Smart Licensing

This chapter describes the smart licensing configuration on Cisco NCS 1010.

Understanding Smart Licensing

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

Smart Licensing helps you simplify three core functions:

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

Smart Licensing Features

- Your device initiates a call home and requests the licenses it needs.

- Pooled licenses - Licenses 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.
- Licenses are stored securely on Cisco servers.
- Licenses can be moved between product instances without license transfer. This greatly simplifies the reassignment of a software license as part of the Return Material Authorization (RMA) process.
- It provides a complete view of all the Smart Software Licenses used in the network using a consolidated usage report of software licenses and devices in one easy-to-use portal.

Cisco Smart Account

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

When creating a Smart Account, you must have the authority to represent the requesting organization. After you submit the request, it goes through a brief approval process. Access http://software.cisco.com to learn about, set up, or manage Smart Accounts.

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

- Create, manage, or view virtual accounts.
- Create and manage Product Instance Registration Tokens.
- Transfer licenses between virtual accounts or view licenses.
- Transfer, remove, or view product instances.
- Run reports against your virtual accounts.
- Modify your email notification settings.
- View overall account information.

Virtual Accounts

A Virtual Account exists as a subaccount tithing the Smart Account. Virtual Accounts are a customer-defined structure based on organizational layout, business function, geography, or any defined hierarchy. They are created and maintained by the Smart Account administrator. Smart Licencing allows you to create multiple license pools or virtual accounts within the Smart Software Manager portal. Using the Virtual Accounts option that you can aggregate licenses into discrete bundles that are associated with a cost center so that one section of an organization cannot use the licenses of another section of the organization. For example, if you segregate your company into different geographic regions, you can create a virtual account for each region to hold the licenses and product instances for that region.

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

Use the Smart Software Manager portal to create license pools or transfer licenses.

Product Instance Registration Tokens

A product requires a registration token until you have registered the product. On successful registration, the device receives an identity certificate. This certificate is saved and automatically used for all future communications with Cisco. Registration tokens are stored in the Product Instance Registration Token Table that is associated with your enterprise account. Registration tokens can be valid 1–365 days.

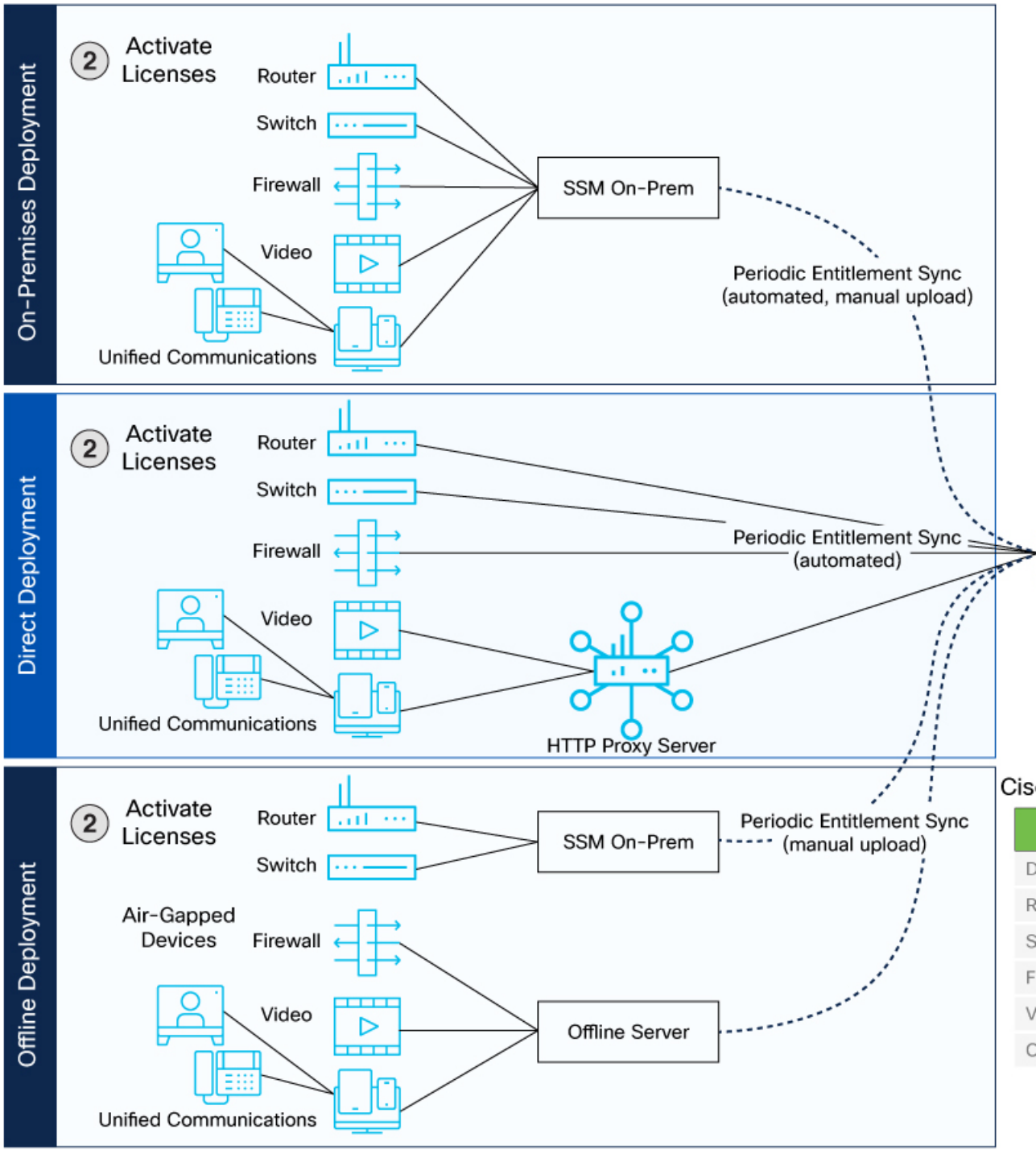
Product Instances

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

Smart Licensing Work Flow

The following figure depicts a working model of smart licensing.

Figure 1: Smart licensing work flow



Benefits of smart licensing

- Licenses are not locked to perform configurations using Cisco NCS 1010 even if the license limit exceeds the paid license limit. You are notified with out-of-compliance notification to buy additional licenses when the license limit exceeds the paid license limit. This saves time with the ability to transfer licenses across the organization.
- Licenses can be pooled across the entire organization, enabling them to be reused across organizational boundaries.
- Provides software asset management information so that you can plan and track the licenses.

Available license entitlements for NCS 1010

Cisco NCS 1010 supports the Vortex model for smart licensing software. The available license entitlements are categorized as Essential and Advantage. Each category is designed to enable specific features and hardware support.

This is the list of license types and their applicability.

- ILA Essentials: One license per ILA card (maximum one license).
- OLT Essentials: One license per WSS port, per OLT card (maximum 32 licenses). For example, if on an WSS port, multiple cross connections are present, one essential license is consumed, and if multiple add/drop connections are present across multiple WSS ports, that number of ESS licenses are consumed.
- ILA Advantage: One license per ILA card. This license enables omnidirectional cross connections or OTDR access features (maximum one license).
- OLT Advantage: One license per WSS port, per OLT card. This type enables OTDR access, Connection Verification feature, Nyquist channel or omnidirectional cross connects (maximum 32 licenses).
- CCMD Essentials: One license per CCMD card (maximum one license).

Licensing behavior with Nyquist channels

When Nyquist channels are enabled, each cross connection created on a port consumes one Essentials license and one Advantage license.

License entitlement display names and descriptions

The table lists the license entitlements as displayed in Cisco Smart Software Manager (CSSM) and their descriptions:

Table 1: NCS 10q0 license entitlements

Display Name in CSSM Server	Description
NCS1010_ADV_ILA_RTU	NCS 1010 ILA Advantage Right-to-Use (RTU)
NCS1010_ADV_ILA_SIA	NCS 1010 ILA Advantage Software Innovation Access (SIA)

Display Name in CSSM Server	Description
NCS1010_ADV_OLT_RTU	NCS 1010 OLT Advantage RTU (per port)
NCS1010_ADV_OLT_SIA	NCS 1010 OLT Advantage SIA (per port)
NCS1010_ESS_ILA_RTU	NCS 1010 ILA Essentials RTU
NCS1010_ESS_ILA_SIA	NCS 1010 ILA Essentials SIA
NCS1010_ESS_OLT_RTU	NCS 1010 OLT Essentials RTU (per port)
NCS1010_ESS_OLT_SIA	NCS 1010 OLT Essentials SIA (per port)

Generate a token in Cisco Smart Software Manager

To create a new token using Cisco Smart Software Manager, perform the following tasks:

Before you begin

Procedure

Step 1 Log in to the Cisco Smart Software Manager.

https://software.cisco.com/software/csws/ws/platform/home#SmartLicensing-Inventory

Step 2 Click the **Inventory** tab, and select your virtual account from the **Virtual Account** drop-down list.

Step 3 Click the **General** tab, and click **New Token**.

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

Step 4 Enter the token description. Specify the number of days the token must be active.

Step 5 Check the **Allow export-controlled functionality on the products registered with this token** check box.

Step 6 Click **Create Token**.

Step 7 Copy the token and register NCS1010 with the same token ID.

An example of the token ID: YzY2ZjYyNjktY2NlOS00NTc4LWIxNTAtMjZkNmNiNzMxMTY1LTE2NjAzNjQ3%0ANzY4Njl8ZVJSckxKN2pFV2tIeHVoMUkxbGxTazFDVm9kc1B5MGlHQmlFWUJi%0Ac3VNRT0%3D%0A

Available Smart Licensing transport modes

The Smart Licensing software management solution supports four transport modes for license communication and reporting. The default transport mode is Cisco Smart Licensing Utility (CSLU), but you can configure other modes as needed.

The available transport modes are:

- Call-Home: Uses Cisco's Call-Home infrastructure to communicate license usage and status to Cisco Smart Software Manager (SSM).
- Smart transport: Establishes a secure, direct connection between the device and SSM over the internet.
- Cisco Smart Licensing Utility (CSLU): Allows communication with SSM through a local CSLU server, acting as an intermediary between devices and SSM.
- Offline: Enables manual transfer of license usage information via files instead of automated network connectivity.

Configure call home mode

Enable call home mode, configure domain name server and CRL options, set smart license transport to call home, and establish licensing trust on the device.

The Call Home mode will be deprecated in a future release.

Before you begin

Procedure

Step 1 Enable call home service and configure the call home profile.

Example:

```
RP/0/RP0/CPU0:ios#call-home
RP/0/RP0/CPU0:ios(config-call-home)#service active
RP/0/RP0/CPU0:ios(config-call-home)#contact smart-licensing
RP/0/RP0/CPU0:ios(config-call-home)#profile CiscoTAC-1
RP/0/RP0/CPU0:ios(config-call-home-profile)#active
RP/0/RP0/CPU0:ios(config-call-home-profile)#destination address http
https://tools.cisco.com/its/service/oddce/services/DDCEService
RP/0/RP0/CPU0:ios(config-call-home-profile)#reporting smart-call-home-data
RP/0/RP0/CPU0:ios(config-call-home-profile)#reporting smart-licensing-data
RP/0/RP0/CPU0:ios(config-call-home-profile)#destination transport-method email disable
RP/0/RP0/CPU0:ios(config-call-home-profile)#destination transport-method http
RP/0/RP0/CPU0:ios(config-call-home-profile)#commit
RP/0/RP0/CPU0:ios(config-call-home-profile)#end
```

Step 2 Configure the domain name and DNS server.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#domain name cisco.com
RP/0/RP0/CPU0:ios(config)#domain name-server 64.102.6.247
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 3 Configure the Certificate Revocation List (CRL) trustpoint.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#crypto ca trustpoint Trustpool crl optional
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 4 Set smart license transport to use call home.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#License smart transport callhome
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 5 Establish license trust using your ID token.

Example:

```
license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Step 6 Synchronize smart license tokens.

Example:

```
license smart sync all
```

Step 7 Verify your call home and license configuration.

Example:

```
RP/0/RP0/CPU0:ios#show license all
Transport:  Type: Callhome
```

Your device is now configured for call home operation and smart licensing, with the specified DNS and CRL settings. The license transport uses call home, and trust is established.

Configure smart transport license registration

Use this procedure to configure smart transport that can be used as an alternative option to Call Home, to connect to the CSSM.

Procedure

Step 1 Configure the smart proxy and hostname .

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#license smart proxy port 80
RP/0/RP0/CPU0:ios(config)#license smart proxy hostname proxy.esl.cisco.com
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 2 Enable Certificate Revocation List (CRL) configuration.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#crypto ca trustpoint Trustpool crl optional
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 3 Enable Call Home using smart transport .

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#License smart transport smart
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 4 Verify the smart transport configuration.

Example:

```
RP/0/RP0/CPU0:ios#show license all
Transport:
  Type: Smart
  URL: https://smartreceiver.cisco.com/licservice/license
  Proxy:
    Address: proxy.esl.cisco.com
    Port: 80
    Username: <empty>
    Password: <empty>
  VRF:
    Not Supported
```

Step 5 Establish trust using your Smart Account ID token.

Example:

```
license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Step 6 Sync the token and licenses with CSSM.

Example:

```
license smart sync all
```

Smart transport is configured for license registration, device trust is established with CSSM, and license information is successfully synchronized. Your Cisco NCS 1010 is now registered and ready for smart license management.

Configure CSLU

You can configure CSLU as one of the transport modes, CSLU is the default mode for software licensing policy. To configure CSLU in Cisco NCS 1010, perform the following steps:

Procedure

Step 1 Use this sample configuration to configure the CSLU URL.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#license smart url cslu http://10.127.60.58:8182/cslu/v1/pi
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 2 Use this sample configuration to enable CRL Configuration.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#crypto ca trustpoint Trustpool crl optional
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 3 Use this sample configuration to enable CSLU.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#License smart transport cslu
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Verify whether CSLU is Configured.

```
RP/0/RP0/CPU0:ios#show license all
Transport:
  Type: cslu
  Cslu address: http://10.127.60.58:8182/cslu/v1/pi
  Proxy:
    Not Configured
  VRF:
    Not Supported
```

Step 4 Use this sample configuration to establish trust using id-token.

Example:

```
license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Step 5 Use this sample configuration to sync the token with the licenses.

Example:

```
license smart sync all
```

Configure Offline

You can configure Offline as one of the options. To configure Offline in Cisco NCS 1010, perform these steps:

Procedure

Step 1 Use this sample configuration to disable transport.

Example:

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#License smart transport off
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

Step 2 Use this sample configuration to save the report.

Example:

```
RP/0/RP0/CPU0:ios#license smart save usage unreported /misc1/disk1/usage.txt
```

Step 3 Use this sample configuration to import the acknowledgment report.

Example:

```
RP/0/RP0/CPU0:ios#license smart import /misc/disk1/ACK_usage.txt
```

Reserve specific licenses for your NCS 1010 device.

Specific License Reservation (SLR) lets you reserve a license for your product instance from the CSSM. To reserve specific licenses for NCS 1010, perform the following steps:

Procedure

Step 1 Deregister the device, if it was already registered for the license, using the **license smart deregister** command.

Example:

```
RP/0/RP0/CPU0:iso#license smart deregister
Thu Jul 19 13:33:30.048 UTC
RP/0/RP0/CPU0:iso# Jul 19 13:17:33.126 UTC: http_client[232] %SECURITY-XR_SSL-6-CERT_VERIFY_INFO :
 SSL Certificate verification:
 Certificate can be used for purpose it was meant to be
License command "license smart deregister " completed successfully.
```

Step 2 Generate the request code using the **license smart reservation request** local command.

Example:

```
RP/0/RP0/CPU0:iso#license smart reservation request local
Thu Jul 19 13:33:47.241 UTC

Enter this request code in the Cisco Smart Software Manager portal:
CB-ZNCS1010-SA:FCB2546B08T-BBTQDthRu-BA
```

Step 3 Use the generated code and generate the authorization code through Cisco Smart Software Manager. See Reserve licenses using Cisco Smart Software Manager, on page 13.

Step 4 Enter the **run** command to launch the iso XR Linux bash shell.

Example:

```
RP/0/RP0/CPU0:iso#run

RP/0/RP0/CPU0:Jul 19 13:35:20.236: run_cmd[67213]: %INFRA-INFRA_MSG.5-RUN_LOGIN : User Cisco logged
 into shell from con0/RP0/CP0
```

Step 5 Create a file using the **vim** *file name* command.

Example:

```
[node0_RP0_CPU0:~]$vim smart1
```

Step 6 Copy the authorization code in the file and type **:wq** to save and exit the file.

Step 7 Use the **exit** command to exit the shell.

Example:

```
[node0_RP0_CPU0:~]$exit
logout
RP/0/RP0/CPU0:Jul 19 13:45:21.146 UTC run-cmd[67213] %INFRA_MSG-5-LOGOUT : User cisco logged out
of shell from con0/RP0/CPU0
```

Step 8 Install the authorization code using the **license smart reservation install file** command.

Example:

```
RP/0/RP0/CPU0:iso#license smart reservation install file /disk0:/smart1
Thu Jul 19 13:46:22.877 UTC
RP/0/RP0/CPU0:Jul 19 13:46:22.946 UTC: plat_sl_client[368]: %LICENSE-PLAT_CLIENT-6-STATE_CHANGE :
Licensing platform state changing from UNREGISTERED to REGISTERED
RP/0/RP0/CPU0:Jul 19 13:46:22.946 UTC: smartlicserver[247]: %LICENSE-SMART_LIC-6-AGENT_REG_SUCCESS
 : Smart Agent for Licensing Registration successful. udi PID:NCS1010-SA,SN:FCB2546B08T
Reservation install file successful
Last Confirmation code 8572aa81
```

Note
You can verify the number of reservations in the Cisco smart software manger portal and can view the product instance name changed to a UDI.

Step 9 Verify the udi using the **show license udi** command.

Example:

```
RP/0/RP0/CPU0:iso#show license udi
Thu Jul 19 13:43:19.731 UTC
UDI: PID:NCS1010-SA,SN:FCB2546B08T
```

Step 10 Verify the license reservation using the command **show license status**.

Example:

```
RP/0/RP0/CPU0:P2A_DT_08#show license status
Thu Jul 19 15:45:27.137 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 Jul 19 2022 15:21:24 UTC

License Authorization:
  Status: AUTHORIZED - RESERVED on Jul 19 2022 15:21:24 UTC
```

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

Miscellaneous:
  Custom Id: <empty>
```

Reserve licenses using Cisco Smart Software Manager

To reserve the required number of licenses using the Cisco Smart Software Manager, perform the following steps:

Procedure

Step 1 Log in to the Cisco Smart Software Manager.

https://software.cisco.com/software/csws/ws/platform/home#SmartLicensing-Inventory

Step 2 Click the **Inventory** tab. From the **Virtual Account** drop-down list, select your smart account.

Step 3 Click **Licenses** and click **License Reservation**.

The **Smart License Reservation** wizard is displayed.

Step 4 In the **Enter Request Page** tab, paste the reservation code that you had generated from NCS 1010 in the **Reservation Request Code** area and click **Next**.

Step 5 In the **Select Licenses** tab, click the **Reserve a specific License** radio button.

The list of surplus licenses available in your virtual account is displayed.

Step 6 Enter the number of licenses that you want to reserve for the required license, in the **Quantity to Reserve** field, and click **Next**.

Step 7 In the **Review and Confirm** tab, click **Generate Authorization Code**.

Step 8 Click **Download as File** to download the authorization code and use the code to register the NCS 1010 device.

Reuse licenses with the SLR deactivation method

You can release some of the purchased licenses belonging to a common license pool, and reuse the same to upgrade new devices that are added into your network, for a temporary period. Later on, you must purchase the licenses for the new devices.

Procedure

Step 1 Deregister the device for which you want to release the licenses, and enable Flexible Consumption Model (FCM) (if not enabled)

Example:

```
RP/0/RP0/CPU0:ios#smart license deregister
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#license smart flexible-consumption enable
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios#end
```

Step 2 Generate the request code using the **license smart reservation request** local command.

Example:

```
RP/0/RP0/CPU0:ios(config)#license smart reservation request local
Fri Jul  1 07:11:56.541 UTC
Enter this request code in the Cisco Smart Software Manager portal:
CC-ZNCS1010-SA:FCB2530B11E-BBTQDthRu-BE
```

Step 3 Use the generated code and generate the authorization code through Cisco Smart Software Manager. See Reserve licenses using Cisco Smart Software Manager, on page 13.

Note
While reserving licenses in CSSM, under the **Select Licenses** tab, enter the number of licenses only for the RTU licenses, and leave the number of licenses as 0 for SIA licenses.

Step 4 Enter the **run** command to launch the iso XR Linux bash shell.

Example:

```
RP/0/RP0/CPU0:iso#run

RP/0/RP0/CPU0:Jul 1 7:35:20.281: run_cmd[67213]: %INFRA-INFRA_MSG.5-RUN_LOGIN : User Cisco logged
into shell from con0/RP0/CP0
```

Step 5 Create a file using the **vim** *file name* command.

Example:

```
[node0_RP0_CPU0:~]$vim smart1
```

Step 6 Copy the authorization code in the file and type **:wq** to save and exit the file.

Step 7 Use the **exit** command to exit the shell.

Example:

```
[node0_RP0_CPU0:~]$exit
logout
RP/0/RP0/CPU0:Jul 1 7:45:21.146 UTC run-cmd[67213] %INFRA_MSG-5-LOGOUT : User cisco logged out of
shell from con0/RP0/CPU0
```

Step 8 Install the authorization code using the **license smart reservation install file** command.

Example:

```
RP/0/RP0/CPU0:iso#license smart reservation install file /disk0:/smart1
Thu Jul 19 13:46:22.877 UTC
RP/0/RP0/CPU0:Jul 1 7:46:22.946 UTC: plat_sl_client[368]: %LICENSE-PLAT_CLIENT-6-STATE_CHANGE :
Licensing platform state changing from UNREGISTERED to REGISTERED
RP/0/RP0/CPU0:Jul 1 7:46:22.946 UTC: smartlicserver[247]: %LICENSE-SMART_LIC-6-AGENT_REG_SUCCESS :
 Smart Agent for Licensing Registration successful. udi PID:NCS1010-SA,SN:FCB2546B08T
Reservation install file successful
Last Confirmation code 8572aa81
```

Note
You can verify the number of reservations in the Cisco smart software manger portal.

Step 9 Verify the license reservation using the command **show license platform summary**.

Example:

```
RP/0/RP0/CPU0:test#show license platform summary
Fri Jul  1 07:24:07.016 UTC
Collection: LAST: Fri Jul 01 2022 07:48:34 UTC
            NEXT: Fri Jul 01 2022 07:48:34 UTC
Reporting:  LAST: Fri Jul 01 2022 07:48:34 UTC
            NEXT: Fri Jul 01 2022 07:48:34 UTC
SIA Status: Node is in deactivated state
```

Step 10 After the node is deactivated and the licenses are freed on the CSSM server, use those licenses to perform software upgrade on another node for a temporary period.

Smart Licensing verification commands

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

- **show license all**
- **show license trace all**
- **show license status**
- **show license summary**
- **show license tech**
- **Show license udi**
- **show license usage**
- **show license platform detail**
- **show license platform summary**
- **show license platform trace**
- **Show license platform trace all**
- **show tech-support smartlic**
- **show call-home detail**
- **show call-home trace all**
- **show tech-support call-home**

The following table defines the available license authorization status in Cisco NCS 1010:

Table 2: License Authorization Status

License Authorization Status	Description
Unconfigured	Smart Software Licensing is not configured.

License Authorization Status	Description
Unidentified	Smart Software Licensing is enabled but is not registered.
Registered	Device registration is completed and an ID certificate is received that is used for future communication with the Cisco licensing authority.
Authorized	Registration is completed with a valid Smart Account and license consumption has begun. This indicates compliance.
Out of Compliance	Consumption exceeds available licenses in the Smart Account.
Authorization Expired	The device is unable to communicate with the Cisco Smart Software Manager for an extended period. This state occurs after 90 days of expiry. The device attempts to contact the CSSM every hour to renew the authorization until the registration period expires.

Example 1:

The following example shows the sample output of the **show license all** command.

```
RP/0/RP0/CPU0:iso#show license all
Fri Jul 15 05:32:02.678 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: InternalTestDemoAccount8.cisco.com
  Virtual Account: NCS1010-PROD
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Jul 15 2022 04:58:24 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jan 11 2023 04:58:23 UTC
  Registration Expires: Jul 15 2023 04:53:20 UTC

License Authorization:
  Status: AUTHORIZED on Jul 15 2022 04:58:40 UTC
  Last Communication Attempt: SUCCEEDED on Jul 15 2022 04:58:40 UTC
  Next Communication Attempt: Aug 14 2022 04:58:40 UTC
  Communication Deadline: Oct 13 2022 04:53:41 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
```

```
Miscellaneous:
  Custom Id: <empty>

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

NCS1010 - Essentials - OLT RTU (NCS1010_ESS_OLT_RTU):
  Description: NCS1010 - Essentials Tier - Optical Line Terminal RTU (Per Port)
  Count: 2
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

NCS1010 - Essentials - OLT SIA (NCS1010_ESS_OLT_SIA):
  Description: NCS1010 - Essentials Subscription - Optical Line Terminal - SIA
               (Per Port)
  Count: 2
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

Product Information
===================
UDI: PID:NCS1010-SA,SN:FCB2546B08T

Agent Version
=============
Smart Agent for Licensing: 5.4.16_rel/63

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

Example 2:

The following example shows the sample output of the **show license platform detail** command.

```
RP/0/RP0/CPU0:iso#show license platform detail
Fri Jul 15 06:56:41.353 UTC
Collection: LAST: Fri Jul 15 2022 06:56:14 UTC
            NEXT: Fri Jul 15 2022 06:58:14 UTC
Reporting:  LAST: Fri Jul 15 2022 06:56:14 UTC
            NEXT: Fri Jul 15 2022 06:58:14 UTC
SIA Status: In Compliance
Parameters: Collection interval:           2 minute(s)
            Reporting  interval:           2 minute(s)
            Throughput gauge:        1000000 Kbps

================================================
Feature/Area 'FCM'
   Name:  FCM
   Status:   ACTIVE
   Flags:


   [ 1] Name:  NCS1010 - Essentials Tier - In-Line Amplifier RTU
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ESS_ILA_RTU,1.0_9b4322b1-bff3-4ddf-944c-16ec9aaab1cc
        Count: Last reported:    0
               Next report:      0
   [ 2] Name:  NCS1010 - Essentials Subscription - In-Line Amplifier - SIA
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ESS_ILA_SIA,1.0_67243ac7-1a7c-41e4-a160-f13df80fd0e4
```

```
        Count: Last reported:    0
               Next report:      0
   [ 3] Name:  NCS1010 - Essentials Tier - Optical Line Terminal RTU (Per Port)
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ESS_OLT_RTU,1.0_e4309530-2085-40e6-9aa6-5f3137ff49b2
        Count: Last reported:    3
               Next report:      0
   [ 4] Name:  NCS1010 - Essentials Subscription - Optical Line Terminal - SIA (Per Port)
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ESS_OLT_SIA,1.0_b3c976c1-e509-474f-8cac-b9db62f28f2b
        Count: Last reported:    3
               Next report:      0
   [ 5] Name:  NCS1010 - Advantage Tier- In-Line Amplifier RTU
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ADV_ILA_RTU,1.0_cf1746b7-def4-4c0e-ab90-de30614507d8
        Count: Last reported:    0
               Next report:      0
   [ 6] Name:  NCS1010 - Advantage Subscription - In-Line Amplifier - SIA
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ADV_ILA_SIA,1.0_ea769b05-9363-47dd-9991-2122c37479eb
        Count: Last reported:    0
               Next report:      0
   [ 7] Name:  NCS1010 - Advantage Tier - Optical Line Terminal RTU (Per Port)
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ADV_OLT_RTU,1.0_7a6ce8f3-3336-4ce2-8803-431227dabfff
        Count: Last reported:    0
               Next report:      0
   [ 8] Name:  NCS1010 - Advantage Subscription - Optical Line Terminal - SIA (Per Port)
        Entitlement Tag:
regid.2022-05.com.cisco.NCS1010_ADV_OLT_SIA,1.0_5f283f1c-143e-4c6e-9af7-73e088fb77a5
        Count: Last reported:    0
               Next report:      0
```

Example 3:

The following example shows the sample output of the **show license status** command.

```
RP/0/RP0/CPU0:iso#show license status
Fri Jul 15 08:17:14.004 UTC

Smart Licensing is ENABLED

Utility:
  Status: DISABLED

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

Transport:
  Type: Callhome

Registration:
  Status: REGISTERED
  Smart Account: InternalTestDemoAccount8.cisco.com
  Virtual Account: NCS1010-PROD
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Jul 15 2022 04:58:24 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jan 11 2023 04:58:24 UTC
  Registration Expires: Jul 15 2023 04:53:21 UTC

License Authorization:
```

```
  Status: OUT OF COMPLIANCE on Jul 15 2022 07:01:00 UTC
  Last Communication Attempt: SUCCEEDED on Jul 15 2022 07:06:52 UTC
  Next Communication Attempt: Jul 15 2022 19:06:51 UTC
  Communication Deadline: Oct 13 2022 07:01:52 UTC

Export Authorization Key:
  Features Authorized:
    <none>

Miscellaneous:
  Custom Id: <empty>
RP/0/RP0/CPU0:P2A_DT_08#show license summary
Fri Jul 15 08:17:23.752 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: InternalTestDemoAccount8.cisco.com
  Virtual Account: NCS1010-PROD
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Jan 11 2023 04:58:23 UTC

License Authorization:
  Status: OUT OF COMPLIANCE
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Jul 15 2022 19:06:51 UTC

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1010 - Essentials... (NCS1010_ESS_OLT_RTU)            32 OUT OF COMPLIANCE
  NCS1010 - Essentials... (NCS1010_ESS_OLT_SIA)            32 OUT OF COMPLIANCE
```

Example 4:

The following example shows the sample output of the **show license platform summary** command.

```
RP/0/RP0/CPU0:iso#show license platform summary
Tue Jul 19 14:09:06.919 UTC
Collection: LAST: Tue Jul 19 2022 14:08:07 UTC
            NEXT: Tue Jul 19 2022 14:10:07 UTC
Reporting:  LAST: Tue Jul 19 2022 14:08:07 UTC
            NEXT: Tue Jul 19 2022 14:10:07 UTC
*********************************IMPORTANT************************************
SIA Status: Out of Compliance(Remaining Grace Period: 90 days, 0 hours)
            SIA license(s) status is Not Authorized.
            SW Upgrade will still be allowed as SIA Grace Period is remaining
******************************************************************************
                                                                      Count
Feature/Area     Entitlement                                       Last Next
============ ================================================== ==== ====
FCM          NCS1010 - Essentials Tier - Optical Line Terminal R    3    0
FCM          NCS1010 - Essentials Subscription - Optical Line Te    3    0
FCM          NCS1010 - Advantage Tier - Optical Line Terminal RT    3    0
FCM          NCS1010 - Advantage Subscription - Optical Line Ter    3    0
```

Example 5:

The following example shows the sample output of the **show license summary** command.

```
RP/0/RP0/CPU0:iso#show license usage
Fri Jul 15 08:17:40.048 UTC
```

```
License Authorization:
  Status: OUT OF COMPLIANCE on Jul 15 2022 07:01:00 UTC

NCS1010 - Essentials - OLT RTU (NCS1010_ESS_OLT_RTU):
  Description: NCS1010 - Essentials Tier - Optical Line Terminal RTU (Per Port)
  Count: 32
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

NCS1010 - Essentials - OLT SIA (NCS1010_ESS_OLT_SIA):
  Description: NCS1010 - Essentials Subscription - Optical Line Terminal - SIA
               (Per Port)
  Count: 32
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED
```

Example 6:

The following example shows the sample output of the **show license usage** command.

```
RP/0/RP0/CPU0:iso#show license usage
Fri Jul 15 08:17:40.048 UTC

License Authorization:
  Status: OUT OF COMPLIANCE on Jul 15 2022 07:01:00 UTC

NCS1010 - Essentials - OLT RTU (NCS1010_ESS_OLT_RTU):
  Description: NCS1010 - Essentials Tier - Optical Line Terminal RTU (Per Port)
  Count: 32
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED

NCS1010 - Essentials - OLT SIA (NCS1010_ESS_OLT_SIA):
  Description: NCS1010 - Essentials Subscription - Optical Line Terminal - SIA
               (Per Port)
  Count: 32
  Version: 1.0
  Status: OUT OF COMPLIANCE
  Export status: NOT RESTRICTED
```

License consumption use cases

In NCS 1010, advanced licenses are consumed based on the features configured.

- For an OLT card, the number of advanced licenses consumed equals the number of essential licenses present when certain advanced features are enabled.
- For an ILA card, only one advanced license is consumed regardless of the number of essential licenses present, when advanced features are enabled.

Examples of license consumption use cases:

- License consumption for overlapping Nyquist channels, on page 21
- License consumption for OTDR scan data, on page 23
- License consumption when tone rate is configured for connection verification, on page 21

License consumption when tone rate is configured for connection verification

When you configure tone rate for connection verification, license consumption is determined by the device type. The examples below show how the license summary output changes when the tone rate configuration is present or removed.

This sample shows the configuration of tone rate for connection verification.

```
RP/0/RP0/CPU0:ios(config)#controller ots 0/0/0/3
RP/0/RP0/CPU0:ios(config-Ots)#tone-rate 25
RP/0/RP0/CPU0:ios(config-Ots)#tone-frequency 191.175
RP/0/RP0/CPU0:ios(config-Ots)#tone-pattern abcd1234
RP/0/RP0/CPU0:ios(config-Ots)#commit
```

This sample displays the license summary output after configuring the tone rate. In addition to the essential licenses, there are the same number of advantage licenses consumed as essential licenses.

```
RP/0/RP0/CPU0:ios#show lic platform summary
Thu Aug 28 14:16:21.188 IST
Collection: LAST: Thu Aug 28 2025 14:15:23 IST
            NEXT: Thu Aug 28 2025 14:16:23 IST
Reporting:  LAST: Thu Aug 28 2025 14:15:23 IST
            NEXT: Thu Aug 28 2025 14:16:23 IST
SIA Status: In Compliance
                                                                    Count
Feature/Area     Entitlement                                      Last Next
============ ================================================== ==== ====
FCM 1         NCS1010 - Essentials Tier - Optical Line Terminal R    3    0
FCM 1         NCS1010 - Essentials Subscription - Optical Line Te    3    0
FCM 1         NCS1010 - Advantage Tier - Optical Line Terminal RT    3    0
FCM 1         NCS1010 - Advantage Subscription - Optical Line Ter    3    0
```

This sample displays the license summary after the tone rate configuration is removed. Only essential licenses are consumed when the tone rate is removed.

```
RP/0/RP0/CPU0:ios#show lic plat sum
Thu Aug 28 15:00:41.565 IST
Collection: LAST: Thu Aug 28 2025 15:00:22 IST
            NEXT: Thu Aug 28 2025 15:01:22 IST
Reporting:  LAST: Thu Aug 28 2025 15:00:22 IST
            NEXT: Thu Aug 28 2025 15:01:22 IST
SIA Status: In Compliance
                                                                    Count
Feature/Area     Entitlement                                      Last Next
============ ================================================== ==== ====
FCM 1         NCS1010 - Essentials Tier - Optical Line Terminal R    3    0
FCM 1         NCS1010 - Essentials Subscription - Optical Line Te    3    0
```

License consumption for overlapping Nyquist channels

When Nyquist channels are configured for omnidirectional cross-connection, both an Essentials license and an Advantage license are consumed for every overlapping Nyquist channel, one of each per channel.

Sample configuring the overlapping Nyquist channel.

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#hw-module location 0/0/NXR0 terminal-ampli grid-mode flex
RP/0/RP0/CPU0:ios(config-hwmod-olt-flexi)#channel-id 191 centre-freq 192.3625 width 50
RP/0/RP0/CPU0:ios(config-hwmod-olt-flexi)#channel-id 192 centre-freq 192.4125 width 55
RP/0/RP0/CPU0:ios(config-hwmod-olt-flexi)#channel-id 193 centre-freq 192.4625 width 50
RP/0/RP0/CPU0:ios(config-hwmod-olt-flexi)#commit
```

This sample displays the overlapping channels highlighted.

```
RP/0/RP0/CPU0:IOS#show hw-module location 0/0/nXR0 terminal-ampli
Thu Aug 21 17:42:52.551 IST

Legend:
NXC      - Channel not cross-connected
ACTIVE - Channel cross-connected to data port
ASE        - Channel filled with ASE
FAILED - Data channel failed, pending transition to ASE
PENDING_ACTIVATION - Data Channel pending transition to ACTIVE/FAIL

Location:             0/0/NXR0

Status:               Provisioned

ASE Total Power:      15.70 dBm

Flex Grid Info

Channel Number      Centre Frequency(THz)       Channel Width(GHz)    Channel Status
Overlapping Channels
1                   193.100000                  75.000                ACTIVE
- ,   -
2                   193.900000                  75.000                ACTIVE
- ,   -
3                   195.000000                  75.000                ACTIVE
- ,   -
4                   194.400000                  75.000                ACTIVE
- ,   -
5                   196.100000                  75.000                ACTIVE
- ,   -
6                   195.950000                  75.000                ACTIVE
- ,   -
7                   195.600000                  75.000                ACTIVE
- ,   -
8                   195.450000                  75.000                ACTIVE
- ,   -
191                 192.362500                  50.000                NXC
- , 192
192                 192.412500                  55.000                NXC
191 , 193
193                 192.462500                  50.000                NXC
192 ,   -
```

This sample displays the license summary output after configuring the Nyquist channels. In addition to the essential licenses, an equal number of advantage licenses are consumed.

```
P/0/RP0/CPU0:ios#show lic platform summary
Thu Aug 21 17:45:11.120 IST
Collection: LAST: Thu Aug 21 2025 17:44:33 IST
            NEXT: Thu Aug 21 2025 17:45:33 IST
Reporting:  LAST: Thu Aug 21 2025 17:44:33 IST
            NEXT: Thu Aug 21 2025 17:45:33 IST
**********************************IMPORTANT***********************************
SIA Status: Out of Compliance(Remaining Grace Period: 87 days, 23 hours)
            Number of SIA license(s) used is more than available.
            SW Upgrade will still be allowed as Grace Period is remaining
******************************************************************************
                                                                      Count
Feature/Area     Entitlement                                        Last Next
============ ================================================== ==== ====
FCM 1        NCS1010 - Essentials Tier - Optical Line Terminal R    8    0
FCM 1        NCS1010 - Essentials Subscription - Optical Line Te    8    0
```

```
FCM 1        NCS1010 - Advantage Tier - Optical Line Terminal RT    8    0
FCM 1        NCS1010 - Advantage Subscription - Optical Line Ter    8    0
FCM 1        Essentials Subscription - CCMD - SIA                   1    0
FCM 1        Essential Tier- CCMD RTU                               1    0
```

License consumption for OTDR scan data

When an OTDR scan status changes to **Data Ready**, the system determines license consumption based on device type. For each completed scan, the same number of Advantage licenses are consumed as Essential licenses.

This output shows a typical result when OTDR scan data status indicates “Data Ready".

```
RP/0/RP0/CPU0:P2B_DT_02_PTP0#show controllers ots 0/0/0/0 otdr-info tx
Tue Aug 26 16:06:56.896 IST
        Scan Direction: TX
        Scan Status: Data Ready
        Total Measured Loss: 0.000000 dB
        Total Measured Length: 9.640000 m
        Optical Return Loss: 23.0 dB
        SOR file: /harddisk:/otdr/P2B_DT_02_PTP0_OTDR_Ots0_0_0_0_TX_20250826-160640.sor
        Total Events detected: 2
        Scan Timestamp: Tue Aug 26 16:06:40 2025 UTC
        Event Type Legend:  NR:Non-Reflective  R:Reflective  FE:Fiber-End
ER:Excess-Reflection EA:Excess-Attenuation

        Event#      |  Detected Event(s)       |  Location(m)     |  Accuracy(m)     |
Magnitude(dB)   |  Attenuation/km(dB)
        1           |  R FE                    |  9.6400          |  2.00            |
-25.81          |  0.00

        2           |  NR FE                   |  9.6400          |  2.00            |
0.00            |  0.00
```

This output displays the license summary. The summary shows the consumption for Essentials and Advantage licenses.

```
 RP/0/RP0/CPU0:P2B_DT_02_PTP0#show lic platform sum
Tue Aug 26 16:11:14.273 IST
Collection: LAST: Tue Aug 26 2025 16:10:43 IST
            NEXT: Tue Aug 26 2025 16:11:43 IST
Reporting:  LAST: Tue Aug 26 2025 16:10:43 IST
            NEXT: Tue Aug 26 2025 16:11:43 IST
SIA Status: In Compliance
                                                                    Count
Feature/Area     Entitlement                                     Last Next
============ ================================================== ==== ====
FCM 1        NCS1010 - Essentials Tier - Optical Line Terminal R    3    0
FCM 1        NCS1010 - Essentials Subscription - Optical Line Te    3    0
FCM 1        NCS1010 - Advantage Tier - Optical Line Terminal RT    3    0
FCM 1        NCS1010 - Advantage Subscription - Optical Line Ter    3    0
```

These are sample outputs where the OTDR scan is stopped.

```
RP/0/RP0/CPU0:ios#otdr-stop controller ots 0/0/0/0 tx
Thu Aug 28 14:05:44.405 IST
OTS OTDR Scan Stopped at TX
RP/0/RP0/CPU0:ios#RP/0/RP0/CPU0:Aug 28 14:05:45.218 IST: osa_driver[271]:
%PLATFORM-OSA-6-OTDR_SCAN_STATUS_INFO : OTDR scan status changed: Ots0/0/0/0 direction: TX
 status: Otdr Scan Stopped scan mode: Auto
```

```
P/0/RP0/CPU0:ios#show controller ots 0/0/0/0 otdr-info tx
Thu Aug 28 14:08:09.117 IST
        Scan Direction: TX
        Scan Status: Stopped
        Total Measured Loss: 0.000000 dB
        Total Measured Length: 9.640000 m
        Optical Return Loss: 23.0 dB
        SOR file: /harddisk:/otdr/P2B_DT_02_PTP0_OTDR_Ots0_0_0_0_TX_20250826-160640.sor
        Total Events detected: 2
        Scan Timestamp: Tue Aug 26 16:06:40 2025 UTC
        Event Type Legend:  NR:Non-Reflective  R:Reflective  FE:Fiber-End
ER:Excess-Reflection EA:Excess-Attenuation

        Event# |  Detected Event(s)  |  Location(m)     |  Accuracy(m)     |  Magnitude(dB)
   |  Attenuation/km(dB)
          1      |  R FE               |  9.6400          |  2.00            |  -25.81
    |  0.00

          2      |  NR FE              |  9.6400          |  2.00            |  0.00
    |  0.00
```

This output displays the license summary. Only Essentials licenses are consumed, as shown in the summary.

```
 RP/0/RP0/CPU0:ios#show lic plat sum
Thu Aug 28 14:08:28.524 IST
Collection: LAST: Thu Aug 28 2025 14:08:22 IST
            NEXT: Thu Aug 28 2025 14:09:22 IST
Reporting:  LAST: Thu Aug 28 2025 14:08:22 IST
            NEXT: Thu Aug 28 2025 14:09:22 IST
SIA Status: In Compliance
                                                                      Count
Feature/Area     Entitlement                                        Last Next
============ ================================================== ==== ====
FCM 1        NCS1010 - Essentials Tier - Optical Line Terminal R    3    0
FCM 1        NCS1010 - Essentials Subscription - Optical Line Te    3    0
```