behalf of many devices. Customers can interact directly with the Cisco licensing infrastructure service using Cisco IOS software commands.

**UDI**—Unique device identifier, which is a Cisco-wide schema to identify products. The UID contains Product ID, Version ID, and 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.

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