# Cisco IOS Software Packaging and Licensing for the Cisco Catalyst 3750-E, 3560-E, 3750-X, and 3560-X Series Switches

The Cisco® Catalyst® 3750-E Series with StackWise® Plus is an enterprise-class line of stackable wiring closet switches. The Cisco Catalyst 3560-E Series is an enterprise-class line of standalone access and aggregation switches. They combine 10/100/1000 and Power over Ethernet (PoE) configurations with upgradable Gigabit Ethernet to 10 Gigabit Ethernet uplinks to enable applications such as IP telephony, wireless, and video. They support two software feature sets: IP Base and IP Services.

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The Cisco Catalyst 3750-X Series with StackWise Plus and the standalone Cisco Catalyst 3560-X Series are two new enterprise-class lines of access switches that support advanced capabilities such as Stack Power, field-replaceable hot-swappable uplink modules, full 802.3at PoE+ support, dual redundant power supplies and fans, and IEEE 802.1AE (MACsec) hardware-based encryption. They support three software feature sets: LAN Base, IP Base, and IP Services.

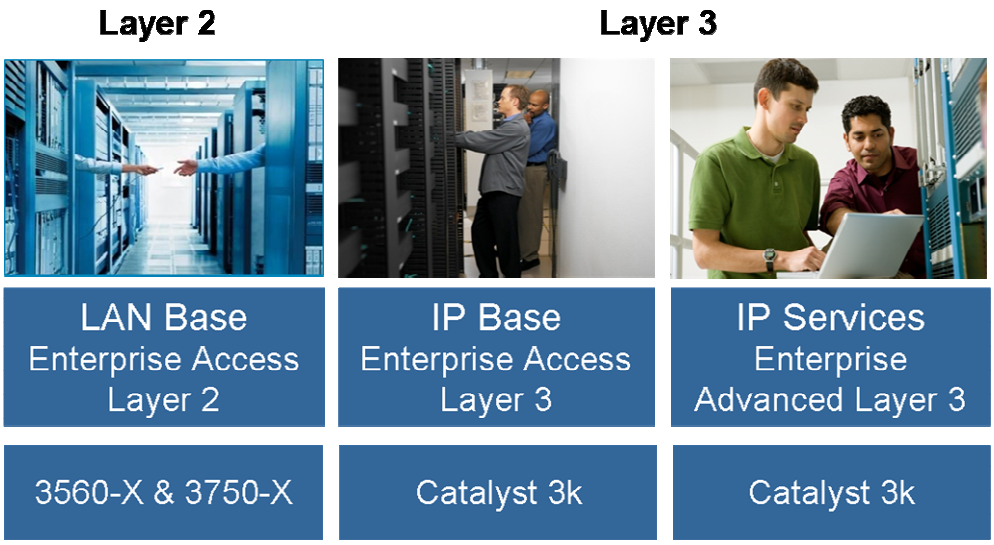
### Feature Sets

The Cisco Catalyst 3K family of switches supports the following three feature sets depending on the specific model of switch:

- LAN Base: Enterprise access Layer 2 switching features
- IP Base: Enterprise access Layer 3 switching features
- IP Services: Advanced Layer 3 switching (IPv4 and IPv6) features

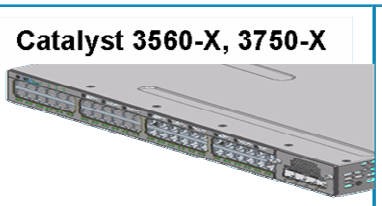
As visually summarized in Figure 1, the Cisco Catalyst 3560-E and 3750-E Series support the IP Base and IP Services feature sets, whereas the Cisco Catalyst 3560-X and 3750-X Series support the LAN Base, IP Base, and IP Services feature sets.

**Figure 1.** Feature Set Overview




In particular, Figure 2 shows the main differences between the three feature sets supported on the Cisco Catalyst 3K switch family.

**Figure 2.** Feature Set Characteristics and Differences



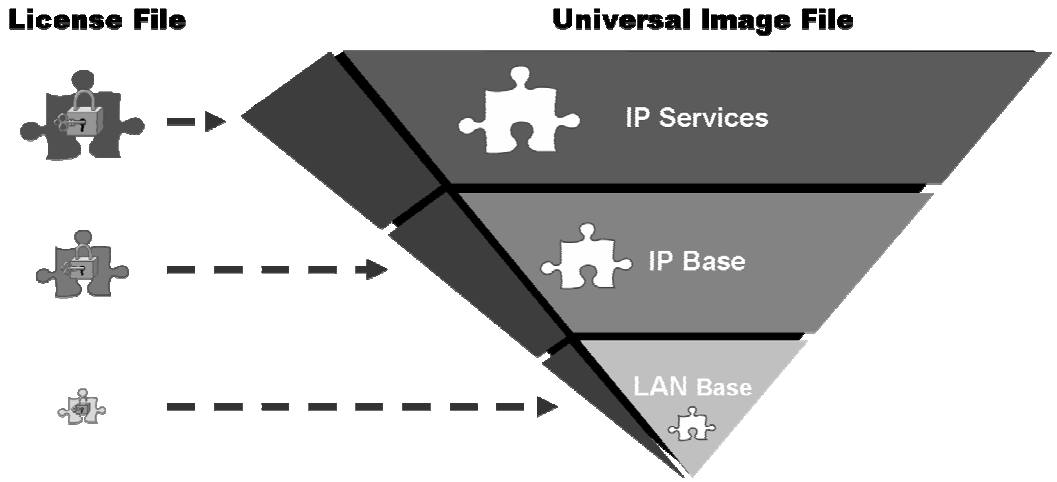
| Functionality | Catalyst 3560-X, 3750-X<br>LAN Base | Catalyst 3560/3750 including E and X series<br>IP Base | IP Services |
|---|---|---|---|
| Layer 2+ | • Enterprise Access Layer 2<br>Wide range of L2 access features for enterprise deployments | • Complete Access L2<br>Supports all Catalyst 3K L2 features including hot standby protocols. Stack power (3750-X). | |
| Layer 3 | • No Routing Support<br>Support for SVI with no IP routing support | • Enterprise Access L3<br>RIP, static and Stub PIM and EIGRP | • Complete Access L3<br>OSPF, EIGRP, BGP, ISIS VRF-lite, WCCP, PBR |
| Manageability | • Basic Manageability<br>Support for a wide range of MIBs, IPSLA Responder, RSPAN | • Enterprise Access L3<br>Gold-Lite, Smart Install Director | • Complete Access L3<br>EEM, IPSLA Initiator |
| Security | • Enterprise Access Security<br>DHCP Snooping, IPSG, DAI, PACLs, Cisco Identity 4.0, NAC and 802.1x features | • Complete Access Security<br>Router and VLAN ACLs, Private VLANs, complete identity and security, TrustSec SXP, IEEE 802.1AE (3560-X/3750-X) | |
| QoS | • Enterprise Access QOS<br>Ingress policing, Trust Boundary, AutoQOS, DSCP mapping | • Complete Access QOS<br>Supports all Catalyst 3K QOS features including per VLAN policies | |

## Universal Image

Each Cisco Catalyst 3750-E/3560-E or 3750-X/3560-X system is loaded with a universal Cisco IOS® Software image. Universal Cisco IOS Software images contain all Cisco IOS Software features. The level of Cisco IOS Software functionality available is determined by the combination of one (or more) licenses installed on the device. A

specific license file stored in the flash memory of the switch can unlock a specific Cisco IOS Software feature set, from the smallest one to the largest one (Figure 3).

**Figure 3.** Feature Set Activation in a Universal Image




For the Cisco Catalyst 3750-E/3560-E Series, there can be two versions of universal images: plain noncrypto universal images and **universalk9** images (which offer all the Cisco IOS Software features, including strong crypto features).

For the Cisco Catalyst 3750-X/3560-X Series, in addition to the aforementioned universalk9 images, there are also images with the universalk9-npe designation in the image name. The reason for this alternate image type is that some countries have import regulations that require that the device does not support any strong data-plane crypto functionality, such as IEEE 802.1AE, in any form. To satisfy the import requirements of those countries, this universal image does not support any strong payload encryption (that is, it is of the **nonpayload encryption** type).

Note that for the aforementioned platforms “nonuniversal” IP Base images are still available and posted on the cisco.com guest page. This is done so that those who have not purchased a Cisco SMARTnet® contract can still get software updates for their LAN Base or IP Base images (or downgrade from IP Services to IP Base and get software updates). LAN Base or IP Base updates are offered as part of the **software update policy** (see Updating Software on the Cisco Catalyst 3750-E, 3560-E, 3750, and 3560 Series Switches).

### Software Activation Overview

Cisco Catalyst 3750-E/3560-E and 3750-X/3560-X switches each have a specific universal Cisco IOS Software image installed encompassing all Cisco IOS Software functionality. This means that for each series of switches a common image is deployed.

**A software activation license** (SAL) is also preinstalled on the device, which activates the specific functionality that the user procures. Each software activation license is unique to a specific device and functions only with that device. In other words, licenses are locked to the switch’s **unique device identifier** (UDI).

A unique device identifier is made up of two components: the **product ID** (PID) and **serial number** (SN). Serial number is an 11-digit number that uniquely identifies a device. The product ID identifies the type of device. This information can be found using the “show license udi” command on the switch CLI or Simple Network Management Protocol (SNMP). This information is also present on a label found on the device. (Cisco recommends recording this information when the switch is first received and storing it in a safe location. In case of issues, the TAC should be contacted for assistance.)

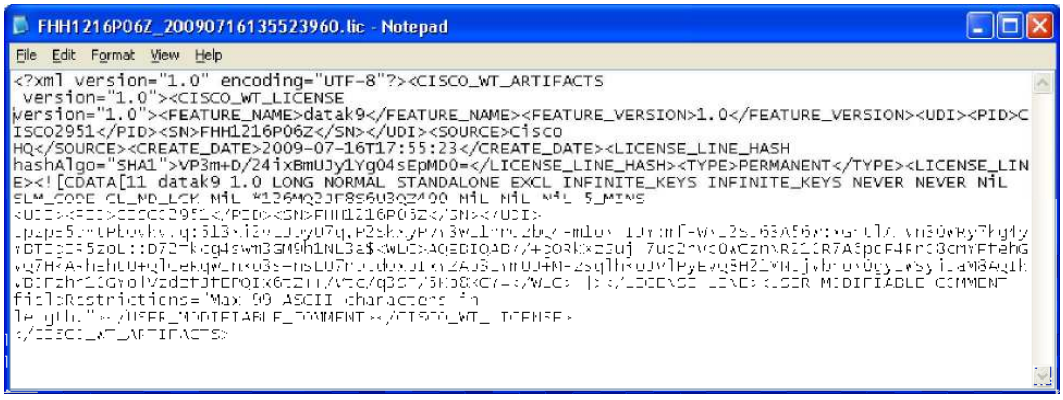
New devices are shipped with software activation licenses preinstalled for feature sets ordered with the switches. A new license is needed only when adding new feature sets. For example, advancing a device from the IP Base feature set to the IP Services feature set requires a new software activation license. However, migrating software images from one release to another (for example, from 12.2(52)SE to 12.2(53)SE) does not require a new license.

A new feature set can be enabled with a new SAL, which can be generated after the purchase of a so-called **product activation key** (PAK).

So, when customers need to activate a different Cisco IOS Software feature set, they can purchase a product activation key for a desired feature set and obtain the UDI(s) for the device(s) to upgrade. UDI and PAK information are passed to Cisco's license portal, which generates the licenses and sends them electronically to the customer.

The final result of the above process is a software activation license file, which is an XML text file with a .lic extension (Figure 4).

**Figure 4.** Software Activation License File




After installing a license file in the flash memory of a switch (for example, member of a stack), one can show it with the following command:

```
3750E# show license file switch 1
License Store: lic0:/lservrc.pri > Special storage location in flash
Store Index: 0
License: 11 ipservices 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFINITE_KEYS
NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *14B4M28DGGM3VN64 00 NiL NiL NiL 5_MINS
<UDI><PID>WS-C3750-E-48PD0S</PID><SN>CAT1033R1FS</SN></UDI>
NSIAm82zIB1QOfAcCodkf1TJKrQ:m5tyO,IrR4FV5a37oPLG7DOOw3ayRBgpdFOjLx9L7mgHEW7ADvb8P9h
Y5afwc5vPWVA4H6WdL10JhZanVlEZ,OkEEdrfoeZwkhq7nmfZ$
<WLC>AQEBIQAB///lwoROBCuPuXBm1TPEs2A0sPqCVLnnY
N3y2qyqf2+n6H1utLAyWThtGSiqJMZADywcqvPiAmWSaEmUT56rstk6gvmj+EQKRf
D9A0ime1czrdKxfILT0LaXT416nwmfp92Tya6vIQ4FnlBdqJ1sMzXeSq8PmVcTU9A
4o9hil9vKur8N9F885D9GVF0bJHciT5M=</WLC>
Comment:
Hash: xlpqb43M0JXXvZ8usNuRrchVEwo=
```

When a device is powered on, the software activation license file is examined by the Cisco IOS Software, which activates the appropriate feature sets. Unlike previous right-to-use licenses, this flexible approach helps users simplify deployment of new switches and maintain an accurate record of the specific image, functionality, and additional features that are activated on each device by providing a definitive mechanism that helps ensure the correct software features are licensed on every device.

### Product Activation Key (PAK)

A PAK is an **11-digit alphanumeric key** created by Cisco manufacturing that identifies a specific software purchase—in other words, it is a short alphanumeric string provided by Cisco as a "proof of purchase" when a software feature set is purchased.

PAKs are not tied to a specific device until they are used to generate a software activation license. They do not have an expiration date and can be redeemed at any time after purchase.

PAKs are ordered using **part numbers on the Cisco price list** (see also the tables below), as there are different PAKs for different types of switches. A PAK can generate multiple licenses before it is fully redeemed (similarly to a debit card).

The **Cisco License Manager** tool can be used to automate the generation of licenses from PAKs for a large number of devices. It is also meant to optimize the license deployment for multiple devices connected in a stack.

Delivery of PAKs can be paper-based or electronic (**eDelivery**). In the former case, they are sent by postal mail to customers. Customers ordering paper-based PAKs are sent a software claim certificate by regular mail identifying their PAK string.

Electronic PAKs can be ordered by using **special SKUs starting with the "L-" prefix**. Customers ordering an electronic PAK receive an email that points to a secure portal where they can download a pdf file containing the PAK information. This information is sent to the customer in a matter of minutes after purchase. (Note that "L-" SKUs are different from the "LL-" SKUs. The latter are **relicensing for used equipment** SKUs. See the Q&A section for more details.)

To order the appropriate PAKs, specific part numbers are available for each series of switches:

- **3750E-LIC= and L-3750E-LIC= (eDelivery type)** are the orderable SKUs for the Cisco Catalyst 3750-E Series' PAKs. Table 1 shows the upgrade options associated with each type of orderable SKU.

**Table 1.** Cisco Catalyst 3750-E Regular and eDelivery Upgrade Options

| Product Name | Product Description |
|---|---|
| **3750E-IPSLCB-QTY** | IP Services for Cisco Catalyst 3750-E 24 ports, upgrade from IP Base |
| **L-3750E-IPSLCB-QTY** | eDelivery IP Services for Cisco Catalyst 3750-E 24 ports, upgrade from IP Base |
| **3750E48-IPSLCB-QTY** | IP Services for Cisco Catalyst 3750-E 48 ports, upgrade from IP Base |
| **L-3750E48-IPSLCB-Q** | eDelivery IP Services for Cisco Catalyst 3750-E 48 ports, upgrade from IP Base |

- **3560E-LIC= and L-3560E-LIC= (eDelivery type)** are the orderable SKUs for the Cisco Catalyst 3650-E Series PAKs, except for two models which have their own specific SKUs: 3560E-12D-LIC=, L-3560E-12D-LIC= (eDelivery type), 3560E-12SD-LIC2=, and L-3560E-12SD-LIC2= (eDelivery type). Table 2 shows the upgrade options associated with each type of orderable SKU.

**Table 2.** Cisco Catalyst 3560-E Regular and eDelivery Upgrade Options

| Product Name | Product Description |
|---|---|
| **3560E-IPSLCB-QTY** | IP Services for Cisco Catalyst 3560 E, upgrade from the IP Base |
| **L-3560E-IPSLCB-QTY** | eDelivery IP Services for Cisco Catalyst 3560 E, upgrade from the IP Base |
| **3560E12D-SLB-QTY** | IP Services for 3560E-12D, upgrade from IP Base |
| **L-3560E12D-SLB-QTY** | eDelivery IP Services for 3560E-12D, upgrade from IP Base |
| **3560E12SD-SLB-QT** | IP Services for 3560E-12SD, upgrade from IP Base |
| **L-3560E12SD-SLB-QT** | eDelivery IP Services for 3560E-12SD, upgrade from IP Base |

- **C3750X-LIC=** is the orderable SKU for the Cisco Catalyst 3750-X Series. Table 3 shows the upgrade options associated with the orderable SKU.

**Table 3.** Cisco Catalyst 3750-X Regular and eDelivery Upgrade Options

| Product Name | Product Description |
|---|---|
| **C3750X-24-L-S=** | Cisco Catalyst 3750X-24 LAN Base to IP Base Cisco IOS Software Upgrade License |
| **L-C3750X-24-L-S=** | Cisco Catalyst 3750X-24 LAN Base to IP Base Cisco IOS Software Upgrade E-delivery License |
| **C3750X-24-S-E=** | Cisco Catalyst 3750X-24 IP Base to IP Services Cisco IOS Software Upgrade License |
| **L-C3750X-24-S-E=** | Cisco Catalyst 3750X-24 IP Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3750X-24-L-E=** | Cisco Catalyst 3750X-24 LAN Base to IP Services Cisco IOS Software Upgrade |
| **L-C3750X-24-L-E=** | Cisco Catalyst 3750X-24 LAN Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3750X-48-L-S=** | Cisco Catalyst 3750X-48 LAN Base to IP Base Cisco IOS Software Upgrade License |
| **L-C3750X-48-L-S=** | Cisco Catalyst 3750X-48 LAN Base to IP Base Cisco IOS Software Upgrade E-delivery License |
| **C3750X-48-S-E=** | Cisco Catalyst 3750X-48 IP Base to IP Services Cisco IOS Software Upgrade License |
| **L-C3750X-48-S-E=** | Cisco Catalyst 3750X-48 IP Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3750X-48-L-E=** | Cisco Catalyst 3750X-48 LAN Base to IP Services Cisco IOS Software Upgrade |
| **L-C3750X-48-L-E=** | Cisco Catalyst 3750X-48 LAN Base to IP Services Cisco IOS Software Upgrade E-delivery License |

- **C3560X-LIC=** is the orderable SKU for the Cisco Catalyst 3560-X Series. Table 4 shows the upgrade options associated with the orderable SKU.

**Table 4.** Cisco Catalyst 3560-X Regular and eDelivery Upgrade Options

| Product Name | Product Description |
|---|---|
| **C3560X-24-L-S=** | Cisco Catalyst 3560X-24 LAN Base to IP Base Cisco IOS Software Upgrade License |
| **L-C3560X-24-L-S=** | Cisco Catalyst 3560X-24 LAN Base to IP Base Cisco IOS Software Upgrade E-delivery License |
| **C3560X-24-S-E=** | Cisco Catalyst 3560X-24 IP Base to IP Services Cisco IOS Software Upgrade License |
| **L-C3560X-24-S-E=** | Cisco Catalyst 3560X-24 IP Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3560X-24-L-E=** | Cisco Catalyst 3560X-24 LAN Base to IP Services Cisco IOS Software Upgrade |
| **L-C3560X-24-L-E=** | Cisco Catalyst 3560X-24 LAN Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3560X-48-L-S=** | Cisco Catalyst 3560X-48 LAN Base to IP Base Cisco IOS Software Upgrade License |
| **L-C3560X-48-L-S=** | Cisco Catalyst 3560X-48 LAN Base to IP Base Cisco IOS Software Upgrade E-delivery License |
| **C3560X-48-S-E=** | Cisco Catalyst 3560X-48 IP Base to IP Services Cisco IOS Software Upgrade License |
| **L-C3560X-48-S-E=** | Cisco Catalyst 3560X-48 IP Base to IP Services Cisco IOS Software Upgrade E-delivery License |
| **C3560X-48-L-E=** | Cisco Catalyst 3560X-48 LAN Base to IP Services Cisco IOS Software Upgrade |
| **L-C3560X-48-L-E=** | Cisco Catalyst 3560X-48 LAN Base to IP Services Cisco IOS Software Upgrade E-delivery License |

## Available License Types

### Permanent Licenses

A permanent license is valid for the life of the device on which it is installed (examples of permanent licenses are LAN Base, IP Base, and IP Services).

### Temporary Licenses

Temporary licenses are used for evaluating new capabilities or in emergency situations. A temporary license allows a feature set to be used for 60 days of actual usage. When the 60-day period expires, the device will continue to operate normally until reloaded. After the reload, the device will default to the original functionality before the temporary license was enabled. Only the actual time that the temporary license is enabled counts towards the 60-

day limit. The Cisco Technical Assistance Center (TAC) can provide an extension license for longer trials or other circumstances.

A temporary license for the Cisco Catalyst 3750-E/3560-E and 3750-X/3560-X switches can be obtained here: https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y.

#### Feature Licenses

Some individual features can be enabled or disabled by license keys. These features check for their licenses before enabling themselves. A feature license will typically have a prerequisite before it will function, such as a requirement for a certain base license.

As of Cisco IOS Software Release 12.2(53)SE there are no feature licenses available.

### Changing Cisco IOS Software Version

Changing Cisco IOS Software version on a device is licensing transparent. Once the new Cisco IOS Software version is loaded on the device, the Cisco IOS Software recognizes the licenses installed on the device and enables corresponding functionality. No user intervention is required.

#### Rebooting a Device

Rebooting a device is licensing transparent. Once a device comes up, the Cisco IOS Software on the device recognizes the licenses installed on the device and enables the corresponding functionality. No user intervention is required.

### Options for Managing Software Activation Licenses

There are two options for generating and managing the software activation licenses on your switch:

- **Cisco License Manager:** Software application that lets you generate, register, install, and manage software licenses on multiple devices in your network.
- **Cisco product license registration portal:** Lets you manually generate and register software licenses through a registration web portal. These licenses can then be copied to, installed, and managed directly on your devices using the Cisco IOS Software CLI.

#### Cisco License Manager

Cisco License Manager is a free software application that helps system administrators easily acquire and deploy Cisco IOS Software licenses on Cisco devices as well as manage the status of licenses for an entire network. Cisco License Manager Version 3.0 fully supports the Cisco Catalyst 3750-E/3560-E and 3750-X/3560-X switches.

For more details on how to download Cisco License Manager, visit http://www.cisco.com/go/clm.

#### Cisco Licensing Portal

The Cisco licensing portal can be found at http:/www.cisco.com/go/license. In general, the portal can be used to:

- Convert a PAK to a license
- Manage and look up licenses on a given switch by providing its PID and serial number
- Transfer licenses from a failed device to a replacement device as part of the RMA process
- Request temporary trial licenses

## Steps of the Software Activation Process

### Generating and Installing a License with Cisco's Licensing Portal

When a new Cisco Catalyst 3750-E/3560-E or 3750-X/3560-X switch is ordered, the device is shipped with a single universal Cisco IOS Software image and with the corresponding license that was configured at the time of ordering from Cisco.

License activation is not necessary for factory-ordered preconfigured licenses prior to use. Licenses are not tied to a particular software image version; therefore, once a license in installed on the switch, migration from release to release can occur without the need to obtain new licenses.

The following prerequisites apply if you are upgrading or installing a new software activation license on Cisco Catalyst 3750-E/3560-E and 3750-X/3560-X switches (for example, when LAN Base was purchased and then the user wants to upgrade to IP Base at a later time):

- If you do not have a cisco.com username and password, obtain them by registering at www.cisco.com.
- It is recommended that you familiarize yourself with the Cisco software licensing concepts detailed in the **Cisco Software Activation Conceptual Overview chapter [1] in the Cisco IOS Software Activation Configuration Guide**.

The following steps outline how to install software activation licenses for upgrades after the initial purchase:

1. Buy the Cisco product number for the software upgrade (for example, **L-3750E-LIC= with the L-3750E48-IPSLCB Q** upgrade option) for upgrading to the corresponding package's functionality.
2. Cisco will then provide the user with a product activation key (11-digit alphanumeric key).
3. Access the Cisco licensing portal at http://www.cisco.com/go/license and provide the PAK, serial number, and product ID of the device (which can be obtained with the "show license udi" command) to generate a unique license file for the device that can be downloaded or emailed to you.
4. Install the license on the device and reboot to upgrade the software functionality on the switch.

### Installing a License with Cisco License Manager

The Cisco License Manager is a secure client-server application for automating Cisco software activation and license management that scales up to networkwide deployments.

Cisco License Manager builds an inventory of licensed features deployed in the network by securely communicating with the license agent embedded in the Cisco IOS Software of each device.

Prerequisites:

- Have the appropriate Cisco License Manager account/privilege to launch Cisco License Manager and implement necessary operations.
- Make sure Cisco License Manager has Internet connectivity to the Cisco licensing servers using HTTPS.
- Cisco License Manager has previously been used to automatically discover the network or manually add devices to it so that Cisco License Manager has built a device inventory.

Deployment steps:

1. Launch the "License Assistant" wizard (select "Get License" under "Common Tasks").
2. Follow the procedure to select PAKs (based on the SKUs) and the targeted devices.
3. Cisco License Manager downloads the licenses and deploys them onto the devices automatically.

## Return Materials Authorization Procedure

When a switch fails and a return materials authorization (RMA) is conducted, Cisco's service depot will send a replacement switch: if the failed switch had a LAN Base, IP Base, or IP Services license installed at the factory based on the **hardware SKU** at the time of ordering (for example, 3750E-48TD-E when ordering an IP Services-based 3750E switch), the replacement switch will come with the same license preinstalled. Therefore, **license "rehosting" is not required in this case**.

There exist, however, cases that require a rehosting procedure: for example, if a switch was initially ordered with an IP Base SKU (for example, 3750E-48TD-S) and later upgraded with an IP Services upgrade SKU and option (for example, 3750E-LIC= and 3750E48-IPSLCB-QTY), then an RMA replacement switch will be based on the original IP Base SKU, and a rehosting procedure must be performed to activate an IP Services license on the replacement switch.

Similarly, in case of a Cisco Catalyst 3750-X/3560-X switch, the IP Services feature set is only available as an upgrade option (from LAN Base or IP Base) at the time of ordering or through a license at a later time: that is, there is no dedicated IP Services switch model. Because of that, when a Cisco Catalyst 3750-X/3560-X switch running IP Services needs to be RMA'd, it will be replaced with one running an IP Base or LAN Base feature set based on the original switch specification. A subsequent upgrade to IP Services is required through a rehosting procedure as described below.

In other words, the RMA procedure supports **like-to-like replacements**; therefore in some cases software activation licenses **may** need to be transferred (that is, rehosting of licenses is required) from the failed device to the replacement device to achieve equivalent software functionality on the replacement switch. In such cases, one needs to know the product IDs and serial numbers of **both the failed and replacement device** and needs to interact with the Cisco licensing portal or Cisco License Manager to transfer licenses from the failed device to the replacement device.

Prerequisites:

- A valid Cisco.com username/password is required.
- Retrieve product ID and serial number from both the source (faulty) and destination (replacement) devices. The serial number and product ID can be retrieved from the label tray on the switch or with the "show license udi" command.
- The source device has rehostable licenses.

### RMA Procedure Without Cisco License Manager

Installation steps:

1. Log into Cisco licensing web portal with Cisco.com username and password. Select "Register for an RMA License" under "RMA License Transfer."
2. Select a product from the drop-down box, follow the procedure as described on the web page, and provide the required information (including PIDs and SNs from both the source and destination devices). Verify the license to be transferred, the registration, and the end user information.
3. Once the rehost registration is complete, download the rehost license.
4. Install the rehost license on the replacement (destination) device with the "license install" command.

### RMA Procedure Using Cisco License Manager

Prerequisites:

- Have the appropriate Cisco License Manager account/privilege to launch Cisco License Manager and implement the necessary operations.
- Make sure Cisco License Manager has Internet connectivity to Cisco licensing portal using HTTPS.
- Use Cisco License Manager to automatically discover the network or manually add devices to it so that Cisco License Manager can build a device inventory

Installation steps:

1. Select “RMA Device” in the “License” menu to launch “RMA Device Assistant.”
2. Follow the step-by-step procedure to select source and destination devices. Then, verify the information collected in the summary window of the assistant. Select the “Deploy license(s) immediately” checkbox.
3. Wait until the RMA license transfer procedure completes.

Note that both the aforementioned RMA rehosting procedures generate a new replacement license from the failed unit’s UDI without requiring a new PAK. Also, note that a maximum of three replacement licenses can be generated from the original license before a TAC call is required.

## Software Activation License How-Tos

### Copy a License File Using TFTP

```
3750E# copy tftp flash:
Address or name of remote host [ ]? 172.20.244.138
Source filename [ ]? r1fs-ips  The IP Services license file
Destination filename [r1fs-ips]?
Accessing tftp://172.20.244.138/r1fs-ips...
Loading r1fs-ips from 172.20.244.138 (via GigabitEthernet1/0/1): !
[OK - 1161 bytes]

1161 bytes copied in 0.059 secs (19678 bytes/sec)
```

(Note that a license file is small, usually less than 2KB in size, and that show flash will display the file in flash even if it has not yet been installed.)

### Install a License

```
3750E# license install flash: r1fs-ips > License file name
Installing licenses from "flash:r1fs-ips"
Installing...Feature:ipservices... Successful:Supported
1/1 licenses were successfully installed
0/1 licenses were existing licenses
0/1 licenses were failed to install

19:46:56: %IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Next reboot level =
ipservices and License = ipservices
```

### Remove a License

```
3750E# license clear ipservices
Feature: ipservices
 1 License Type: Permanent
 License State: Active, In Use
 License Addition: Exclusive
 Comment:
```

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

**Show a License File**

```
3750E# show license file switch 1
License Store: lic0:/lservrc.pri > Special storage location in flash
Store Index: 0
 License: 11 ipservices 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFINITE_KEYS
NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *14B4M28DGGM3VN64 00 NiL NiL NiL 5_MINS
<UDI><PID>WS-C3750-E-48PD0-S</PID><SN>CAT1033R1FS</SN></UDI>
NSIAm82zIB1QOfAcCodkf1TJKrQ:m5tyO,IrR4FV5a37oPLG7DOOw3ayRBgpdFOjLx9L7mgHEW7ADvb8P9h
Y5afwc5vPWVA4H6WdL10JhZanVlEZ,OkEEdrfoeZwkhq7nmfZ$
<WLC>AQEBIQAB///lwoROBCuPuXBm1TPEs2A0sPqCVLnnY
N3y2qyqf2+n6H1utLAyWThtGSiqJMZADywcqvPiAmWSaEmUT56rstk6gvmj+EQKRf
D9A0ime1czrdKxfILT0LaXT416nwmfp92Tya6vIQ4FnlBdqJ1sMzXeSq8PmVcTU9A
4o9hil9vKur8N9F885D9GVF0bJHciT5M=</WLC>
Comment:
Hash: xlpqb43M0JXXvZ8usNuRrchVEwo=
```

**Show License Details**

```
3750E# show license status
 Administrative status
 Install success count: 2
 Install failure count: 0
 Install duplicate count: 0
 Comment add count:    0
 Comment delete count: 0
 Clear count:    1
 Save count:     0
 Save cred count:      0

 Client status
 Request success count  2
 Request failure count  0
 Release count   1
 Global Notify count   140


3750E# show license detail
 Index: 1 Feature: ipservices
 Version: 1.0
 License Type: Permanent
 License State: Active, In Use
 Lock type: Node locked
 Vendor info <PID>WS-C3750-E-48PD-S</PID><SN>CAT1033R1FS</SN>
 License Addition: Exclusive
 License Generation version 135266304
 License Precedence: 0
```

**Find Out Which Image Is Installed**

```
Excerpt from the show version output:
Switch Ports Model SW Version SW Image
```

```
1 54 WS-C3750-E-48PD 12.2(53)SE C3750-E-UNIVERSAL-M
```

**Find Out Product IDs and Serial Numbers**

```
3750E# show license udi switch 1
Device# PID SN UDI
-------------------------------------------------------------------------------
*1 WS-C3750-E-48PD-S CAT1033R1FS WS-C3750-E-48PD-:CAT1033R1FS
```

(Note that the UDI information is required when activating a license, along with the PAK. The UDI is also physically printed on the switch.)

## Software Activation Deployment

### Maintenance Provider Guidelines for Managing Software Activation

Customers have been requesting easier ways to track their software systems, add service features, and upgrade images. Now Cisco is helping maintenance providers simplify these tasks for their customers (as outlined below). With the new software activation model, each network device has a universal Cisco IOS Software image already installed. A universal image contains all software features available for the device and the software version, all in one binary.

A software activation license key preinstalled in the device prior to shipping from Cisco or loaded after deployment activates specific functionality. Each software activation license key is unique to a specific device. More details can be found at http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/white_paper_maintenance_activation.html.

### Channel Partners Guidelines for Managing Software Activation

The new software activation deployment model helps to:

- Simplify new feature and software upgrade purchases: Software activation license keys activate new features, eliminating the need for channel partners to perform multiple site visits or deliver multiple equipment configurations.
- Reduce upgrade inventory: Software activation keys for most products can be delivered instantly, using email. eDelivery eliminates the need for channel partners to stock software upgrades, reducing inventory costs.
- Increased customer engagement: The new Cisco software activation process encourages customers to work with their channel partners to purchase and activate software before it is downloaded and used.

More details can be found at http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/white_paper_cisco_sw_activation.html.

## Licensing and Packaging Q&A on Cisco Catalyst 3750-E/3560-E/3750-X/3560-X Switches

**Q. What is Cisco Software Activation, and how does it work?**

**A.** Cisco Software Activation is the mechanism used to activate software features and components on various Cisco platforms. Cisco Software Activation is used to generate a unique license key for a feature set on a specific device and activate that functionality.

Additional information can be found at http://www.cisco.com/go/sa.

Software activation authorizes and activates the Cisco IOS Software feature set. A special file contained in the switch, called a license file, is examined by Cisco IOS Software when the switch is powered on. Based on the license's type, Cisco IOS Software activates the appropriate feature set. License types can be changed or upgraded to enable a different feature set.

**Q. What Cisco Catalyst switches offer software activation?**

**A.** Cisco Catalyst 3750-X, 3650-X, 3750-E, and 3560-E Series Switches offer software activation.

**Q. Are existing Cisco Catalyst 3750 and 3560 Series Switches affected by software activation?**

**A.** No, software activation is supported on the new Cisco Catalyst 3750-X, 3650-X, 3750-E, and 3560-E Series Switches and does not affect existing Cisco Catalyst 3750 or 3560 Series Switches.

**Q. Is manual software activation required when a new switch is purchased with the LAN Base, IP Base, or IP Services feature set?**

**A.** No, new switches will be shipped with the appropriate license keys preinstalled based on the specified feature set at the time of ordering. If customers choose to upgrade to a different feature set later, they can order the upgrade and install the license to unlock that feature set.

**Q. What are the different types of feature sets?**

**A.** There are three types of software licenses: LAN Base, IP Base, and IP Services. LAN Base is only supported on the Cisco Catalyst 3750-X, 3650-X, and Cisco Catalyst 2K switches.

- LAN Base: Enables basic Layer 2 forwarding and IPv4/IPv6 switch management.
- IP Base: Enables Layer 2 forwarding, IPv6 management, and basic Layer 3 routing, including Enhanced Interior Gateway Routing Protocol (EIGRP) stub and Protocol Independent Multicast (PIM) stub mode.
- IP Services: Includes IP Base and enables advanced IPv4/IPv6 Layer 3 routing such as EIGRP, Open Shortest Path First (OSPF), WCCP, VRF-lite, PBR, and IPv4 multicast routing.

**Q. Does software activation affect Cisco IOS Software release upgrades, such as upgrading from Cisco IOS Software Release 12.2(52)SE to Release 12.2(53)SE?**

**A.** No, Cisco IOS Software releases can be upgraded without changing the existing feature set license. Software license is required only for upgrading to a different feature set, such as upgrading from the IP Base to the IP Services feature set.

**Q. What kind of universal images are supported on the Cisco Catalyst 3750-X/3560-X platform?**

**A.** Two universal image types are supported:

1. Universal images with the “universalk9” designation in the image name: This universal image offers all the Cisco IOS Software features, including strong crypto features such as IEEE 802.1AE (MACsec). The strong enforcement of encryption capabilities provided by Cisco Software Activation satisfies requirements for the export of encryption capabilities.
2. Universal images with the “universalk9-npe” designation in the image name: Some countries have import requirements that require that the device does not support any strong data crypto functionality in any form. To satisfy the import requirements of those countries, this universal image does not support any strong payload encryption such as IEEE 802.1AE (MACsec).

**Q. Where can I learn more about Cisco Software Activation?**

**A.** For more information, visit http://www.cisco.com/go/sa.

**Q. What is a PAK?**

**A.** PAK stands for product activation key. A PAK is an 11-digit alphanumeric key created by Cisco manufacturing and defines the feature set associated with the PAK. PAK is not tied to a specific device until the license is created.

**Q. How is a PAK delivered?**

**A.** Delivery of PAKs can be paper based or electronic. Paper-based PAKs are sent on a piece of paper by postal mail to customers.

**Q. What is an eDelivery PAK?**

**A.** eDelivery is Cisco's process for electronic fulfillment and subsequent asset management of customer orders for software license entitlement documentation. With eDelivery, users can more efficiently manage and download their product activation keys (PAKs). Once a customer has placed an order for an eDelivery product, they receive an email containing a link to the eDelivery application. Customers access the application using their Cisco.com user profile, user ID, and password and download a claim certificate in pdf format. The claim certificate contains the product activation key (PAK) number.

**Q. Where can I find more information about eDelivery?**

**A.** For more details, visit http://www.cisco.com/web/partners/tools/edelivery.html.

**Q. Do PAKs expire?**

**A.** No. PAKs do not expire.

**Q. Can one PAK be used for multiple license keys?**

**A.** Yes, a PAK can be purchased that generates any specified number of licenses. The total number of licenses the PAK can generate is specified during the ordering process. Regardless of the number of upgrades purchased, the customer will only receive one PAK per switch type, which can be used to generate multiple licenses.

**Q. What is required to obtain a license?**

**A.** Product activation key (PAK), the product ID (PID), and the serial number (SN) are required for key generation functions.

**Q. What is the unique device identifier (UDI)?**

**A.** The UDI is a combination of the product ID (PID), the serial number, and the hardware version. The UDI is printed on a label that is located on the back of every switch and also viewable from the command-line interface (CLI) (show license udi) and management tools (using Simple Network Management Protocol [SNMP]). Only the PID and serial number are used for license creation.

**Q. What are PID and serial number (SN), and where can I find them?**

**A.** Serial number is an 11-digit key that uniquely identifies a device. Product ID (PID) identifies the product family to which the product belongs. This information can be found using the "show license udi" command.

**Q. Where do customers go to obtain a software license key once they have a PAK?**

**A.** They should go to the Software License Registration page on cisco.com. If they are using Cisco License Manager, then this can be used to collect the license key(s) (see section below on Cisco License Manager).

**Q. What happens if I mistype my serial number/PID on the licensing portal?**

**A.** Cisco backend checks for mistyped PID and serial number.

**Q. I generated the license with the UDI information from a different device than the one on which license is being installed. What happens?**

**A.** Cisco IOS Software will not allow installation of license on a device generated with a different device UDI than that of the device. Cisco TAC can generate licenses in case of error in generating licenses.

**Q. Does license installation require a reboot of the device to activate new functionality?**

**A.** A switch needs to be rebooted after installing a package license to activate the new functionality. A reboot is not required though if the switch is already using a temporary license for the newly installed technology package license. For feature licenses, reload of the switch is not required after installation of the feature license.

**Q. Do Cisco Catalyst switches support temporary/demo licenses?**

**A.** Cisco Catalyst switches support temporary licenses that are valid for 60 days of usage. Customers can also get temporary licenses (valid for 60 days of use) for trial by going to http://www.cisco.com/go/license or directly to https://tools.cisco.com/SWIFT/Licensing/PrivateRegistrationServlet?DemoKeys=Y.

**Q. How is the time remaining on temporary licenses calculated?**

**A.** Temporary licenses are usage based and are valid for 60 days; for example, if a customer uses the temporary license for 40 days and then shuts down the switch, that customer will still have 20 days left on the temporary license.

**Q. Do temporary licenses get removed automatically when a permanent license is installed? Or does the temporary license have to be removed before the permanent license can be activated and installed?**

**A.** Temporary licenses will remain after a permanent license is installed and activated. If a permanent license is activated in the switch, then temporary license will automatically become inactive.

**Q. How long does license key generation take?**

**A.** When using the Software License Registration page on cisco.com, license key generation is instant.

**Q. What is the format of the license key?**

**A.** The license is in the form of a file with a ".lic" extension. Adding this file to the appropriate Cisco device will activate the purchased Cisco IOS Software feature set. The contents of the .lic file must not be altered in any way, as this will render it useless. If a customer wants to add their own notes to the license file (that is, PO numbers, user information, and so on), then this can be done using the device CLI.

The license file can be installed using the Cisco IOS Software command line interface (CLI) or the Cisco License Manager. Instructions for using the CLI are included in the email along with the license key.

**Q. Is the name of the license file unique?**

**A.** Yes. The serial number of the switch is included in the license file name, making it unique.

**Q. Where is the software license stored on the switch?**

**A.** The license file is stored on a special area of the flash memory in the switch. The license file is not directly viewable within the switch's file system, but the CLI exists to view and manage the license file.

**Q. What happens if the software license file gets corrupted? Will the switch still work?**

**A.** The license file is stored in a special area of memory that is not directly accessible, so it is unlikely to become corrupted. In the event of corruption, the switch will continue to function until it is reloaded/rebooted, at which time it will only enable the LAN Base or IP Base feature set (that is, the default feature set). If possible, the license must be reinstalled; otherwise, the switch can be returned using the Cisco RMA process.

**Q. Can licenses be used if the switch is purchased from a third party? What is the process?**

**A.** Although the ownership of hardware can be transferred through a third-party transaction, the right to use Cisco IOS Software cannot be transferred. A software license transfer must be purchased from Cisco for the desired feature set (see also Cisco Software Transfer and Relicensing Policy).

Software license transfer part numbers typically start with the “LL-” prefix. They are also called relicensing for used equipment SKUs. Note that license transfers do not require a PAK to be used or a license file to be installed. The existing license file on the switch can remain in use. With a valid Cisco.com user account, switch owners can use the Cisco license portal (http://www.cisco.com/go/license) to access license information by submitting the device’s credentials. The credentials can be obtained using the CLI or an appropriate network management tool.

**Note:** Software license transfers are different from plain eDelivery “L-“ SKUs.

Table 5 shows the current relicensing for **used equipment** SKUs.

**Table 5.** Relicensing for Used Equipment SKUs

| License Name | Product Description |
|---|---|
| **LL-3750E-IPB=** | IP Base SW Image license for Cisco Catalyst 3750-E Series |
| **LL-3750E-IPS=** | IP Services SW Image license for Cisco Catalyst 3750-E Series |
| **LL-3560E-IPB=** | IP Base SW Image license for Cisco Catalyst 3560-E Series |
| **LL-3560E-IPS=** | IP Services SW Image license for Cisco Catalyst 3560-E Series |
| **LL-C3560X-24-L-S=** | C3560X-24 LAN Base to IP Base E-License for Used Switch |
| **LL-C3560X-48-L-S=** | C3560X-48 LAN Base to IP Base E-License for Used Switch |
| **LL-C3560X-24-S-E=** | C3560X-24 IP Base to IP Services E-License for Used Switch |
| **LL-C3560X-48-S-E=** | C3560X-48 IP Base to IP Services E-License for Used Switch |
| **LL-C3560X-24-L-E=** | C3560X-24 LAN Base to IP Services E-License for Used Switch |
| **LL-C3560X-48-L-E=** | C3560X-48 LAN Base to IP Services E-License for Used Switch |
| **LL-C3750X-24-L-S=** | C3750X-24 LAN Base to IP Base E-License for Used Switch |
| **LL-C3750X-48-L-S=** | C3750X-48 LAN Base to IP Base E-License for Used Switch |
| **LL-C3750X-24-S-E=** | C3750X-24 IP Base to IP Services E-License for Used Switch |
| **LL-C3750X-48-S-E=** | C3750X-48 IP Base to IP Services E-License for Used Switch |
| **LL-C3750X-24-L-E=** | C3750X-24 LAN Base to IP Services E-License for Used Switch |
| **LL-C3750X-48-L-E=** | C3750X-48 LAN Base to IP Services E-License for Used Switch |

**Q. How are software licenses managed?**

**A.** Several options exist to manage software licenses. The CLI provides the ability to install (license install), view (show license), and remove (license clear) software licenses. This functionality is also available through SNMP for integration with standards-based network management tools. For a larger number of switches, the Cisco License Manager discovers and manages the licenses for up to 10,000 switches. For more information about Cisco License Manager, refer to http://www.cisco.com/go/clm.

**Q. In a stack of Cisco Catalyst 3750-E or 3750-X switches, must the same type of feature set be used on each switch?**

**A.** Cisco StackWise Plus combines powerful failover capabilities with unified software management. When the same type of feature set is used on each switch in a stack, failover and software management features work as designed: simply and transparently.

**Q. How are software licenses managed for a stack of Cisco Catalyst 3750-E or 3750-X switches?**

**A.** Software licenses are managed at the individual switch level and hence are not affected by stack configuration. However, a master switch can facilitate distribution of licenses to other switch members in the stack.

**Q. What new Cisco IOS Software commands have been introduced for CLI-based license management?**

**A.** Details of all the new CLI commands and syntax are described in the Cisco IOS Software Licensing Feature Guide. Some of them are also listed in the How-Tos section of this document.

**Q. Can I add my own text to the license file (for example, to include asset numbers and so on)?**

**A.** Yes, you can use the Cisco IOS Software CLI or Cisco License Manager to add your own text.

**Q. Is there MIB support for licensing?**

**A.** Yes. CISCO-LICENSE-MGMT-MIB provides support for licensing information.

**Q. What is Cisco License Manager?**

**A.** Cisco License Manager is a standalone application from Cisco that helps you rapidly deploy multiple Cisco software licenses across their networks. Cisco License Manager can discover network devices, view their license information, and acquire and deploy licenses from Cisco. The application provides a graphical user interface (GUI) that simplifies installation and helps to automate license acquisition as well as perform multiple licensing tasks from a central location. You can also use the Cisco License Manager's application programming interface (API) to create your own programs for performing licensing tasks.

**Q. How much does Cisco License Manager cost?**

**A.** Cisco License Manager is free.

**Q. How many devices can Cisco License Manager support?**

**A.** Cisco License Manager 3.0 can support 500,000 devices.

**Q. Where can I find more information about Cisco License Manager?**

**A.** Visit http://www.cisco.com/go/clm to find more details.

**Q. How are licenses handled during RMA process?**

**A.** Cisco will ship a replacement device with the same license that was originally ordered with the failed switch. All upgraded licenses need to be transferred from the faulty device to the replacement device to get a functionally equivalent replacement device.

**Q. How are licenses transferred during an RMA process?**

**A.** Customer can use Cisco License Manager or can go to Cisco licensing portal (http://www.cisco.com/go/license) to transfer licenses from a faulty device to a replacement device. When an in-service device fails, its software license can be transferred by using the "Register for an RMA License" function on the Cisco licensing portal. Five pieces of information must be gathered before initiating the license transfer: a valid service contract number (optional), the PID and SN of the returned switch, and the PID and SN of the replacement switch.

Note, though, that if the failed switch had a LAN Base, IP Base, or IP Services license installed at the factory based on the hardware SKU at the time of ordering (for example, 3750E-48TD-E when ordering an IP Services-based 3750E switch), the replacement switch will come with the same license preinstalled. Therefore, license transfer is not always required.

**Q. What happens if I cannot transfer my licenses right away to the replacement device?**

**A.** A temporary licenses can be used to have the desired functionality on the device for 60 days.

**Q. Is a new software activation key required to enable crypto on an existing noncrypto switch?**

**A.** No, a software activation key is not required to enable crypto. You just need to obtain the appropriate k9 image from the Software Center on Cisco.com.

**Q. Do switches need to be connected to the Internet for the licenses to be enabled and the software activated?**

**A.** No, Internet connectivity is not required for license application or normal operation of the device.

**Q. With software activation, is there any change to the return materials authorization (RMA) process?**

**A.** For most customers, there is no change to the RMA process. Depending on the type (product ID) of the returned switch, replacement from Cisco will come with the same type of feature license (LAN Base, IP Base, or IP Services) based on the HW PID at the time of the ordering. For switches upgraded to IP Base or IP Services in the field, the license must be transferred from the returned switch to the replacement switch using Cisco license portal at http://www.cisco.com/go/license or using Cisco License Manager. Access to the failed switch is not required; the portal requires the failed switch's UDI and the new replacement switch's UDI. The old license is instantly regenerated for the new switch. In other scenarios, license transfer is not necessary because the

replacement switch comes with the required feature license. In case of problems, contact the Cisco Technical Assistance Center (TAC) for assistance.

**Q. Are there any known issues with email clients with regard to handling license file attachments?**

**A.** The majority of the email clients handle license file attachments without any issues. However, certain email clients (such as Entourage) do not properly handle UTF-8 BOM characters in the attachment and this causes failures during the installation of license files. If a user experiences any XML related errors during installation of a license, a different email client should be tried. Alternatively, one can open a license file using a text editor and remove the UTF-8 BOM marking characters (three junk characters) in the beginning of the license file. The installation can be retried after removing those special characters. The installation should then succeed.

## References


1. Cisco Software Activation Conceptual Overview: http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_overview.html
2. Cisco Software Activation Tasks and Commands: http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_commands.html
3. Cisco License Manager Deployment: A Quick Start : http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/guide_clm_deployment.html
4. Cisco Software Activation: Simplifying Software Deployment and License Management: http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/whitepaper_cisco_sw_license.html
5. Maintenance Provider Guidelines for Managing Software Activation: http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/white_paper_maintenance_activation.html
6. Cisco Software Activation: Channel Partners Guidelines for Managing Software Activation: http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps9677/white_paper_cisco_sw_activation.html


## Product Information

Additional product information is available at the following sites:

- Cisco Catalyst 3750-X Series Switches: http://www.cisco.com/go/3750x
- Cisco Catalyst 3750-E Series Switches: http://www.cisco.com/go/3750-E
- Cisco Catalyst 3750 Series Switches: http://www.cisco.com/go/catalyst3750
- Cisco Catalyst 3560-X Series Switches: http://www.cisco.com/go/3560x
- Cisco Catalyst 3560-E Series Switches: http://www.cisco.com/go/3560-E
- Cisco Catalyst 3560 Series Switches: http://www.cisco.com/go/catalyst3560

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Printed in USA C11-579326-00 03/10