



Configuring Smart Licensing

This module describes the configuration related to the Smart Licensing.

Table 1: Feature History for Smart License

Release	Modification
Release 7.0.11	Smart Licensing was introduced

This model contains the following topics:

- [What Is Smart Licensing, on page 1](#)
- [How Does Smart Licensing Works?, on page 2](#)
- [Deployment Options for Smart Licensing, on page 3](#)
- [About Call Home, on page 5](#)
- [Flexible Consumption Model Licenses, on page 5](#)
- [Configure Licenses Using Smart Licensing, on page 12](#)
- [Smart Licensing Workflow, on page 19](#)
- [Licenses, Product Instances, and Registration Tokens, on page 19](#)
- [Virtual Accounts, on page 20](#)
- [Compliance reporting, on page 20](#)

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.
- **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.



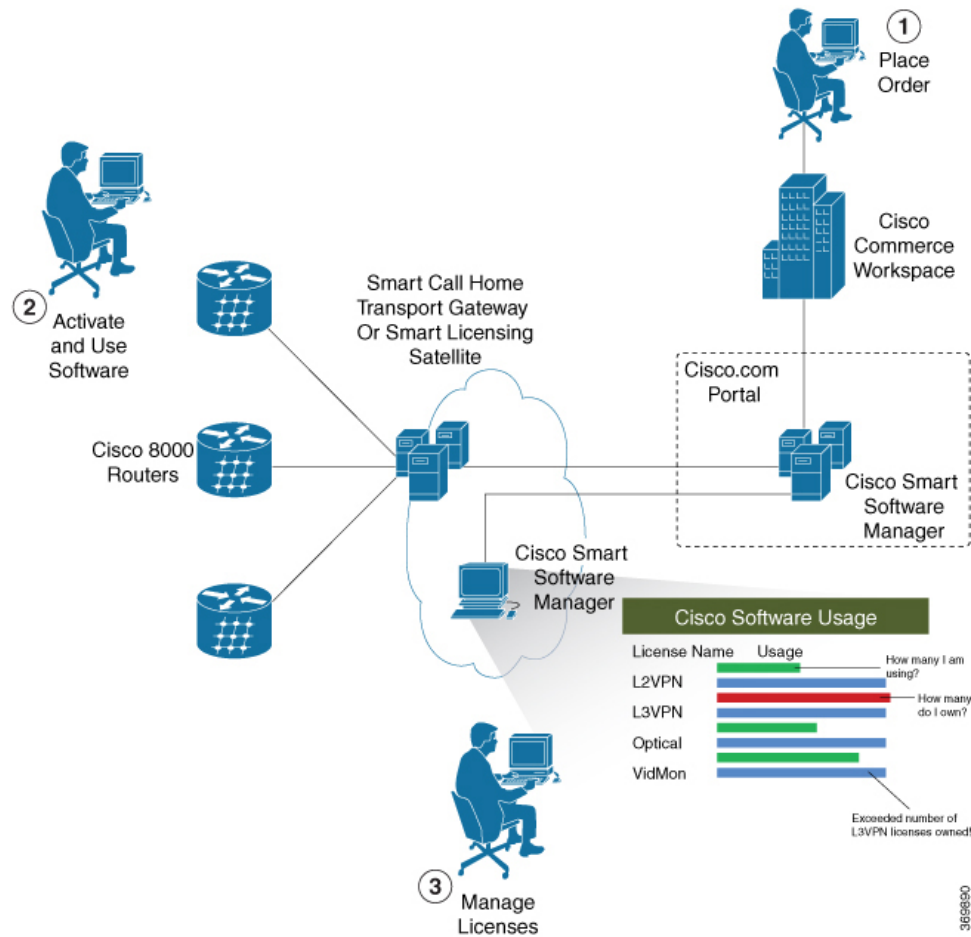
- Note**
- By default Smart Licensing is enabled.
 - Supports only Flexible Consumption model Smart Licensing.

For more information on Smart Licensing and related documentation, see https://www.cisco.com/c/en_in/products/software/smart-accounts/software-licensing.html.

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 router starts. 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](#).



Note Starting Cisco IOS XR Software Release 7.10.1, name server is required to validate CN in X.509 certificate is FQDN. TLS connection to CSSM is not be established if there is no name server configured. However, you can configure **crypto ca fqdn-check ip-address allow** to bypass the name-server configuration

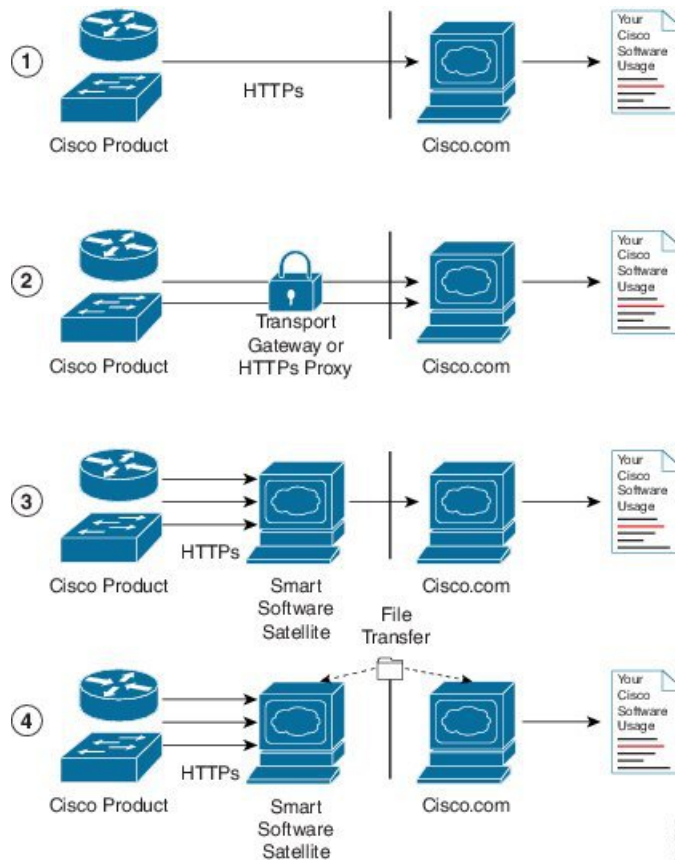
You need to configure **crypto ca trustpoint Trustpool vrf vrf-name** with **http client vrf vrf-name** for CSSM communication in VRF.

- **Management 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.

Flexible Consumption Model Licenses

Table 2: Feature History Table

Feature Name	Release Information	Description
Cisco Smart Licensing on the 8202-32FH-M router	Release 7.5.4	Support for Smart Licensing is now extended to 8202-32FH-M router.
Support for Smart Licensing on the line cards, 8111_32EH and 8201_24H8FH.	Release 7.8.1	Support for Smart Licensing is now extended to the hardware: <ul style="list-style-type: none"> • 8111_32EH • 8201_24H8FH
Support for Smart Licensing on the line cards, 8800-LC-48H-O, 88-LC0-36FH-MO and 88-LC0-36FH-O.	Release 7.3.16	Support for Smart Licensing is now extended to the hardware: <ul style="list-style-type: none"> • 8800-LC-48H-O • 88-LC0-36FH-MO • 88-LC0-36FH-O

Smart Licensing uses Flexible Consumption licensing model. This model of licensing is available at low initial investment, provides easy scalability, and allows customers to increase consumption of licenses as they expand. Flexible Consumption model licenses are checked for usage on a daily basis. The daily license usage is reported to the Smart Licensing Manager at Cisco.com.

The Flexible Consumption model licensing for your hardware or software is enabled by default.

There are three types of licenses in this model:

- Essential licenses are the licenses that are required by every active port, for example ESS-CA-400G-RTU-2. These licenses support the pay as you grow model of flexible consumption model of licensing.
- Advantage (earlier known as Advanced) licenses are the licenses that are required for ports that use advanced features like L3VPN. Example of an advantage license is ADV-CA-400G-RTU-2. These licenses support the pay as you grow model of flexible consumption model of licensing.
- Tracking licenses, for example 8201-TRK. These licenses support systems and line cards and help you to understand the number of systems or line cards in use in a network.

The following table provides the supported hardware for different Flexible Consumption model licenses for Cisco 8000:



Note These licenses are platform dependent.

Table 3: FCM Licenses

License Name	Hardware Supported	Consumption Pattern
Essential and Advantage Licenses: <ul style="list-style-type: none"> • ESS-CA-400G-RTU-2 • ESS-CA-100G-RTU-2 • ADV-CA-400G-RTU-2 • ADV-CA-100G-RTU-2 	Fixed port router: Cisco 8201 Router Modular port router: Cisco 8812 Router	The number of essential or advantage licenses consumed depends on the number of active ports and is reported on per chassis basis.

License Name	Hardware Supported	Consumption Pattern
Hardware Tracking Licenses that support chassis <ul style="list-style-type: none"> • 8201-TRK • 8812-TRK • 8808-TRK • 8818-TRK • 8202-TRK • 8800-LC-48H-TRK • 8800-LC-36FH-TRK • 8800-LC-48H-O • 88-LC0-36FH-MO • 88-LC0-36FH-O • 8111_32EH_TRK • 8201_24H8FH_TRK • 8202-32FH-M 	These Tracking licenses are named on the basis of the hardware supported. For example, 8201-TRK licenses support Cisco 8201 Router.	The number of licenses consumed depends on the number of line cards in use.

Table 4: Nested Licenses

License PID	License Entitlement	License Description
ADN-CA-100G-SIA-3	1 ESS SIA 3 Tag + 1 ADV SIA 3 Tag	Advantage 100G Software Innovation Access License
ADN-CA-100G-SIA-5		
ADN-CA-100G-SIA-ST		
ADN-CA-400G-SIA-3		
ADN-CA-400G-SIA-5		
ADN-CA-400G-SIA-ST		
ESS-ADN-CA-100G-RTU		
ESS-ADN-CA-400G-RTU		
ESS-ADN-CA-100GS5		
ESS-ADN-CA-100GS3		
ESS-ADN-CA-100GSST		

License PID	License Entitlement	License Description
ESS-ADN-CA-400GS5		
ESS-ADN-CA-400GS3		
ESS-ADN-CA-400GSST		
ADN-CA-100G-RTU-2		
ADN-CA-400G-RTU-2		
ADV-CA-100G-SIA-3		
ESS-CA-100G-SIA-3		

Software Innovation Access

Table 5: Feature History Table

	Release Information	Feature Description
Software Innovation Access (SIA) Entitlement	Release 7.3.1	SIA license grants you access to the latest software upgrades which contain new features, bug fixes, and security enhancements for devices on your network. Also, it enables the consumption of Advantage and Essential Right-to-Use (RTU) licenses on your device, and allows portability of these RTU licenses from one device to another.

Overview

Software Innovation Access (SIA) subscription, a type of FCM licensing, provides access to the latest software upgrades and features for your network. SIA licenses enable the consumption of Right-to-Use (RTU) licenses for your devices to access software innovation and avail support for your devices throughout the term of subscription.

The benefits of SIA subscription are:

- **Access to software innovation:** SIA subscription provides access to continuous software upgrades which contain latest features, security enhancements, and bug fixes for all your devices at a network level.
- **Pooling of licenses:** SIA subscription enables Right-to-Use (RTU) licenses to be shared across your FCM network from a common license pool through the virtual account.
- **Protects your investment:** SIA subscription enables the portability of perpetual RTU licenses purchased for your current device to a next-generation router when you expand or upgrade your network.

The initial term of a SIA subscription is for a term of three years. You can renew the subscription by contacting your Cisco account representative. An equal number of SIA licenses and corresponding RTU licenses are

required to enjoy the benefits, and ensure that your network is in compliance. There are two types of SIA licenses available:

- **Advantage SIA license (ADV-AC-10G-SIA-3 and ADV-CA-100G-SIA-3):** To utilize Advantage RTU licenses, you need Advantage SIA licenses.
- **Essential SIA license (ESS-AC-10G-SIA-3 and ESS-CA-100G-SIA-3):** Essential SIA licenses are required to utilize Essential RTU on your device.

If your device is in a state of SIA Out-of-Compliance (OOC) the benefits cease.

SIA Out-of-compliance (OOC) state

When your device is in a SIA Out-of-compliance state, support for major software version upgrades in your network devices are restricted. However, you can continue to perform minor updates, SMU installations, and RPM installations, and continue to utilize the RTU licenses without support for porting.

A device can get into a SIA Out-of-compliance (OOC) state in the following instances:

- The SIA License *EVAL* period of 90 days has expired.
- The number of SIA licenses consumed has exceeded the number of SIA licenses purchased. This can also occur when the RTU licenses consumed is higher than the number of SIA licenses purchased.
- The term of the SIA license has expired and you haven't renewed the subscription.
- The license authorization status is:
 - Not Authorized: The license authorization code installed doesn't contain sufficient counts for the request. This can occur when you attempt to use more licenses than the licenses available in your Virtual Account.
 - Authorization expired: The device hasn't been able to connect to CSSM for an extended period, due to which the authorization status couldn't be verified.



Note The CSSM smart license hierarchy applies to the Right-to-Use (RTU) license only. Therefore, if there is an insufficient RTU 100G license, CSSM can convert the RTU 400G license into four RTU 100G licenses. This is not applicable for SIA license.

In order to bring your device to In-Compliance state, perform one of the following steps:

- Register your device with CSSM if the SIA license *EVAL* period has expired.
- If the SIA license has expired or the number of SIA licenses consumed is more than the number of SIA licenses purchased, contact your Cisco Account Representative to purchase or renew the required licenses.
- If the authorization code has insufficient counts for the request, generate the code with sufficient counts.
- If the authorization has expired, connect the device with CSSM.



Note Up to Cisco IOS XR Release 7.3.1, Cisco 8000 series routers consume one 400G license per one 400G interface.

From Cisco IOS XR Release 7.3.2 onwards, Cisco 8000 series routers consume four 100G licenses per one 400G interface. If necessary, contact your Cisco Account Representative to convert SIA 400G license into four SIA 100G licenses.

When the device enters an OOC state, a grace period of 90 days (cumulative of all the previous occurrences) begins. During this period, SIA license benefits can still be availed. The system attempts to renew the authorization period by connecting with the CSSM during the grace period, or even after the grace period has expired. If an attempt isn't successful, it remains in an OOC state. If the attempt is successful, a new authorization period begins and the device is In-Compliance.

Verification

To verify the device compliance status, use the **show license platform summary** command:

Examples

Status: In-Compliance

```
Router# show license platform summary
Fri Aug 7 20:28:46.222 UTC
Collection: LAST: Fri Aug 07 2020 20:28:42 UTC
           NEXT: Fri Aug 07 2020 20:29:42 UTC
Reporting: LAST: Fri Aug 07 2020 20:28:42 UTC
           NEXT: Fri Aug 07 2020 20:29:42 UTC
SIA Status: In Compliance
```

Feature/Area	Entitlement	Count	
		Last	Next
FCM	Core & Aggr Essentials SW Right-to-Use per 400G for	1	0
FCM	Core & Aggr Essentials SIA per 400G for Cisco 8000	1	0

Status: Out-of-Compliance (Grace Period Remaining)

```
Router# show license platform summary
Fri Aug 7 21:00:47.525 UTC
Collection: LAST: Fri Aug 07 2020 21:00:42 UTC
           NEXT: Fri Aug 07 2020 21:01:42 UTC
Reporting: LAST: Fri Aug 07 2020 21:00:42 UTC
           NEXT: Fri Aug 07 2020 21:01:42 UTC
*****IMPORTANT*****
SIA Status: Out of Compliance(Remaining Grace Period: 90 days, 0 hours)
           SIA license(s) status is Not Authorized.
           SW Upgrade will still be allowed as SIA Grace Period is remaining
*****
```

Feature/Area	Entitlement	Count	
		Last	Next
FCM	Core & Aggr Essentials SW Right-to-Use per 400G for	2	0
FCM	Core & Aggr Essentials SIA per 400G for Cisco 8000	2	0

Status: Out-of-Compliance (Grace Period expired and upgrades are blocked)

```
Router# show license platform summary
Fri Aug 7 21:19:58.580 UTC
```

```

Collection: LAST: Fri Aug 07 2020 21:19:17 UTC
           NEXT: Fri Aug 07 2020 21:20:17 UTC
Reporting: LAST: Fri Aug 07 2020 21:19:17 UTC
           NEXT: Fri Aug 07 2020 21:20:17 UTC
*****IMPORTANT*****
SIA Status: Out of Compliance(Grace Period Expired)
           SW Upgrades are blocked as SIA license(s) are in "Not Authorized" state
*****
Feature/Area      Entitlement                                     Count
                                           Last Next
=====
FCM               Core & Aggr Essentials SW Right-to-Use per 400G for 2 0
FCM               Core & Aggr Essentials SIA per 400G for Cisco 8000 2 0

```

Perpetual without SIA Renewal

The Perpetual without Software Innovation Access (SIA) Renewal (PSR) feature enables continued deployment of FCM products after SIA subscriptions have expired, if you choose not to renew the subscription.

PSR reserves Right to Use (RTU) licenses for each device which ensures you can continue to use the RTU license without having corresponding SIA licenses. Deployment of PSR will avoid Out-of-Compliance (OOC) messages after expiry of SIA subscriptions. Though software updates and usage of production SMUs are permitted, major software upgrades are not permitted once PSR is enabled.



Note

- You will lose the following benefits of SIA licensing if PSR is enabled:
 - Pooling of Software licenses
 - Software upgrades
 - Investment protection
- You can deploy PSR only after SIA subscriptions expire.
- PSR is not available on traditional model of licensing.

PSR Deployment Options

There are two methods for deployment of PSR on your device:

- Cisco EZ-Register

Cisco EZ-Register is a simplified, automated mechanism to register or reserve licenses for multiple devices in your network with Cisco Smart Software Manager (CSSM). It utilizes an input file that is configured by the Network Administrator to execute a script. For more details on using this method, contact your Cisco account representative.

- Manual Deployment

For manual deployment of PSR, you must complete the following steps on your device:

- Enable smart licensing using the **license smart enable** command.
- Configure smart reservation on your device using the **license smart reservation** command.

- Generate a *Reservation request code* using the **license smart reservation request local** command.
- Navigate to your virtual account in the Cisco Smart Software manager (CSSM) tool and enter the *Reservation request code*.
- Select the license and quantity for each of them to be reserved on the device.
- Review the selected details and generate an Authorization code in CSSM.
- Copy or download the Authorization code.
- Use the **license smart reservation install file authcode** command to install the Authorization code on the device

Configure Licenses Using Smart Licensing

Register and Activate Your Device

Smart Licensing components are packaged into the 8000-x64-7.0.11.iso image. The https client that is required for configuring the Smart Call Home is packaged into the cisco8k-k9sec RPM. 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 at <https://www.cisco.com/c/en/us/buy/smart-accounts/software-manager.html>.
- 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 365 days and can be used to register any number of Cisco routers . There is no need to create token every time for a new device.

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
```

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.



Note In a Cisco 8000 distributed platform, you might see the following message when one or more line cards are shutdown using the **hw-module** command:

```
RP/0/RP0/CPU0:router#: smartlicserver[324]: %LICENSE-SMART_LIC-2-PLATFORM_ERROR :
Smart Licensing has encountered an internal software error.
Contact TAC: Unable to retrieve current TS path
```

```
RP/0/RP0/CPU0:router#: smartlicserver[324]: %LICENSE-SMART_LIC-2-PLATFORM_ERROR :
Smart Licensing has encountered an internal software error.
Contact TAC: INVALID SysDataList: No storage path for first device
```

```
RP/0/RP0/CPU0:router#: smartlicserver[324]: %LICENSE-SMART_LIC-2-PLATFORM_ERROR :
Smart Licensing has encountered an internal software error.
Contact TAC: Incorrect Data List detected.
```

The messages are logged only once, and they are short-lived. The messages are not service impacting, and can be ignored.

Check License Consumption Status

Use the **show license** commands to display the Smart Licensing status and consumption states.

Step 1 show license status

Example:

```
RP/0/RP0/CPU0:router:router#show license status
```

Displays the compliance status of Smart Licensing. Following are the possible status:

- **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 Smart Software Manager.
- **Authorized**—Indicates that your device is able to communicate with the Cisco Smart Software 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.

Note A warning message appears when a license is out-of-compliance. A log message is also saved in the syslog.

- **Eval Period**—Indicates that Smart Licensing is consuming the evaluation period. The eval period is valid until 90 days. You must register the device with the Cisco Smart Software Manager, else your license expires.
- **Disabled**—Indicates that Smart Licensing is disabled.
- **Invalid**—Indicates that Cisco does not recognize the entitlement tag as it is not in the database.

Step 2 show license all

Example:

```
RP/0/RP0/CPU0:router#show license all
Tue Sep 24 02:53:42.729 UTC

Smart Licensing Status
=====

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test 1
  Virtual Account: NCS550 Testing
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Sep 24 2019 02:49:34 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Mar 22 2020 02:49:34 UTC
  Registration Expires: Sep 23 2020 02:44:45 UTC

License Authorization:
  Status: AUTHORIZED on Sep 24 2019 02:49:48 UTC
  Last Communication Attempt: SUCCEEDED on Sep 24 2019 02:49:48 UTC
  Next Communication Attempt: Oct 24 2019 02:49:47 UTC
  Communication Deadline: Dec 23 2019 02:44:58 UTC

Export Authorization Key:
  Features Authorized:
  <none>

Utility:
  Status: DISABLED

Data Privacy:
  Sending Hostname: yes
  Callhome hostname privacy: DISABLED
  Smart Licensing hostname privacy: DISABLED
  Version privacy: DISABLED

Transport:
  Type: Callhome

License Usage
=====

8201 Base HW Tracking PID (8201-TRK):
  Description: 8201 Base HW Tracking PID
  Count: 1
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

8000 Software Tracking PID 7.0 (XR-8K-7.0-TRK):
  Description: 8000 Software Tracking PID 7.0
  Count: 1
```

```

Version: 1.0
Status: AUTHORIZED
Export status: NOT RESTRICTED

Core & Aggr Essentials SW Right-to-Use per 100G for Cisco 8000 series (ESS-CA-100G-RTU-2):
  Description: Core & Aggr Essentials SW Right-to-Use per 100G for Cisco 8000
                series
  Count: 1
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

Core & Aggr Advance SW Right-to-Use per 100G for Cisco 8000 series (ADV-CA-100G-RTU-2):
  Description: Core & Aggr Advance SW Right-to-Use per 100G for Cisco 8000
                series
  Count: 1
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

Product Information
=====
UDI: PID:8201-SYS,SN:FOC2245N7D8

Agent Version
=====
Smart Agent for Licensing: 4.9.6_rel/41

Reservation Info
=====
License reservation: DISABLED

```

Displays all entitlements in use. Additionally, it shows associated licensing certificates, compliance status, UDI, and other details.

Step 3 **show license status**

Example:

```

RP/0/RP0/CPU0:router#show license status
Tue Sep 24 03:00:49.103 UTC

Smart Licensing is ENABLED

Utility:
  Status: DISABLED

Data Privacy:
  Sending Hostname: yes
  Callhome hostname privacy: DISABLED
  Smart Licensing hostname privacy: DISABLED
  Version privacy: DISABLED

Transport:
  Type: Callhome

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test 1
  Virtual Account: NCS550 Testing
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Sep 24 2019 02:49:34 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Mar 22 2020 02:49:34 UTC

```

```
Registration Expires: Sep 23 2020 02:44:45 UTC
```

License Authorization:

```
Status: AUTHORIZED on Sep 24 2019 02:49:48 UTC
Last Communication Attempt: SUCCEEDED on Sep 24 2019 02:49:48 UTC
Next Communication Attempt: Oct 24 2019 02:49:48 UTC
Communication Deadline: Dec 23 2019 02:44:59 UTC
```

Export Authorization Key:

```
Features Authorized:
<none>
```

Displays the status of all entitlements in use.

Step 4 show license summary

Example:

```
RP/0/RP0/CPU0:router#show license summary
Tue Sep 24 02:54:28.659 UTC
```

```
Smart Licensing is ENABLED
```

Registration:

```
Status: REGISTERED
Smart Account: BU Production Test 1
Virtual Account: NCS550 Testing
Export-Controlled Functionality: ALLOWED
Last Renewal Attempt: None
Next Renewal Attempt: Mar 22 2020 02:49:34 UTC
```

License Authorization:

```
Status: AUTHORIZED
Last Communication Attempt: SUCCEEDED
Next Communication Attempt: Oct 24 2019 02:49:47 UTC
```

License Usage:

License	Entitlement tag	Count	Status
8201 Base HW Trackin...	(8201-TRK)	1	AUTHORIZED
8000 Software Tracki...	(XR-8K-7.0-TRK)	1	AUTHORIZED
Core & Aggr Essentia...	(ESS-CA-100G-RTU-2)	1	AUTHORIZED
Core & Aggr Advance ...	(ADV-CA-100G-RTU-2)	1	AUTHORIZED

```
RP/0/RP0/CPU0:ios#show license udi
Tue Sep 24 02:54:34.082 UTC
UDI: PID:8201-SYS,SN:FOC2245N7D8
```

Displays a summary of all entitlements in use.

Step 5 show license platform summary

Example:

```
RP/0/RP0/CPU0:router#show license platform summary
Tue Sep 24 02:58:29.102 UTC
Current state: REGISTERED
```

```
Collection: LAST: Tue Sep 24 2019 02:57:32 UTC
NEXT: Tue Sep 24 2019 02:58:32 UTC
Reporting: LAST: Tue Sep 24 2019 02:57:32 UTC
NEXT: Tue Sep 24 2019 02:58:32 UTC
```

Feature/Area	Entitlement	Count	Last	Next
=====	=====	=====	=====	=====

Flexible Consumption Model	Core & Aggr Essentials SW Right-to-Use per 100G	1	0
Flexible Consumption Model	Core & Aggr Advance SW Right-to-Use per 100G fo	1	0
Flexible Consumption Model	Cisco 8201 Base Hardware Tracking PID	1	0
Flexible Consumption Model	8000 Router IOS XR 7.0 SW Version Tracking PID	1	0

Displays the registration status and provides a detailed information regarding the number of essential, advanced and tracking license consumption in generic or Flexible Consumption Model license model.

Step 6 show license platform detail

Example:

```
RP/0/RP0/CPU0:router#show license platform detail
Tue Sep 24 02:58:33.730 UTC
Current state:    REGISTERED

Collection: LAST: Tue Sep 24 2019 02:58:32 UTC
              NEXT: Tue Sep 24 2019 02:59:32 UTC
Reporting:  LAST: Tue Sep 24 2019 02:58:32 UTC
              NEXT: Tue Sep 24 2019 02:59:32 UTC

Parameters: Collection interval:    1 minute(s)
              Reporting interval:   1 minute(s)
              Throughput gauge:     1000000 Kbps

=====
Feature/Area 'Flexible Consumption Model'
  Name: Flexible Consumption Model
  Status: ACTIVE
  Flags:

  [ 1] Name: Core & Aggr Essentials SW Right-to-Use per 400G for Cisco 8000 series
        Entitlement Tag:
        regid.2019-03.com.cisco.ESS-CA-400G-RTU-2,1.0_015f335a-e7cd-4d5c-aec5-b9a0eee2df9b
        Count: Last reported: 0
              Next report: 0
  [ 2] Name: Core & Aggr Essentials SW Right-to-Use per 100G for Cisco 8000 series
        Entitlement Tag:
        regid.2019-03.com.cisco.ESS-CA-100G-RTU-2,1.0_48bdd67b-c17a-42fe-908a-9ed16d242b84
        Count: Last reported: 1
              Next report: 0
  [ 3] Name: Core & Aggr Advance SW Right-to-Use per 400G for Cisco 8000 series
        Entitlement Tag:
        regid.2019-03.com.cisco.ADV-CA-400G-RTU-2,1.0_5a5661d3-275b-485e-bb57-642a81f35e7a
        Count: Last reported: 0
              Next report: 0
  [ 4] Name: Core & Aggr Advance SW Right-to-Use per 100G for Cisco 8000 series
        Entitlement Tag:
        regid.2019-03.com.cisco.ADV-CA-100G-RTU-2,1.0_f7ea7475-09bb-4705-9e21-252dd1e2e5cd
        Count: Last reported: 1
              Next report: 0
```

Displays the detailed licenses that can be consumed in particular platform in both generic and Flexible Consumption Model 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 Flexible Consumption Model license model.

Step 7 show call-home smart-licensing statistics

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
Tue Sep 24 03:00:56.895 UTC
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+00:00)
REGISTRATION	3	0	0	0	2019-09-24 02:49:34
ACKNOWLEDGEMENT	3	0	0	0	2019-09-24 02:49:40
ENTITLEMENT	3	0	0	0	2019-09-24 02:49:48
DEREGISTRATION	2	0	0	0	2019-09-24 01:48:08

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:

- The device is registered.

license smart renew {auth | id}

Example:

```
RP/0//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.
```

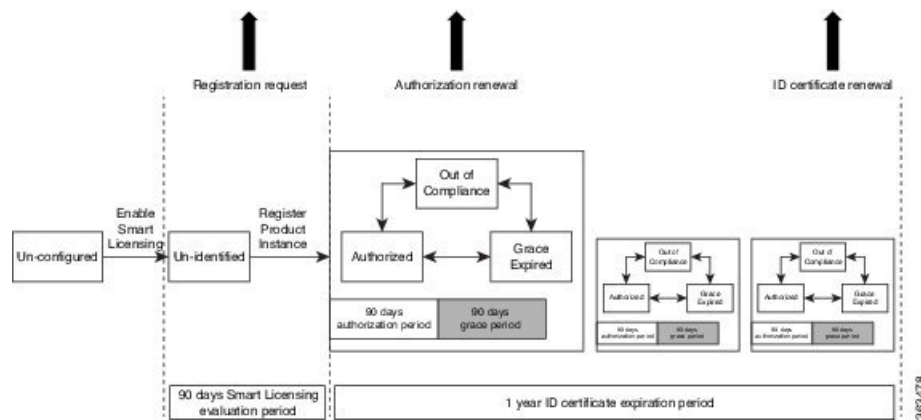
Renew your ID or authorization with Cisco smart licensing. If ID certification renewal fails, then the product instance goes to an unidentified state and starts consuming the evaluation period.

Note

- The warning message that the smart licensing evaluation period has expired is displayed in the console every hour. There is, however, no functionality impact on the device. The issue is seen on routers that do not have the Flexible Consumption licensing model enabled. To stop the repetitive messaging, register the device with the smart licensing server and enable the Flexible Consumption model. Later load a new registration token.
- 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.

Smart Licensing Workflow

The Smart Licensing workflow is depicted in this flowchart.



Licenses, Product Instances, and Registration Tokens

Licenses

Depending on the product, all Cisco products licenses are any one of the following two types:

- 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 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://software.cisco.com/> 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.



Note A warning message appears when a license is out-of-compliance. A log message is also saved in the syslog.

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