Smart Licensing

Cisco IOS XR software contains all the supported features for a given release. Before the introduction of smart licensing (or software entitlement) on Cisco IOS XR software, you could freely activate all available software packages on your network devices and could enable all the bundled features. Smart licensing has been introduced so you pay only for the features that you need today, but can upgrade when necessary while keeping your investment safe. Licensing enables you to purchase individual software features and upgrade hardware capacity in a safe and reliable way.

The licensing methods supported on Cisco IOS XR software are:

- Smart Licensing
- Default (traditional) Licensing

Table 1: Feature Support for Smart Licensing

Release	Modification
Release 3.9.0	The software entitlement feature was introduced.
Release 4.3.1	NV Satellite license was supported.
Release 5.2.0	Smart Licensing was introduced.
Release 5.3.1	Support for Smart Licensing was introduced on Cisco ASR 9000 High Density 100GE Ethernet line cards. General availability release for Smart Licensing on ASR 9000.
Release 6.0.1	Updated consumption model line card support
Release 7.4.1	YANG data models for Smart Licensing was introduced.

This model contains the following topics:

What is Smart Licensing?

Smart Licensing is a cloud-based, flexible software licensing model that enables you to activate and manage Cisco software licenses across their organization. Smart Licensing solution allows you to easily track the status of your license and software usage trends. Cisco Smart Licensing establishes a pool of licenses or entitlements that can be used across the entire organization in a flexible and automated manner. Smart Licensing helps simplify four core functions:

- **Purchase**—Creates a Smart Account (and optionally, your Virtual Account). Licenses are added to your Smart Account and are immediately available for use.

- **Install**—Register your product with your Smart Account using an account-based Registration Token. Thereafter, the entire process is automatic. Product Activation Keys (PAKs) and license files are no longer needed.

- **Management**—Make changes to license consumption by updating your configuration; any license change is automatically reflected in your Smart Account. You can share licenses in your Virtual Account through the license pooling option. License pools (logical grouping of licenses) can reflect your organization structure. Smart Licensing solution also offers Cisco Smart Software Manager, a centralized portal that enables you to manage all your Cisco software licenses from one centralized website.

- **Visibility and Asset Management**—Cisco Smart Software Manager (CSSM) portal offers an integrated view of the licenses you own and have deployed. 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. *Configuring Call Home on the Cisco ASR 9000 Series Router* describes the Smart Call Home feature.

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.

Smart Licensing for Cisco IOS XR 64 bit

Table 2: Feature History Table

Feature Name	Release Information	Feature Description
Support for Smart Licensing on ASR 9902 Routers, 0.8T PEC, and ASR 9000 5th generation 400G Line Cards.	Release 7.4.1	Smart Licensing support is now extended to the following routers and line cards: • ASR-9902 • A9K-8HG-FLEX-SE/TR • A9K-4HG-FLEX-SE/-TR ine cards • A99-4HG-FLEX-SE/TR line cards

Cisco IOS XR 64 bit does not support Traditional Licensing. Only Smart Licensing is supported in Cisco IOS XR 64 bit. Smart Licensing is enabled by default on Cisco IOS XR 64 bit. Here are few things to consider for Smart Licensing in Cisco IOS XR 64 bit:

• Smart Licensing cannot be disabled.

• All the Smart Licensing CLIs are executed from EXEC mode.

• EVAL Period is supported.

This table shows license consumption logic for non-Consumption Model (CM) line cards:

Table 3: Feature wise requirement for Non-CM Line Cards

License	Eligibility Criteria
AIP	If number of VRFs are greater than 8, AIP license is consumed.
IVRF	If number of VRFs are less than or equal to 8, IVRF license is consumed.
	If customer has less than or equal to 8 VRFs, who purchased AIP license in their smart account, please contact your Cisco account representative if you see issues like insufficient IVRF licenses.
	The router consumes the IVRF license only when a physical interface on the line card has two or more VRFs.
	Note The router does not consider VRFs in the logical interfaces for IVRF licensing. You must configure two or more separate VRFs to request an IVRF license.

This table lists supported licenses for non-Consumption Model (CM) line cards:

Table 4: Non-CM Line Cards Software Licenses for Cisco IOS XR 64-bit

Non-CM Line Cards Software License PID	Description
A9K-800G-IVRF	ASR 9000 8-port 100 GE Infrastructure VRF Right to Use License
A9K-400G-IVRF	ASR 9000 4-port 100 GE Infrastructure VRF license Right to Use License
A99-1200G-IVRF	ASR 9900 Infrastructure VRF license Right to Use License
A9K-800G-AIP-SE	ASR 9000 8-port 100 GE Advance IP Service Edge Right to Use License
A9K-800G-AIP-TR	ASR 9000 8-port 100 GE Advance IP Transport Optimised Right to Use License
A9K-400G-AIP-SE	ASR 9000 4-port 100 GE Advance IP Service Edge Right to Use License
A9K-400G-AIP-TR	ASR 9000 4-port 100 GE Advance IP Transport Optimised Right to Use License
A99-1200G-AIP	ASR 9900 12port 100GE Advanced IP Right to Use License

Non-CM Line Cards Software License PID	Description
A9K-800G-OPT-LIC	ASR 9000 8-port 100 GE Advance Optical Right to Use License
A9K-400G-OPT-LIC	ASR 9000 4-port 100 GE Advance Optical Right to Use License
A99-1200G-ADVRTNG	ASR 9900 12port 100GE Advanced Routng Right to Use License
S-A9K-9901-AIP-LC	ASR 9000 Smart License L3 VPN for NON PAYG 9901 System
S-A9K-9901-VRF-LC	ASR 9000 Smart License I-VRF for NON PAYG 9901 System
S-A9K-9901-120AIP	ASR 9000 Smart License L3 VPN for 120G PAYG 9901 System
S-A9K-9901-256AIP	ASR 9000 Smart License L3 VPN for 256G PAYG 9901 System
S-A9K-BNG-ADV-8K	ASR 9000 Smart License for BNG license for Advance Features
S-A9K-BNG-LIC-8K	ASR 9000 BNG License Unit for 8000 subscribers
A9K-24P-80GRTU-SE	ASR 9000 80G Upgrade license for 24-port 10G/1G dual rate Service Edge
A9K-24P-80GRTU-TR	ASR 9000 80G Upgrade license for 24-port 10G/1G dual rate Transport Optimized
A9K-48P1GE-AIP-SE	ASR 9000 Advance IP Service Edge License for full scale VRFs for 48-port 1G mode
A9K-48P1GE-AIP-TR	ASR 9000 Advance IP Transport Optimized License for full scale VRFs for 48-port 1G mode
A9K-48P10G-SE-UPG	ASR 9000 48-port 1G to 10G Service Edge Upgrade License
A9K-48P10G-TR-UPG	ASR 9000 48-port 1G to 10G Transport Optimized Upgrade License
S-A9903-8HG-IVRF	ASR 9003 800G Infrastructure VRF license Right to Use License
S-A9903-8HG-AIP	ASR 9003 800G Advance IP Right to Use License
S-A9903-8HG-CGN	ASR 9003 800G CGN Right to Use License
S-A9K-MACSEC-10	ASR 9000 MACsec 10G License

Non-CM Line Cards Software License PID	Description
S-A9K-MACSEC-40	ASR 9000 MACsec 40G (4x10G) License
S-A9K-MACSEC-100	ASR 9000 MACsec 100G (10x10G) License
S-A9K-4HG-IVRF	ASR 9000 400G Infrastructure VRF license Right to Use License
S-A9K-4HG-AIP-TR	ASR 9000 400G Advance IP Transport Optimised Right to Use License
S-A9K-4HG-AIP-SE	ASR 9000 400G Advance IP Service Edge Right to Use License
S-A9K-4HG-CGN	ASR 9000 400G CGN Right to Use License
S-A9902-IVRF	ASR 9902 Infrastructure VRF license Right to Use License
S-A9902-AIP	ASR 9902 Advance IP Right to Use License
S-A9902-CGN	ASR 9902 CGN Right to Use License
S-A9902-OPTLIC	ASR 9902 Optical Right to Use License

Note Currently, A9K-48P1GE-AIP-TR license is not supported on Cisco IOS XR 32 bit software.

Consumption Model licenses are of of two types: Foundation and Premium. This table lists supported licenses for CM line cards:

Foundation Licenses

Foundation	License PID	Eligibility Criteria	License PID
L2VPN	S-A9K-L2-10G/1G/100G	per 10G	Check the output of the following commands: • **show l2vpn xconnect** • **show l2vpn bridge-domain** Each main-interface in the output qualifies for a license.

L3VPN	S-A9K-L3-10G/1G/100G	per 10G	Check the output of the following commands: • show ipv4 vrf all interface brief | ex default • show ipv6 vrf all interface brief | ex default First, remove all internal VRFs form the output (VRF names starting with "**"). Each remaining main-interface in the output qualifies for a license.
IP/MPLS	S-A9K-IP-10G/1G/100G	per 10G	1. Check if main-interface qualifies for L2VPN Foundation License. 2. Check if main-interface qualifies for L3VPN Foundation License. 3. Check if main-interface is in "no shutdown" state. 4. If any of 1, 2 and 3 is met, main-interface qualifies for a license.

Configuration Threshold for Premium Licenses

Configuration	Threshold Value
L2 Subinterfaces	4,096
Bridge Domain	1,024
MAC scale	32,000
L3 Routes (IPv4/IPv6 global)	132,000
MPLS TE (Head+Tail)	1,024

VRF scale	8
L3 Subinterfaces	1,024

This is the list of show commands available for Smart Licensing in Cisco IOS XR 64 bit :

- show license all—shows all information regarding Smart license

- show license platform—shows platform-specific licensing information (cisco-support)

- show license status—shows smart licensing status information

- show license summary—shows smart licensing summary

- show license techsupport—shows smart licensing tech support information

- show license trace—shows tracing for smart licensing code (cisco-support)

- show license udi—shows smart licensing UDI information

- show license usage—shows smart licensing usage information

- show license platform detail—shows smart license detail information (cisco-support)

- show license platform summary—shows smart license summary (cisco-support)

- show license platform trace—shows platform specific licensing trace information (cisco-support)

What is Flexible Consumption Model?

Table 5: Feature History Table

Feature Name	Release Information	Feature Description
Support for Flexible Consumption Model on • A99-8X100GE-SE • A9K-48X10GE-1G-SE • A99-48X10GE-1G-SE • A9K-MOD400-SE • A9K-24X10GE-1G-SE • A9K-4X100GE • A9K-MOD200-SE • ASR-9901	Release 7.3.1	Support for Flexible Consumption Model (FCM) is now extended to the hardware: • A99-8X100GE-SE • A9K-48X10GE-1G-SE • A99-48X10GE-1G-SE • A9K-MOD400-SE • A9K-24X10GE-1G-SE • A9K-4X100GE • A9K-MOD200-SE • ASR-9901

Feature Name	Release Information	Feature Description
Essential and Advantage smart licenses in a combined entitlement	Release 7.4.1	With this release, the Advanced licenses are now referred to as the Advantage licenses, without essential entitlement. Also, a new license model – Advantage with Essentials, has been introduced that contains both Essential and Advantage licenses as a combined entitlement in a single PID. This simplifies the license procurement and management effort by eliminating the need to procure separate PIDs for Essential and Advantage licenses.

The Flexible Consumption Model (FCM) provides the capability and flexibility to purchase software capacity as needed. FCM delivers the following:

- Pay-as-you-grow—Enables you to lower initial costs and add more capacity over time.

- Simplify operations—FCM delivers the carrier-class IOS-XR software feature set with two software suites, Essentials and Advantage, that simplify license management.

- Utilize capital efficiently—License pooling enables an efficient way to share licenses across the network.

The types of licenses in this model are:

- Essential Licenses are the base licenses that are required by every active port for its operation. An example of Essential License is ESS-ED-100G-RTU1.

- Advantage (earlier known as Advanced licenses) without essential licenses, are the licenses that are required on top of Essential Licenses for ports that use advanced features like L3VPN. An example of an advantage license is ADV-ED-100G-RTU1.

- Advantage with Essential combination licenses are the licenses that are packaged together as a combined entitlement. Example of an advantage license with essentials is ADN-ED-100G-SIA3.

- Tracking licenses are the licenses that are required for the hardware for its operation, for example A99-32X100GE-TRK.

To enable Flexible Consumption model licensing on routers running Cisco IOS XR :

```
Router(config)# license smart flexible-consumption enable
Router(config)# commit
```

Alternatively, you can use the YANG data model `Cisco-IOS-XR-smart-license-cfg` to enable FCM:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101">
  <get-config>
    <source>
      <running/>
    </source>
    <filter>
      <licensing xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-smart-license-cfg">
        <flex-consumption/>
      </licensing>
    </filter>
```

```
    </get-config>
</rpc>
```

To verify the Flexible Consumption Model configuration:

```
Device# show running-config license smart flexible-consumption enable
```

The following table provides information about FCM licenses for ASR 9000 Series routers:

Table 6: Flexible Consumption Model Licensing Usage Pattern

License Name	Hardware Supported	Consumption Pattern
Essential Licenses: • ESS-ED-100G-RTU1 Advantage Licenses: • ADV-ED-100G-RTU1	Line-cards: A9K-16X100GE-TR, A99-32X100GE-TR and A99-16X100GE-X-SE	The number of essential or advanced licenses consumed depends on the number of active ports and is reported on per chassis basis
Hardware Tracking Licenses: • A99-32X100GE-TRK • A9K-16X100GE-TRK • A99-16X100G-X-TRK • A99-8X100GE-TRK • A9K-48X10GE-1G-TRK • A99-48X10GE-1G-TRK • A9K-MOD400-TRK • A9K-24X10GE-1G-TRK • A9K-400GE-LAN-TRK • A9K-MOD200-TRK • ASR-9901-TRK • ASR-9902-TRK • A9903-8HG-PEC-TRK • A9K-400GE-LAN-TRK	These Tracking licenses are named on the basis of the hardware supported.	The number of licenses consumed depends on the hardware in use.

License Name	Hardware Supported	Consumption Pattern
RTU License • Essential: ESS-ED-100G-RTU1 • Advantage: ADV-ED-100G-RTU1 SIA License: • Essential: ESS-ED-100G-SIA3 • Advantage: ADV-ED-100G-SIA3 Upgrade License: • Essential: A9K-ESS-ED-100G-EU • Advantage: A9K-ADV-ED-100G-EU	Line cards: A9K-24X10GE-1G-SE, A9K-24X10GE-1G-TR, A9K-48X10GE-1G-SE and A9K-48X10GE-1G-TR	The number of essential or advanced licenses consumed depends on the number of active ports and is reported on per chassis basis Either SIA or Upgrade license is consumed and that depends on the system configuration.

Table 7: Advantage with Essential Licenses

License Product ID	License Description
ADN-ED-100G-SIA3	Edge Advantage with Essentials SIA per 100G for 36-59 months
ADN-ED-100G-SIA5	Edge Advantage with Essentials SIA per 100G for 60-120 months
ADN-ED-400G-SIA3	Edge Advantage with Essentials SIA per 400G for 36-59 months
ADN-ED-400G-SIA5	Edge Advantage with Essentials SIA per 400G for 60-120 months
ESS-ADN-ED-100G	Edge Essentials to Advantage Upgrade RTU per 100G
ESS-ADN-ED-400G	Edge Essentials to Advantage Upgrade RTU per 400G
ADN-ED-100G-SIAST	Edge Advantage with Essentials SIA per 100G 1-35 months Term
ADN-ED-400G-SIAST	Edge Advantage with Essentials SIA per 400G 1-35 months Term
ESS-ADN-ED-100G-S5	Edge Essentials-Advantage Upgrade SIA per 100G 60-120 months

License Product ID	License Description
ESS -ADN-ED-100G-S3	Edge Essentials -Advantage Upgrade SIA per 100G 36-59 months
ESS-ADN-ED-100G-ST	Edge Essentials - Advantage Upgrade SIA per 100G 1-35 months Term
ESS-ADN-ED-400G-S5	Edge Essentials -Advantage Upgrade SIA per 400G 60-120 months
ESS-ADN-ED-400G-S3	Edge Essentials -Advantage Upgrade SIA per 400G 36-59 months
ESS-ADN-ED-400G-ST	Edge Essentials - Advantage Upgrade SIA per 400G 1-35 months Term
ADN-ED-100G-RTU1	Edge Advantage with Essentials Software RTU License per 100G
ADN-ED-400G-RTU1	Edge Advantage with Essentials Software RTU License per 400G
ESS-ED-400G-SIAST	Edge Essentials SIA per 400G 1-35 months Term
A9K-CONV-ADN	ASR 9000 Consumption Model conversion to Flexible Consumption Model: ADN-ED-100G-RTU1
A9K-CONV-ESS-400G	ASR 9000 Traditional license conversion to Flexible Consumption Model: ESS-ED-400G-RTU1
A9K-CONV-ADN-400G	ASR 9000 Traditional license conversion to Flexible Consumption Model: ADN-ED-400G-RTU1
A9KCM-CONV-ADN	ASR 9000 CM conversion to Flexible Consumption Model: ADN-ED-100G-RTU1
A9KCM-CONV-ESS400G	ASR 9000 CM conversion to Flexible Consumption Model: ESS-ED-400G-RTU1
A9KCM-CONV-ADN400G	ASR 9000 CM conversion to Flexible Consumption Model: ADN-ED-400G-RTU1

This table lists supported advanced licenses, license type, their eligibility criteria, and license PIDs.

List of Advanced licenses

Advances Licenses	License PID	Eligibility Criteria	License PID
nV Satellite	A9K-NVSAT1-LIC	per-number	Feature is enabled if command output of **show nv satellite status brief** generates non-zero output.

H-QoS	A9K-HQoS-RTU-10/ A9K-HQoS-RTU-1/ A9K-HQOS-100G-X	per-10G/1G/100G	1. Run the **show qos summary queue loc 0/X/cpu0 out** command for each linecard slot.
			2. Count number of queues for each physical interface.
			3. Do not count lines which have N/A as QueueID.
			4. Interface qualifies for license if it uses more than 8 queues.
LI	A9K-LI-LIC	per-chassis	Feature is enabled if output of **show install active summary** command matches **-li-px**.
Timing	A9K-MOBILE-LIC	per-chassis	Feature is enabled if output of **show ptp interfaces** or **show frequency synchronization interfaces brief** shows at least one interface.
Adv Optical	A9K-DWDM-RTU-10, A9K-DWDM-RTU-1	per-10G/1G	Run **show controllers hundredGigE 0/X/0/X internal** and **show controllers tenGigE 0/X/0/X internal** commands for each 10GE and 100GE interface in the chassis. Interface qualifies for license if Transport mode is OTN.
MACSec	A9K-MAC-RTU-10	per-10G	Run the **show macsec mka interface**command. Each main-interface in the output qualifies for a license.
OAM	A9K-OAM-RTU-10,A9K-OAM-RTU-1, A9K-OAM-100G-X	per-10G/1G/100G	Run the **show ethernet cfm local maintenance-points mep** and **show ethernet cfm local maintenance-points mip** commands. Each main-interface in the output qualifies for a license.Interfaces appearing under several commands do only require one license. This captures MEPS/MIPS as well as Y.1731 PM.\\

Virtual Interface	S-A9K-VIRT-RTU-10	per-10G	Run the **show interfaces summary** command. If output shows IFT_BVI instances, run the command for BVIs. Or,if output shows IFT_PW_ETHER instances, run the command for PW-HE.
			BVI:
			1. Run the **show l2vpn bridge-domain detail** command. For each bridge-domain in the output,check if bridge-domain contains a BVI. If bridge-domain doesn't contain BVI, there is nothing to license. You should proceed to the next bridge-domain.
			2. If bridge-domain contains a BVI, each main-interface in that bridge-domain qualifies for a license.
			3. If output shows Bundle-Ether, use **show int bundle-ether X** to find members.
			4. Interfaces appearing under several bridge-domains do only require one license.
			PW-HE:
			1. Run the **show generic-interface-list** command.
			2. Each main-interface in the output qualifies for a license if it downloaded to FIB and number of items should be non-zero
			3. If output shows Bundle-Ether, use the **show int bundle-ether X** command to find members.
			4. Interfaces appearing several times do only require one license.

VxLAN	A9K-VXLN-RTU-10	per-10G/per 1G/per 100G	1. Run the **show l2vpn bridge-domain** command.
			2. For each bridge-domain in the output, check if bridge-domain contains a list of VNIs.
			3. If bridge-domain doesn't contain a list of VNIs, there is nothing to license. You can proceed to the next-bridge domain.
			4. If bridge-domain contains a list of VNIs, each main-interface in that bridge-domain qualifies for a license.
			5. Interfaces appearing under several bridge-domains do only require one license.
EVPN	A9K-EVPN-RTU-10	per-10G/per 1G/per 100G	1. Run the **show l2vpn bridge-domain** command.
			2. For each bridge-domain in the output,check if bridge-domain is of type:.pbb-edge or pbb-core
			3. If bridge-domain is not of type: pbb-edge or pbb-core, there is nothing to license. You can proceed to the next bridge-domain.
			4. If bridge-domain is of type: pbb-edge or pbb-core then, each main-interface in that bridge-domain qualifies for a license.
			5. Interfaces appearing under several bridge-domains do only require one license.

BNG	SIA-9K-BNG-LIC-3K, SIA-9K-BNG-ADV-3K	per-number	Run the **show subscriber session all summary** command.Add up all subscribers reported as "activated".
			Note • This catches IPv4/IPv6 and dual-stack subscribers. • Each dual-stack subscriber is only counted once.

Note 100G licenses are consumed only on the following hardware:

- A9K-16X100GE-TR
- A99-32X100GE-TR
- A99-16X100GE-X-SE
- A9K-20HG-FLEX-SE/TR
- A99-24HG-FLEX-SE/TR
- A99-32X100GE-X-SE/TR
- A9K-8HG-FLEX-SE/TR

This is the list of show commands available for Smart Licensing in Cisco IOS XR 64 bit :

- show license all—shows all information regarding Smart license
- show license platform—shows platform-specific licensing information (cisco-support)
- show license status—shows smart licensing status information
- show license summary—shows smart licensing summary
- show license techsupport—shows smart licensing tech support information
- show license trace—shows tracing for smart licensing code (cisco-support)
- show license udi—shows smart licensing UDI information
- show license usage—shows smart licensing usage information
- show license platform detail—shows smart license detail information (cisco-support)
- show license platform summary—shows smart license summary (cisco-support)
- show license platform trace—shows platform specific licensing trace information (cisco-support)

Note	The consumption of a particular license can be derived from its license type. If the license type is based on increments of 10G, then a 100G interface consumes ten 10G tags. Likewise, a 40G interface consumes four 10G tags.

Software Innovation Access

Table 8: 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:

- : To utilize Advantage RTU licenses, you need Advantage SIA licenses.

- : Essential SIA licenses are required to utilise 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.

When the device enters an OOC state, a grace period of 90 days (cumulative of all the previous occurences) 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
Sun Feb 14 22:25:36.115 UTC
```

```
Collection: LAST: Sun Feb 14 2021 22:24:40 UTC
            NEXT: Sun Feb 14 2021 22:25:40 UTC
Reporting:  LAST: Sun Feb 14 2021 22:24:40 UTC
            NEXT: Sun Feb 14 2021 22:25:40 UTC
SIA Status: In Compliance
                                                             Count
Feature/Area      Entitlement                              Last Next
============ ========================================= ==== ====
FCM          Total A9K-48X10GE-1G LCs in the system        1    0
FCM          ASR9k Core & Agg Netw SW&Autom Adv 1.0 Perp RTU (pe   1    0
FCM          Advance Edge SIA per 100G Subscription        1    0
FCM          ASR9k Core & Agg Netw SW&Autom Ess 1.0 Perp RTU (pe   1    0
FCM          Essential Edge SIA per 100G Subscription      1    0
```

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

```
Router# show license platform summary
Mon Feb 15 12:10:00.009 UTC
Collection: LAST: Mon Feb 15 2021 12:09:17 UTC
            NEXT: Mon Feb 15 2021 12:10:17 UTC
Reporting:  LAST: Mon Feb 15 2021 12:09:17 UTC
            NEXT: Mon Feb 15 2021 12:10:17 UTC
*********************************IMPORTANT*************************************
SIA Status: Out of Compliance(Remaining Grace Period: 89 days, 23 hours)
            SIA license(s) status is Not Authorized.
            SW Upgrade will still be allowed as SIA Grace Period is remaining
*****************************************************************************
                                                             Count
Feature/Area      Entitlement                              Last Next
============ ========================================= ==== ====
FCM          ASR9k Core & Agg Netw SW&Autom Adv 1.0 Perp RTU (pe   1    0
FCM          Advance Edge SIA per 100G Subscription        1    0
FCM          ASR9k Core & Agg Netw SW&Autom Ess 1.0 Perp RTU (pe   1    0
FCM          Essential Edge SIA per 100G Subscription
```

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

```
Router# show license platform summary
Mon Feb 15 12:10:00.009 UTC
Collection: LAST: Mon Feb 15 2021 12:16:17 UTC
            NEXT: Mon Feb 15 2021 12:17:17 UTC
Reporting:  LAST: Mon Feb 15 2021 12:16:17 UTC
            NEXT: Mon Feb 15 2021 12:17:17 UTC
*********************************IMPORTANT*************************************
SIA Status: Out of Compliance(Grace Period Expired)
            SW Upgrades are blocked as SIA license(s) are in "Not Authorized" state
*****************************************************************************
                                                             Count
Feature/Area      Entitlement                              Last Next
============ ========================================= ==== ====
FCM          ASR9k Core & Agg Netw SW&Autom Adv 1.0 Perp RTU (pe   1    0
FCM          Advance Edge SIA per 100G Subscription        1    0
FCM          ASR9k Core & Agg Netw SW&Autom Ess 1.0 Perp RTU (pe   1    0
FCM          Essential Edge SIA per 100G Subscription
```

How Does Smart Licensing Work?

Table 9: Feature History Table

Feature Name	Release Information	Feature Description
Smart Transport Support	Release 7.4.1	You can now use Smart transport to communicate with CSSM. Smart transport is a transport method where a Smart Licensing (JSON) message is contained within an HTTPs message, and exchanged between a product instance and CSSM, to communicate. The following Smart transport configuration options are available: • Smart transport: In this method, a product instance uses a specific Smart transport licensing server URL. This must be configured exactly as shown in the workflow section. • Smart transport through an HTTPs proxy: In this method, a product instance uses a proxy server to communicate with the licensing server, and eventually, CSSM.

Figure 1: Smart Licensing - Workflow
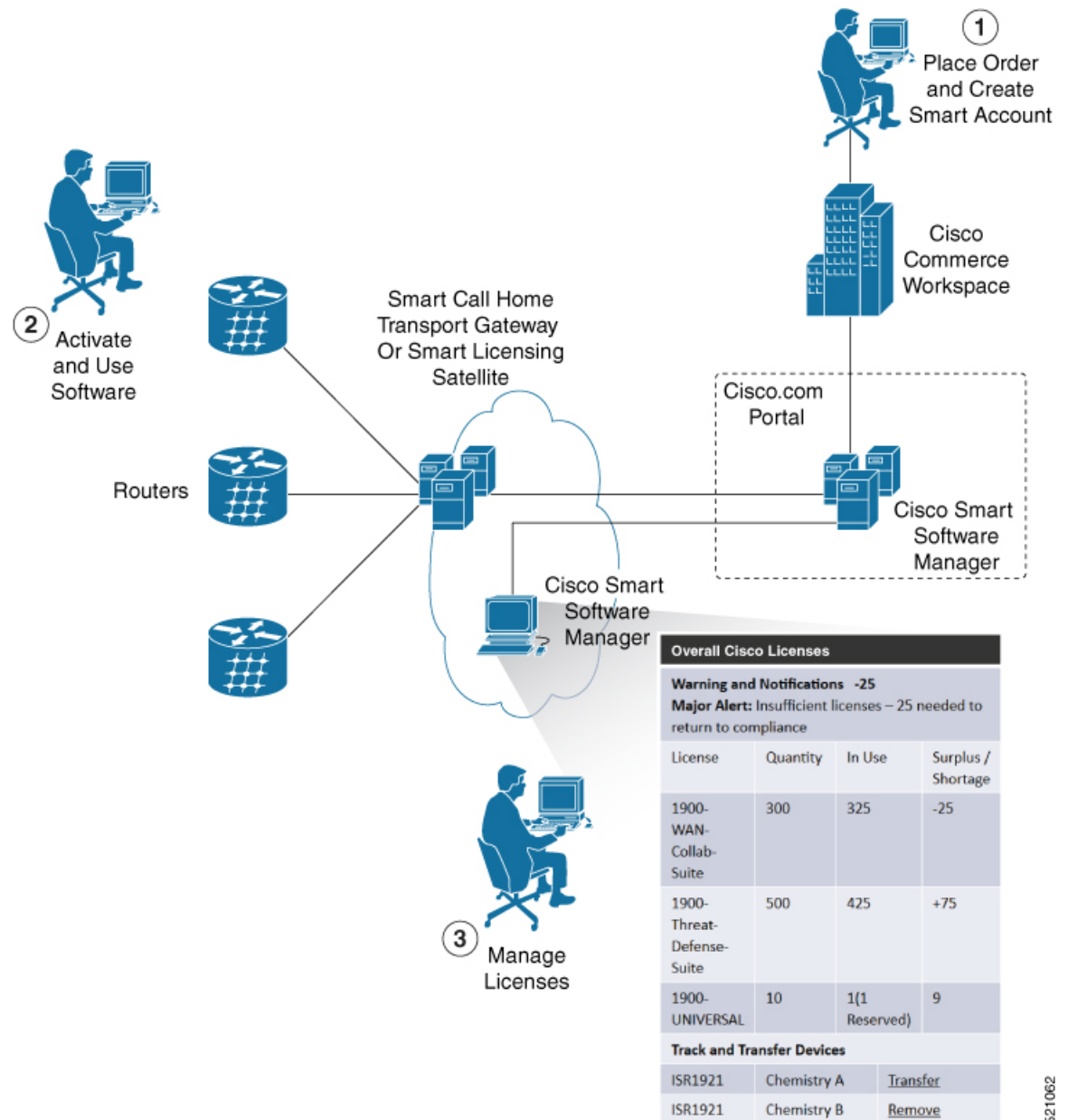
1. Place Order and Create Smart Account—You must have a Smart Account to set up Smart Licensing.

    a. Go to https://software.cisco.com/.

    b. Under the **Administration** section, click **Get a Smart Account or Request Access to an Existing Smart Account**.

    c. Verify or enter your Cisco.com profile details to complete creating a Smart Account.

2. Activate and Use Software—Register your product. For more information, see the *Registering your Router* section. You can use either of the following options to communicate with the CSSM:

- Smart Transport—The Smart Transport method is a transport method where a Smart Licensing (JSON) message is contained within a HTTPs message, and exchanged between a product instance and CSSM to communicate. The following Smart transport configuration options are available.

    - Smart Transport: In this method, a product instance uses a specific Smart transport licensing server URL. This must be configured exactly as shown in the workflow section.

    - Smart transport through an HTTPs proxy: In this method, a product instance uses a proxy server to communicate with the licensing server, and eventually, CSSM.

- Smart Call Home—The Smart Call Home feature is automatically configured. Smart Call Home is used by Smart Licensing as a medium for communication with the CSSM. 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. For more information on Smart Call Home feature, see the Smart Call Home Deployment Guide.

- Smart Licensing CSSM On-Prem—The Smart licensing on-premise option provides an on-premises collector that can be used to consolidate and manage Smart license usage, as well as facilitate communications back to the CSSM at Cisco.com.

3. Manage Licenses—You can manage and view reports about your overall license usage in the Smart Software Manager portal.

What is Cisco Smart Software Manager?

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). The Cisco Smart Software Manager allows you to:

- 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
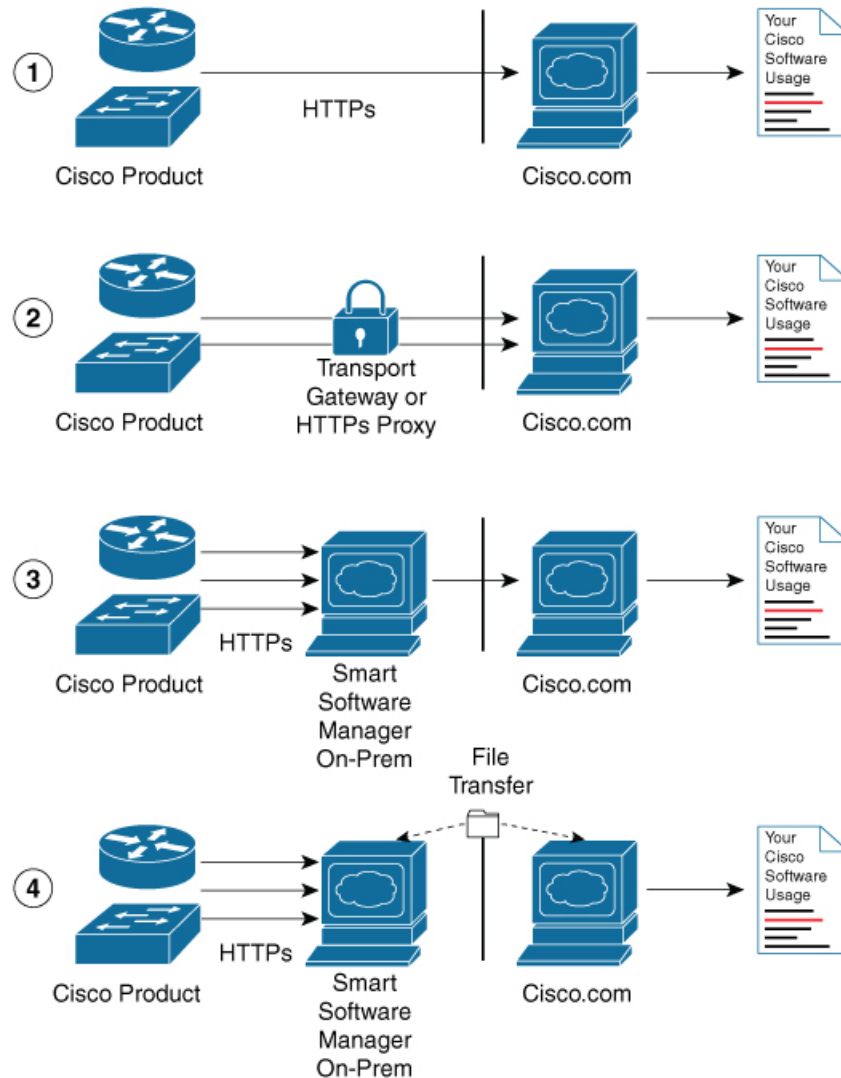
- View overall account information

To access the Cisco Smart Software Manager:

- Go to https://software.cisco.com.

- Under the **License** section, click **Smart Software Licensing**.

Smart Licensing Deployment Options

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

Figure 2: Smart Licensing Deployment Options

1. Direct cloud access—In this method, Cisco products send usage information directly over the internet to CSSM on http://www.cisco.com; 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 CSSM 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 (once a month) to keep the databases in synchronization.

Options 1 and 2 provide easy deployment options, whereas options 3 and 4 provide secure environment deployment options.

Note Smart Software On-Premise provides support for options 3 and 4.

The communication between Cisco devices and CSSM is facilitated by the Smart Call Home software.

YANG Data Models for Smart Licensing

Table 10: Feature History Table

Feature Name	Release Information	Description
YANG Data Models for Smart Licensing	Release 7.4.1	With this feature, you can use data models for all the smart licensing operations such as registering your device with a token, renewing token ID, deregistering device to remove the software entitlements and so on using NETCONF remote procedure calls (RPCs). The following data models are introduced: Cisco-IOS-XR-smart-license-cfg.yang cisco-smart-license.yang Cisco-IOS-XR-smartlicense-platform-oper.yang Cisco-IOS-XR-infra-smartlicense-oper.yang Cisco-IOS-XR-smart-license-act.yang You can access these data models from the Github repository.

YANG is a data modeling language that helps to create configurations, retrieve operational data and execute actions. The router acts on the data definition when these operations are requested using NETCONF RPCs. The data model handles the following types of requirements on the routers for smart licensing functionality:

Data	Data Model	CLI Commands
Configuration data: a set of writable data that is required to configure smart licensing on the router.	**Native data model:** Cisco-IOS-XR-smart-license-cfg.yang	• license smart reservation • [no] license smart reservation • license smart flexible-consumption enable • [no] license smart flexible-consumption enable
Operational state data: a set of data that the system obtains at run time.	**Common data model:** cisco-smart-license.yang **Native data model:** Cisco-IOS-XR-smart-license-platform-oper.yang Cisco-IOS-XR-infra--smartlicense-oper.yang	• show license platform summary • show license platform detail • show license [all	summary	usage	udi]
Actions: a set of NETCONF actions that support robust networkwide configuration transactions.	**Native data model:** Cisco-IOS-XR-smart-license-act.yang	• license smart register id token • license smart deregister • license smart renew id • license smart renew auth • license smart reservation request local • license smart reservation cancel local • license smart reservation install file <file path> • license smart reservation return local • license smart reservation return authorization file <file path> • license smart transport smart • license smart url <url> • license smart software-upgrade enable • license smart proxy hostname <hostname/ip> • license smart proxy port <port>

You can access the data models from the Github repository. To learn more about the data models and put them to use, see the *Programmability Configuration Guide for Cisco ASR 9000 Series Routers*.

Permanent License Reservation

Permanent License Reservation (PLR) is a solution designed for classified environments that don't allow electronic communication in or out of the environment. In such environments, routers are unable to communicate to the Cisco Smart Software Manager (CSSM) directly or through CSSM OnPrem. These deployments can use PLR that allows using all entitlements on the router without communicating to Cisco.

To enable and use the PLR feature, generate a reservation request code from the router. Use this code in the CSSM portal to reserve an available PLR license and generate an authorization code. When you enter this authorization code in the router CLI, the license reservation becomes effective. Both the request and the authorization codes are short sequences of characters that you can write down on a paper. Later, you can enter the codes without the need for any electronic transfers.

Limitation

To use the Permanent License Reservation feature, you must have an approval and authorization from Cisco.

For assistance, go to www.cisco.com/go/scm or contact your account representative.

Configuring Permanent License Reservation

Prerequisites

You must ensure these prerequisites are completed before configuring Permanent License Reservation:

> **Note** Work with your account representative for assistence with the below prerequisites.

- Create a Smart Account
- Enable your Smart Account for PLR
- Get access to PLR PIDs in CCW
- Order PLR licenses in CCW and make sure they are reflected in your Smart Account on CSSM

Workflow

Here is the list of configurations that should be executed in sequence to complete the PLR feature:

1. Enabling Permanent License Reservation
2. Generating a Request Code from the Router
3. Reserving a PLR License in Cisco SSM
4. Registering a Router with the Authorization Code

Here is the list of configurations that are used to cancel, return and disable PLR:

- Cancel a Reservation in Progress

- Return a Reserved License

- Return a Reservation from an Authorization Code

- Disabling Permanent License Reservation

Steps to Enable PLR

Enabling Permanent License Reservation

Before you begin

Enable Flexible Consumption Model (FCM) of licensing. To enable Flexible Consumption model licensing for your hardware, use **license smart flexible-consumption enable** command in the global configuration mode.

Configuration

In order to enable PLR feature, license reservation must be configured in the global configuration mode:

```
Router(config)# license smart reservation
```

Note   These commands initiate communication with CSSM portal and hence will not work after enabling PLR:

- license smart register

- license smart deregister

- license smart renew

Generating a Request Code from the Router

After enabling the PLR feature, you must generate a request code.

This procedure shows how to generate a request code from the router:

```
RP/0/RSP0/CPU0:router# license smart reservation request local
Fri Mar  6 12:39:02.818 UTC
Enter this request code in the Cisco Smart Software Manager portal:
CD-ZNCS-5501-SE:FOC2118R24P-AVYd1FABK-AC /* This is a sample code */
```

The command will print a reservation code on the console that needs to be entered in CSSM.

Note   • Evaluation timer will continue to count down until an authorization code is installed.

- A syslog is logged for every 24 hours until the authorization code is installed.

Reserving a PLR License in Cisco SSM

This procedure shows how to generate an authorization code from CSSM portal:

Step 1   Go to Cisco SSM from https://software.cisco.com

Log in to the Cisco SSM portal using the username and password provided by Cisco.

Step 2   Under **License** section, click **Smart Software Licensing**

Step 3   Click the **Inventory** tab and from the **Virtual Account** drop-down list, choose your virtual account.

You can search by typing your virtual account name, or you can scroll the list and select your account name.

Step 4   Go to **Licenses** tab and click **License Reservation**.

The Smart License Reservation window appears. This window has four steps that should be performed in sequence to complete the procedure.

a) In **Enter Request Code** tab, type the code in the **Reservation Request Code** field and click **Next.**

b) In **Select Licenses** tab, select **Permanent License Reservation** option and click **Next**.

The required platform-specific PLR licenses are selected automatically.

c) In **Review and confirm** tab, review the product instance details, and click **Generate Authorization Code**.

d) The Authorization Code is generated and displayed in the **Authorization Code** tab. Click **Copy to Clipboard** to copy the authorization code or write it down.

The authorization code is a short sequence of characters that you can enter in the router CLI without the need for any electronic transfers.

Registering a Router with the Authorization Code

This procedure shows how to register a router with the authorization code that is generated from CSSM:

```
Router# license smart reservation install <authorization-code>
```

The PLR license reservation is enabled, and the SL status changes to Authorized state.

The router stops using the evaluation period.

Verification

To verify the license status after the registration, use the **show license status** command:

```
RP/0/RSP0/CPU0:router# show license status
Thu Jul 16 11:27:16.052 UTC
Smart Licensing is ENABLED
Utility:
  Status: DISABLED
License Reservation is ENABLED
Data Privacy:
  Sending Hostname: yes
    Callhome hostname privacy: DISABLED
    Smart Licensing hostname privacy: DISABLED
  Version privacy: DISABLED
```

```
Transport:
  Type: Callhome
Registration:
  Status: REGISTERED - UNIVERSAL LICENSE RESERVATION
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Jul 16 2020 11:27:08 UTC
License Authorization:
  Status: AUTHORIZED - RESERVED on Jul 16 2020 11:27:08 UTC

Export Authorization Key:
  Features Authorized:
    <none>

Miscellaneus:
  Custom Id: <empty>
```

The show command confirms that the PLR license reservation is enabled, and the License Authorization status changed to Authorized Reserved state.

This completes the PLR feature configuration.

How to Cancel, Return and Disable PLR

Cancel a Reservation in Progress

A reservation is cancelled when you want to reserve the license for a different chassis.

Before you begin

- A reservation request has been made but an authorization code has not been installed on the router.

Configuration

This procedure shows how to cancel a reservation process before the authorization code is installed:

```
Router# license smart reservation cancel local
```

Verification

To verify the license status after cancelling a reservation, use the **show license reservation** command:

```
RP/0/RSP0/CPU0:router# show license reservation
Thu Jul 16 11:52:21.476 UTC
Smart Licensing is ENABLED
Utility:
  Status: DISABLED
License Reservation is ENABLED
Data Privacy:
  Sending Hostname: yes
    Callhome hostname privacy: DISABLED
    Smart Licensing hostname privacy: DISABLED
  Version privacy: DISABLED
Transport:
  Type: Callhome
Registration:
  Status: UNREGISTERED
  Export-Controlled Functionality: NOT ALLOWED
```

```
License Authorization:
  Status: No Licenses in Use
Export Authorization Key:
  Features Authorized:
    <none>
Miscellaneus:
  Custom Id: <empty>
```

Return a Reserved License

You can return a reserved license when the chassis is decommissioned. One more use case is when you want to go back to Smart Licensing mode.

To return a reserved license, first generate a return code. Afterwards the return code will be used in CSSM portal to return the licenses to the virtual pool. The returned PLR licenses can be used later on the same or another router.

1. Generate a return code:

```
RP/0/RSP0/CPU0:router# license smart reservation return local
Thu Jul 16 11:39:06.113 UTC
Enter this return code in Cisco Smart Software Manager portal:
CsnKVs-nRNATW-opCeeR-yfefzh-uiDGfh-XvD /* This is a sample code */
```

The license reservation return code is printed on the console. Copy the code to clipboard or write it down.

The request code is a short sequence of characters that you can enter without the need for any electronic transfers.

2. Enter the code in the CSSM portal.

   a. Log into the Cisco SSM portal at https://software.cisco.com using the username and password provided by Cisco.

   b. Under **License** section, click Smart Software Licensing.

   c. Click **Inventory** tab and from the **Virtual Account** drop-down, choose your virtual account.

      You can search by typing your virtual account name, or you can scroll the list and select your account name.

   d. Go to **Product Instance**.

      This page displays the list of product instances by name and product type.

   e. Search for your router name and select **Remove** from the **Actions** drop-down list corresponding to the router name.

   f. In the **Remove Product Instance** window, paste the license reservation return code and click **Remove Product Instance** to perform the action.

Verification

To verify the license status after returning a license, use the **show license status** command:

```
RP/0/RSP0/CPU0:router# show license status
Thu Jul 16 11:41:28.727 UTC
Smart Licensing is ENABLED
Utility:
  Status: DISABLED
```

```
License Reservation is ENABLED
Data Privacy:
  Sending Hostname: yes
    Callhome hostname privacy: DISABLED
    Smart Licensing hostname privacy: DISABLED
  Version privacy: DISABLED
Transport:
  Type: Callhome
Registration:
  Status: UNREGISTERED
  Export-Controlled Functionality: NOT ALLOWED
License Authorization:
  Status: No Licenses in Use
Export Authorization Key:
  Features Authorized:
    <none>

Miscellaneus:
  Custom Id: <empty>
```

After returning the license:

- The registration status changes to the UNREGISTERED state.

- Export controlled functionality gets disabled.

- Smart License status returns to the Unidentified state and starts to consume the Evaluation period.

✎

Note   To use the device in the normal Smart Licensing mode, disable PLR and register the device with Smart License server.

For information on how to disable PLR, see Disabling Permanent License Reservation, on page 32

Return a Reservation from an Authorization Code

When you generate an authorization code, it causes CSSM to permanently reserve the license. Before installing the license you can return the license.

Before you begin

- The router should not have a reservation authorization code installed.

- A reservation request should not be pending.

Generating a Retun Code

Using the authorization code generate a return code from the CLI using the **license smart reservation return authorization** command. Unlike the reservation return CLI the **license smart reservation return authorization** command takes the authorization code from the command line. The current reservation state is ignored.

This command is useful if the customer has created a request code and generated an authorization code from CSSM portal but then cancels the request on the device. The following command allows the customer to still generate a return code and enter it in the CSSM to return the license to the account.

```
Router# license smart reservation return authorization <authorization code>
```

The command prints the reservation return code that must be entered in the CSSM portal to return the license to the virtual pool.

Note
- If there is an existing return code saved by the smart agent it will be ignored and a new return code will be generated from the specified authorization code.

- The generated return code will not be saved.

Disabling Permanent License Reservation

This procedure shows how to disable the PLR feature in Smart Licensing:

```
Router(config)# no license smart reservation
Router(config)# commit
```

Note
- If a reservation request has been made but an authorization code hasn't been installed, disabling PLR cancels the reservation request on the router.

- If there's an authorization code installed on the router, then PLR won't be removed. Instead, a message to use the **license smart reservation return** command to remove the authorization code is displayed.

  This means that the license reservation feature may be disabled but there's still an authorization code installed. This will be reflected in the show commands.

- If any entitlements are in use, then the evaluation period countdown begins. Register the device with the existing token before evaluation period expires.

- If an authorization code is installed and the Agent is in the authorized state, it will transition back to the unidentified state. The Authorization code won't be removed.

What to do next

Reload and register the device with Smart License server using the existing token:

```
RP/0/RP0/CPU0:ios#license smart register idtoken <token_ID>
Thu Jul 23 13:07:38.761 UTC

License command "license smart register idtoken" completed successfully.
```

In the previous command, use the existing token in place of *token_ID* attribute.

If you do not have a token, then generate a new token from the CSSM portal.

For information on how to generate a new token, see *Generate Product Registration Token from the Portal* topic in the latest release of System Management Configuration Guide for respective platform in Cisco.com

Specific License Reservation

Table 11: Feature History Table

Feature Name	Release	Feature Description
Specific License Reservation	Release 7.3.1	Specific License Reservation (SLR) allows customers in highly secure networks to utilize smart licenses without communicating the license information to the Cisco Smart Software manager (CSSM).

SLR is reservation of specific licenses from the smart account as per the usage on the router.Whereas, PLR is for selected customers who don't want tracking of license usage. This license allows unlimited usage without taking into consideration of license usage on the router.

Specific License Reservation (SLR) allows customers in highly secure networks to utilize smart licenses without communicating the license information to the Cisco Smart Software manager (CSSM).Routers that are registered with smart licenses share router information at regular intervals with Cisco Smart Software Manager (CSSM). Routers that are deployed in a highly secure network must not share the router information externally. Cisco offers license reservation as an on-request configuration for these routers.

Specific License Reservation is a solution designed for classified environments that don't allow electronic communication in or out of the environment. In such environments, routers are unable to communicate with the Cisco Smart Software Manager (CSSM) directly or through CSSM OnPrem. These deployments can use SLR that allows using all entitlements on the router without communicating to Cisco.

To enable and use the SLR feature, generate a reservation request code from the router. Use this code in the CSSM portal to reserve an available SLR license and generate an authorization code. When you enter this authorization code in the router CLI, the license reservation becomes effective.

Limitations

- License reservation provides limited or no functionality to certain smart licensing features such as transfer of licenses between products, license usage, asset management and so on.

- To use the Specific License Reservation feature, you must have an approval and authorization from Cisco. For assistance, go to www.cisco.com/go/scm or contact your account representative.

Configuring Specific License Reservation

Before configuring Specific License Reservation, connect with your account representative and complete the following tasks:

- Create a Smart Account.

- Enable your Smart Account for SLR.

- Get access to SLR PIDs in Cisco Commerce Workspace (CCW).

- Order SLR licenses in CCW and make sure they are available in your Smart Account on CSSM.

Enable Specific License Reservation feature of licensing using the **license smart reservation** command in the global configuration mode.

Workflow

Here is the list of configurations that should be executed in sequence to complete the SLR feature:

1. Enabling Specific License Reservation

2. Generating a Request Code from the Router

3. Reserving a SLR License in Cisco SSM

4. Registering a Router with the Authorization Code

Here is the list of configurations that are used to cancel, verify, remove, and return SLR:

- Cancelling a SLR Request

- Verifying the License Status After Cancelling SLR

- Removing SLR from a Router

- Generating a Return Code from a Router

- Removing the Product Instance from CSSM

Enabling Specific License Reservation

First, enable Flexible Consumption Model (FCM) of licensing. To enable FCM for your hardware, use the **license smart flexible-consumption enable** command in the global configuration mode.

Then, enable Specific License Reservation feature of licensing. In order to enable SLR feature, license reservation must be configured in the global configuration mode:

```
Router(config)# license smart reservation
```

Generating a Request Code from the Router

After enabling the SLR feature, use the **license smart reservation request local** command to generate a request code. Enter this code in CSSM.

Example:

```
RP/0/RSP0/CPU0:router# license smart reservation request local
Fri Mar 6 12:39:02.818 UTC
Enter this request code in the Cisco Smart Software Manager portal:
CD-ZNCS-5501-SE:FOC2118R24P-AVYd1FABK-AC /* This is a sample code */
```

Reserving a SLR License in Cisco SSM

This procedure shows how to generate an authorization code from CSSM portal:

SUMMARY STEPS

1. Go to Cisco SSM from https://software.cisco.com
2. Under **License** section, click **Smart Software Licensing**
3. Click the **Inventory** tab and from the **Virtual Account** drop-down list, choose your virtual account.
4. Go to **Licenses** tab and click **License Reservation**.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Go to Cisco SSM from https://software.cisco.com	Log in to the Cisco SSM portal using the username and password provided by Cisco.
Step 2	Under **License** section, click **Smart Software Licensing**	
Step 3	Click the **Inventory** tab and from the **Virtual Account** drop-down list, choose your virtual account.	You can search by typing your virtual account name, or you can scroll the list and select your account name.
Step 4	Go to **Licenses** tab and click **License Reservation**.	The Smart License Reservation window appears. This window has four steps that should be performed in sequence to complete the procedure.

Registering a Router with the Authorization Code

This procedure shows how to register a router with the authorization code that is generated from CSSM:

```
Router# license smart reservation install [<> | file]
```

Note
- '<>' is the code itself or an alternative is to import from a file.

- 'file' option is prefered in those cases where the authorization code is long.

  Example:

  RP/0/RSP0/CPU0:router# license smart reservation install file /disk2:/AuthorizationCode_SN_FOX24XXXXX.txt /* This is a sample code */

  The "/" before the directory (/disk2:/ or /harddisk:/) is needed because of the linux file path.

The SLR license reservation is enabled, and the SL status changes to Authorized state.

The router stops using the evaluation period.

Verification

To verify the license status after the registration, use the **show license reservation** command:

```
RP/0/RSP0/CPU0:router# show license reservation
Fri Feb 5 16:35:37.340 UTC
License reservation: ENABLED
Overall status:
  Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
```

```
                Reservation status: RESERVATION IN PROGRESS on Feb 05 2021 16:33:08 UTC
                Request code: CC-ZNCS-55A2-MOD-S:FOC2245R05H-AVYd1FABK-45
```

To cancel, verify, remove, and return SLR

Cancelling a SLR Request

The license reservation request code can be cancelled before or after an authorization code is generated. Note that the authorization file needs to be returned to Cisco SSM if the cancellation request is raised after an authorization code is generated from CSSM.

To cancel an SLR request before the authorization code is installed, perform this procedure:

```
RP/0/RSP0/CPU0:router# license smart reservation cancel local
Fri Feb 5 16:41:55.262 UTC
Reservation cancelled
```

Verifying the License Status After Cancelling SLR

To verify the status of license after cancelling SLR, use the **show license reservation** command:

```
RP/0/RSP0/CPU0:router# show license reservation
Fri Feb 5 16:41:58.284 UTC
License reservation: ENABLED
Overall status:
Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
Reservation status: NOT INSTALLED
Last return code: CQ8K5Y-gYxar7-baroN9-BH2d4X-EaG7bH-6L7QmQ-mEGwy3-fxSCxo-Dku
```

Removing SLR from a Router

To remove SLR from a router, perform the following tasks:

1. Generate a return code from a router.

2. Enter the return code on CSSM.

3. Remove the product instance.

Generating a Return Code from a Router

To generate a return code, use the **license smart reservation return** command:

To verify the license status after returning a license, use the **show license status** command:

```
Router# license smart reservation return [local]
```

The command prints the reservation return code that must be entered in the CSSM portal to return the license to the virtual pool.

Removing the Product Instance from CSSM

This procedure shows how to remove the product instance from CSSM portal:

SUMMARY STEPS

1. Go to Cisco SSM from https://software.cisco.com
2. Under **License** section, click **Smart Software Licensing**
3. Click the **Inventory** tab and from the **Virtual Account** drop-down list, choose your virtual account.
4. Click the **Product** instances tab.
5. Locate the required product instance from the product instances list. Optionally, you can enter a name or product type string in the search tab to locate the product instance.
6. Click the required product instance to expand the same.
7. From the **Actions** drop-down list, choose **Remove**.
8. In the **Reservation Return Code** field, enter the return code.
9. Click **Remove Product Instance**.

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	Go to Cisco SSM from https://software.cisco.com	Log in to the Cisco SSM portal using the username and password provided by Cisco.
Step 2	Under **License** section, click **Smart Software Licensing**	
Step 3	Click the **Inventory** tab and from the **Virtual Account** drop-down list, choose your virtual account.	You can search by typing your virtual account name, or you can scroll the list and select your account name.
Step 4	Click the **Product** instances tab.	The list of product instances that are available is displayed.
Step 5	Locate the required product instance from the product instances list. Optionally, you can enter a name or product type string in the search tab to locate the product instance.	
Step 6	Click the required product instance to expand the same.	The **Overview** window is displayed.
Step 7	From the **Actions** drop-down list, choose **Remove**.	The **Remove Product Instance** window is displayed.
Step 8	In the **Reservation Return Code** field, enter the return code.	
Step 9	Click **Remove Product Instance**.	

The reservation information is removed, and the license is made available in the virtual account.

Configuration Examples for SLR

The following sections provide various SLR examples.

Enabling FCM

To enable FCM, use the **license smart flexible-consumption enable** command:

```
Router# configure
Router(config)# license smart flexible-consumption enable
Router(config)# exit
```

Enabling SLR

Before enabling SLR, you must enable Flexible Consumption Model (FCM) of licensing. To enable FCM for your hardware, use the **license smart flexible-consumption enable** command in the global configuration mode.

To enable SLR, use the **license smart reservation** command in the global configuration mode:

```
Router# configure
Router(config)# license smart reservation
Router(config)# exit
```

Viewing the License Information Before Registering

To display license entitlements, use the **show license all** command:

```
RP/0/RSP0/CPU0:router# show license all
Fri Feb 5 16:35:41.983 UTC

Smart Licensing Status
======================
Smart Licensing is ENABLED
License Reservation is ENABLED

Registration:
Status: RESERVATION IN PROGRESS
Export-Controlled Functionality: NOT ALLOWED
Reservation process started on: Feb 05 2021 16:33:08 UTC

License Authorization:
Status: EVAL MODE
Evaluation Period Remaining: 81 days, 21 hours, 24 minutes, 53 seconds

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: Transport Off

Miscellaneous:
Custom Id: <empty>

License Usage
=============
(ADV-100G-RTU-1):
Description:
Count: 1
```

```
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ADV-100G-SIA-3):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ESS-100G-RTU-1):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ESS-100G-SIA-3):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

Product Information
===================
UDI: PID:NCS-55A2-MOD-S,SN:FOC2245R05H

Agent Version
=============
Smart Agent for Licensing: 5.1.8_rel/25

Reservation Info
================
License reservation: ENABLED

Overall status:
Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
    Reservation status: RESERVATION IN PROGRESS on Feb 05 2021 16:33:08 UTC
    Request code: CC-ZNCS-55A2-MOD-S:FOC2245R05H-AVYd1FABK-45
```

To display the license usage information, use the **show license usage** command:

```
RP/0/RSP0/CPU0:router# show license usage

Fri Feb 5 16:40:55.693 UTC

License Authorization:
Status: EVAL MODE
Evaluation Period Remaining: 81 days, 21 hours, 22 minutes, 46 seconds

(ADV-100G-RTU-1):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
```

```
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ADV-100G-SIA-3):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ESS-100G-RTU-1):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED

(ESS-100G-SIA-3):
Description:
Count: 1
Version: 1.0
Status: EVAL MODE
Export status: NOT RESTRICTED
Reservation:
Reservation status: NOT INSTALLED
```

To display all the license summaries, use the**show license summary** command:

```
RP/0/RSP0/CPU0:router# show license summary

Fri Feb 5 16:35:32.192 UTC

Smart Licensing is ENABLED
License Reservation is ENABLED

Registration:
    Status: RESERVATION IN PROGRESS
    Export-Controlled Functionality: NOT ALLOWED

License Authorization:
    Status: EVAL MODE
    Evaluation Period Remaining: 81 days, 21 hours, 25 minutes, 3 seconds

License Usage:
License                 Entitlement Tag             Count Status
--------------------------------------------------------------------------
                        (ADV-100G-RTU-1)            1 EVAL MODE
                        (ADV-100G-SIA-3)            1 EVAL MODE
                        (ESS-100G-RTU-1)            1 EVAL MODE
                        (ESS-100G-SIA-3)            1 EVAL MODE
```

To display the license status information, use the**show license status** command:

```
RP/0/RSP0/CPU0:router# show license status

Fri Feb 5 16:35:47.566 UTC

Smart Licensing is ENABLED
```

```
Utility:
    Status: DISABLED
License Reservation is ENABLED

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

Registration:
    Status: RESERVATION IN PROGRESS
    Export-Controlled Functionality: NOT ALLOWED
    Reservation process started on: Feb 05 2021 16:33:08 UTC

License Authorization:
    Status: EVAL MODE
    Evaluation Period Remaining: 81 days, 21 hours, 24 minutes, 47 seconds

Export Authorization Key:
    Features Authorized:
    <none>

Miscellaneous:
Custom Id: <empty>
```

Viewing the License Status After Registering

To display license entitlements, use the **show license all** command:

```
RP/0/RSP0/CPU0:router# show license all

Fri Feb 5 16:37:57.228 UTC

Smart Licensing Status
======================
Smart Licensing is ENABLED
License Reservation is ENABLED

Registration:
    Status: REGISTERED - SPECIFIC LICENSE RESERVATION
    Export-Controlled Functionality: ALLOWED
    Initial Registration: SUCCEEDED on Feb 05 2021 16:37:38 UTC

License Authorization:
    Status: AUTHORIZED - RESERVED on Feb 05 2021 16:37:38 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: Transport Off

Miscellaneous:
    Custom Id: <empty>

License Usage
=============
Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G (ADV-100G-RTU-1):
    Description: Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Core & Aggr Advanced SIA per 100G (ADV-100G-SIA-3):
    Description: Core & Aggr Advanced SIA per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G (ESS-100G-RTU-1):
    Description: Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Core & Aggr Essentials SIA per 100G (ESS-100G-SIA-3):
    Description: Core & Aggr Essentials SIA per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Product Information
===================
UDI: PID:NCS-55A2-MOD-S,SN:FOC2245R05H

Agent Version
=============
Smart Agent for Licensing: 5.1.8_rel/25

Reservation Info
================
License reservation: ENABLED

Overall status:
    Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
        Reservation status: SPECIFIC INSTALLED on Feb 05 2021 16:37:38 UTC
        Last Confirmation code: 21662953
```

```
Specified license reservations:
    Core & Aggr Advanced SIA per 100G (ADV-100G-SIA-3):
        Description: Core & Aggr Advanced SIA per 100G
        Total reserved count: 1
        Enforcement type: ENFORCED
        Term information:
            Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
                Authorization type: SPECIFIC INSTALLED on Feb 05 2021 16:37:38 UTC
                License type: TERM
                    Start Date: 2020-SEP-11 UTC
                    End Date: 2021-SEP-11 UTC
                    Term Count: 1
    Core & Aggr Essentials SIA per 100G (ESS-100G-SIA-3):
        Description: Core & Aggr Essentials SIA per 100G
        Total reserved count: 1
        Enforcement type: ENFORCED
        Term information:
            Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
                Authorization type: SPECIFIC INSTALLED on Feb 05 2021 16:37:38 UTC
                License type: TERM
                    Start Date: 2020-SEP-11 UTC
                    End Date: 2021-SEP-11 UTC
                    Term Count: 1
    Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G (ADV-100G-RTU-1):
        Description: Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G
        Total reserved count: 1
        Enforcement type: ENFORCED
        Term information:
            Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
                Authorization type: SPECIFIC INSTALLED on Feb 05 2021 16:37:38 UTC
                License type: TERM
                    Start Date: 2021-JAN-11 UTC
                    End Date: 2022-JAN-11 UTC
                    Term Count: 1
    Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G (ESS-100G-RTU-1):
        Description: Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G
        Total reserved count: 1
        Enforcement type: ENFORCED
        Term information:
            Active: PID:NCS-55A2-MOD-S,SN:FOC2245R05H
                Authorization type: SPECIFIC INSTALLED on Feb 05 2021 16:37:38 UTC
                License type: TERM
                    Start Date: 2021-JAN-11 UTC
                    End Date: 2022-JAN-11 UTC
                    Term Count: 1
```

To display the license usage information, use the **show license usage** command:

```
RP/0/RSP0/CPU0:router# show license usage

Fri Feb 5 16:38:08.167 UTC

License Authorization:
    Status: AUTHORIZED - RESERVED on Feb 05 2021 16:37:38 UTC

Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G (ADV-100G-RTU-1):
    Description: Core and Aggregation Advanced SW Right-to-Use v1.0 per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1
```

```
Core & Aggr Advanced SIA per 100G (ADV-100G-SIA-3):
    Description: Core & Aggr Advanced SIA per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G (ESS-100G-RTU-1):
    Description: Core and Aggregation Essentials SW Right-to-Use v1.0 per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1

Core & Aggr Essentials SIA per 100G (ESS-100G-SIA-3):
    Description: Core & Aggr Essentials SIA per 100G
    Count: 1
    Version: 1.0
    Status: AUTHORIZED
    Export status: NOT RESTRICTED
    Reservation:
        Reservation status: SPECIFIC INSTALLED
        Total reserved count: 1
```

To display all the license summaries, use the **show license summary** command:

```
RP/0/RSP0/CPU0:router# show license summary

Fri Feb 5 16:37:51.470 UTC

Smart Licensing is ENABLED
License Reservation is ENABLED

Registration:
    Status: REGISTERED - SPECIFIC LICENSE RESERVATION
    Export-Controlled Functionality: ALLOWED

License Authorization:
Status: AUTHORIZED - RESERVED

License Usage:
License                     Entitlement Tag            Count Status
-----------------------------------------------------------------------------
Core and Aggregation...     (ADV-100G-RTU-1)               1 AUTHORIZED
Core & Aggr Advanced...     (ADV-100G-SIA-3)               1 AUTHORIZED
Core and Aggregation...     (ESS-100G-RTU-1)               1 AUTHORIZED
Core & Aggr Essentia...     (ESS-100G-SIA-3)               1 AUTHORIZED
```

To display the license status information, use the **show license status** command:

```
RP/0/RSP0/CPU0:router# show license status

Fri Feb 5 16:38:03.370 UTC

Smart Licensing is ENABLED

Utility:
    Status: DISABLED
License Reservation is ENABLED
```

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

Transport:
    Type: Transport Off

Registration:
    Status: REGISTERED - SPECIFIC LICENSE RESERVATION
    Export-Controlled Functionality: ALLOWED
    Initial Registration: SUCCEEDED on Feb 05 2021 16:37:38 UTC

License Authorization:
    Status: AUTHORIZED - RESERVED on Feb 05 2021 16:37:38 UTC

Export Authorization Key:
    Features Authorized:
        <none>

Miscellaneous:
    Custom Id: <empty>
```

Configuring Smart Licensing

Prerequisites for Configuring Smart Licensing

Ensure that you have completed the following activities on Cisco Smart Software Manager:

• Set up a Cisco Smart Account. For more information, see the *How Smart Licensing Works* section in this document.

• Set up Virtual Account or accounts. For more information, see the *Virtual Accounts* section in the Smart Software Manager Help.

• Create user roles in the **Users** tab in the **Manage Smart Account** page. Provide the appropriate user access rights.

• Accept the Smart Software Licensing Agreement on Cisco Smart Software Manager to register your router.

• Have a layer 3 connection set up on your router.

• Configure a valid DNS and proper time on the router to connect CSSM or CSSM On-Prem.

Setting up the Router for Smart Licensing

Table 12: Three-step Roadmap to Set up the Router for Smart Licensing

Activity	Communication Connection Options		
Step 1—Configure Communications	See the *Configuring a Direct Cloud Connection* section.	See the *Configuring a Connection through a HTTP Proxy* section.	See the *Connecting to CSSM On-Premise* section.
Step 2—Register and Activate	See the *Registering and Activating your Router* section.		
Step 3—Verify the Configuration	See the *Verifying your Smart Licensing Configuration* section.		

Configuring a Communications Connection Between the Router and Cisco Smart Software Manager

Configuring a Direct Cloud Connection

In this deployment option, the **configure call-home profile** is configured by default. Use the **show call-home profile all** command to check the profile status.

Call Home service provides email-based and web-based notification of critical system events to Cisco Smart Software Manager.

To configure and enable Call Home service:

SUMMARY STEPS

1. **configure**
2. **call-home**
3. **service active**
4. **contact-email-addr** *email-address*
5. **profile CiscoTAC-1**
6. **destination transport-method http**
7. **destination address http** *url*
8. **active**
9. **no destination transport-method email**
10. **commit**
11. **exit**
12. **exit**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**configure** **Example:** Router# configureteral	Enters global configuration mode.
Step 2	**call-home** **Example:** Router(config)# call-home	Enters Call Home configuration mode.
Step 3	**service active** **Example:** Router(config-call-home)# service active	Activates Call Home service.
Step 4	**contact-email-addr** *email-address* **Example:** Router(config-call-home)# contact-email-addr username@example.com	Assigns the provided email address. You can enter up to 200 characters in email address format. **Note** Spaces are not allowed in the email address.
Step 5	**profile CiscoTAC-1** **Example:** Router(config-call-home)# profile CiscoTAC-1	Enables the CiscoTAC-1 profile to be used with the Call Home service. By default, the CiscoTAC-1 profile is disabled.
Step 6	**destination transport-method http** **Example:** Router(config-call-home-profile)# destination transport-method http	Enables the Call Home service through an HTTP connection.
Step 7	**destination address http** *url* **Example:** Router(config-call-home-profile)# destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService	Connects the router to the Cisco Smart Software Manager.
Step 8	**active** **Example:** Router(config-call-home-profile)# active	Enables the destination profile.
Step 9	**no destination transport-method email** **Example:** Router(config-call-home-profile)# no destination transport-method email	Disables the email option for the Call Home service.
Step 10	**commit** **Example:** Router(config-call-home-profile)# commit	Commits the configuration.

	Command or Action	Purpose
Step 11	**exit** **Example:** `Router(config-call-home-profile)# exit`	Exits the Call Home destination profile configuration mode and returns to the Call Home configuration mode.

Step 12	**exit**
	
	Example:
	
	`Router(config-call-home)# exit`
	`Router(config)#`
		Exits the Call Home configuration mode and returns to the global configuration mode.

Configuring a Connection Through an HTTP Proxy

The Call Home service can be configured through an HTTPs proxy server.

SUMMARY STEPS

1. **configure**
2. **call-home**
3. **service active**
4. **contact-email-address** *email-address*
5. **http-proxy** *proxy-address* **port** *port-number*
6. **profile CiscoTAC-1**
7. **no destination transport-method email**
8. **exit**
9. **profile** *profile-name*
10. **reporting smart-licensing-data**
11. **destination transport-method http**
12. **destination address http** *url*
13. **active**
14. **exit**
15. **exit**
16. **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure** **Example:** `Router# configure`	Enters global configuration mode.
Step 2	**call-home** **Example:** `Router(config)# call-home`	Enters Call Home configuration mode.

	Command or Action	Purpose
Step 3	**service active** **Example:** `Router(config-call-home)# service active`	Enables the Call Home feature.
Step 4	**contact-email-address** *email-address* **Example:** `Router(config-call-home)# contact-email-addr sch-smart-licensing@cisco.com`	Configures the default email address.
Step 5	**http-proxy** *proxy-address* **port** *port-number* **Example:** `Router(config-call-home)# http-proxy 198.51.100.10 port 3128`	Provides the proxy server information to the Call Home service.
Step 6	**profile CiscoTAC-1** **Example:** `Router(config-call-home)# profile CiscoTAC-1`	Enables the CiscoTAC-1 profile to be used with the Call Home service. By default, the CiscoTAC-1 profile is disabled.
Step 7	**no destination transport-method email** **Example:** `Router(config-call-home-profile)# no destination transport-method email`	Disables the email option for the Call Home service.

Step 8	**exit**
	
	Example:
	`Router(config-call-home-profile)# exit`
	`Router(config-call-home)#`
		Exits the Call Home destination profile configuration mode and returns to the Call Home configuration mode.

Step 9	**profile** *profile-name* **Example:** `Router(config-call-home)# profile test1`	Enters the Call Home destination profile configuration mode for the specified destination profile name. If the specified destination profile does not exist, it is created.
Step 10	**reporting smart-licensing-data** **Example:** `Router(config-call-home-profile)# reporting smart-licensing-data`	Enables data sharing with the Call Home service through the configured transport method, in this case, HTTP.
Step 11	**destination transport-method http** **Example:** `Router(config-call-home-profile)# destination transport-method http`	Enables the HTTP message transport method.
Step 12	**destination address http** *url* **Example:** `Router(config-call-home-profile)# destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService`	Connects the router to the Cisco Smart Software Manager.

	Command or Action	Purpose
Step 13	**active** **Example:** `Router(config-call-home-profile)# active`	Enables the destination profile.
Step 14	**exit** **Example:** `Router(config-call-home-profile)# exit`	Exits the Call Home destination profile configuration mode and returns to the Call Home configuration mode.

Step 15	**exit**
	
	Example:
	`Router(config-call-home)# exit`
	`Router(config)#`
		Exits the Call Home configuration mode and returns to the global configuration mode.

Step 16	**commit** **Example:** `Router(config)# commit`	Commits the configuration.

Configuring Smart Transport Through an HTTPs Proxy

To use a proxy server to communicate with CSSM when using the Smart transport mode, complete the following steps:

Note   Authenticated HTTPs proxy configurations are not supported.

SUMMARY STEPS

1. **configure terminal**
2. **license smart transport smart**
3. **license smart url** *transport-url*
4. **license smart proxy** *hostname* **port** *port-number*
5. **commit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**license smart transport smart** **Example:** `Router(config)# license smart transport smart`	Enables Smart transport mode. Automatically configures the Smart URL. (https://smartreceiver.cisco.com/licservice/license).

	Command or Action	Purpose

Step 3	**license smart url***transport-url*
	
	Example:
	
	`Router(config)# license smart url`
	`https://your-transport-url.com`
		Configures the url of smart transport for transporting messages.
		
		transport-url: The Smart Transport url

Step 4	**license smart proxy** *hostname***port***port-number*
	
	Example:
	
	`Router(config)# license smart proxy 198.51.100.10`
	` port 3128`
		Configures a proxy for the Smart transport mode. When a proxy is configured, licensing messages are sent to the proxy along with the final destination URL (CSSM). The proxy sends the message on to CSSM. Provide the address and port information:
		
		• **hostname**: Enter the IP Address or hostname of the proxy server.
		
		• **port**: Specifies the proxy port. Enter the proxy port number.

Step 5	**commit** **Example:** `Router(config)# commit`	Commits the configuration.

Connecting to CSSM On-Premise

This section describes how to configure the Call Home service for on-premise smart software through connected or disconnected mode.

SUMMARY STEPS

1. **configure**
2. **call-home**
3. **profile** *profile-name*
4. **reporting smart-licensing-data**
5. **destination transport-method http**
6. **destination address http** *url*
7. **no destination address http** *url*
8. **destination preferred-msg-format** {**long-text** | **short-text** | **xml**}
9. **active**
10. **exit**
11. **exit**
12. **http client source-interface** *ip-version interface-type interface-number*
13. **crypto ca trustpoint** *name*
14. **commit**
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure** **Example:** `Router# configure`	Enters global configuration mode.
Step 2	**call-home** **Example:** `Router(config)# call-home`	Enters Call Home configuration mode.
Step 3	**profile** *profile-name* **Example:** `Router(config-call-home)# profile test1`	Enters the Call Home destination profile configuration mode for the specified destination profile name. If the specified destination profile doesn't exist, it is created.
Step 4	**reporting smart-licensing-data** **Example:** `Router(config-call-home-profile)# reporting smart-licensing-data`	Enables data sharing with the Call Home service through the configured transport method, in this case, HTTP.
Step 5	**destination transport-method http** **Example:** `Router(config-call-home-profile)# destination transport-method http`	Enables the HTTP message transport method.

Step 6	**destination address http** *url*
	
	Example:
	
	`Router(config-call-home-profile)# destination address http http://209.165.201.15/Transportgateway/services/DeviceRequestHandler`
	
	`Or`
	`Router(config-call-home-profile)# destination address http https://209.165.201.15/Transportgateway/services/DeviceRequestHandler`
		Configures the destination URL (CSSM) to which Call Home messages are sent. Ensure the IP address or the fully qualified domain name (FQDN) in the destination URL matches the IP address or the FQDN as configured for the **Host Name** on the CSSM On-Prem.

Step 7	**no destination address http** *url* **Example:** `Router(config-call-home-profile)# no destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService`	Removes the default destination address.
Step 8	**destination preferred-msg-format** {**long-text**	**short-text**	**xml**} **Example:** `Router(config-call-home-profile)# destination preferred-msg-format xml`	(Optional) Configures a preferred message format. The default message format is XML.

	Command or Action	Purpose
Step 9	**active** **Example:** `Router(config-call-home-profile)# active`	Enables the destination profile.
Step 10	**exit** **Example:** `Router(config-call-home-profile)# exit`	Exits the Call Home destination profile configuration mode and returns to the Call Home configuration mode.

Step 11	**exit**
	
	Example:
	`Router(config-call-home)# exit`
	`Router(config)#`
		Exits the Call Home configuration mode and returns to the global configuration mode.

Step 12	**http client source-interface** *ip-version interface-type interface-number* **Example:** `Router(config)# http client source-interface ipv4 Vlan100`	Configures a source interface for the HTTP client. **Note** This command is mandatory for a VRF interface.

Step 13	**crypto ca trustpoint** *name*
	
	Example:
	`Router(config)# crypto ca trustpoint SLA-TrustPoint`
	`Router(config-trustp)#`
		(Optional) Declares the trustpoint and its name.

Step 14	**commit** **Example:** `Router(config-trustp)# commit`	Commits the configuration.

Step 15	**end**
	
	Example:
	`Router(config-trustp)# end`
	`Router(config)#`
		Returns to the global configuration mode.

Installing CSSM On-Premise

For information on installation instructions, see the Smart Software Manager On-Prem Installation Guide.

Registering and Activating Your Router

Product registration securely associates a device with the Smart Account and the Virtual Account of your choice. It also establishes trust between the end product and the CSSM. Tokens are used to register a product with the appropriate Virtual Account on CSSM Cloud (on Cisco.com) or CSSM On-Premise.

A Registration Token:

• Can be either used once or reused multiple times. You can set a limit to the number of times a token can be reused when you create the token.

• Can be created and revoked at any time.

• Expires after a period of time (default is 30 days; minimum is one day; maximum is 365 days)

A Registration Token is not:

• Product specific: The same Registration Token can be used on different product types.

• A license, key, or PAK.

• Stored on the Cisco device and they are not persistent.

• Required after the product is registered. Token expiration has no effect on previously registered products; it simply means that that token can no longer be used to register a new product.

Generating a New Token from CSSM

Step 1   If you choose the direct cloud access deployment option, log in to CSSM from https://software.cisco.com/.

If you chose the mediated access deployment option, log in to CSSM On-Prem from *https://<on-prem-ip-address>:8443*.

Step 2   Select the **Inventory** tab.

Step 3   From the Virtual Account drop-down list, choose the virtual account to which you want to register your product.

Step 4   Select the **General** tab.

Step 5   Click **New Token**.

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The **Create Registration Token** window is displayed.

Step 6   In the **Description** field, enter the token description.

In the **Expire After** field, enter the number of days the token must be active. The default value is 30 days.

In the **Max. Number of Uses** field, enter the maximum number of uses allowed after which the token expires.

Select the **Allow export-controlled functionality on the products registered with this token** checkbox to ensure Cisco compliance with US and country-specific export policies and guidelines. For more information, see https://www.cisco.com/c/en/us/about/legal/global-export-trade.html.
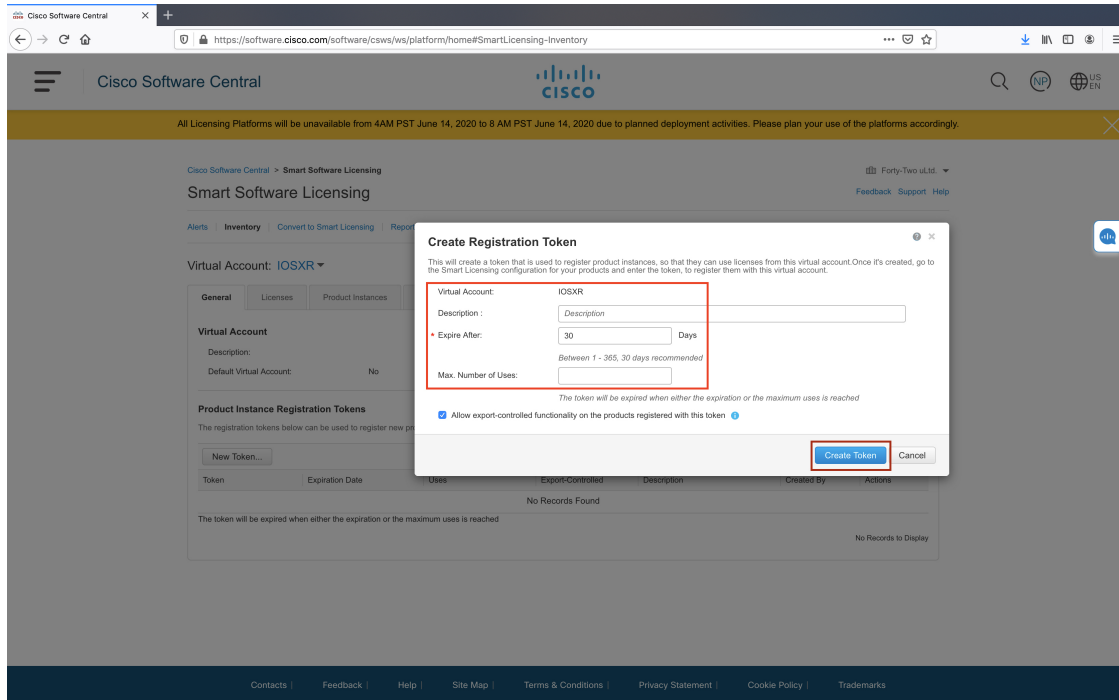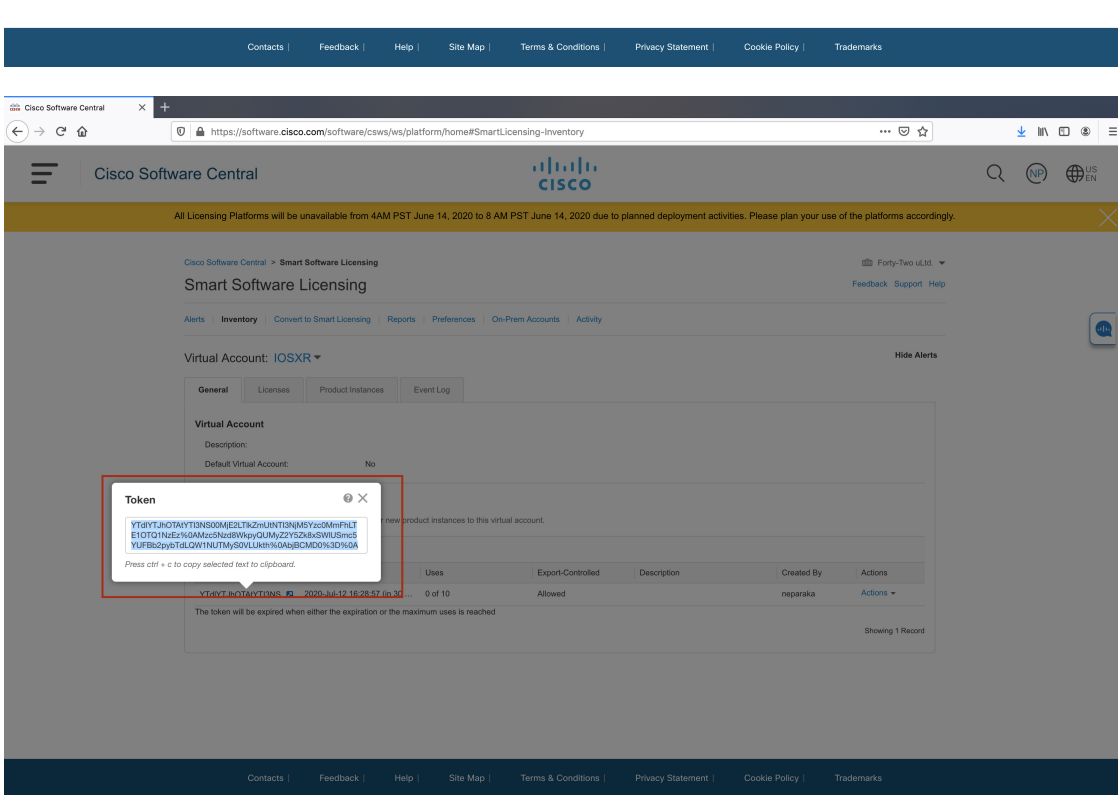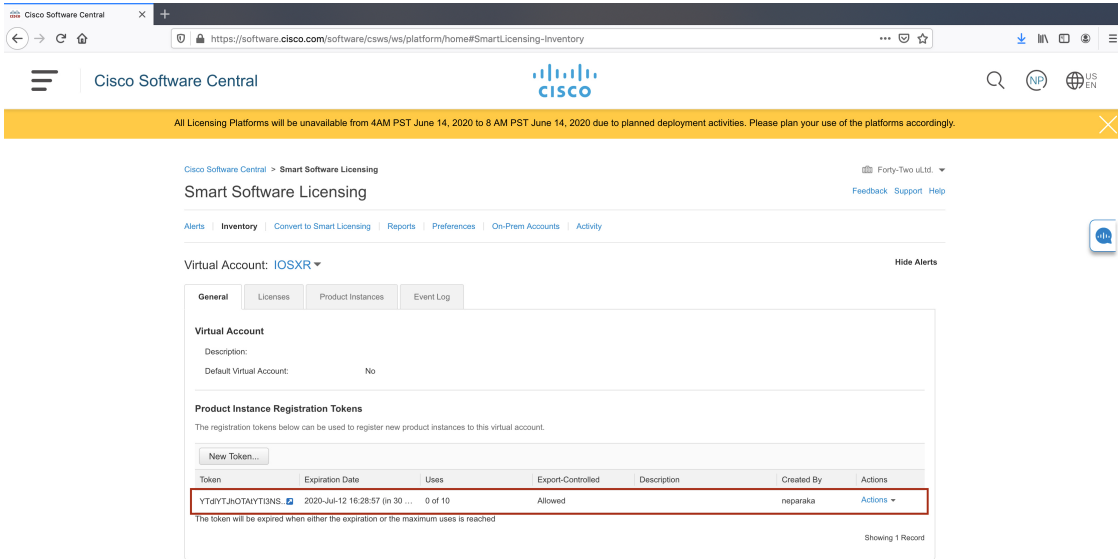

Click **Create Token**.

Step 7   After the token is created, select and copy the token to a text file.

You need this token to register your router.

Registering Your Device With the Token

SUMMARY STEPS

1. **license smart register idtoken** *token-ID*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**license smart register idtoken** *token-ID* **Example:** ```license smart register idtoken $Tl4UytrNXBzbEs1ck8veUtWaG5abnZJOFdDa1FwbVRa%0AblRMbz0%3D%0A```	Registers Smart Licensing on the router using the registration token created in the CSSM. On successful registration, the product instance is created in the CSSM virtual account and its license usage is displayed on the CSSM. **Register Device Using YANG Data Model** As an alternative to the CLI command, the `Cisco-IOS-XR-smart-license-act` YANG data model can also be used to register your device with CSSM On-prem server: ```<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101"> <register-id-token xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-smart-license-act"> <id-token>$Tl4UytrNXBzbEs1ck8veUtWaG5abnZJORDa1FwbVRa%0AblRMbz0%3D%0A</id-token> </register-id-token> </rpc>```

Renewing Your Smart Licensing Registration

Your registration is automatically renewed every six months. To find the status of the license, use the **license smart renew auth** command.

As long as the license is in an 'Authorized' or 'Out-of-compliance' (OOC) state, 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 to renew the authorization period. If a retry is successful, a new authorization period starts.

Note If the smart license renewal fails, then the product instance goes to an unidentified state and starts consuming the evaluation period.

Before you begin

Ensure that the following conditions are met to renew your smart license:

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

SUMMARY STEPS

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

DETAILED STEPS

	Command or Action	Purpose
Step 1	**license smart renew** {**auth**	**id**} **Example:** `Router# license smart renew auth`	Renews your token ID or authorization with Cisco smart licensing.

Example

Renew Token ID Using YANG Data Model

You can renew your token ID or smart licensing regsistration using `Cisco-IOS-XR-smart-license-act` YANG data model. The following example shows the NETCONF RPC request:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101">
  <renew-id xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-smart-license-act"/>
</rpc>
```

To renew the authorization, use the following NETCONF RPC request:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101">
  <renew-auth xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-smart-license-act"/>
</rpc>
```

Deregistering Your Router from CSSM

When a router is taken off the inventory, shipped elsewhere for redeployment, or returned to Cisco for replacement, you can deregister that router.

Before you begin

Ensure that a Layer 3 connection to CSSM is available to successfully deregister the device.

SUMMARY STEPS

1. **license smart deregister**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**license smart deregister** **Example:** `Router# license smart deregister`	Cancels the registration of the router and sends the router into evaluation mode. All smart licensing entitlements and certificates on the corresponding platform are removed. The product instance of the router stored on CSSM is also removed.

Example

Deregister Device Using YANG Data Model

You can deregister your device with CSSM On-prem server using `Cisco-IOS-XR-smart-license-act` YANG data model. The following example shows the NETCONF RPC request:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101">
  <de-register xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-smart-license-act"/>
</rpc>
```

Verifying the Smart Licensing Configuration

Use the following **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. **show license status**
4. **show license udi**
5. **show license summary**
6. **show license platform summary**
7. **show license platform detail**
8. **show call-home smart-licensing statistics**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show license status** **Example:** `Router# show license status`	Displays the compliance status of Smart Licensing. Following are the possible status: • **Waiting**—Indicates that 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.

	Command or Action	**Purpose**
		• **Authorized**—Indicates that your device is able to communicate with the Cisco license manager, and is authorized to initiate requests for license entitlements.
		• **Out-Of-Compliance**—Indicates that one or more of your licenses are out-of-compliance. Buy more licenses, or renew the existing licenses.
		• **Eval Period**—Indicates that Smart Licensing is consuming the evaluation period. Register the device with the Cisco Licensing manager, else your license expires.
		Note Repetitive 'Smart Licensing evaluation expired' warning messages are displayed on the console every hour, but there is no functionality impact on the device. To stop these repetitive messages, register the device again with new a registration token.
		• **Disabled**—Indicates that Smart Licensing is disabled.
		• **Invalid**—Indicates that Cisco does not recognize the entitlement tag as the tag is not in the database.
Step 2	**show license all** **Example:** Router# show license all	Displays all entitlements in use. The output also displays the associated licensing certificates, compliance status, Unique Device Identifier (UDI), and other details.
Step 3	**show license status** **Example:** Router# show license status	Displays the status of all entitlements in use.
Step 4	**show license udi** **Example:** Router# show license udi	Displays the Unique Device Identifier (UDI) information.
Step 5	**show license summary** **Example:** Router# show license summary	Displays a summary of all entitlements in use.
Step 6	**show license platform summary** **Example:** Router# show license platform summary	Displays the registration status and provides detailed information about the essential, advantage, and tracking license consumption in generic or vortex license model.
Step 7	**show license platform detail** **Example:**	Displays detailed information about:

	Command or Action	Purpose
	Router# show license platform detail	• Licenses that can be consumed on a platform in both, generic and vortex models • The active model, whether generic or vortex model • The current count and the next consumption count of a license
Step 8	**show call-home smart-licensing statistics** **Example:** Router# show call-home smart-licensing statistics	Displays statistics of the communication between the Smart Licensing manager and the Cisco back-end using Smart Call Home. **Note** If the communication fails or drops, check your call home configuration for any errors.

Smart Licensing Configuration Examples

Example: Viewing the Call Home Profile

To display the **http Call Home profile** or the **On-Prem Call Home profile**, use the **show call-home profile all** command.

```
RP/0/RSP0/CPU0:router# show call-home profile all
Fri Sep 11 17:56:22.254 PDT


Profile Name: CiscoTAC-1
    Profile status: ACTIVE
    Profile mode: Full Reporting
    Reporting Data: Smart Call Home, Smart Licensing
    Preferred Message Format: xml
    Message Size Limit: 3145728 Bytes
    Transport Method: http
    HTTP  address(es): https://tools.cisco.com/its/service/oddce/services/DDCEService
    Other address(es): default

    Periodic configuration info message is scheduled every 11 day of the month at 11:25

    Periodic inventory info message is scheduled every 11 day of the month at 11:10

    Alert-group              Severity
    -----------------------  ------------
    inventory                normal

    Syslog-Pattern           Severity
    -----------------------  ------------
    .*                       critical
RP/0/RSP0/CPU0:router#show call-home profile all
Fri Sep 11 17:33:00.962 PDT
Profile Name: CiscoTAC-1
    Profile status: ACTIVE
    Profile mode: Full Reporting
    Reporting Data: Smart Call Home, Smart Licensing
    Preferred Message Format: xml
    Message Size Limit: 3145728 Bytes
```

```
    Transport Method: http
    HTTP  address(es): http://10.30.110.38/Transportgateway/services/DeviceRequestHandler
    Other address(es): default

    Periodic configuration info message is scheduled every 11 day of the month at 11:25

    Periodic inventory info message is scheduled every 11 day of the month at 11:10

    Alert-group              Severity
    -----------------------  ------------
    inventory                normal

    Syslog-Pattern           Severity
    -----------------------  ------------
    .*                       critical
```

Example: Viewing License Information Before Registration

To display the license entitlements, use the **show license all** command:

```
RP/0/RSP0/CPU0:router# show license all
Smart Licensing Status
======================

Smart Licensing is ENABLED

Registration:
  Status: UNREGISTERED
  Export-Controlled Functionality: NOT ALLOWED

License Authorization:
  Status: EVAL MODE
  Evaluation Period Remaining: 33 days, 22 hours, 52 minutes, 34 seconds

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
=============

(A9K-48P10G-TR-UPG):
  Description:
  Count: 1
  Version: 1.0
  Status: EVAL MODE
  Export status: NOT RESTRICTED

Product Information
===================
UDI: PID:ASR-9906,SN:FOX2247P3QM
```

```
HA UDI List:
    0/RSP0/CPU0: Active:PID:ASR-9906,SN:FOX2247P3QM
    0/RSP1/CPU0: Standby:PID:ASR-9906,SN:FOX2247P3QM

Agent Version
=============
Smart Agent for Licensing: 4.10.10_rel/45

Reservation Info
================
License reservation: DISABLED
```

To display the license usage information, use the **show license usage** command:

```
RP/0/RSP0/CPU0:router# show license usage
License Authorization:
  Status: EVAL MODE
  Evaluation Period Remaining: 33 days, 22 hours, 51 minutes, 34 seconds
(A9K-48P10G-TR-UPG):
  Description:
  Count: 1
  Version: 1.0
  Status: EVAL MODE
  Export status: NOT RESTRICTED
```

To display all the license summaries, use the **show license summary** command:

```
RP/0/RSP0/CPU0:router# show license summary
Smart Licensing is ENABLED

Registration:
  Status: UNREGISTERED
  Export-Controlled Functionality: NOT ALLOWED

License Authorization:
  Status: EVAL MODE
  Evaluation Period Remaining: 33 days, 22 hours, 42 minutes, 48 seconds

License Usage:
  License                 Entitlement tag             Count Status
  ----------------------------------------------------------------------
                          (A9K-48P10G-TR-UPG)             1 EVAL MODE
```

To display the license status information, use the **show license status** command:

```
RP/0/RSP0/CPU0:router# show license status

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: UNREGISTERED
```

```
        Export-Controlled Functionality: NOT ALLOWED

    License Authorization:
      Status: EVAL MODE
      Evaluation Period Remaining: 33 days, 22 hours, 41 minutes, 37 seconds

    Export Authorization Key:
      Features Authorized:
        <none>
```

Example: Registering the Router

To register a device, use the **license smart register idtoken** command:

```
Router# license smart register idtoken
Tl4UytrNXBzbEs1ck8veUtWaG5abnZJOFdDa1FwbVRa%0AblRMbz0%3D%0A
```

Example: Viewing License Information After Registration

To display the license entitlements, use the **show license all** command

```
RP/0/RSP0/CPU0:router# show license all

Smart Licensing Status
======================

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Forty-Two uLtd.
  Virtual Account: IOSXR
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Sep 11 2020 18:13:49 PDT
  Last Renewal Attempt: None
  Next Renewal Attempt: Mar 10 2021 17:13:48 PST
  Registration Expires: Sep 11 2021 18:08:46 PDT

License Authorization:
  Status: OUT OF COMPLIANCE on Sep 11 2020 18:14:01 PDT
  Last Communication Attempt: SUCCEEDED on Sep 11 2020 18:14:01 PDT
  Next Communication Attempt: Sep 12 2020 06:14:00 PDT
  Communication Deadline: Dec 10 2020 17:08:59 PST

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
=============
```

```
Essentials Software RTU License (per 100G) for Edge (ESS-SE-100G-RTU-1):
  Description: Essentials Software RTU License (per 100G) for Edge
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

Advanced Software RTU License (per 100G) for Edge (ADV-SE-100G-RTU-1):
  Description: Advanced Software RTU License (per 100G) for Edge
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9900 32X100GE FC Tracking PID (A99-32X100GE-TRK):
  Description: ASR 9900 32X100GE FC Tracking PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9000 3rd Generation 12x100GE Hardware Tracking PID (A99-12X100GE-TRK):
  Description: ASR 9000 3rd Generation 12x100GE Hardware Tracking PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9000 3rd Generation 7 Fabric 48x10GE-1GE Hardware Tracking PID (A99-48X10GE-1G-TRK):
  Description: ASR 9000 3rd Generation 7 Fabric 48x10GE-1GE Hardware Tracking
              PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED


Product Information
===================
UDI: PID:ASR-9906,SN:FOX2247P3QM

HA UDI List:
    0/RSP0/CPU0: Active:PID:ASR-9906,SN:FOX2247P3QM
    0/RSP1/CPU0: Standby:PID:ASR-9906,SN:FOX2247P3QM

Agent Version
=============
Smart Agent for Licensing: 4.10.10_rel/45

Reservation Info
================
License reservation: DISABLED
```

To display the license usage information, use the **show license usage** command:

```
RP/0/RSP0/CPU0:router# show license usage
License Authorization:
  Status: OUT OF COMPLIANCE on Sep 11 2020 18:14:01 PDT

Essentials Software RTU License (per 100G) for Edge (ESS-SE-100G-RTU-1):
  Description: Essentials Software RTU License (per 100G) for Edge
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED
```

```
Advanced Software RTU License (per 100G) for Edge (ADV-SE-100G-RTU-1):
  Description: Advanced Software RTU License (per 100G) for Edge
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9900 32X100GE FC Tracking PID (A99-32X100GE-TRK):
  Description: ASR 9900 32X100GE FC Tracking PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9000 3rd Generation 12x100GE Hardware Tracking PID (A99-12X100GE-TRK):
  Description: ASR 9000 3rd Generation 12x100GE Hardware Tracking PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

ASR 9000 3rd Generation 7 Fabric 48x10GE-1GE Hardware Tracking PID (A99-48X10GE-1G-TRK):
  Description: ASR 9000 3rd Generation 7 Fabric 48x10GE-1GE Hardware Tracking
           PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED
```

To display all the license summaries, use the **show license summary** command:

```
RP/0/RSP0/CPU0:router# show license summary
Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Forty-Two uLtd.
  Virtual Account: IOSXR
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Mar 10 2021 17:13:49 PST

License Authorization:
  Status: OUT OF COMPLIANCE
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Sep 12 2020 06:14:01 PDT

License Usage:
  License              Entitlement tag              Count Status
  -----------------------------------------------------------------------------
  Essentials Software ... (ESS-SE-100G-RTU-1)           1 OUT OF COMPLIANCE
  Advanced Software RT... (ADV-SE-100G-RTU-1)           1 OUT OF COMPLIANCE
  ASR 9900 32X100GE FC... (A99-32X100GE-TRK)            1 OUT OF COMPLIANCE
  ASR 9000 3rd Generat... (A99-12X100GE-TRK)            1 OUT OF COMPLIANCE
  ASR 9000 3rd Generat... (A99-48X10GE-1G-TRK)          1 OUT OF
```

To display the license status information, use the **show license status** command:

```
RP/0/RSP0/CPU0:router# show license status

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: Forty-Two uLtd.
  Virtual Account: IOSXR
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Sep 11 2020 18:13:49 PDT
  Last Renewal Attempt: None
  Next Renewal Attempt: Mar 10 2021 17:13:48 PST
  Registration Expires: Sep 11 2021 18:08:46 PDT

License Authorization:
  Status: OUT OF COMPLIANCE on Sep 11 2020 18:14:01 PDT
  Last Communication Attempt: SUCCEEDED on Sep 11 2020 18:14:01 PDT
  Next Communication Attempt: Sep 12 2020 06:14:00 PDT
  Communication Deadline: Dec 10 2020 17:08:59 PST

Export Authorization Key:
  Features Authorized:
    <none>
```