Smart Licensing

Smart Licensing

Smart Licensing is a cloud-based licensing solution that simplifies the licensing experience across the enterprise by making it easier to purchase, deploy, track, and renew Cisco software through a single, simple user interface.

- Provides visibility into license ownership and consumption.
- Allows you to track the status of your license and software usage trends.
- Helps you simplify three core functions: purchasing, management, and reporting.

Core functions of Smart Licensing

Smart Licensing helps you simplify the following 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

Smart Licensing provides the following features.

- Your device initiates a call home and requests the licenses it needs.
- Pooled licences - Licences are company account-specific, and can be used with any compatible device in your company. You can activate or deactivate different types of licenses on the device without actually installing a license file on the device.
- 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

NCS 1004 integrates with Cisco Smart Accounts to simplify license management.

Smart Accounts provide a centralized, organized, and simple-to-use solution for managing Cisco software licenses across an entire organization. They act as a container that holds all Cisco software assets, allowing customers to view, store, manage, and move these assets as needed. Smart Accounts enable full visibility into license entitlements and usage, helping optimize software management. Smart Accounts support license pooling, portability, and provide compliance reporting.

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

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

Virtual Accounts are customizable subaccounts within a Smart Account used to organize and optimize Cisco licenses. They can be structured to reflect business units, product types, or geographic locations, allowing

better planning and utilization of assets. 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.

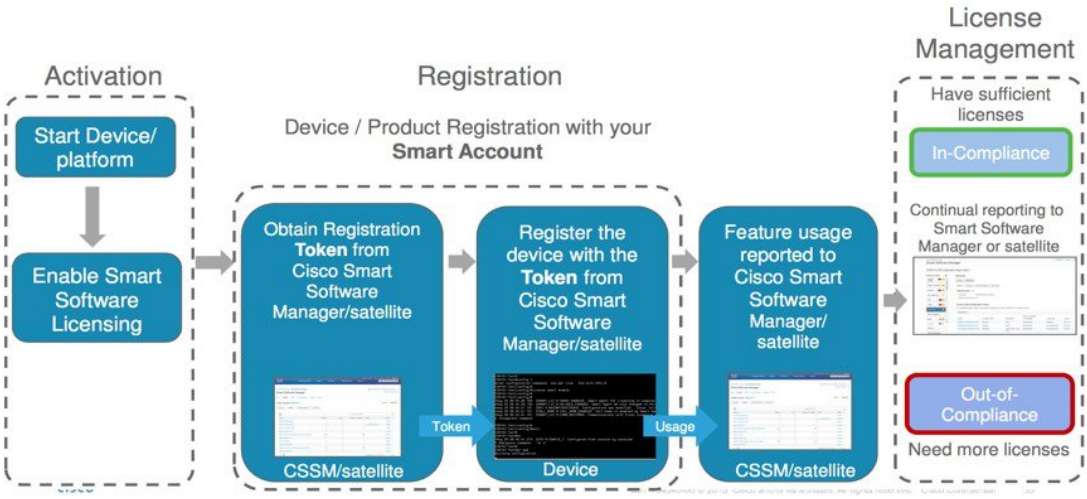
Product Instances

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 workflow

The following figure depicts a working model of smart licensing that involves a three-step procedure.

Figure 1: Smart Licensing Work Flow



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

2. **Enabling and Use Smart Licensing**: Smart Licensing is enabled by default. You can use either of the following options to communicate:

   - **Smart Call Home**: The Smart Call Home feature is automatically configured when Smart Licensing is enabled. Smart Call Home is used by Smart Licensing as a medium for communication with the Cisco license service. Call Home feature allows Cisco products to periodically call-home and perform an audit and reconciliation of your software usage information. This information helps Cisco efficiently track your install base, keep them up and running, and effectively pursue service and support contract renewals. For more information on Smart Call Home feature, see http://www.cisco.com/c/dam/en/us/td/docs/switches/lan/smart_call_home/SCH_Deployment_Guide.pdf.

   - **Smart Software Manager Satellite**: is a component of Cisco Smart Licensing and works with Cisco Smart Software Manager (SSM). It helps customers intelligently manage product licenses, providing near real-time visibility and reporting of the Cisco licenses they purchase and consume.

     For customers who do not want to manage their installed base using a direct Internet connection, the Smart Software Manager satellite is installed on the customer premises and provides a subset of Cisco SSM functionality. After you download the satellite application, deploy it, and register it to Cisco SSM, you can perform the following functions locally:

     - Activate or register a license
     - Get visibility to your company's licenses
     - Transfer licenses between company entities

     Periodically, the satellite must synchronize with Cisco SSM to reflect the latest license entitlements.

     For more information about the Smart Software Manager satellite, see http://www.cisco.com/c/en/us/buy/smart-accounts/software-manager-satellite.html.

3. **Manage and Report Licenses**: You can manage and view reports about your overall software usage in the Smart Software Manager portal. Compliance reporting describes the types of Smart Licensing reports.

Smart licensing benefits for Cisco NCS 1004

Smart Licensing for Cisco NCS 1004 offers several important advantages. These benefits streamline license management, enhance operational flexibility, and improve visibility of software assets across Cisco NCS 1004 deployments.

- License pooling: Licenses can be pooled and reused across the entire organization, enabling flexibility across organizational boundaries.
- No lock-out on over-consumption: Configurations can be performed even if license usage exceeds the purchased limit. When this occurs, out-of-compliance notifications are issued, allowing continued operations while prompting the user to buy additional licenses as needed.
- Asset management visibility: Smart Licensing provides detailed information for software asset management, which helps organizations plan and track their license usage.

Smart Licensing in Cisco NCS 1004

Cisco NCS 1004 supports a set of line card product IDs (PIDs), each with specific licensing characteristics that determine whether smart licensing applies and how the licenses are charged.

- **NCS1K4-1.2T-K9**—High-cost PID. This card does not support smart licensing.
- **NCS1K4-1.2T-L-K9**—Licensed PID for 1.2T line card and the licenses are charged per port.
- **NCS1K4-OTN-XPL**—Licensed PID for OTN-XP line card.
- **NCS1K4-QXP-L-K9**—Licensed PID for QXP line card.
- **NCS1K4-QXP-K9**—Non-licensed PID for QXP line card.
- **NCS1K4-2-QDD-CK9L**—Licensed PID for 800G QDD Line Card - C-band.
- **S-NCS1K4-ULE-400=**—Licensed PID for 400G encryption for OTN-XP Card.

You can use either one or a combination of both types of the 1.2T line card in the NCS 1004.

Software entitlements of Cisco NCS 1004

This reference enables you to identify the smart licensing entitlement for each Cisco NCS 1004 software feature and understand the per-port charging model so that you can plan license procurement.

Software entitlement is a system that consists of a license manager on Cisco NCS 1004. The license manager manages licenses for various software and hardware features. The license manager parses and authenticates the license before accepting it. The following table lists the features and its corresponding entitlements that can be enabled on Cisco NCS 1004 using licenses:

Table 1: Feature History

Feature Name	Release Information	Feature Description
Smart Licensing Support on 2-QDD-C Card	Cisco IOS XR Release 7.9.1	Smart licensing is now supported on the 2-QDD-C card. Being a cloud-based software license management solution, it enables you to automate the licensing process and provides some of these functionalities: • Asset management information to plan and track the licenses. • License pooling across the organization, enabling them to be reused across organizational boundaries. • Notifyes to buy out-of-compliance licenses when the license limit exceeds the paid license limit.

Table 2: Software Entitlements of Cisco NCS 1004

Feature	Software Entitlement
NCS1K4 Smart License-one QSFP28 client	S-NCS1K4-LIC-100G=
NCS1K4 Smart License - one QSFP28 client with encryption	S-NCS1K4-LIC-100X=
NCS1K4 Smart License - 100Gbps of client bandwidth	S-NCS1K4-100G-CL=
NCS1K4 Smart License - Long Haul	S_NCS1K4_LONGHAUL
NCS1K4 Smart License - Subsea	S_NCS1K4_SUBSEA
NCS1K4 Smart License - 100Gbps of client bandwidth	S_NCS1K4_100
NCS1K4 Smart License - 400Gbps of client bandwidth	S_NCS1K4_400

The licenses are charged per port basis and dependent on the number of trunk ports and client ports that you configure. The license count for the configuration of 4 x 100GE client ports or lesser is zero. For configurations greater than 4 x 100GE client ports, the license count is incremented by one for every 100GE client port configured at the slice level. The license count for the trunk port is incremented based on the BPS & optics configuration.

Generic smart licensing

This reference enables you to identify the generic smart license entitlements that span multiple Cisco NCS 1004 cards and verify the license usage with sample show command outputs.

Generic Smart Licensing feature allows you to purchase licenses that can be used on 2-QDD-C card, 1.2T card, and OTN XP card with any client data rate with or without encryption. This feature further simplifies license procurement and management of licensing.

Table 3: Feature History

Feature Name	Release Information	Feature Description
Generic Smart License	Cisco IOS XR Release 7.10.1	Smart licensing functionality is enhanced to enable you to use one common license across cards and functionalities. Hence, a single license will provide entitlement to use 2-QDD-C card, 1.2T card, and OTN XP card, with encryption enabled or disabled, and for different client data rates. This feature reduces license procurement and management effort.

Generic Smart Licensing Software Entitlements of Cisco NCS 1004:

Feature	Software Entitlement
NCS1K4 - 100G without encryption	S_NCS1K4_100
NCS1K4 smart license - 100G with encrypiton	S-NCS1K4-LIC-100X=
NCS1K4 - 400G without encryption	S_NCS1K4_400
NCS1K4 - 100G with encryption	S-NCS1K4-LIC-100X=
NCS1K4 - 400G - with encrypition	S_NCS1K4_400_ENC

Sample output for 100G smart licensing without encryption on the 1.2T card

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
```

```
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC
```

Sample output for 100G smart licensing with encryption on the 1.2T card:

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1K4 - 100G           (S_NCS1K4_100)                    7 AUTHORIZED
```

Sample output for 100G smart licensing without encryption on OTN-XP card:

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC

License Usage:
  License                                 Entitlement Tag                     Count Status
  -----------------------------------------------------------------------------------------

  NCS1K4 smart license...    (S-NCS1K4-LIC-100X=)              1 AUTHORIZED
```

Sample output for 100G smart licensing without encryption on OTN-XP card.

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
```

```
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1K4 - 100G           (S_NCS1K4_100)                    1 AUTHORIZED
```

Sample output for 100G smart licensing with encryption on OTN-XP card

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC
Smart Licensing is ENABLED
Registration:
Status: REGISTERED
Smart Account: BU Production Test
Virtual Account: NCS1000
Export-Controlled Functionality: ALLOWED
Last Renewal Attempt: None
Next Renewal Attempt: Aug 14 2023 16:53:02 UTC
License Authorization:
Status: AUTHORIZED
Last Communication Attempt: SUCCEEDED
Next Communication Attempt: Mar 26 2023 14:41:27 UTC
License Usage:
License Entitlement Tag Count Status
-----------------------------------------------------------------------------
NCS1K4 smart license... (S-NCS1K4-LIC-100X=) 1 AUTHORIZED
```

Sample output for 400G smart licensing without encryption on OTN-XP card

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC
Smart Licensing is ENABLED
Registration:
Status: REGISTERED
Smart Account: BU Production Test
Virtual Account: NCS1000
Export-Controlled Functionality: ALLOWED
Last Renewal Attempt: None
Next Renewal Attempt: Aug 14 2023 16:53:02 UTC
License Authorization:
Status: AUTHORIZED
Last Communication Attempt: SUCCEEDED
Next Communication Attempt: Mar 26 2023 14:41:27 UTC
License Usage:
License Entitlement Tag Count Status
-----------------------------------------------------------------------------
NCS1K4 - 400G (S_NCS1K4_400) 1 AUTHORIZED
```

Sample output for 400G smart licensing with encryption on OTN-XP card

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC
Smart Licensing is ENABLED
```

```
Registration:
Status: REGISTERED
Smart Account: BU Production Test
Virtual Account: NCS1000
Export-Controlled Functionality: ALLOWED
Last Renewal Attempt: None
Next Renewal Attempt: Aug 14 2023 16:53:02 UTC
License Authorization:
Status: AUTHORIZED
Last Communication Attempt: SUCCEEDEDNext Communication Attempt: Mar 26 2023 14:41:27 UTC
License Usage:
License Entitlement Tag Count Status
-----------------------------------------------------------------------------
NCS1K4 - 400G - ENC (S_NCS1K4_400_ENC) 1 AUTHORIZED
```

The following sample output displays 100G smart licensing without encryption on OTN-XP card:

The following sample output displays 100G smart licensing with encryption on OTN-XP card:

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC
   License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1K4 smart license... (S-NCS1K4-LIC-100X=)              1 AUTHORIZED
```

The following sample output displays smart licensing support for 400G without encryption on OTN-XP card:

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC

License Usage:
  License                 Entitlement Tag               Count Status
```

```
  ------------------------------------------------------------------------------
  NCS1K4 - 400G           (S_NCS1K4_400)                    1 AUTHORIZED
```

The following sample output displays smart licensing support for 400G with encryption on OTN-XP card:

```
RP/0/RP0/CPU0:ios#show license summary
Fri Feb 24 14:42:02.029 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Aug 14 2023 16:53:02 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 26 2023 14:41:27 UTC

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1K4 - 400G - ENC     (S_NCS1K4_400_ENC)                1 AUTHORIZED
```

Create a token

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

Procedure

Step 1 Log in to the Cisco Smart Software Manager.

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

Step 2 Select the token with the name that was provided while creating the token.

Step 3 Click on the blue arrow on the token. The token ID generates.

Step 4 Copy the token and register the NCS1004 with the same token ID.

Configure smart licensing

Enable smart license management on your Cisco NCS 1004 by connecting the device to Cisco Smart Licensing services.

Smart licensing automates license activation and compliance, helping you centrally manage device licenses.

To configure smart licensing in Cisco NCS 1004, perform these tasks:

Procedure

Step 1 Configure the domain name server for the smart license server.

Example:

```
RP/0/RP0/CPU0:ios#configure
Sat Dec 15 15:25:14.385 IST
RP/0/RP0/CPU0:ios(config)#domain name-server 198.51.100.247
```

Step 2 Setup the CiscoTAC-1 profile and destination address for Smart Call Home, using these commands:

call-home

service active

contact smart-licensing

profile CiscoTAC-1

active

destination address http {http|https}://{FQDN}/its/service/oddce/services/DDCEService

destination transport-method http

Note
The destination address must be the fully qualified domain name (FQDN) of the Cisco Smart Software Manager (`tools.cisco.com`) or your Smart Licensing satellite server. Configure the DNS server before setting up the call-home destination. The CiscoTAC-1 profile is the default for smart licensing and must not be deleted.

Example:

```
RP/0/RP0/CPU0:ios#configure
Sat Dec 15 15:25:14.385 IST
RP/0/RP0/CPU0:ios(config)#domain name-server 198.51.100.247
```

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

]

Step 3 Configure the crypto ca Trust point profile, if CRL distribution point is not defined in the Satellite server certificate or if the device is not able to reach the host mentioned in the CRL distribution point.

Example:

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

Step 4 Create and copy the registration token ID using Cisco Smart Software Manager.

For more details about creating a token, see Create a token.

Step 5 Use the **license smart register idtoken** *token-ID* in the privileged EXEC mode, to register the token ID in Cisco NCS 1004.

If registration fails due to communication issues, wait 24 hours for the device to retry or force the registration using the **license smart register idtoken** *token-ID* **force** command.

If the device is removed from inventory, redeployed, or returned to Cisco using Return Merchandise Authorization (RMA), cancel registration and remove entitlements, using the **license smart deregister** command to cancel the registration on your device. All smart licensing entitlements and certificates on the platform are removed.

ID certificates are renewed automatically after six months. In case, the renewal fails, the product instance goes into unidentified state. You can manually renew the ID certificate using the **license smart renew id** command.

Authorization periods are renewed by the Smart Licensing system every 30 days. As long as the license is in an 'Authorized' or 'Out-of-Compliance' (OOC), the authorization period is renewed. Use the **license smart renew auth** command to make an on-demand manual update of your registration. Thus, instead of waiting 30 days for the next registration renewal cycle, you can issue this command to instantly find out the status of your license.

After 90 days, the authorization period expires and the status of the associated licenses display "AUTH EXPIRED". Use the **license smart renew auth** command to retry the authorization period renewal. If the retry is successful, a new authorization period begins.

The Cisco NCS 1004 is registered with Cisco Smart Licensing, license entitlements are tracked automatically, and compliance is maintained.

Verify smart licensing configuration

This reference enables you to verify smart licensing configuration on Cisco NCS 1004 by listing the supported show commands, describing each license authorization status, and providing sample command outputs for confirmation.

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**

This table defines the available license authorization status in Cisco NCS 1004:

Table 4: License Authorization Status

License Authorization Status	Description
Unconfigured	Smart Software Licensing is not configured.
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: show license all

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

```
RP/0/RP0/CPU0:SIT-5#show license all
Wed Sep 22 17:18:19.761 IST

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Jun 21 2021 12:40:52 IST
  Last Renewal Attempt: None
  Next Renewal Attempt: Dec 18 2021 12:40:51 IST
  Registration Expires: Jun 21 2022 12:35:49 IST

License Authorization:
  Status: AUTHORIZED on Sep 09 2021 11:45:43 IST
  Last Communication Attempt: SUCCEEDED on Sep 09 2021 11:45:43 IST
  Next Communication Attempt: Oct 09 2021 11:45:42 IST
  Communication Deadline: Dec 08 2021 11:40:41 IST

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

Miscellaneus:
  Custom Id: <empty>

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

NCS1K4 - Subsea - 1.2T Line Card (S_NCS1K4_SUBSEA):
  Description: NCS1K4 - Subsea - 1.2T Line Card
  Count: 3
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

NCS1K4 smart license - one QSFP28 client (S-NCS1K4-LIC-100G=):
  Description: NCS1K4 smart license - one QSFP28 client
  Count: 18
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

NCS1K4 smart license - one QSFP28 client with encryption (S-NCS1K4-LIC-100X=):
  Description: NCS1K4 smart license - one QSFP28 client with encryption
  Count: 2
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

NCS1K4 - Long Haul - 1.2T Line Card (S_NCS1K4_LONGHAUL):
  Description: NCS1K4 - Long Haul - 1.2T Line Card
  Count: 2
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

Product Information
====================
UDI: SN:CAT2249B009,UUID:default-sdr

Agent Version
=============
Smart Agent for Licensing: 4.13.32_rel/85

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

Example 2: show license platform detail

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

```
RP/0/RP0/CPU0:ios#show license platform detail
Mon Feb 11 15:59:55.422 IST
Current state:    REGISTERED

Collection: LAST: Mon Feb 11 2019 15:57:53 IST
            NEXT: Mon Feb 11 2019 16:57:53 IST
Reporting:  LAST: Mon Feb 11 2019 15:57:53 IST
            NEXT: Tue Feb 12 2019 15:57:53 IST

Parameters: Collection interval:          60 minute(s)
            Reporting  interval:        1440 minute(s)
            Throughput gauge:        1000000 Kbps

================================================
Feature/Area 'system'
   Name:  System
   Status:   ACTIVE
   Flags: CONFIG

   [ 1] Name:  NCS1K4 smart license - one QSFP28 client
        Entitlement Tag:
regid.2018-05.com.cisco.S-NCS1K4-LIC-100G=,1.0_03df009f-5ac5-48da-af50-4279ddea5e24
        Count: Last reported:    8
               Next report:      0
   [ 2] Name:  NCS1K4 smart license - one QSFP28 client with encryption
        Entitlement Tag:
regid.2018-05.com.cisco.S-NCS1K4-LIC-100X=,1.0_3938b0c5-f635-4426-9f0f-936d930cea9e
        Count: Last reported:    8
               Next report:      0
```

Example 3: show license status

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

```
RP/0/RP0/CPU0:ios#show license status
Mon Feb 11 16:02:24.499 IST

Smart Licensing is ENABLED
  Initial Registration: SUCCEEDED on Mon Feb 11 2019 15:51:10 IST
  Last Renewal Attempt: None
  Next Renewal Attempt: Sat Aug 10 2019 15:52:10 IST
  Registration Expires: Tue Feb 11 2020 15:46:59 IST

License Authorization:
  Status: AUTHORIZED on Mon Feb 11 2019 15:53:40 IST
  Last Communication Attempt: SUCCEEDED on Mon Feb 11 2019 15:53:40 IST
  Next Communication Attempt: Wed Mar 13 2019 15:53:39 IST
  Communication Deadline: Sun May 12 2019 15:47:29 IST
```

Example 4: show license usage

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

```
RP/0/RP0/CPU0:ios#show license usage
Mon Feb 11 15:59:29.817 IST

License Authorization:
  Status: AUTHORIZED on Mon Feb 11 2019 15:53:40 IST

NCS1K4 smart license - one QSFP28 client (S-NCS1K4-LIC-100G=):
  Description: NCS1K4 smart license - one QSFP28 client
  Count: 8
  Version: 1.0
  Status: AUTHORIZED

NCS1K4 smart license - one QSFP28 client with encryption (S-NCS1K4-LIC-100X=):
  Description: NCS1K4 smart license - one QSFP28 client with encryption
 Count: 8
  Version: 1.0
  Status: AUTHORIZED
```

Example 5: show license udi

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

```
RP/0/RP0/CPU0:ios#show license udiMon Feb 11 16:02:46.733 IST

Product Information
===================
UDI: SN:CAT2231B18Y,UUID:default-sdr
```

Criteria for license consumption of subsea networks

A subsea license is a trunk-based smart license model that

- is consumed on Cisco NCS 1004 whenever specified subsea trunk-port configurations, bits-per-symbol values, or chromatic dispersion ranges exist in the running configuration,
- supports tracking license status and software usage trends for subsea deployments, and
- allows access to subsea-specific controls such as extended chromatic dispersion and advanced compensation settings.

Table 5: Feature History

Feature Name	Release Information	Feature Description
Licensing Feature Update	Cisco IOS XR Release 7.3.2	Criteria for license consumption in Long Haul and Subsea networks are introduced. Long Haul (LH) and Subsea are two trunk-based license models that are implemented regardless of the line rate, in addition to the existing client-based licenses. These license models allow the user to easily track the status of licenses and software usage trends. The long-haul license is required to enable QPSK and 8QAM modes. The subsea license is required to enable BPSK and subsea specific controls such as extended chromatic dispersion, special non-linear compensation settings and so on.

Criteria for license consumption

The criteria for license consumption of subsea networks are as follows:

- If any of the following trunk-port configurations appear in the running configuration, the subsea license is consumed:
  - `Ios(config-optics)#filter-roll-off-factor <0-1>`
  - `Ios(config-optics)#rx-voa target-power <-190,+30>`
  - `Ios(config-optics)#rx-voa fixed-ratio <+100,+1700>`
  - `Ios(config-optics)#enh-colorless-mode <1-3>`
  - `Ios(config-optics)#enh-sop-tol-mode <1-3>`
  - `Ios(config-optics)#nleq-comp-mode <1-4>`
  - `Ios(config-optics)#cross-pol-gain-mode <1-15>`
  - `Ios(config-optics)#cross-pol-weight-mode <1-7>`
  - `Ios(config-optics)#cpr-win-mode <1-15>`
  - `Ios(config-optics)#cpr-ext-win-mode <1-15>`
- The license is consumed if the bps value is in the range of 1–2 bits per symbol or 1, excluding the boundary value of 2 in the following command:

  ```
  show controller optics <trunk-port>
  ```
- The license is consumed if the cd-min value is less than -10000 or cd-max value is greater than 100000, excluding the boundary values in the output of the following command:

```
show controller optics <trunk-port>
```

Example for license consumption

The following output of **show license usage** command shows the license usage count as one.

```
RP/0/RP0/CPU0:BH-SIT2#show license usage
Tue Aug  3 11:12:42.440 IST
License Authorization:
Status: AUTHORIZED on Aug 03 2021 11:10:12 IST
NCS1K4 - Subsea - 1.2T Line Card (S_NCS1K4_SUBSEA):
Description: NCS1K4 - Subsea - 1.2T Line Card
Count: 1
Version: 1.0
Status: AUTHORIZED
Export status: NOT RESTRICTED
```

Criteria for license consumption of long-haul networks

The long-haul smart license is consumed on Cisco NCS 1004 when the bits-per-symbol value reported by the trunk controller falls within the qualifying range, and the license remains consumed while the line card is up.

Long-haul license consumption criteria

The smart license is consumed if the bps value is in the range of 2 - 4 bits per symbol including the boundary values in the output of the following command:

```
show controller optics 0/1/0/1
```

Example:

show controller optics 0/1/0/1 Bits per symbol = 3.0000000000 bits/symbol

In the above example, the bits per symbol value is 3, so the license is consumed.

Note

- The license is consumed even when the trunk port is in shutdown state.
- The license is consumed only when the line card is up and running.

Example for license consumption

The following output of **show license usage** command shows the license usage count as two:

```
RP/0/RP0/CPU0:SIT-4#show license usage
Tue Aug 3 15:53:48.453 IST
License Authorization:
NCS1K4 - Long Haul - 1.2T Line Card (S_NCS1K4_LONGHAUL):
Description: NCS1K4 - Long Haul - 1.2T Line Card
Count: 2
Version: 1.0
Status: AUTHORIZED
Export status: NOT RESTRICTED
```

Register a smart license on Cisco NCS 1004

Enable smart license functionality on Cisco NCS 1004 and maintain licensing compliance via Cisco Smart Software Manager (CSSM).

Use this process to register a smart license for your Cisco NCS 1004 device, address synchronization issues between the device and CSSM, and perform license renewal and deregistration when needed.

Procedure

Step 1 Register the license using the `license smart register idtoken` <*idtoken*> command:

```
RP/0/RP0/CPU:ios#license smart register idtoken <idtoken>
```

Step 2 Access the Cisco Smart Software Manager portal, https://software.cisco.com/software/csws/ws/platform/home#module/SmartLicensing.

Step 3 Remove the existing product instance in CSSM:

a) Click **Inventory**.
b) Click **Product Instances**.
c) Select the node instance.
d) Click **Actions**, and then **Remove**.

Step 4 Renew the authorization period on the device.

```
RP/0/RP0/CPU0:ios#license smart renew auth
```

```
RP/0/RP0/CPU0:ios#show logging | i "Data and signature"
Thu May 27 09:57:02.237 UTC
RP/0/RP0/CPU0:May 27 09:54:57.783 UTC: smartlicserver[311]:
LICENSE-SMART_LIC-3-AUTH_RENEW_FAILED : Authorization renewal with the Cisco Smart Software Manager
 (CSSM) :
Error received from Smart Software Manager: Data and signature do not match  for udi
PID:8812,SN:FOX2202WIVM
```

Note
The error message in the output of the **show logging** command is expected and is due to loss of synchronization between the CSSM server and the device after removing the product instance directly from the CSSM server.

Step 5 Deregister the device from CSSM.

```
RP/0/RP0/CPU0:ios#license smart deregister
```

```
RP/0/RP0/CPU0:ios#show logging | i DEREG
Thu May 27 14:48:58.170 UTC
RP/0/RP0/CPU0:May 27 09:58:58.464 UTC: smartlicserver[311]:
%LICENSE-SMART_LIC-3-AGENT_DEREG_FAILED : Smart Agent for Licensing DeRegistration with Cisco Smart
 Software Manager (CSSM) failed:
Agent received a failure status in a response message. Please check the Agent log file for the detailed
 message.
```

Note
The error message in the output of the **show logging** command is expected.

The Cisco NCS 1004 device is registered, synchronized, and deregistered as needed with CSSM. Expected error messages confirm the resolution of device and CSSM synchronization issues.

Supported transport modes for Smart Licensing

Smart Licensing software management enables you to choose from several transport modes, depending on your network connectivity and operational requirements. The default transport mode is Cisco Smart Licensing Utility (CSLU), but you can select Call-Home, Smart Transport, or Offline modes based on your needs.

The supported transport modes and their key features are:

- Call-Home mode: Directly communicates with Cisco through a Call-Home feature to register and manage licenses. Suitable for networks with internet access.
- Smart Transport mode: Utilizes Smart Licensing Transport to relay license information securely to Cisco servers. Recommended for environments that require secure, automated reporting.
- CSLU mode: Uses Cisco Smart Licensing Utility as an intermediary for managing licenses locally, offering flexibility and local control. This mode is the default.
- Offline mode: Operates without an active internet connection by generating and transferring files manually for license management. Designed for isolated or secure environments where connectivity is restricted.

You can change the transport mode to best match your network and management preferences.

Configure Call Home for Smart Licensing

Enable Call Home to establish secure communication with CSSM, which is required for smart licensing and license reporting on your device.

Call Home connects your device with CSSM and automates license registration, reporting, and updates. Proper configuration ensures compliance and full access to Cisco licensing features.

Procedure

Step 1 Enable Call Home and configure Call Home mode settings:

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 name 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 Enable Certificate Revocation List (CRL) configuration, if you have a Trustpool CA.

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 Call Home as the smart license transport mode.

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
```

Verify whether the Callhome is Configured.

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

Step 5 Establish trust with smart licensing using an ID token.

Example:

```
license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Call Home is enabled and configured on your device. The device will connect to CSSM for automated license management, compliance, and reporting.

Configure Smart Transport

Set up Smart Transport to connect your device to the CSSM for license management and establish a trusted network connection.

Smart Transport serves as an alternative to Call Home for connecting to CSSM. It enables secure network-based license registration and trust establishment.

Procedure

Step 1 Configure the Smart proxy and hostname for communication with CSSM.

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 to manage certificate trust.

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 Smart Transport for license registration.

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
```

Verify Smart Transport is configured correctly.

```
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 4 Establish trust with CSSM using an id-token.

Example:

```
license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Smart Transport is configured for secure communication and trust establishment with CSSM. The device can now use CSSM for license registration and management tasks.

Configure CSLU transport mode

Establish CSLU as the transport mode for license communication between your device and an on-premise CSLU server.

CSLU (Cisco Smart License Utility) is the default transport mode for software license management. Configuring CSLU enables secure license communications and compliance reporting for your device.

Procedure

Step 1 Use the **license smart url cslu http://<cslu-local>:8182/cslu/v1/pi** command to configure the CSLU URL.

Example:

In this sample configuration, the **10.127.59.44** is the CSLU URL that the on-premise server provided. This URL changes for each on-premise servers.

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#license smart url cslu http://10.127.59.44:8182/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 the **license smart transport cslu** command 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
```

Step 4 Use the **show license all** command to verify the CSLU configuration.

Example:

The sample output shows the configuration transport type with the on-prem server address.

```
RP/0/RP0/CPU0:ios#show license all
Transport:
  Type: cslu
  Cslu address: http://10.127.59.44:8182/cslu/v1/pi
  Proxy:
    Not Configured
  VRF:
    Not Supported
```

Step 5 (Optional) Use the **license smart trust idtoken**<*token-id*> command to establish trust using id-token.

Example:

The command uses **Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n** as a sample token id.

```
RP/0/RP0/CPU0:ios#license smart trust idtoken Zesdf3243u48329fdfhsfhsfkjs1233j4h1j1j4j41n
```

Step 6 Use the **license smart sync all** command to send the license usage reports to server and receive the compliance status for the licenses consumed by the node.

Example:

```
RP/0/RP0/CPU0:ios#license smart sync all
Tue Aug 26 13:03:28.287 IST
```

Note
If you are using on-prem version 9-202407 or later, this command retrieves the on-prem account details and the compliance information.

The device uses CSLU transport for license communications, and all required trust relationships are established.

What to do next

- Review device status in Cisco Smart Software Manager.
- Ensure device reports successful license communication

Configure offline license mode

Enable offline license operation for devices that cannot directly connect to Cisco Smart Licensing servers.

Offline license mode is necessary when your device cannot communicate with Cisco Smart Licensing servers over the network. This process allows you to manage licenses through manual file operations.

Procedure

Step 1 Disable transport to switch the device to offline license mode

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 Save the license usage report.

Example:

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

Step 3 Import the acknowledgment report.

Example:

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

The device operates in offline license mode. License usage is recorded and acknowledgments are managed manually without network transport to Cisco Smart Licensing.

Smart licensing for OTN-XP line card

Smart licensing on the Cisco NCS 1004 OTN-XP line card is calculated based on 100G client bandwidth and is independent of the client type, with the license charged per 100G client bandwidth used.

- The license calculation is based on 100G client bandwidth and is independent of the client type.
- The licensed OTN-XP line card PID is **NCS1K4-OTN-XPL**.
- The license is charged based on the usage of 100G client bandwidth.

License usage count for Cisco NCS 1004 OTN-XP line card

This reference enables you to verify license usage on the OTN-XP line card by showing a sample slice configuration in muxponder mode and the related show command outputs that confirm the license count.

License usage overview

The Cisco NCS 1004 OTN-XP line card uses smart licensing to track client bandwidth utilization. The S-NCS1K4-100G-CL= license represents 100Gbps of client bandwidth.

License count calculation:

Using 1–10 client ports requires 1 license.

- Using 1–10 client ports requires 1 license.
- Using 11–20 client ports requires 2 licenses.
- For each additional set of 10 ports, one more license is needed.

Sample slice configuration in muxponder mode

```
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0
  trunk-rate 100G
  client-port-rate 2 lane 3 client-type OTU2
  client-port-rate 2 lane 4 client-type OTU2E
  client-port-rate 4 lane 1 client-type 10GE
  client-port-rate 4 lane 2 client-type OTU2
  client-port-rate 4 lane 3 client-type OTU2E
  client-port-rate 4 lane 4 client-type 10GE
  client-port-rate 5 lane 1 client-type OTU2E
  client-port-rate 5 lane 2 client-type 10GE
  client-port-rate 5 lane 3 client-type OTU2
  client-port-rate 5 lane 4 client-type OTU2E
```

Slice state output example

The following sample shows the status of the configured slice as **Provisioned**.

```
RP/0/RP0/CPU0:ios#show hw-module location 0/1 mxponder
Fri Dec  6 02:50:32.858 UTC

Location:             0/1
Slice ID:             0
Client Bitrate:       MIXED
Trunk  Bitrate:       100G
Status:               Provisioned
LLDP Drop Enabled:    FALSE
Client Port                     Mapper/Trunk Port    Peer/Trunk Port        OTU40/1/0/0
                                Traffic Split Percentage

OTU20/1/0/2/3                         NONE           ODU20/1/0/0/2/3           100
OTU20/1/0/4/2                         NONE           ODU20/1/0/0/4/2           100
OTU20/1/0/5/3                         NONE           ODU20/1/0/0/5/3           100
OTU2E0/1/0/2/4                        NONE           ODU2E0/1/0/0/2/4          100
OTU2E0/1/0/4/3                        NONE           ODU2E0/1/0/0/4/3          100
OTU2E0/1/0/5/1                        NONE           ODU2E0/1/0/0/5/1          100
OTU2E0/1/0/5/4                        NONE           ODU2E0/1/0/0/5/4          100
TenGigECtrlr0/1/0/4/1           ODU2E0/1/0/0/4/1          NONE                100
TenGigECtrlr0/1/0/4/4           ODU2E0/1/0/0/4/4          NONE                100
TenGigECtrlr0/1/0/5/2           ODU2E0/1/0/0/5/2          NONE                100
```

License count output example

The following sample shows the license usage count as "Count: 1":

```
RP/0/RP0/CPU0:ios#show license all
Fri Dec  6 02:58:39.906 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Dec 06 2019 02:54:27 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 03 2020 02:54:26 UTC
  Registration Expires: Dec 05 2020 02:49:42 UTC

License Authorization:
  Status: AUTHORIZED on Dec 06 2019 02:56:50 UTC
  Last Communication Attempt: SUCCEEDED on Dec 06 2019 02:56:50 UTC
  Next Communication Attempt: Dec 06 2019 14:56:49 UTC
  Communication Deadline: Mar 05 2020 02:52:06 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
=============

NCS 1K4 smart License -  100Gbps of client bandwidth (S-NCS1K4-100G-CL=):
  Description: 100G Client bandwidth - Smart License
  Count: 1
  Version: 1.0
  Status: Authorized
  Export status: NOT RESTRICTED

Product Information
===================
UDI: SN:CAT2217B025,UUID:default-sdr

Agent Version
=============
Smart Agent for Licensing: 4.10.4_rel/21

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

License count calculation logic

For client port types 10GE, OTU2, and OTU2E:

- If the number of client ports used is between 1 and 10, the "S-NCS1K4-100G-CL=" license count is 1.
- If the number of client ports used is between 11 and 20, the license count is 2.
- This pattern continues in increments of 10 (for each set of 10 ports, an additional license is required).

Smart licensing for OTN-XP card in regen mode

The OTN-XP line card supports smart licensing in regen mode. Regen is a signal regenerator that sits between two nodes to regenerate the signal, and smart licensing automates the licensing process and tracks software usage trends.

Table 6: Feature History

Feature Name	Release Information	Feature Description
Smart Licensing for OTN-XP Card in Regen Mode	Cisco IOS XR Release 7.8.1	Now the OTN-XP Line Card supports the smart licensing feature in Regen mode. Regen is a signal regenerator and it sits between two nodes to regenerate the signal. it enables you to automate the time-consuming manual licensing tasks and allows you to easily track the status of your license and software usage trends. Supported modes: • 200G and 400G

Check the license count for OTN-XP line card in regen mode

This reference enables you to verify the smart license count consumed by the OTN-XP line card in regen mode by showing card details, datapath status, and license verification command outputs.

You can verify the smart license consumption of the OTN-XP line card in regen mode by checking the card details, the configured datapath status, and the license usage details.

Checking card details

The following sample shows how to check the card details:

```
RP/0/RP0/CPU0:regen#show platform
Wed Nov 16 15:11:51.088 UTC
Node              Type                       State             Config state
--------------------------------------------------------------------------------
0/0               NCS1K4-OTN-XPL             OPERATIONAL       NSHUT
0/1               NCS1K4-LC-FILLER           PRESENT           NSHUT
```

Configuring datapath

The following sample shows the status of the configured slice as **Provisioned**.

```
RP/0/RP0/CPU0:regen#show hw-module location 0/0 regen
Wed Nov 16 15:11:01.258 UTC

Location:             0/0
Trunk  Bitrate:       400G
Status:               Provisioned
East Port                  West Port
---------                  ---------
CoherentDSP0/0/0/12         CoherentDSP0/0/0/13
```

Checking the license count

```
RP/0/RP0/CPU0:regen#show license all
Wed Nov 16 15:12:59.353 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test 1
  Virtual Account: N1K4-DT-PROD-TEST
  Export-Controlled Functionality: ALLOWED
  Initial Registration: SUCCEEDED on Nov 16 2022 15:06:56 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: May 15 2023 15:06:56 UTC
  Registration Expires: Nov 16 2023 09:40:34 UTC

License Authorization:
  Status: AUTHORIZED on Nov 16 2022 15:08:48 UTC
  Last Communication Attempt: SUCCEEDED on Nov 16 2022 15:08:48 UTC
  Next Communication Attempt: Dec 16 2022 15:08:47 UTC
  Communication Deadline: Feb 14 2023 09:42:29 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
=============
```

```
NCS1K4 - 400G RG (S_NCS1K4_400G_RG):
  Description: NCS1K4 - 400G REGEN License
  Count: 1
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED

Product Information
===================
UDI: SN:CAT2311B0BN,UUID:default-sdr

Agent Version
=============
Smart Agent for Licensing: 5.4.21_rel/77

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

Checking license count and usage

The following sample shows the license count and usage details:

```
RP/0/RP0/CPU0:regen#show license usage
Wed Nov 16 15:14:08.648 UTC

License Authorization:
  Status: AUTHORIZED on Nov 16 2022 15:08:48 UTC

NCS1K4 - 400G RG (S_NCS1K4_400G_RG):
  Description: NCS1K4 - 400G REGEN License
  Count: 1
  Version: 1.0
  Status: AUTHORIZED
  Export status: NOT RESTRICTED
```

Smart license model for QXP line card

A smart license model for QXP card is a licensing mechanism that

- uses a specific licensed product ID, **NCS1K4-QXP-L-K9** for the Cisco NCS 1004 QXP line card, and
- calculates license consumption based on the number of trunk slices provisioned.

Examples

Sample configuration of a slice in 400GE TXP modeS

```
RP/0/RP0/CPU0:ios#configure
Thu Oct 21 23:12:12.906 UTC
RP/0/RP0/CPU0:ios(config)#hw-module location 0/1 mxponder-slice 0
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#trunk-rate 400G
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#client-port-rate 1 client-type 400GE
RP/0/RP0/CPU0:ios(config-hwmod-mxp)#commit
```

Checking the slice state

The following sample shows the status of the configured slice as Provisioned.

```
RP/0/RP0/CPU0:ios#show hw-module location 0/1 mxponder-slice 0
Thu Oct 21 23:14:08.700 UTC

Location:             0/1
Slice ID:             0
Client Bitrate:       400GE
Trunk  Bitrate:       400G
Status:               Provisioned
LLDP Drop Enabled:    FALSE
ARP Snoop Enabled:    FALSE
Client Port                     Mapper/Trunk Port          CoherentDSP0/1/0/0
                                Traffic Split Percentage

FourHundredGigECtrlr0/1/0/1              -                            100
```

Checking the license count

The following sample shows the license usage count as 2.

```
RP/0/RP0/CPU0:ios#show license summary
Tue Dec 28 22:35:29.824 UTC

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  Export-Controlled Functionality: ALLOWED
  Last Renewal Attempt: None
  Next Renewal Attempt: Jun 26 2022 22:19:25 UTC

License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Jan 27 2022 22:33:09 UTC

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  NCS1K4 - QDD TXP Trunk  (S_N1K4_LIC_TRK)                  2 AUTHORIZED
```