



# Smart Licensing

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This chapter describes Smart Licensing configuration on Cisco NCS 1002.

This chapter contains the following topics:

- [Understanding Smart Licensing, on page 1](#)
- [Benefits of Smart Licensing, on page 4](#)
- [PIDs of NCS 1002, on page 4](#)
- [Software Entitlements and Smart Licenses of Cisco NCS 1002, on page 5](#)
- [Creating a Token, on page 6](#)
- [Configuring Smart Licensing, on page 6](#)
- [Verifying Smart Licensing Configuration, on page 7](#)

## 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

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 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

A Virtual Account exists as a sub-account titling 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 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.

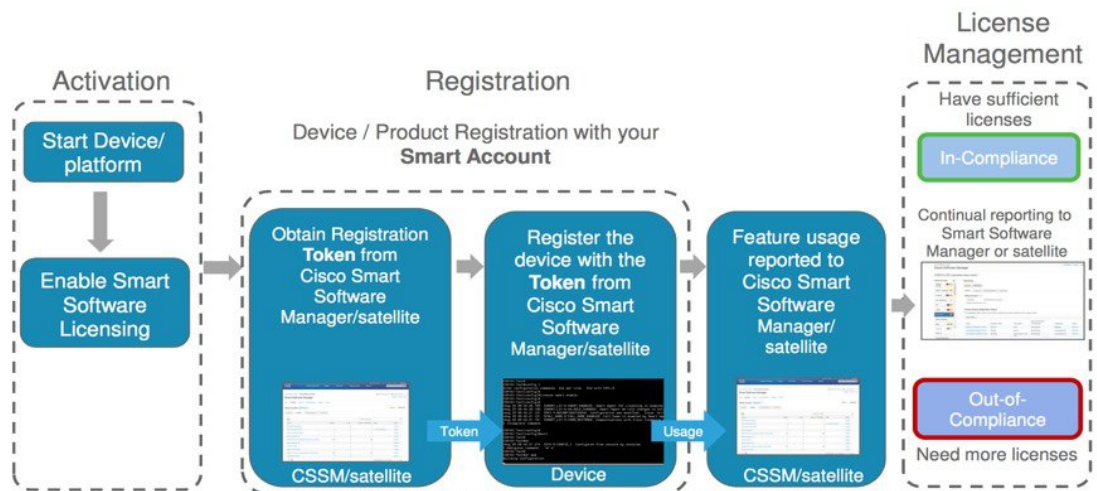
### Product Instances

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**



- 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](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.

## PIDs of NCS 1002

Cisco NCS 1002 has two PIDs:

- **Fully licensed PID (NCS1002-K9)**—This is a high cost PID. By using the fully licensed PID, you can configure and use the software without any explicit licensing.
- **Partially licensed PID (NCS1002-LIC-K9)**—This is a low cost PID and you have to additionally buy licenses to configure the software.

# Software Entitlements and Smart Licenses of Cisco NCS 1002

Software entitlement is a system that consists of a license manager on Cisco NCS 1002 that manages licenses for various software and hardware features. The license manager parses and authenticates a license before accepting it.

Core features are available for use without any license. The following features are available on Cisco NCS 1002 only using licenses.

The following table lists the features and its corresponding entitlements that can be enabled on Cisco NCS 1002 using licenses:

**Table 1: Software Entitlements of Cisco NCS 1002**

Feature	Software Entitlement
NCS1K Smart License - one slice with 200G DWDM	L_NCS1K_200G_LIC
NCS1K Smart License - one slice with 200G/250G DWDM	L_NCS1K_250G_LIC
NCS1K Smart License - one slice with encryption	L_NCS1K_ENCR_LIC
(Only for R6.2.1 and R6.2.2) NCS1K Smart License - streaming telemetry	L-NCS1K-ST-LIC



**Note** You can view these software entitlements and their usage details in the [Cisco Smart Software Manager](#) portal.

There is one-to-one mapping mapping between the software entitlement and the smart license. For example, S-NCS1K-LIC-200G= license requested by the customer maps to the L\_NCS1K\_200G\_LIC entitlement stored in the software.

**Table 2: Smart Licenses of NCS 1002**

License Requested	License Given	Configuartion Done
S-NCS1K-LIC-200G=	S-NCS1K-LIC-200G=	Slice with 200G trunk without encryption
S-NCS1K-LIC-250G=	S-NCS1K-LIC-200G=	Slice with 250G or 200G trunk without encryption
	S-NCS1K-LIC-250G= (Additional 200G license will be given)	
S-NCS1K-LIC-ENCR=	S-NCS1K-LIC-ENCR=	One slice with encryption
(Only for R6.2.1 and R6.2.2) S-NCS1K-LIC-ST=	S-NCS1K-LIC-ST=	Telemetry configuration

# Creating a Token

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

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- Step 1** Log into the [Cisco Smart Software Manager](#).
  - Step 2** Click the **Inventory** tab, and select your virtual account from the **Virtual Account** drop-down list.
  - Step 3** From the **General** tab, choose **New Token**.  
The **Create Registration Token** dialog appears.
  - Step 4** Enter the token description.
  - Step 5** Specify the number of days the token must be active.
  - Step 6** Check the **Allow export-controlled functionality on the products registered with this token** check box.
  - Step 7** Click **Create Token**.
  - Step 8** Copy the token and register NCS 1002 with the same token ID.
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# Configuring Smart Licensing

To configure smart licensing in Cisco NCS 1002, perform the following tasks:

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- 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:NCS1002(config)#domain name-server 203.0.113.247
```
  - 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 203.0.113.247
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 1002, 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.

## 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 status**
- **show license summary**

- **show license tech**
- **show license udi**
- **show license usage**
- **show license platform detail**
- **show tech-support smartlic**
- **show tech-support call-home**

The following table defines the available license authorization status in Cisco NCS1002:

**Table 3: 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 will be 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 of time. This state occurs after 90 days of expiry. The device will attempt to contact the CSSM every hour in order to renew the authorization until the registration period expires.

### Example 1:

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

```
RP/0/RP0/CPU0:ios#show license all
Fri Jan  6 01:33:24.230 UTC
Smart Licensing Status
=====
Smart Licensing is ENABLED
Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
  Virtual Account: NCS1000 Initial
  Registration: SUCCEEDED on Thu Jan 05 2017 15:04:18 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Tue Jul 04 2017 15:04:18 UTC
  Registration Expires: Fri Jan 05 2018 09:25:50 UTC
License Authorization:
  Status: AUTHORIZED on Thu Jan 05 2017 15:17:04 UTC
  Last Communication Attempt: SUCCEEDED on Thu Jan 05 2017 15:17:04 UTC
  Next Communication Attempt: Sat Feb 04 2017 15:17:04 UTC
  Communication Deadline: Fri Jan 05 2018 09:25:50 UTC
License Usage
=====
No licenses in use
Product Information
=====
```



```
UDI: SN:CAT1111B0KR,UUID:default-sdr
Agent Version=====Smart Agent for Licensing: 2.2.0_rel/17RP/0/RP0/CPU0:ios#
```

### Example 2:

The following example shows the sample output of **show license platform detail** command. The output displays telemetry entry only for R6.2.1 and R6.2.2.

```
RP/0/RP0/CPU0:ios#show license platform detail
Fri Jan 20 12:09:30.729 UTC
Current state: REGISTERED
Collection: LAST: Fri Jan 20 12:03:13 2017
           NEXT: Fri Jan 20 13:03:13 2017
Reporting: LAST: Fri Jan 20 12:03:13 2017
           NEXT: Sat Jan 21 12:03:13 2017
Parameters: Collection interval: 60 minute(s)
           Reporting interval: 1440 minute(s)
           Throughput gauge: 1000000 Kbps
=====
Feature/Area 'sys_features'
  Name: sys_features
  DLL: libplat_sl_plugin_sys_features.so
  Flags: CONFIG
  # CLI: 1
  Entitlements (total 1):
  [ 0] Name: NCS1K Smart License - streaming telemetry
      Token:
regid.2017-01.com.cisco.L-NCS1K-ST-LIC-,1.0_6222b080-6651-4611-a725-fc84b647d614
      Count: Last reported: 1
      Next report: 0
=====
Feature/Area 'system'
  Name: System
  DLL: libplat_sl_plugin_system.so
  Flags: CONFIG
  # CLI: 3
  Entitlements (total 3):
  [ 0] Name: NCS1K Smart License - one slice with 200G DWDM
      Token:
regid.2017-01.com.cisco.L-NCS1K-200G-LIC,1.0_b03ac261-7397-4a66-b1e2-affa324ac518
      Count: Last reported: 0
      Next report: 0
  [ 1] Name: NCS1K Smart License - one slice with 200G/250G DWDM
      Token:
regid.2017-01.com.cisco.L-NCS1K-250G-LIC,1.0_c0520a76-f3f9-4773-b841-60fadfa70e4e
      Count: Last reported: 0
      Next report: 0
  [ 2] Name: NCS1K Smart License - one slice with encryption
      Token:
regid.2017-01.com.cisco.L-NCS1K-ENCR-LIC-,1.0_18fbcf09-68a5-4853-9534-cdbcad8dc918
      Count: Last reported: 0
      Next report: 0
```

### Example 3:

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

```
RP/0/RP0/CPU0:ios#show license summary
Thu Feb 2 23:10:46.723 UTC
Smart Licensing is ENABLED
Registration:
  Status: REGISTERED
  Smart Account: BU Production Test
```

```

Virtual Account: NCS1000
Last Renewal Attempt: None
Next Renewal Attempt: Tue Aug 01 2017 23:09:00 UTC
License Authorization:
  Status: AUTHORIZED on Thu Feb 02 2017 23:09:12 UTC
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Thu Feb 02 2017 23:10:53 UTC
License Usage:
  License                Entitlement tag                Count  Status
  -----
                        (L-NCS1K-200G-LIC)                2      PENDING
                        (L-NCS1K-250G-LIC)                1      PENDING
                        (L-NCS1K-ENCR-LIC-)                1      PENDING

```

**Example 4:**

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

```

RP/0/RP0/CPU0:ios#show license usage
Fri Feb  3 21:08:24.097 UTC
License Authorization:
  Status: No Licenses in Use
RP/0/RP0/CPU0:ios#
RP/0/RP0/CPU0:ios#show license trace ?
  all          Show tracing for both Smart Licensing and client(cisco-support)
  client       Show tracing for the agent client code(cisco-support)
  smartlic     Show tracing for the Smart Licensing Code(cisco-support)

```