



## Configure Licenses Using Smart Licensing

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## What Is Smart Licensing

Smart Licensing is a cloud-based, software license management solution that enables you to automate time-consuming, manual licensing tasks. The solution allows you to easily track the status of your license and software usage trends.

Smart Licensing helps simplify three core functions:

- **Purchasing**—The software that you have installed in your network can automatically selfregister themselves, without Product Activation Keys (PAKs).
- **Management**—You can automatically track activations against your license entitlements. Also, there is no need to install the license file on every node. You can create license pools (logical grouping of licenses) to reflect your organization structure. Smart Licensing offers you Cisco Smart Software Manager, a centralized portal that enables you to manage all your Cisco software licenses from one centralized website. *Cisco Smart Software Manager* provides details.
- **Reporting**—Through the portal, Smart Licensing offers an integrated view of the licenses you have purchased and what has been deployed in your network. You can use this data to make better purchase decisions, based on your consumption.



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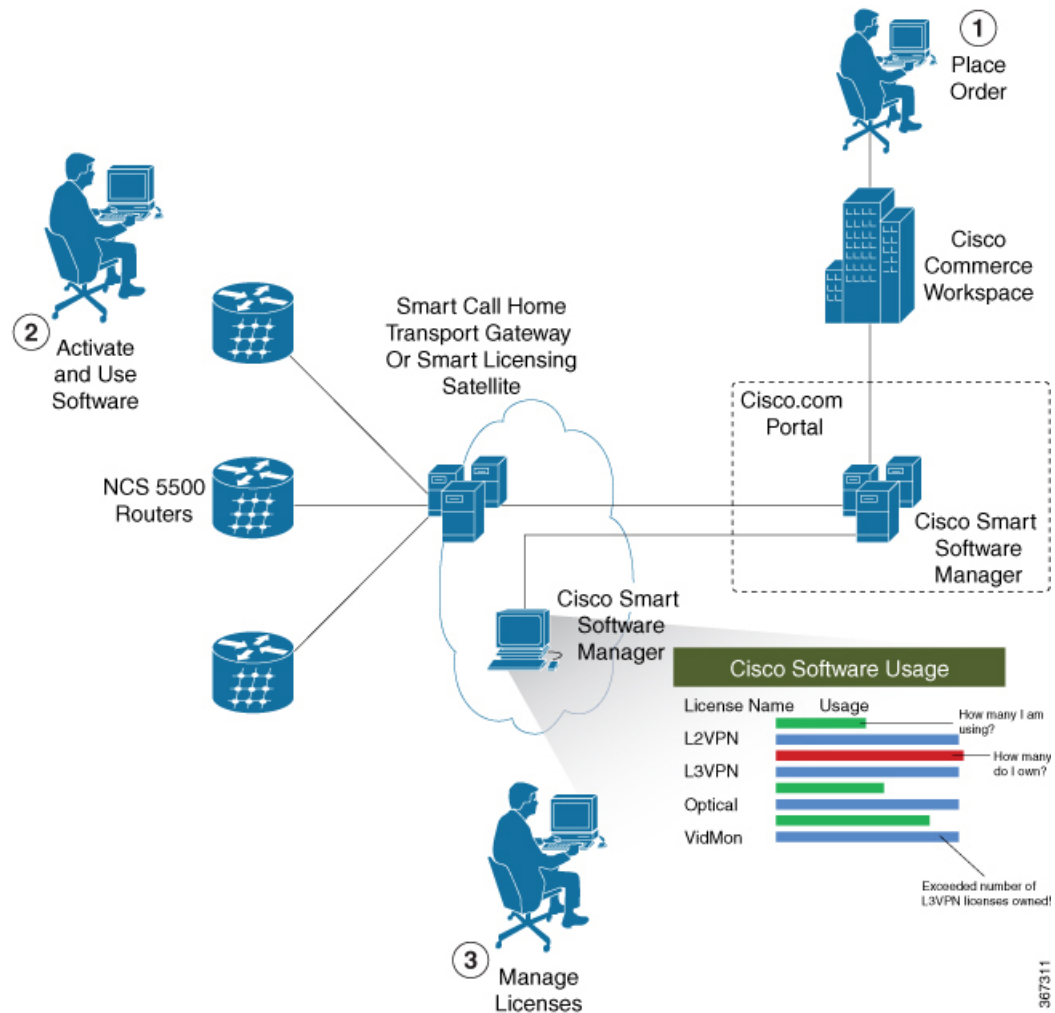
### Note

- By default Smart Licensing is enabled.
  - Only nonconsumption model Smart Licensing is supported.
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# How Does Smart Licensing Works?

Smart Licensing involves the three steps that are shown in the following illustration, that depicts the working model of the Smart Licensing.

**Figure 1: Smart Licensing - Example**



- **Setting up Smart Licensing**—You can place the order for Smart Licensing, to manage licenses on Cisco.com portal. You agree to the terms and conditions governing the use and access of [Smart Licensing in the Smart Software Manager portal](#).
- **Enabling and Use Smart Licensing**—Follow the steps to enable Smart Licensing. *Smart Licensing Workflow* provides an illustration.

After you enable Smart Licensing, you can use either of the following options to communicate:

- **Smart Call Home**—The Smart Call Home feature is automatically configured after the Smart Licensing is enabled. Smart Call Home is used by Smart Licensing as a medium for communication with the Cisco license service. Call Home feature allows Cisco products to periodically call-home and perform an audit and reconciliation of your software usage information. This information helps

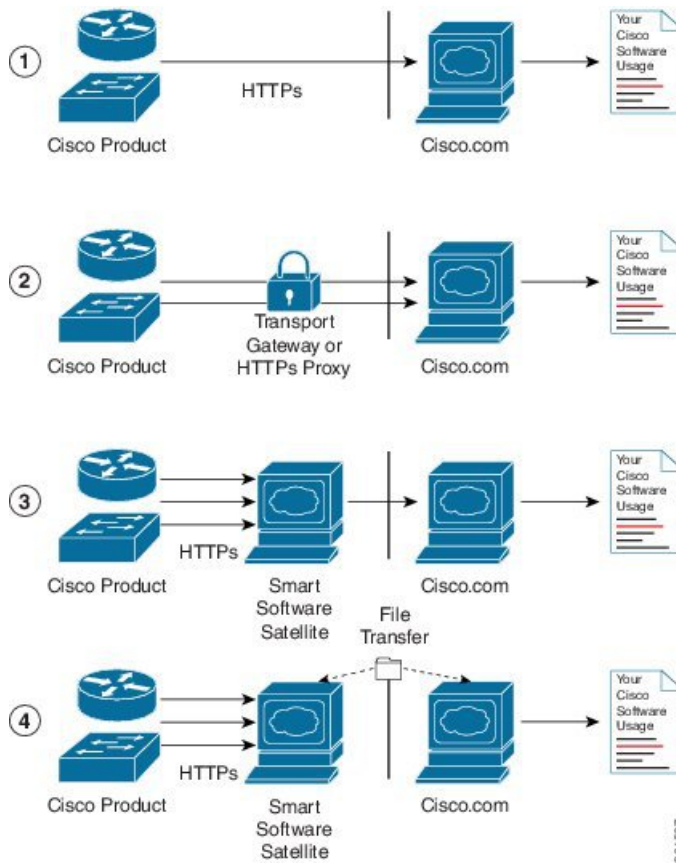
Cisco efficiently track your install base, keep them up and running, and more effectively pursue service and support contract renewals, without much intervention from your end. For more information on Smart Call Home feature, see the [Smart Call Home Deployment Guide](#).

- **Smart Licensing Satellite**—The Smart licensing satellite option provides an on-premises collector that can be used to consolidate and manage Smart license usage, as well facilitate communications back to Cisco License Service at [Cisco.com](#).
- **Manage and Report Licenses**—You can manage and view reports about your overall software usage in the Smart Software Manager portal.

## Deployment Options for Smart Licensing

The following illustration shows the various options available for deploying Smart Licensing:

**Figure 2: Smart Licensing Deployment Options**



1. **Direct cloud access**—In direct cloud access deployment method, Cisco products send usage information directly over the internet to Cisco.com (Cisco license service); no additional components are needed for deployment.
2. **Direct cloud access through an HTTPs proxy**—In direct cloud access through an HTTPs proxy deployment method, Cisco products send usage information over the internet through a proxy server -

either a Smart Call Home Transport Gateway or off-the-shelf Proxy (such as Apache) to Cisco License Service on <http://www.cisco.com>.

3. **Mediated access through an on-premises collector-connected**—In mediated access through an on-premises collector-connected deployment method, Cisco products send usage information to a locally-connected collector, which acts as a local license authority. Periodically, the information is exchanged to keep the databases in synchronization.
4. **Mediated access through an on-premises collector-disconnected**—In the mediated access through an on-premises collector-disconnected deployment method, Cisco products send usage information to a local disconnected collector, which acts as a local license authority. Exchange of human-readable information is performed occasionally (maybe once a month) to keep the databases in synchronization.

Options 1 and 2 provide an easy deployment option, and options 3 and 4 provide a secure environment deployment option. Smart Software Satellite provides support for options 3 and 4.

The communication between Cisco products and Cisco license service is facilitated by the Smart Call Home software.

## About Call Home

Call Home provides an email and http/https based notification for critical system policies. A range of message formats are available for compatibility with pager services or XML-based automated parsing applications. You can use this feature to page a network support engineer, email a Network Operations Center, or use Cisco Smart Call Home services to generate a case with the Technical Assistance Center. The Call Home feature can deliver alert messages containing information about diagnostics and environmental faults and events.

The Call Home feature can deliver alerts to multiple recipients, referred to as Call Home destination profiles. Each profile includes configurable message formats and content categories. A predefined destination is provided for sending alerts to the Cisco TAC, but you also can define your own destination profiles. When you configure Call Home to send messages, the appropriate CLI show command is executed and the command output is attached to the message. Call Home messages are delivered in the following formats:

- Short text format which provides a one or two line description of the fault that is suitable for pagers or printed reports.
- Full text format which provides fully formatted message with detailed information that is suitable for human reading.
- XML machine readable format that uses Extensible Markup Language (XML) and Adaptive Messaging Language (AML) XML schema definition (XSD). The AML XSD is published on the Cisco.com website at <http://www.cisco.com/>. The XML format enables communication with the Cisco Systems Technical Assistance Center.

## Supported Flexible Consumption Model Licenses

Smart Licensing uses Flexible Consumption model licensing model. Flexible Consumption model licensing is based on the capacity of the ports configured. If you purchase a chassis that supports Flexible Consumption model licensing, you need to configure Flexible Consumption model licensing to enable the licensing features. Flexible Consumption model licensing checks usage across all ports of a system on a daily basis and reports license usage results to the Smart Licensing Manager at Cisco.com.

To enable Flexible Consumption model licensing for your hardware or software, use license **smart flexible-consumption enable** command in the global configuration mode. To disable Flexible Consumption model licensing for your hardware or software, use the **no license smart flexible-consumption enable** command in the global configuration mode.

The following table provides the consumption pattern of different Flexible Consumption model licenses for NCS 540:

**Table 1: Flexible Consumption Licensing Model Usage Pattern**

Flexible Consumption Model Licenses	Consumption Pattern
ESS-AC-10G-RTU-1	If the router has a fixed chassis (N540-24Z8Q2C-M, N540-X-24Z8Q2C-M), the license consumption checks are performed on the chassis.
ADV-AC-10G-RTU-1	If the router has a fixed chassis (N540-24Z8Q2C-M, N540-X-24Z8Q2C-M), the license consumption checks are performed on the chassis.
N540-24Z8Q2C-TRK	Licensing consumption is checked on per chassis basis for N540-24Z8Q2C-M system.
N540X-24Z8Q2C-TRK	Licensing consumption is checked on per chassis basis for N540-X-24Z8Q2C-M system.
XR-6.3-AC-TRK	Licensing consumption is reported for the software image that the system is using and this licensing is for IOS XR 6.3.
XR-6.3-K9-AC-TRK	Licensing consumption is reported for the software image that the system is using and this licensing is for IOS XR 6.3.
XR-6.5-AC-TRK	Licensing consumption is reported for the software image that the system is using and this licensing is for IOS XR 6.5.
XR-6.5-K9-AC-TRK	Licensing consumption is reported for the software image that the system is using and this licensing is for IOS XR 6.5.

# Configure Licenses Using Smart Licensing

## Register and Activate Your Device

Smart Licensing components are packaged into the `<cisco-8000-image>`. The https client that is required for configuring the Smart Call Home is packaged into the `<filename>`. Use the steps described here to register and activate your device, and associate the device with your virtual account.

To register and activate your device, you must:

- Generate registration token from the Cisco Smart Software Manager portal.
- Use the registration token to register your device using CLI.

### Generate Product Registration Token from the Portal

You must have purchased the product for which you are adding the license. When you purchase the product, you are provided with a username and password to the Cisco Smart Software Manager portal, from where you can generate the product instance registration tokens.

1. Log in to Cisco Smart Software Manager at [Smart Software Licensing](#).
2. Under **Inventory** menu, click **General** tab.
3. Click **New Token** to generate a product registration token.

Copy the new token value, which is used to register and activate your device, and associate the device to your virtual account.



#### Note

This token is valid for 290 days.

### Register New Product in CLI

In the CLI, use the registration token to activate the device.

```
RP/0/RP0/CPU0:router#license smart register idtoken token_ID
RP/0/RP0/CPU0:router#commit
```

On successful registration, the device receives an identity certificate. This certificate is saved on your device and automatically used for all future communications with Cisco. Every 290 days, Smart Licensing automatically renews the registration information with Cisco. If registration fails, an error is logged. Also, license usage data is collected and a report is sent to you every month. If necessary, you can configure your Smart Call Home settings such that sensitive information (like hostname, username and password) are filtered out from the usage report.

## Verify Smart Licensing Configuration

After enabling Smart Licensing, you can use the **show** commands to verify the default Smart Licensing configuration. If any issue is detected, take corrective action before making further configurations.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>show license status</b>  <b>Example:</b> RP/0/RP0/CPU0:router#show license status	Displays the compliance status of Smart Licensing. Following are the possible status: <ul style="list-style-type: none"> <li>• <b>Waiting</b>—Indicates the initial state after your device has made a license entitlement request. The device establishes communication with Cisco and</li> </ul>

	Command or Action	Purpose
		<p>successfully registers itself with the Cisco license manager.</p> <ul style="list-style-type: none"> <li>• <b>Authorized</b>—Indicates that your device is able to communicate with the Cisco license manager, and is authorised to initiate requests for license entitlements.</li> <li>• <b>Out-Of-Compliance</b>—Indicates that one or more of your licenses are out-of-compliance. You must buy additional licenses.</li> <li>• <b>Eval Period</b>—Indicates that Smart Licensing is consuming the evaluation period. You must register the device with the Cisco Licensing manager, else your license expires.</li> </ul> <p><b>Note</b> A repetitive Smart Licensing evaluation expired warning messages are displayed on the console every hour, but there is no functionality impact is seen on the device. To stop these repetitive messages, you should register the device again with new registration token.</p> <ul style="list-style-type: none"> <li>• <b>Disabled</b>—Indicates that Smart Licensing is disabled.</li> <li>• <b>Invalid</b>—Indicates that Cisco does not recognize the entitlement tag as it is not in the database.</li> </ul>
<b>Step 2</b>	<b>show license all</b> <b>Example:</b> RP/0/RP0/CPU0:router#show license all	Displays all entitlements in use. Additionally, it shows associated licensing certificates, compliance status, UDI, and other details.
<b>Step 3</b>	<b>show license status</b> <b>Example:</b> RP/0/RP0/CPU0:router#show license status	Displays the status of all entitlements in use.
<b>Step 4</b>	<b>show license udi</b> <b>Example:</b> RP/0/RP0/CPU0:router#show license udi	Displays a UDI information.
<b>Step 5</b>	<b>show license summary</b>	Displays a summary of all entitlements in use.

	Command or Action	Purpose
	<b>Example:</b> RP/0/RP0/CPU0:router#show license summary	
<b>Step 6</b>	<b>show license platform summary</b>  <b>Example:</b> RP/0/RP0/CPU0:router#show license platform summary	Displays the registration status and provides a detailed information regarding the number of essential, advanced and tracking license consumption in generic or vortex license model.
<b>Step 7</b>	<b>show license platform detail</b>  <b>Example:</b> RP/0/RP0/CPU0:router#show license platform detail	Displays the detailed licenses that can be consumed in particular platform in both generic and vortex models. Also displays the current and the next consumption count of a particular license. Displays information of the active model, whether is it generic or vortex license model.
<b>Step 8</b>	<b>show call-home smart-licensing statistics</b>	Displays the statistics of communication between the Smart Licensing manager and the Cisco back-end using Smart Call Home. In case communication fails or drops, check your call home configuration for any errors.

The following example shows sample output from the **show call-home smart-licensing statistics** command:

```
RP/0/RP0/CPU0:router#show call-home smart-licensing statistics
Success: Successfully sent and response received.
Failed : Failed to send or response indicated error occurred.
Inqueue: In queue waiting to be sent.
Dropped: Dropped due to incorrect call-home configuration.
```

Msg Subtype	Success	Failed	Inqueue	Dropped	Last-sent (GMT-07:00)
ENTITLEMENT	2	0	0	0	2014-04-24 18:24:34
REGISTRATION	1	0	0	0	2014-04-25 03:53:57
ACKNOWLEDGEMENT	1	0	0	0	2014-04-23 19:21:21
RENEW	1	0	0	0	2014-04-23 19:21:11
DEREGISTRATION	1	0	0	0	2014-04-25 03:31:35

## Renew Smart Licensing Registration

In general, your registration is automatically renewed every six months. Use this option to make an on-demand manual update of your registration. Thus, instead of waiting six months for the next registration renewal cycle, you can issue this command to instantly find out the status of your license.

### Before you begin

You must ensure that the following conditions are met to renew your smart license:

- Smart licensing is enabled.
- The device is registered.



**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>license smart renew {auth   id}</b>  <b>Example:</b> <pre>RP/0/RP0/CPU0:#license smart renew auth  Tue Apr 22 09:12:37.086 PST  license smart renew auth: Authorization process is in progress. Please check the syslog for the authorization status and result.</pre>	Renew your ID or authorization with Cisco smart licensing. If ID certification renewal fails, then the product instance goes to an unidentified state and starts consuming the evaluation period.  <b>Note</b> Authorization periods are renewed by the Smart Licensing system every 30 days. As long as the license is in an 'Authorized' or 'Out-of-compliance' (OOC), the authorization period is renewed. Grace period starts when an authorization period expires. During the grace period or when the grace period is in the 'Expired' state, the system continues to try renew the authorization period. If a retry is successful, a new authorization period starts.

## De-register Smart Licensing

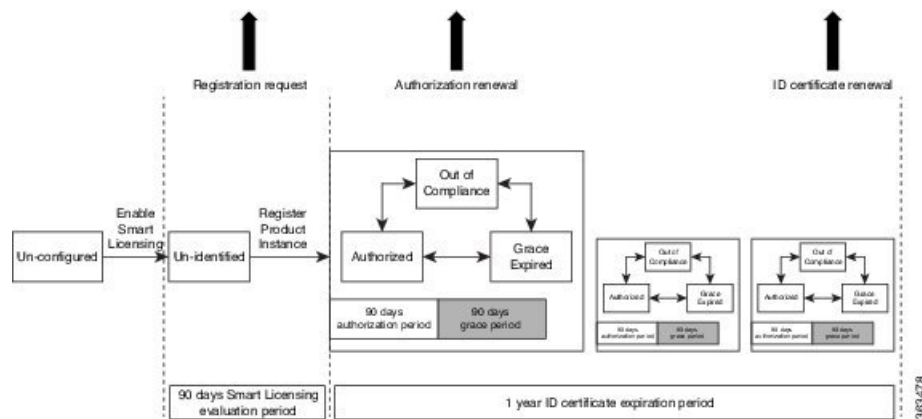
When your device is taken off the inventory, shipped elsewhere for redeployment or returned to Cisco for replacement using the return merchandise authorization (RMA) process, you can use the de-register option to cancel the registration on your device. Use the following steps to cancel device registration:

**Procedure**

	Command or Action	Purpose
<b>Step 1</b>	<b>license smart deregister</b>  <b>Example:</b> <pre>RP/0/RP0/CPU0 #license smart deregister  license smart deregister: Success  License command "license smart deregister " completed successfully.</pre>	Cancels the device registration, and sends it into a 30-day evaluation mode. All Smart Licensing entitlements and certificates on the platform are removed.  <b>Note</b> Though the product instance has been de-registered from the Cisco license cloud service, Smart Licensing is still enabled.

## Smart Licensing Workflow

The Smart Licensing workflow is depicted in this flowchart.



# Licenses, Product Instances, and Registration Tokens

## Licenses

Licenses are required for all Cisco products. All Cisco product licenses are one of two types which vary depending on the product:

- Perpetual licenses—Licenses that do not expire.
- Term licenses—Licenses that automatically expire after a set amount of time: one year, three years, or whatever term was purchased.

All product licenses reside in a virtual account.

## Product Instances

A product instance is an individual device with a unique device identifier (UDI) that is registered using a product instance registration token (or registration token). You can register any number of instances of a product with a single registration token. Each product instance can have one or more licenses residing in the same virtual account. Product instances must periodically connect to the Cisco Smart Software Manager servers during a specific renewal period. If a product instance fails to connect, it is marked as having a license shortage, but continues to use the license. If you remove the product instance, its licenses are released and made available within the virtual account.

## Product Instance Registration Tokens

A product requires a registration token until you have registered the product. Registration tokens are stored in the Product Instance Registration Token Table associated with your enterprise account. Once the product is registered the registration token is no longer necessary and can be revoked and removed from the table without effect. Registration tokens can be valid from 1 to 365 days.

# Virtual Accounts

Smart Licensing allows you to create multiple license pools or virtual accounts within the Smart Software Manager portal. Using the **Virtual Accounts** option you can aggregate licenses into discrete bundles associated with a cost center so that one section of an organization cannot use the licenses of another section of the organization. For example, if you segregate your company into different geographic regions, you can create a virtual account for each region to hold the licenses and product instances for that region.

All new licenses and product instances are placed in the default virtual account in the Smart Software Manager, unless you specify a different one during the order process. Once in the default account, you may choose to transfer them to any other account as desired, provided you have the required access permissions.

Use the Smart Software Manager portal at <https://tools.cisco.com/rhodu/index> to create license pools or transfer licenses.

## Compliance reporting

On a periodic basis, as described by the terms of the Smart Licensing contract, reports are automatically sent to you containing inventory and license compliance data. These reports will take one of three forms:

- **Periodic Record**—This record is generated on a periodic (configurable) basis with relevant inventory data saved at a given point of time. This report is saved within the Cisco cloud for archival.
- **Manual Record**—You can manually generate this record with relevant inventory data saved at any given point of time. This report will be saved within the Cisco cloud for archival.
- **Compliance Warning Report**—This report is automatically or manually generated when a license compliance event occurs. This report does not contain a full inventory data, but only any shortfalls in entitlements for a given software license.

You can view these reports from the Smart Software Manager portal at <https://tools.cisco.com/rhodu/index>.

