



Smart Licensing

This chapter describes the smart licensing configuration on Cisco NCS 1004.

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Understanding Smart Licensing

Smart Licensing is a cloud-based approach to licensing. Smart Licensing simplifies the licensing experience across the enterprise making it easier to purchase, deploy, track, and renew Cisco Software. It provides visibility into license ownership and consumption through a single, simple user interface. 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 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 Overview

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 Licensing 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.

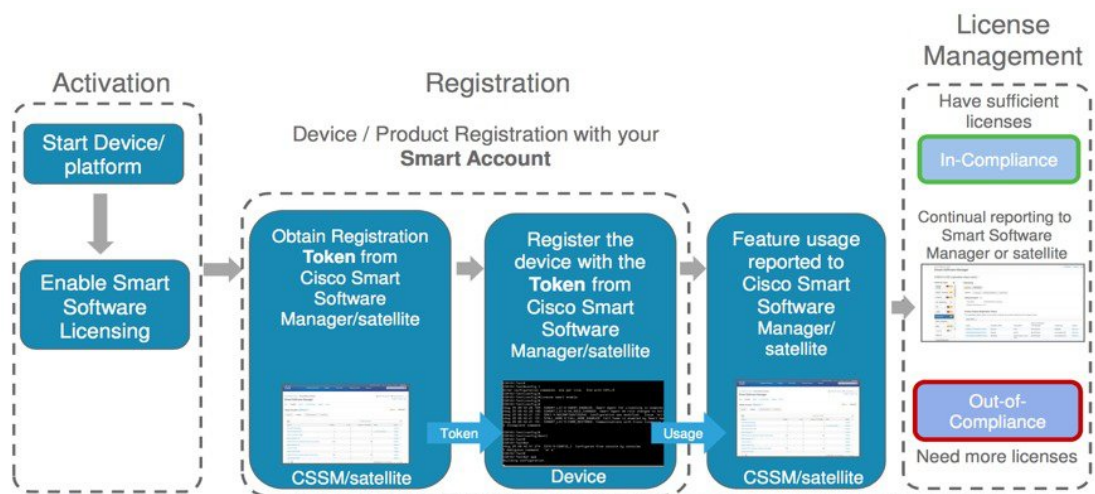
Product Instances

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 that involves a three-step procedure.

Figure 1: Smart Licensing Work Flow



- 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.
- 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.

Benefits of Smart Licensing

- Licenses are not locked to perform configurations 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.

Licensing in NCS 1004

Cisco NCS 1004 has the following line card PIDs :

- **NCS1K4-1.2T-K9**—High-cost PID. You can use this line card without any explicit 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.

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

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: 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= |

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.

Configure Smart Licensing

To configure smart licensing in Cisco NCS 1004, perform the following 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:NCS1004(config)#domain name-server 198.51.100.247
```

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

FQDN must be either Cisco Smart Software Manager FQDN (tools.cisco.com) or Smart Licensing satellite server FQDN. You must configure the DNS server before setting-up the call-home destination address as FQDN. Use the **domain name-server {DNS server IP}** command to configure the DNS server on the device.

Example:

```
domain name-server 198.51.100.247
call-home
```

```

service active
contact smart-licensing
profile CiscoTAC-1
active
destination address http https://tools.cisco.com/its/service/oddce/services/DDCEService
destination transport-method http

```

Note

CiscoTAC-1 profile is the default profile for smart licensing and it must not be deleted.

- 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 [Creating a Token, on page 6](#).

- Step 5** In the privileged EXEC mode, register the token ID in Cisco NCS 1004, using the following commands:

license smart register idtoken *token-ID*

The registration may fail if the token is invalid or there is communication failure between the device and the portal or satellite. If there is a communication failure, there is a wait time of 24 hours before the device attempts to register again. To force the registration, use the **license smart register idtoken** *token-ID* **force** command.

When your device is taken off the inventory, shipped elsewhere for redeployment, or returned to Cisco for replacement using the return merchandise authorization (RMA) process, you can use 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.

Creating 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.
URL: <https://software.cisco.com/#SmartLicensing-Inventory>
- Step 2** Select the appropriate Virtual Account.
- Step 3** From the **General** tab, choose **New Token**. Create Registration Token dialog box appears.
- Step 4** Follow the dialog to provide a name, duration, and export compliance applicability before accepting the terms and responsibilities.
- Step 5** Click **Create Token**.
-

Verifying Smart Licensing Configuration

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 1004:

Table 2: 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:

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

```
RP/0/RP0/CPU0:ios#show license all
Mon Feb 11 15:58:44.047 IST

Smart Licensing Status
=====

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000
  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

License Usage
=====

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

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

Agent Version
=====
Smart Agent for Licensing: 2.2.0_rel/48

```

Example 2:

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:

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:

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:

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
```

License Registration

You can use the following procedure to register license:

Procedure

-
- Step 1** Register the license using the following command:
RP/0/RP0/CPU0:ios#license smart register idtoken <idtoken>
 - Step 2** Browse to the URL : <https://software.cisco.com/software/cs/ws/platform/home#module/SmartLicensing>.
 - Step 3** Click **Inventory**.
 - Step 4** Click **Product Instances**.
 - Step 5** Select the node instance.
 - Step 6** Click **Actions**.
 - Step 7** Click **Remove**.
 - Step 8** Renew the authorization period using the following command:
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 9 Perform deregister using the following command:

```
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.

Smart Licensing for OTN-XP Line Card

Overview

- 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.

Checking the License Usage Count

You can also check the number of licenses utilised, by entering the **show license all** command.

Configuring Slice

The following sample shows the configuration of slice 0 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
```

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
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 Traffic Split Percentage | Peer/Trunk Port | OTU40/1/0/0 |
|---|------------------|----------------------|
| 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 |
| TenGigEctr1r0/1/0/4/1 | ODU2E0/1/0/0/4/1 | NONE 100 |
| TenGigEctr1r0/1/0/4/4 | ODU2E0/1/0/0/4/4 | NONE 100 |
| TenGigEctr1r0/1/0/5/2 | ODU2E0/1/0/0/5/2 | NONE 100 |

Checking the License Count

The following sample shows the license usage count as 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
```



Note The license count for 10GE, OTU2, and OTU2e is calculated as follows:

- If $1 \leq \text{number of client ports used} \leq 10$, it implies the "S-NCS1K4-100G-CL=" has license count of 1 and similarly if $11 \leq \text{number of client ports used} \leq 20$, it implies the "S-NCS1K4-100G-CL=" has license count of 2 and so on.
-

