Configuring Smart Licensing

This module describes the configuration related to the Smart Licensing.

Table 1: Feature History for Smart License

Release	Modification
Release 6.3.2	Smart Licensing was introduced.
Release 6.5.2	Flexible Consumption License Model was introduced.
Release 7.4.1	YANG Data Models for Smart Licensing was introduced.

This module 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.

What is Flexible Consumption Model?

Table 2: Feature History Table

Feature Name	Release Information	Feature Description
Flexible Consumption Model on NC57-48Q2D-S and NC57-48Q2D-SE-S	Release 7.10.1	Flexible Consumption Model on NC57-48Q2D-S and NC57-48Q2D-SE-S Line cards.
Flexible Consumption Model on NCS-57D2-18DD-SYS	Release 7.8.1	Flexible Consumption Model (FCM) is now extended to the NCS-57D2-18DD-SYS chassis.
FCM Licensing on the line cards: • NCS-57C3-MOD • NCS-57C3-MODS • NC57-36H6D-LC	Release 7.4.1	Support for FCM licensings is extended to the following line cards: • NCS-57C3-MOD • NCS-57C3-MODS • NC57-36H6D-LC
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.

Feature Name	Release Information	Feature Description
Support for Flexible Consumption Model (FCM) licensing on the chassis NCS-57B1-6D24-SYS and NCS-57B1-5DSE-SYS.	Release 7.3.1	Support for FCM licensing is now extended to the following chassis: • NCS-57B1-6D24-SYS • NCS-57B1-5DSE-SYS

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 simplifies 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-100G-RTU-1.

- 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-400G-RTU-1.

- 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-100G-RTU-1.

- Tracking licenses, for example NCS-5501-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 tables provide information about FCM licenses for NCS 5500 and NCS 5700 Series routers:

Table 3: Flexible Consumption Model Licensing Usage Pattern

License Name	Hardware Supported	Consumption Pattern
Essential Licenses: • ESS-100G-RTU-1 • ESS-400G-RTU-1 Advantage Licenses: • ADV-100G-RTU-1 • ADV-400G-RTU-1	• Routers with fixed chassis unit: NCS-5501-SYS, NCS-5501-SE-SYS, NCS-5502-SYS, NCS-5502-SE-SYS, NCS-55A1-24H-SYS, NCS-55A1-36H-S-SYS, NCS-55A2-MOD-HD-S-SYS, NCS-55A2-MOD-SE-S-SYS, NCS-55A2-MOD-S-SYS, NCS-55A1-36H-SE-S-SYS, NCS-55A1-48Q6H-SYS, NCS-55A1-24Q6H-SS-SYS, NCS-57B1-6D24-SYS, and NCS-57B1-5DSE-SYS • Routers with modular chassis unit: NCS-5504-SYS, NCS-5508-SYS, NCS-5516-SYS • Line cards: NC-57-18DD-SE, NC-57-24DD, NC-55-32T16Q4H-A, NC-57-36H-SE, NC-55-36X100G, NC-55-36X100GA-SE, NC-55-18H18F, NC-55-24H12F-SE, NC-55-24X100G-SE, NC-55-6X200-DWDM-S, NC-55-MOD-A-S, NC-55-MOD-A-SE-S, and NC-55-36X100G-S	The number of essential or advantage licenses that are consumed depends on the number of active ports and is reported on per chassis basis.

License Name	Hardware Supported	Consumption Pattern
Hardware Tracking Licenses that support chassis: • NCS-5501-TRK • NCS-5501-SE-TRK • NCS-5502-TRK • NCS-5502-SE-TRK • NCS-5504-TRK • NCS-5508-TRK • NCS-5516-TRK • NCS-55A1-24H-TRK • NCS-55A1-36H-TRK • NCS-55A1-36HS-TRK • NCS-55A1-48Q6H-TRK • NCS-55A2-MOD-TRK • NCS-55A2-MODH-TRK • NCS-55A2-MODS-TRK • NCS-55A1-24Q6-TRK • NCS-55A1-24QX-TRK • NC55-32T16Q-LC-TRK • NCS-57B1-6D24-SYS • NCS-57B1-5DSE-SYS • NCS_57D2_18DD_TRK	These Tracking licenses are named on the basis of the hardware supported. For example, NCS-5501-TRK licenses support NCS 5501 systems.	The number of licenses that are consumed depends on the number of chassis in use.

License Name	Hardware Supported	Consumption Pattern
Hardware Tracking Licenses that support line cards: • NC55-36H-LC-TRK • NC55-36HSE-LC-TRK • NC55-18HF-LC-TRK • NC55-24H12-LC-TRK • NC55-24HSE-LC-TRK • NC55-DWDM-LC-TRK • NC55-MOD-A-SE-TRK • NC55-MOD-A-TRK • NC55-36HS-LC-TRK • NC55-18D12TH SE-LC-TRK • NC55-24D-LC-TRK • NCS-57C3-MOD-TRK • NCS-57C3-MODS-TRK • NC57-36H6D-LC-TRK	These Tracking licenses are named on the basis of the line card supported. For example, NC55-36H-LC-TRK licenses support NC-55-36X100G line cards.	The number of licenses that are consumed depends on the number of line cards in use.

Table 4: Advantage with Essential Licenses

License Product ID	License Entitlement	License Description
ADN-100G-RTU-1	1 ESS RTU Tag + 1 ADV RTU Tag	Core & Aggregation Advantage with Essentials SW RTU v1.0 100G
ADN-100G-RTU-2	1 ESS RTU Tag + 1 ADV RTU Tag	Core & Aggregation Advantage with Essentials SW RTU v2.0 100G
ADN-100G-SIA-3	1 ESS SIA 3 Tag + 1 ADV SIA 3 Tag	Core & Aggr Advantage with Essentials SIA 100G 3-5 year term
ADN-100G-SIA-5	1 ESS SIA 3 Tag + 1 ADV SIA 3 Tag	Core & Aggr Advantage with Essentials SIA 100G 5-10 year term
ADN-100G-SIA-ST	1 ESS SIA 3 Tag + 1 ADV SIA 3 Tag	Core & Aggr Advantage with Essentials SIA 100G 1-35 month term
ESS-100G-RTU-2	1 ESS RTU Tag	Core & Aggregation Essentials SW Right-to-Use v2.0 per 100G

License Product ID	License Entitlement	License Description
ESS-ADN-100G-SIA3	1 ADV SIA 3 Tag	Core & Agg Essentials to Advantage Upgrade SIA 100G 3-5 yrs
ESS-ADN-100G-SIA5	1 ADV SIA 3 Tag	Core & Agg Essentials to Advantage Upgrade SIA 100G 5-10 yrs
ESS-ADN-100G-SIAST	1 ADV SIA 3 Tag	Core & Agg Essentials to Advantage Upgrade SIA 100G 1-35 month term
ESS-ADN-100G-RTU2	1 ADV RTU Tag	Core & Agg Essentials to Advantage Upgrade RTU v2.0 100GE
ESS-ADN-100G-RTU1	1 ADV RTU Tag	Core & Agg Essentials to Advantage Upgrade RTU v1.0 100GE

Software Innovation Access

Table 5: Feature History Table

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

Overview

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

The benefits of SIA subscription are:

- **Access to software innovation**: SIA subscription provides access to continuous software upgrades which contain latest features, security enhancements, and bug fixes for all your devices at a network level.

- **Pooling of licenses**: SIA subscription enables Right-to-Use (RTU) licenses to be shared across your FCM network from a common license pool through the virtual account.

- **Protects your investment**: SIA subscription enables the portability of perpetual RTU licenses purchased for your current device to a next-generation router when you expand or upgrade your network.

The initial term of a SIA subscription is for a term of three years. You can renew the subscription by contacting your Cisco account representative. An equal number of SIA licenses and corresponding RTU licenses are required to enjoy the benefits, and ensure that your network is in compliance. There are two types of SIA licenses available:

- : 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
Fri Feb 12 20:33:51.784 UTC
Collection: LAST: Fri Feb 12 2021 20:33:46 UTC
NEXT: Fri Feb 12 2021 20:35:46 UTC
Reporting: LAST: Fri Feb 12 2021 20:33:46 UTC
NEXT: Fri Feb 12 2021 20:35:46 UTC
SIA Status: In Compliance
               Count
Feature/Area Entitlement Last Next
============ =================================================== ==== ====
FCM NCS 5500 Core & Agg Netw SW&Autom Ess(100G) 1.0 Per 1 0
FCM Core & Aggr Essentials SIA per 100G 1 0
FCM 5501 SE Base Hardware Tracking PID 1 0
```

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

```
Router# show license platform summary
Mon Mar 30 04:01:50.405 IST
Collection: LAST: Mon Mar 30 2020 04:01:12 IS
            NEXT: Mon Mar 30 2020 04:02:12 IST
Reporting:  LAST: Mon Mar 30 2020 04:01:12 IST
            NEXT: Mon Mar 30 2020 04:03:12 IST
*********************************IMPORTANT*************************************
SIA Status: Out of Compliance(Remaining Grace Period: 89 days, 23 hours)
            Number of SIA license(s) used is more than available.
            SW Upgrade will be allowed as SIA Grace Period is remaining
*****************************************************************************
                                                                 Count
Feature/Area     Entitlement                                     Last Next
=============== ================================================ ==== ====
FCM             NCS 5500 Core & Agg Netw SW&Autom Ess(100G) 1.0  2    0
FCM             Essential SIA License                            2    0
FCM             Total NC-55-18H18F LCs in the system             1    0
FCM             5508 Base Hardware Tracking PID                  1    0
```

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

```
Router# show license platform summary
Mon Mar 30 04:41:02.036 IST
Collection: LAST: Mon Mar 30 2020 04:40:12 IST
            NEXT: Mon Mar 30 2020 04:41:12 IST
Reporting:  LAST: Mon Mar 30 2020 04:39:12 IST
            NEXT: Mon Mar 30 2020 04:41:12 IST
*********************************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            NCS 5500 Core & Agg Netw SW&Autom Ess(100G) 1.0  2    2
FCM            Essential SIA License                           2    2
```

Perpetual without SIA Renewal

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

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

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

PSR Deployment Options

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

• Cisco EZ-Register

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

• Manual Deployment

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

• Enable smart licensing using the **license smart enable** command.

• Configure smart reservation on your device using the **license smart reservation** command.

• Generate a *Reservation request code* using the **license smart reservation request local** command.

• Navigate to your virtual account in the Cisco Smart Software manager (CSSM) tool and enter the *Reservation request code*.

• Select the license and quantity for each of them to be reserved on the device.

• Review the selected details and generate an Authorization code in CSSM.

- Copy or download the Authorization code.

- Use the **license smart reservation install file authcode** command to install the Authorization code on the device

How Does Smart Licensing Work?

Table 6: 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
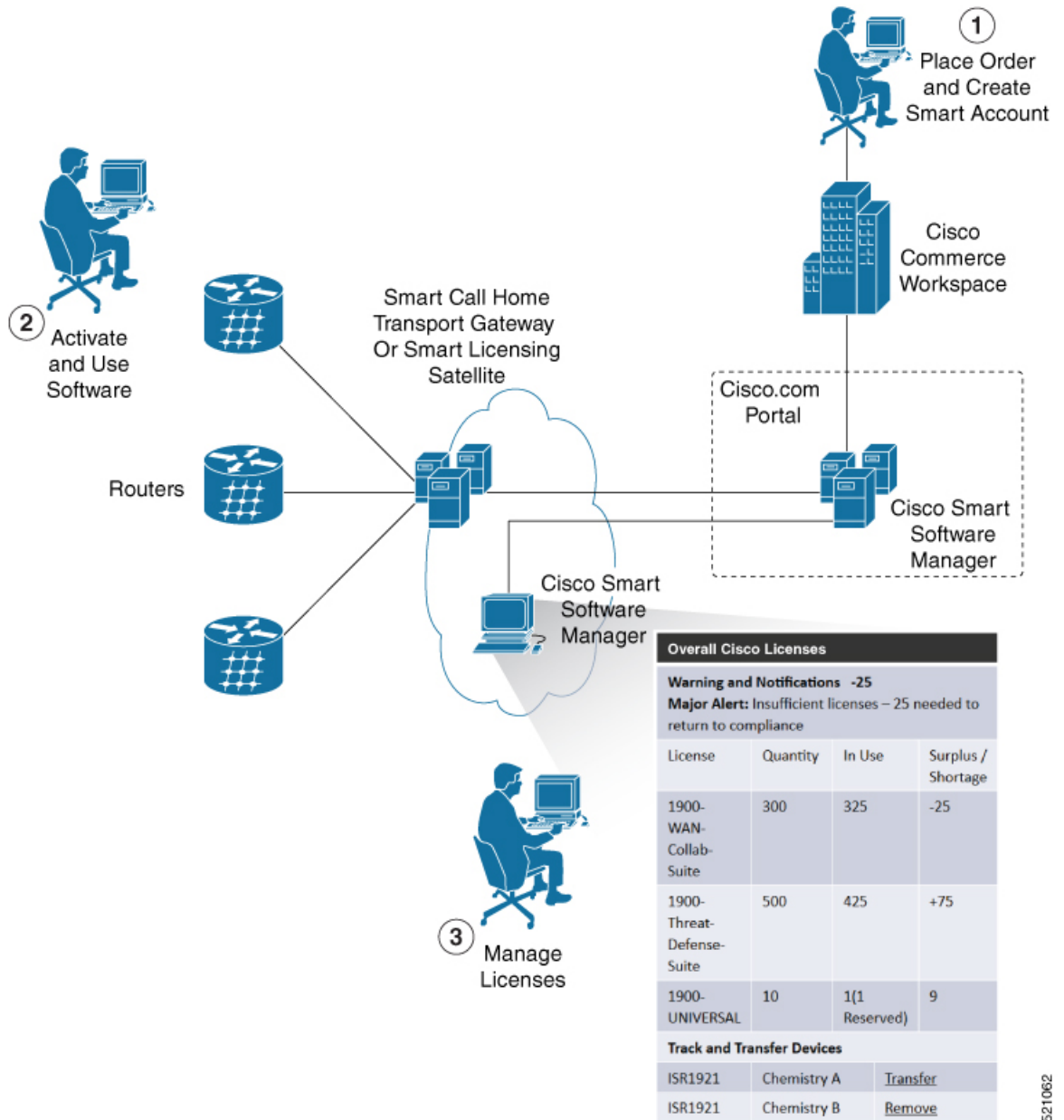
1. Place Order and Create Smart Account—You must have a Smart Account to set up Smart Licensing.

   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
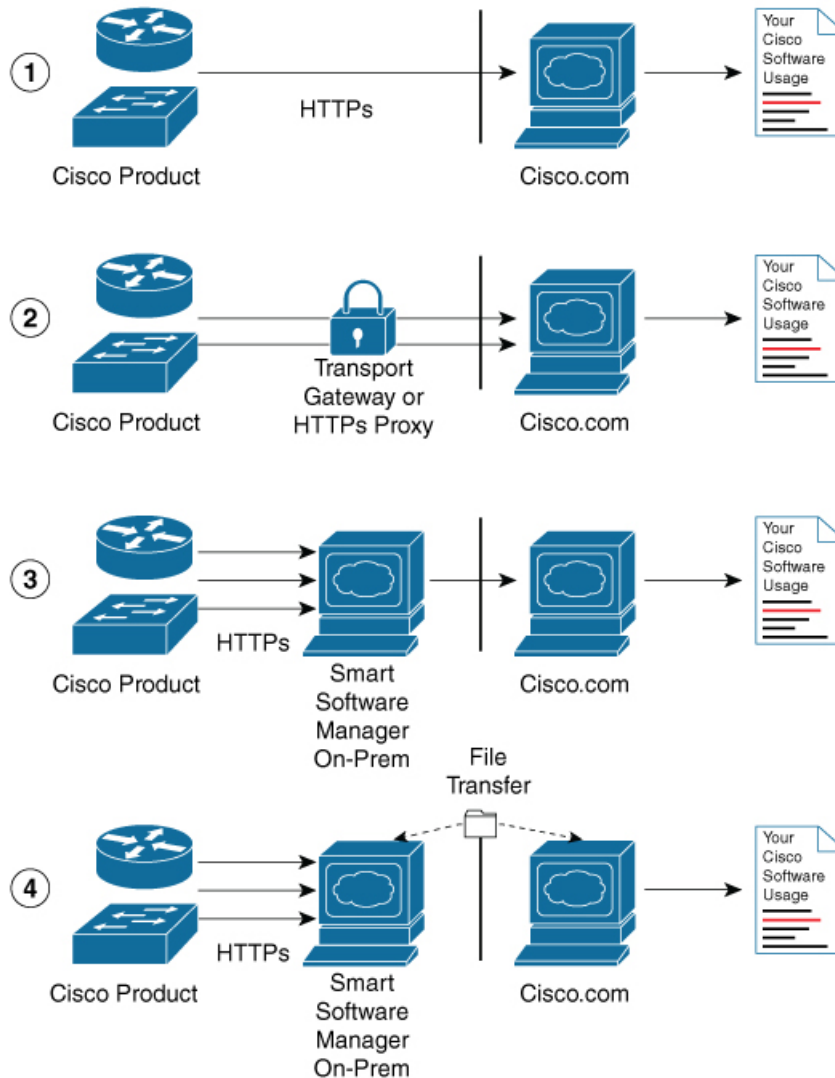
- View overall account information

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 7: 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 NCS 5500 Series Routers*.

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 8: 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 terminal**
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 terminal** **Example:** `Router# configure terminal`	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.

	Command or Action	Purpose
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.
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 terminal**
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 terminal** **Example:** Router# configure terminal	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	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.

	Command or Action	Purpose

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.

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).
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 terminal**
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 trustpool policy crl optional**
14. **commit**
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	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 does not 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.

	Command or Action	Purpose

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.

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 trustpool policy crl optional**
	
	Example:
	
	`Router(config)# crypto ca trustpool policy crl`
	`optional`
		(Optional) Bypasses the Certificate Revocation Lists (CRLs) check and establishes the connection. By default, the CRLs check is mandatory while establishing a TLS connection. We recommend this step when the smart licensing-enabled router is within a network and can rely on the License server to check the certificate status without retrieving and caching each CRL for every peer.

Step 14	**commit** **Example:** `Router(config)# commit`	Commits the configuration.
Step 15	**end** **Example:** `Router(config)# end`	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.

Note When the router is in an unregistered state, the licenses are in EVAL (evaluation) mode. Evaluation period will last for 90 days.

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**.

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.
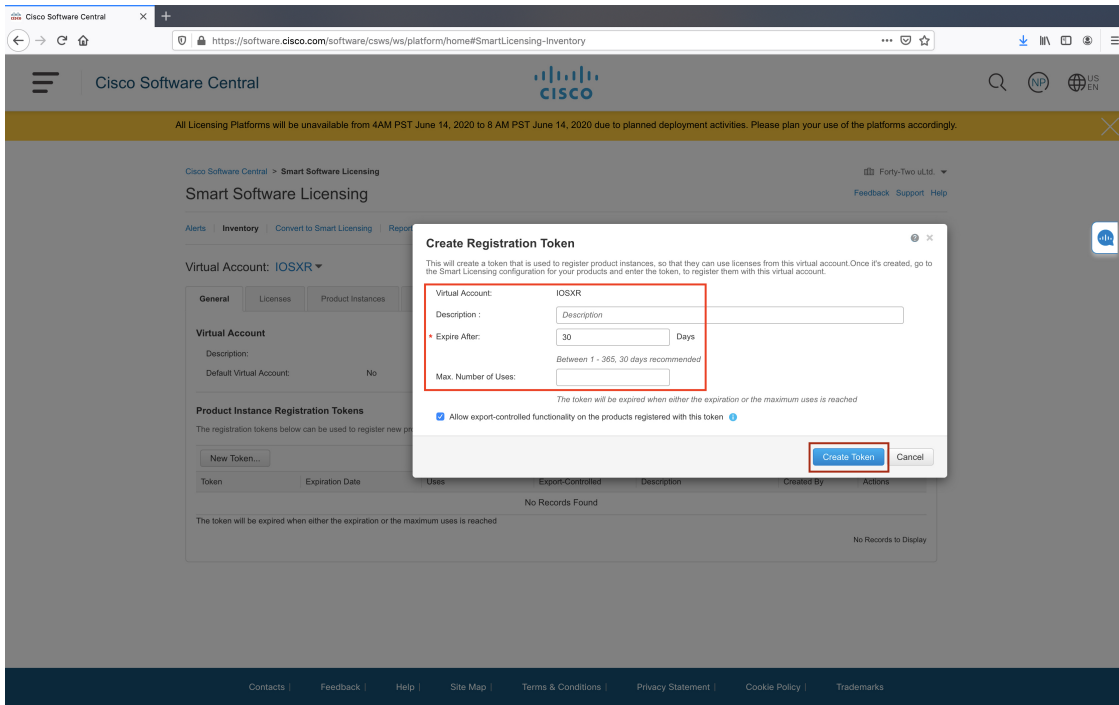
521051

Click **Create Token**.

Step 7 After the token is created, select and copy the token to a text file.
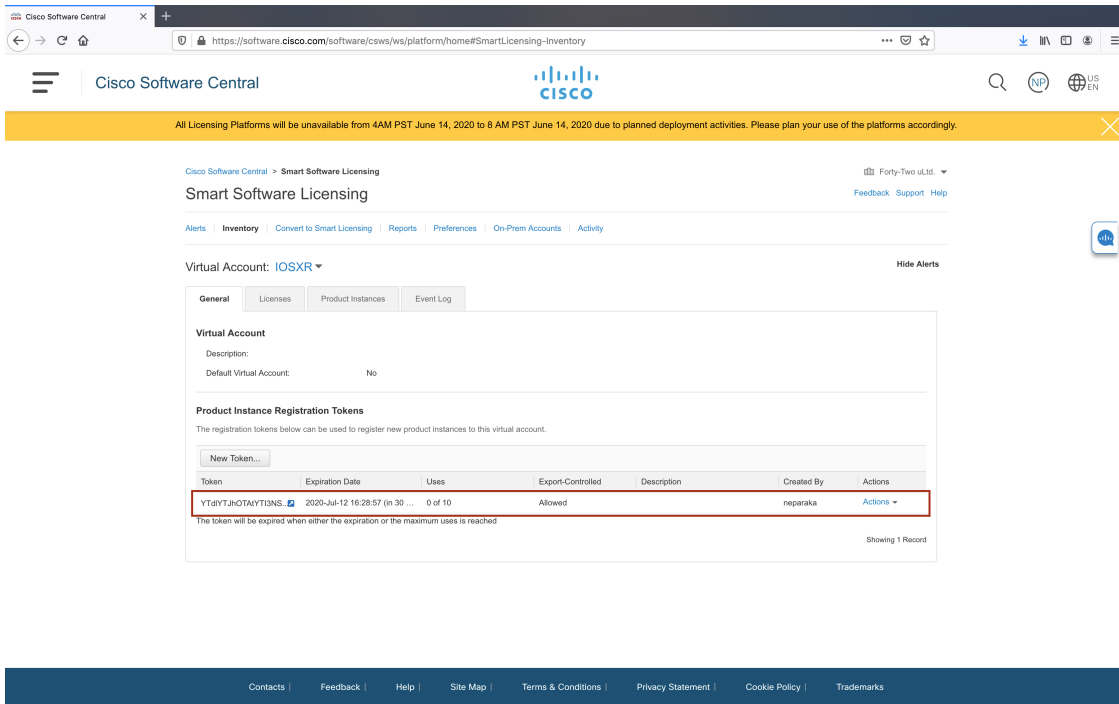
521052
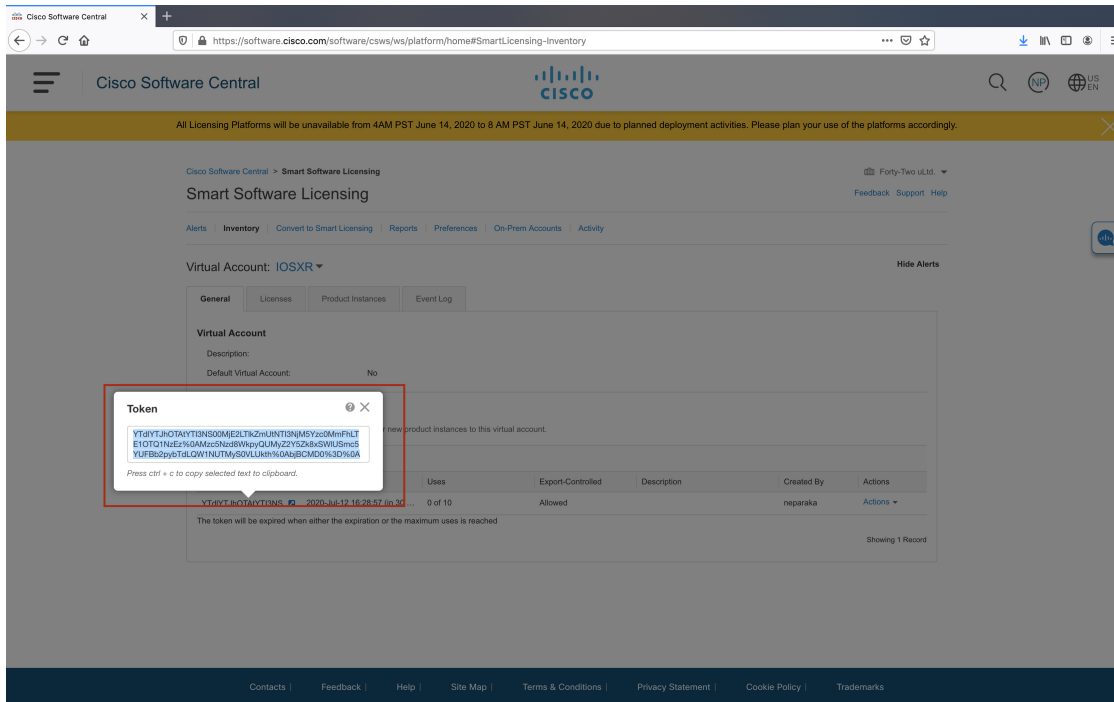
You need this token to register your router.

What to do next

See the *Registering Your Device With the Token* section.

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.

Example

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. The following example shows the NETCONF RPC request:

```
<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>$Tl4UytrNXBzbEs1ck8veUtWaG5abnZJOFdDa1FwbVRa%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 regsitration 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. • **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.

	Command or Action	Purpose
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 without essentials, advantage with essentials, and tracking license consumption in generic or vortex license model.
Step 7	**show license platform detail** **Example:** `Router# show license platform detail`	Displays detailed information about: • 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.

```
Router# show call-home profile all
Tue Aug 18 23:52:16.590 UTC

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 17 day of the month at 13:15

        Periodic inventory info message is scheduled every 17 day of the month at 13:0

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

        Syslog-Pattern           Severity
        ----------------------  ------------
        .*                          critical
Router# show call-home profile all

Wed Aug 19 01:55:14.974 UTC

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 17 day of the month at 13:15

        Periodic inventory info message is scheduled every 17 day of the month at 13:0

        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:

```
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: 83 days, 23 hours, 36 minutes, 0 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
==============

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

(NCS-5501-TRK):
  Description:
  Count: 1
  Version: 1.0
  Status: EVAL MODE
  Export status: NOT RESTRICTED

Product Information
===================
UDI: PID:NCS-5501,SN:FOC2137R1SL

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

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

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

```
Router# show license usage

License Authorization:
  Status: EVAL MODE
  Evaluation Period Remaining: 83 days, 23 hours, 34 minutes, 34 seconds

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

(NCS-5501-TRK):
  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:

```
Router# show license summary
Smart Licensing is ENABLED

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

License Authorization:
  Status: EVAL MODE
  Evaluation Period Remaining: 83 days, 23 hours, 33 minutes, 52 seconds

License Usage:
  License                  Entitlement tag             Count Status
  --------------------------------------------------------------------------
                           (ESS-100G-RTU-1)            1 EVAL MODE
                           (NCS-5501-TRK)              1 EVAL MODE
```

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

```
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: 83 days, 23 hours, 32 minutes, 57 seconds

Export Authorization Key:
  Features Authorized
```

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

```
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 Aug 18 2020 23:51:46 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Feb 14 2021 23:51:46 UTC
  Registration Expires: Aug 18 2021 23:46:43 UTC

License Authorization:
  Status: OUT OF COMPLIANCE on Aug 18 2020 23:51:57 UTC
  Last Communication Attempt: SUCCEEDED on Aug 18 2020 23:51:57 UTC
  Next Communication Attempt: Aug 19 2020 11:51:57 UTC
  Communication Deadline: Nov 16 2020 23:46:56 UTC

Export Authorization Key:
  Features Authorized:
    <none>

Utility:
  Status: DISABLED

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

Transport:
  Type: Callhome

License Usage
=============

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: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

5501 Base Hardware Tracking PID (NCS-5501-TRK):
  Description: 5501 Base Hardware Tracking PID
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

Product Information
===================
UDI: PID:NCS-5501,SN:FOC2137R1SL

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

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

View License Entitlement Using YANG Data Model

You can view the license entitlements using `Cisco-IOS-XR-infra-smartlicense-oper` YANG data model. Use the following NETCONF RPC request:

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="101">
  <get>
    <filter>
      <smart-agent xmlns="http://cisco.com/ns/yang/Cisco-IOS-XR-infra-smartlicense-oper">
        <licensing>
          <state/>
        </licensing>
      </smart-agent>
    </filter>
  </get>
</rpc>
```

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

```
Router# show license usage
License Authorization:
  Status: OUT OF COMPLIANCE on Aug 18 2020 23:51:57 UTC

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: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

5501 Base Hardware Tracking PID (NCS-5501-TRK):
  Description: 5501 Base 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:

```
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: Feb 14 2021 23:51:46 UTC

License Authorization:
  Status: OUT OF COMPLIANCE
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Aug 19 2020 11:51:56 UTC

License Usage:
  License                              Entitlement tag            Count Status

--------------------------------------------------------------------------------------------

  Core and Aggregation...          (ESS-100G-RTU-1)          1 OUT OF COMPLIANCE
  5501 Base Hardware T...          (NCS-5501-TRK)            1 OUT OF COMPLIANCE
```

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

```
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 Aug 18 2020 23:51:46 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Feb 14 2021 23:51:45 UTC
  Registration Expires: Aug 18 2021 23:46:42 UTC

License Authorization:
  Status: OUT OF COMPLIANCE on Aug 18 2020 23:51:57 UTC
  Last Communication Attempt: SUCCEEDED on Aug 18 2020 23:51:57 UTC
  Next Communication Attempt: Aug 19 2020 11:51:56 UTC
  Communication Deadline: Nov 16 2020 23:46:55 UTC

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

Specific License Reservation

Table 9: 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.

	Command or Action	Purpose
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>
```