What Is Smart Licensing ?

Smart Licensing is a system that consists of a license manager on a Cisco IOS XE device that manages licenses for various software and hardware features. The license manager parses and authenticates a license before accepting it. The software features on the router use the license manager APIs to check out and release licenses. Licenses are stored in persistent storage on the router.

Information About 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 self-register themselves, without Product Activation Keys (PAKs).

- **Management:** You can automatically track activations against your license entitlements. Additionally, 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.

- **Reporting:** Through the portal, Smart Licensing offers an integrated view of the licenses you have purchased and what has been actually deployed in your network. You can use this data to make better purchase decisions, based on your consumption.

Smart Versus Traditional Licensing

Traditional (node locked) licencing	Smart (dynamic) licencing
You must procure the license and manually install it on the device.	Your device initiates a call home and requests the licenses it needs.
Node-locked licences - license is associated with a specific device.	Pooled licences - licences are company account-specific, and can be used with any compatible device in your company. You can activate or deactivate different types of licenses on the device without actually installing a license file on the device.
No common install base location to view licenses purchased or software usage trends	Licenses are stored securely on Cisco servers accessible 24x7x365.
No easy means to transfer licenses from one device to another.	Licenses can be moved between product instances without a license transfer. This greatly simplifies the reassignment of a software license as part of the Return Material Authorization (RMA) process.
Limited visibility into all software licenses being used in the network. Licenses are tracked only on per node basis.	Complete view of all Smart Software Licenses used in the network using a consolidated usage report of software licenses and devices in one easy-to-use portal.

Create a Cisco Smart Account

Cisco Smart Account is an account where all products enabled for Smart Licensing are deposited. Cisco Smart Account allows you to manage and activate your licenses to devices, monitor license use, and track Cisco license purchases. Through transparent access, you have a real-time view into your Smart Licensing products. IT administrators can manage licenses and account users within your organization's Smart Account through the Smart Software Manager.

You can create your Cisco Smart Account at this webpage: https://webapps.cisco.com/software/company/smartaccounts/home#accountcreation-account/request.

For information on how to create a Cisco Smart Account, see: http://www.cisco.com/c/en/us/products/collateral/software/one-software/solution-overview-c22-733273.html.

Smart Licensing Working

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

Figure 1: Smart Licensing - Example
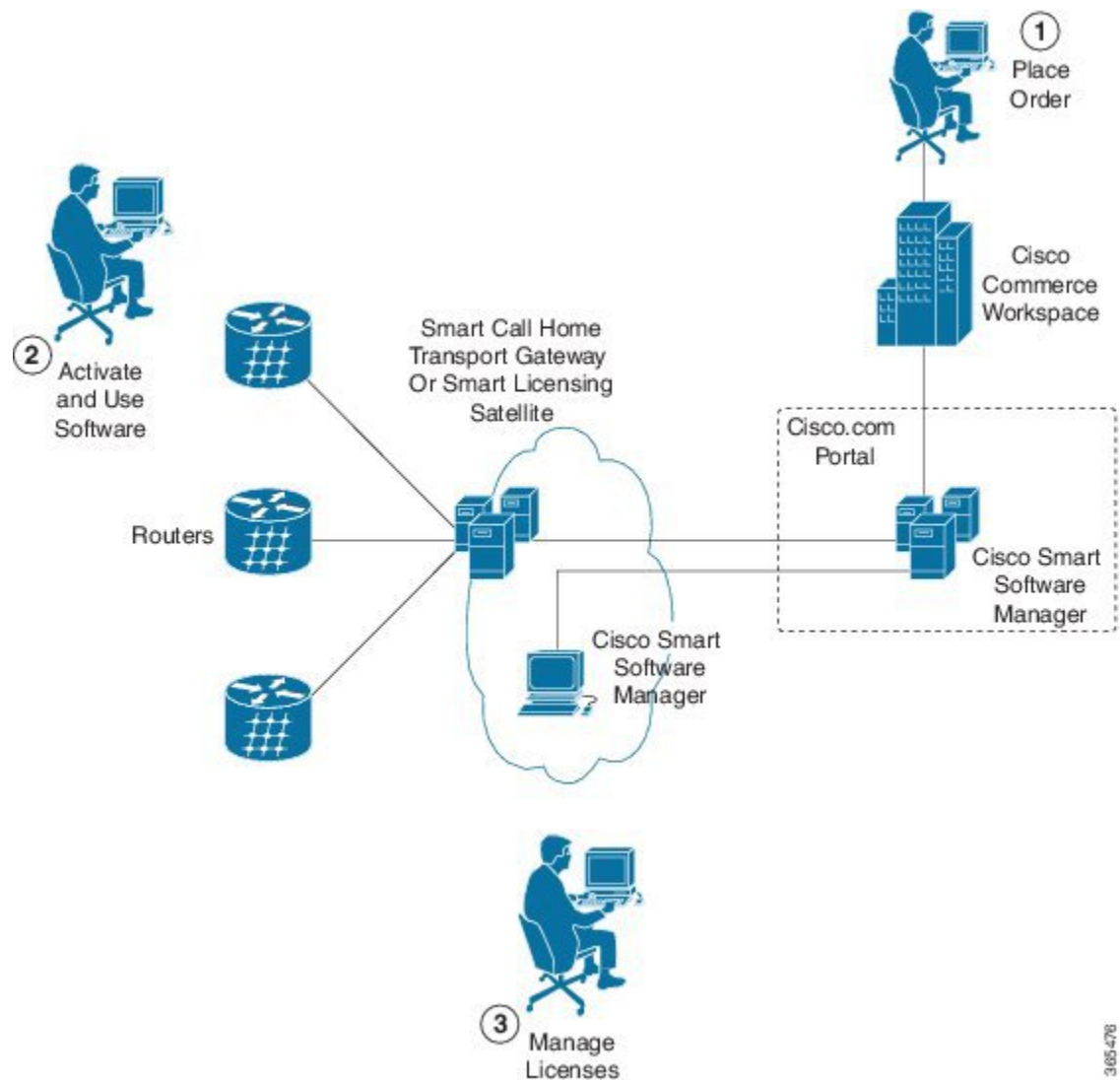
- **Setting up Smart Licensing:** You can place the order for Smart Licensing, to manage licenses on Cisco.com portal. You agree to the terms and conditions governing the use and access of Smart Licensing in the Smart Software Manager portal.

- **Enabling and Use Smart Licensing:** Enable Smart Licensing, on page 6 describes the steps you must follow to enable Smart Licensing. *Smart Licencing 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.

- **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 http://www.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
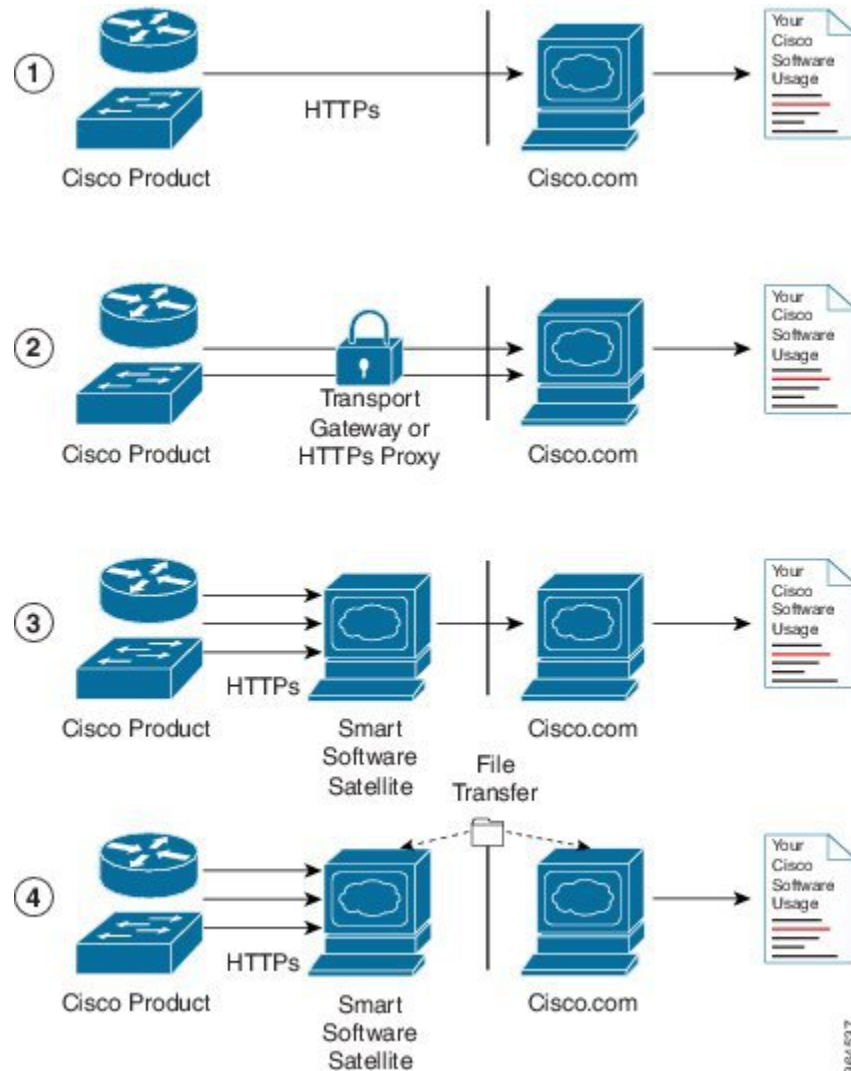
1 **Direct cloud access:** In direct cloud access deployment method, Cisco products send usage information directly over the internet to Cisco.com (Cisco license service); no additional components are needed for deployment.

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.

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**.

Enable Smart Licensing

On successful registration, the device will receive an identity certificate. This certificate is saved on your device and automatically used for all future communications with Cisco. Every 30 days, Smart Licensing will automatically renew the registration information with Cisco. If registration fails, an error will be logged. Additionally, license usage data is collected and a report is sent to you every month. If required, you can configure your Smart Call Home settings such that sensitive information (like hostname, username and password) are filtered out from the usage report.

Note   Once Smart Licensing mode is enabled, all CLIs related to the traditional licensing mode are disabled.

Before You Begin

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

SUMMARY STEPS

1. Login to Cisco Smart Software Manager at https://tools.cisco.com/rhodui/index.
2. **license smart enable**
3. **license boot level** { *advancedmetroipaccess* | *metroaccess* | *metroipaccess* }
4. **license feature**   { *atm* | *gnss* | *ipsec* | *port* | *ptp* | *upoe* }
5. **license smart register idtoken** *token_ID*

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	Login to Cisco Smart Software Manager at https://tools.cisco.com/rhodui/index.	Get a token from the Cisco portal using the link. You must log in to the portal using a Cisco provided username and password. Once you have generated the token, select **Copy** hyperlink to copy the token or download the token to a text file. The token is used to register and activate a device, and assign the device to a virtual account. **Note** This token is valid for 30 days.

	Command or Action	Purpose
Step 2	**license smart enable** **Example:** `Device(config)#license smart enable`	Enables basic Smart Licensing. Use the **no** form of this command to disable Smart Licensing and revert to the traditional or strict mode of licensing. **Note** If you revert smart licencing to CSL, router need to be rebooted.
Step 3	**license boot level** { *advancedmetroipaccess* | *metroaccess* | *metroipaccess* } **Example:** `Device(config)#license boot level advancedmetroipaccess`	Enables technological license, these licenses need router reboot after configuring.
Step 4	**license feature** { *atm* | *gnss* | *ipsec* | *port* | *ptp* | *upoe* } **Example:** `Device(config)#license feature atm`	Enables different feature level licences available. **Note** Feature level license supported depends on the ASR 903 variant. For more information see, http://www.cisco.com/c/en/us/td/docs/routers/asr920/configuration/guide/csa/b_port_licensing_asr920.html

Step 5	**license smart register idtoken** *token_ID*
	
	Example:
	`Device# license smart register idtoken NmE1Yzg0OWMtYmJ4`
	
	`license smart register: Registration process is`
	`in progress.Please check the syslog for the`
	
	`registration status and result`
		Enables to register your device.

What to Do Next

You can use the Cisco Smart Software Manager to:

- Create virtual accounts

- Assign a registered device to a virtual account

- View licenses in a virtual account

- Manage product instance registration tokens

- Transfer a license

- View, transfer or remove product instances in a virtual account

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.

SUMMARY STEPS

1. **show license status**
2. **show license all**
3. exit
4. **show license tech support**
5. **show license usage**
6. **show license summary**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**show license status**
	
	Example:
	`Device#show`
	`license status`
		Displays the compliance status of Smart Licensing. Following are the possible status:
		
		• **Enabled**: Indicates that Smart Licensing is enabled.
		
		• **Waiting**: Indicates the initial state after your device has made a license entitlement request. The device establishes communication with Cisco and successfully registers itself with the Cisco license manager.
		
		• **Authorized**: Indicates that your device is able to communicate with the Cisco license manager, and is authorised to initiate requests for license entitlements.
		
		• **Out-Of-Compliance**: Indicates that one or more of your licenses are out-of-compliance. You must buy additional licenses.
		
		• **Eval Period**: Indicates that Smart Licencing is consuming the evaluation period. You must register the device with the Cisco Licensing manager, else your license expires.
		
		• **Grace Period**: Indicates that connectivity to the Cisco license manager is lost. You must try restore connectivity to renew the authorization period.
		
		• **Disabled**: Indicates that Smart Licensing is disabled.
		
		• **Invalid**: Indicates that Cisco does not recognize the entitlement tag as it is not in the database.
		
		Example:
		<pre>Smart Licensing is ENABLED
		
		Registration:
		  Status: REGISTERED
		  Smart Account: BU Production Test
		  Virtual Account:Device
		  Export-Controlled Functionality: Allowed
		  Initial Registration: SUCCEEDED on Dec 17 02:31:11 2015 UTC
		  Last Renewal Attempt: None
		  Next Renewal Attempt: Jun 14 02:31:10 2016 UTC
		  Registration Expires: Dec 16 02:25:58 2016 UTC
		
		License Authorization:
		  Status: AUTHORIZED on Feb 01 05:08:29 2016 UTC
		  Last Communication Attempt: FAILED on Feb 01 05:08:29 2016 UTC</pre>

	Command or Action	Purpose

		``
		    Failure reason: Fail to send out Call Home HTTP message.
		  Next Communication Attempt: Feb 02 04:09:56 2016 UTC
		  Communication Deadline: Mar 16 03:00:33 2016 UTC
		``

Step 2	**show license all** **Example:** ``` Device#show license all ```	Displays all entitlements in use. It can also be used to check if Smart Licensing is enabled. Additionally, it shows associated licensing certificates, compliance status, UDI, and other details.
Step 3	exit	

Step 4	**show license tech support**	Displays the output of the license commands. Example:
		``
		Smart Licensing Status
		======================
		
		Smart Licensing is ENABLED
		
		Registration:
		  Status: REGISTERED
		  Smart Account: BU Production Test
		  Virtual Account:Device
		  Export-Controlled Functionality: Allowed
		  Initial Registration: SUCCEEDED on Dec 17 02:31:11 2015 UTC
		  Last Renewal Attempt: None
		  Next Renewal Attempt: Jun 14 02:31:11 2016 UTC
		  Registration Expires: Dec 16 02:25:59 2016 UTC
		
		License Authorization:
		  Status: AUTHORIZED on Feb 01 05:08:29 2016 UTC
		  Last Communication Attempt: FAILED on Feb 01 05:08:29 2016 UTC
		    Failure reason: Fail to send out Call Home HTTP message.
		  Next Communication Attempt: Feb 02 04:09:57 2016 UTC
		  Communication Deadline: Mar 16 03:00:34 2016 UTC
		
		Evaluation Period:
		  Evaluation Mode: Not In Use
		  Evaluation Period Remaining: 89 days, 23 hours, 20 minutes, 20 seconds
		``

Step 5	**show license usage**	Displays the license usage information. Example:
		``
		Device#show license usage
		License Authorization:
		  Status: AUTHORIZED on Feb 01 05:08:29 2016 UTC
		
		Device METRO IP ACCESS (metroipaccess):
		  Description: Device METRO IP ACCESS
		  Count: 1
		  Version: 1.0
		  Status: AUTHORIZED
		
		Device 1588 (1588):
		  Description: Device 1588
		  Count: 1
		  Version: 1.0
		``

	Command or Action	Purpose
| | | ```
Status: AUTHORIZED

Device ATM (atm):
  Description: Device ATM
  Count: 1
  Version: 1.0
  Status: AUTHORIZED

Device UPOE (upoe):
  Description: Device UPOE
  Count: 1
  Version: 1.0
  Status: AUTHORIZED

Device GNSS (gnss):
  Description: Device GNSS
  Count: 1
  Version: 1.0
  Status: AUTHORIZED

Device 6-1GE PORT LICENSE (1GEupgradelicense):
  Description: Device 6-1GE PORT LICENSE
  Count: 2
  Version: 1.0
  Status: AUTHORIZED

Device 2-10G PORT LICENSE (10GEupgradelicense):
  Description: Device 2-10G PORT LICENSE
  Count: 2
  Version: 1.0
  Status: AUTHORIZED
``` |
| Step 6 | show license summary | Displays the summary of all active licenses. Example:<br>```
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: Device
  Export-Controlled Functionality: Allowed
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 14 02:31:11 2016 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: FAILED
  Next Communication Attempt: Feb 02 04:09:57 2016 UTC

License Usage:
  License                 Entitlement tag              Count Status
  ---------------------------------------------------------------------------
  Device METRO IP ACCESS (metroipaccess)                  1 AUTHORIZED
``` |

Command or Action	Purpose
	``` Device 1588 (1588) 1 AUTHORIZED Device ATM (atm) 1 AUTHORIZED Device UPOE (upoe) 1 AUTHORIZED Device GNSS (gnss) 1 AUTHORIZED Device 6-1GE PORT L... (1GEupgradelicense) 2 AUTHORIZED Device 2-10G PORT L... (10GEupgradelicense) 2 AUTHORIZED ```

Renew Smart Licensing Registration

In general, your registration is automatically renewed every 30 days. Use this option to make an on-demand manual update of your registration. Thus, instead of waiting 30 days 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.

SUMMARY STEPS

1. **license smart renew** {**auth** | **id**}

DETAILED STEPS

	Command or Action	Purpose
Step 1	**license smart renew** {**auth**	**id**} **Example:** ``` Device# 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. ```	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. **Note** 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:

SUMMARY STEPS

1. **license smart deregister**

DETAILED STEPS

	Command or Action	Purpose

Step 1	**license smart deregister**
	
	Example:
	`Device# license smart deregister`
	
	`license smart deregister: Success`
	
	`License command "license smart deregister "`
	` completed successfully.`
		Cancels the device registration, and sends it into a 30-day evaluation mode. All Smart Licensing entitlements and certificates on the platform are removed.
		Note Though the product instance has been de-registered from the Cisco license cloud service, Smart Licencing is still enabled.

Smart Licensing Workflow

The Smart Licensing workflow is depicted in this flowchart.

Cisco Smart Software Manager Overview

Cisco Smart Software Manager enables you to manage all of your Cisco Smart software licenses from one centralized website. With Cisco Smart Software Manager, you organize and view your licenses in groups called virtual accounts (collections of licenses and product instances). Use the Cisco Smart Software Manager to do the following tasks:

- Create, manage or view virtual accounts.

- Create and manage Product Instance Registration Tokens.

- Transfer licenses between virtual accounts or view licenses.

- Transfer, remove or view product instances.

- Run reports against your virtual accounts.

- Modify your email notification settings.

- View overall account information.

The Cisco Smart Software Manager **Help** describes the procedures for carrying out these tasks. You can access the Cisco Smart Software Manager on https://webapps.cisco.com/software/csws/ws/platform/home, by clicking **Licensing**, and then selecting **Smart Software Manager**; and then login using the username and password provided by Cisco.

Note   Use Chrome 32.0, Firefox 25.0 or Safari 6.0.5 web browsers to access the Cisco Smart Software Manager. Also, ensure that Javascript 1.5 or a later version is enabled in your browser.

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.

In addition, there are demo licenses that expire after at most 60 days. As implied by the name, demo licenses are not intended for production use.

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 Licencing 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/rhodui/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/rhodui/index.

Traditional Licensing Consideration in Smart Licensing

Traditional licensing, and the associated commands, currently co-exist with Smart Licensing. By default, the software image is loaded with the traditional, strictly-enforced mode of licensing. You may want to retain the traditional licensing model in the following scenarios:

- when there are multiple users, and you do not know the actual end user of your software.

- when the software is deployed in a location with limited access to the license and inventory management solution.

- when the user has opted not to establish a Smart Call Home relationship with Cisco.

- when a Smart Call Home relationship cannot be maintained with the user owing to logistics and a fallback is required.