

Cisco Smart Licensing

A new licensing model, based on a single technology, has been designed for Cisco called Smart Licensing that is intended to provide Enterprise Level Agreement-like capabilities for all Cisco products. The Cisco Smart Licensing is based on the Trust but Verify model.

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://tools.cisco.com/ITDIT/CFN/. An account on http://www.cisco.com/ is not required.

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Hardware Compatibility Matrix for the Cisco cBR Series Routers



Note T

The hardware components that are introduced in a given Cisco IOS-XE Release are supported in all subsequent releases unless otherwise specified.

Cisco CMTS Platform	Processor Engine	Interface Cards
Cisco cBR-8 Converged Broadband Router	Cisco IOS-XE Release 16.5.1 and Later Releases	Cisco IOS-XE Release 16.5.1 and Later Releases
	Cisco cBR-8 Supervisor:	Cisco cBR-8 CCAP Line Cards:
	• PID—CBR-SUP-250G	• PID—CBR-LC-8D30-16U30
	• PID—CBR-CCAP-SUP-160G	• PID—CBR-LC-8D31-16U30
		• PID—CBR-RF-PIC
		• PID—CBR-RF-PROT-PIC
		• PID—CBR-CCAP-LC-40G
		• PID—CBR-CCAP-LC-40G-R
		• PID—CBR-CCAP-LC-G2-R
		• PID—CBR-SUP-8X10G-PIC
		• PID—CBR-2X100G-PIC
		Digital PICs:
		• PID—CBR-DPIC-8X10G
		• PID—CBR-DPIC-2X100G
		Cisco cBR-8 Downstream PHY Module:
		• PID—CBR-D31-DS-MOD
		Cisco cBR-8 Upstream PHY Modules:
		• PID—CBR-D31-US-MOD

Table 1: Hardware Compatibility Matrix for the Cisco cBR Series Routers

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Note Do not use DPICs (8X10G and 2x100G) to forward IP traffic, as it may cause buffer exhaustion, leading to line card reload.

The only allowed traffic on a DPIC interface is DEPI, UEPI, and GCP traffic from the Cisco cBR-8 router to Remote PHY devices. Other traffic such as DHCP, SSH, and UTSC should flow via another router, since DPICs cannot be used for normal routing.

Prerequisites for Cisco Smart Licensing

• You must configure the DNS server using the **ip name-server** global configuration command.

- You must configure the IP DNS-based hostname-to-address translation using the ip domain-lookup global configuration command.
- Cisco Smart Licensing is enabled by default on the Cisco cBR router. However, you must ensure that the CiscoTAC-1 call-home profile points to the Cisco Smart Software Manager at the following URL using the **show call-home profile CiscoTAC-1** command:

https://tools.cisco.com/its/service/oddce/services/DDCEService

The following is a sample output of the **show call-home profile CiscoTAC-1** command:

Router# show call-home profile CiscoTAC-1

```
Load for five secs: 10%/1%; one minute: 9%; five minutes: 8%
Time source is NTP, 16:49:35.525 PDT Thu Oct 29 2015
Profile Name: CiscoTAC-1
    Profile status: ACTIVE
    Profile mode: Anonymous Reporting Only
    Reporting Data: Smart Call Home, Smart Licensing
    Preferred Message Format: xml
    Message Size Limit: 3145728 Bytes
    Transport Method: http
    Email address(es): callhome@cisco.com
    HTTP address(es): https://tools.cisco.com/its/service/oddce/services/DDCEService
```

Periodic configuration info message is scheduled every 19 day of the month at 11:41

Periodic inventory info message is scheduled every 19 day of the month at 11:26

Alert-group	Severity
crash	debug
diagnostic	minor
environment	minor
inventory	normal
Syslog-Pattern	Severity
.*	major

• Ensure that you can ping the DNS server. If you are unable to ping the server, verify the connectivity to the NME port on the Cisco cBR router.



Note

If you are using a Virtual Routing and Forwarding (VRF) instance, ensure that you can ping the VRF instance.

Information About Cisco Smart Licensing

Cisco Smart Licensing is software-based licensing that consists of tools and processes to authorize the customers for the usage and reporting of the Cisco products. The feature has the capability to capture the customer order and communicate with the Cisco Cloud License Service through Smart Call Home transport media or through Smart Transport to complete the product registration and authorization. If the Cisco products stop

communicating with the Cisco Cloud License Service for 90 days, the cable interfaces in the Cisco products will be locked, which means the customer can no longer enable/disable the cable interfaces.

The Cisco Smart Licensing feature is aimed at giving users an experience of a single, standardized licensing solution for all Cisco products.

In the Cisco Smart Licensing Model, you can activate licensed features (also known as entitlements) without the use of a special software key or upgrade license file. You can activate the new functionality using the appropriate product commands and configurations and the functionality is activated. A software reboot is not required for the Cisco cBR router.

The Cisco cBR router supports software activation using Cisco Smart Licensing. The Cisco Smart Licensing is enabled by default on the Cisco cBR router.



The **no http secure server-identity-check** option was default in versions 16.7.2 and earlier, and was not configurable. Ensure that you configure the **no http secure server-identity-check** option after upgrading to maintain parity with images earlier than 16.7.3. The default option is **http secure server-identity-check**.

A LCHA license is needed for each working linecard that is protected by the protect linecard.

Downstream License

The DOCSIS 3.1 license scheme provides support to identify the DOCSIS 3.1 channels and their width. The DOCSIS 3.1 entitlement is DOCSIS 3.1 Downstream Channel License.



Configuration of DOCSIS 3.1 Downstream OFDM channel consumes both DOCSIS 3.0 and DOCSIS 3.1 license in a 1:1 ratio with license units of 6 MHz.

Out of Compliance Enforcement

The following two events are responsible for triggering a DOCSIS configuration lock enforcement.

Eval-Expired (Evaluation Period Expired)

When a router is not registered with Smart License Manager for more than ninety days.

Auth-Expired (authorization Period Expired)

When a registered router fails to communicate with the Smart License Manager for more than ninety days.

When either of the above mentioned events occur, the Smart Agent sends a notification to the platform. The platform, upon receiving such notification, **locks** the following CLI commands:

- [no] cable upstream shutdown upstream-port-number
- contoller upstream-cable slot/subslot/controller-port-number
- rf-chanchannel-number

Any attempt to configure the above mentioned CLIs in this condition would fail and a warning message will be displayed. Under this condition all other CLIs are configurable, some of which may be required to configure Cisco License Call Home, connect to cisco and register the device to come out of either of the above two events and enter into authorized or Out of Compliance (OOC) state.

You can copy the modified configuration file to the startup configuration file and reload the device to make that configuration effective. However, when the device is in enforced state, you can only copy the running configuration file to the startup configuration file.



Any attempt to copy any other file fails and a warning message is displayed.

How to Configure Cisco Smart Licensing

This section contains the following:

Using Cisco Smart Licensing Agent on the Router

Step 1	Set up a	Cisco Smart Account. See Setting Up a Cisco Smart Account, on page 5.				
Step 2	Log in to	o the Cisco Smart Software Manager.				
Step 3	(Optiona	l) Create a virtual account. See Creating Virtual Accounts, on page 12.				
	Note A single default virtual account is always available.					
Step 4	Create a	product instance registration token. See Creating a Product Instance Registration Token, on page 13.				
Step 5	Register Router v	the router with the Cisco Licensing Cloud using the product instance registration token. See Registering the vith the Cisco Licensing Cloud Using the Registration Token, on page 15.				
Step 6	Log in to	the Cisco Smart Software Manager for managing licenses.				
	For more Software	e information, see the <i>Cisco Smart Software Manager User Guide</i> , which is accessible from the Cisco Smart e Manager tool.				

Setting Up a Cisco Smart Account

Cisco Smart Account enables you to fully utilize the license management features of the smart-enabled products.

Before you begin

• Ensure that you have a CCO ID.

- **Step 1** Log in to Cisco Software Workspace (CSW) with your CCO ID.
- Step 2 Hover the cursor over the Administration tab and click Create Smart Accounts.

Figure 1: Creating Smart Account

cisco	Products & Services	Support	How to Buy	Training & Events	Warkhode (change) Partners	Lopped In Account	Layout Ny Car (
Cisco Sof	tware Workspace						E Hele John D
•	Orders & Delivery	Licensing	Provisioning		Support & Upgrades	A	ini eletration
Software W	orkspace					Create Sr	nart Account
						E	10
М	anage software	e to ac	celerate	your bu	isiness	X	

- **Step 3** Perform one of the following to select the Account Approver:
 - To select yourself as the Approver, click the Yes, I will be the Approver for the account radio button.
 - To select other person as the Approver, click the **No, the person specified below will be the Approver for the account** radio button and specify the person's e-mail ID.
 - **Note** The specified Approver must have the authority to enter legal agreements. The Approver serves as the primary owner and nominates account administrators.

Figure 2: Selecting the Approver

Cisco Softwa Smart Accounts	re Workspace		
Smart Accoun	t Request		Нер
Use this page to request a templify if we have been appreciated and the sent to the App	mart Account that will be used for managing you rover to complete the account setup.	a' company's relationship with Claco, including initiatives such as Smart Li	censing. Once the information below has been provided, an
Account Approver			
Can you act as the Approx	r for this account? "It is person will approve term	is and conditions for the account and will be the one completing the account	nt setup process. Leann More
· Yes, I will be the Approv	erfor the account.		
No, the person specifies Enter person's compare	below will be the Approver for the account ny email account		
Account Information			
Below is the information for Account Domain Ide	the company. The Account Dontain Identifier is to atten: test, big-u, edu, Edd	ased on the email address of the Approver and must belong to the compa	ny fratolitoon fria account Learn More
AccountName:	big-u.edu		
Continue			

- **Step 4** If you are the Approver, perform the following:
 - a) Enter the Account Name, Company/Organization Name, Country, and State/Province/Region information.
 - b) (Optional) Click **Edit**. In the *Edit Account Identifier* window, enter a valid Proposed Domain Identifier and Contact Phone Number. Click **OK**.
 - **Note** The default domain identifier is the Approver e-mail domain. If you edit the domain identifier, the change goes through a manual approval process.

c) Click Continue to select the legal address to be linked to your Cisco Smart Account.

Figure 3: Setting Up Account Information When You Are The Approver

AccountName b	g-u.edu	Edit Account Identifier		
Controe		This Account Domain Identifier is Cisco com profile and will need to by telephone to complete this pro below. If you do decide to change the Ac	generated based on the domain of the undergo an approval process if you of cess, so please verify or enter your de count Domain identifier, it must mainte	primary email address in you hange it. Class will contact yo sired contact phone number win domain format and can
		include subdomains to the left of	the domain, e.g., east.example.com or	west.example.com.
		* Proposed Domain Identifier:	twister.big-u.edu	
		Contact Pitone Number:		×

- **Step 5** If you are not the Approver, perform the following:
 - a) Enter the Account Name and an optional Message to Approver.
 - b) (Optional) Click Edit. In the Edit Account Identifier window, enter a valid Proposed Domain Identifier. Click OK.
 - **Note** The default domain identifier is the Approver e-mail domain. If you edit the domain identifier, the change goes through a manual approval process.
 - c) Click Continue.

Figure 4: Setting Up Account Information When You Are Not The Approver

Account Name:	Company ABC		
Message to Approver include any information below the	t you would like to include in the em	al message that will be sent to the Approver.	
		Edit Account Identifier	
Costinue		The Account Domain Identifier is generated based on the domain o will require the Approver to complete an approval process via telep	of the approver's email address and hone if you change it.
		If you do decide to change the Account Domain Identifier, it must m include subdomains to the left of the domain, e.g., east.example.co.	aintain domain format and can m or west example.com.
		Proposed Domain Identifier:	
		Please enter a valid domain, Le	example com or west example.co

- **Step 6** If you are not the Approver, the Approver will receive an e-mail and must perform the following:
 - a) Click Complete Smart Account Setup in the received e-mail.

Figure 5: Complete Smart Account Setup Link in E-mail

New Cisco Smart Account - NTT Demo Account (Pending)

A new Cisco Smart Account has been requested for "NTT Demo Account" and you have been designated as an "Approver" for this account.A Smart Account is used for managing your company's relationship with Cisco, including initiatives such as Smart Licensing. This account is currently in a Pending state, as it requires a person designated as an "Approver" to complete the process. Review the Account Summary information below and click the Complete Smart Account Setup link to continue. As a part of this process, you will be asked to accept a Smart Account Agreement. If you'd like to look at the agreement beforehand, you can <u>preview the acceement</u>.

Complete Smart Account Setup » Note: You will need to log in with a Cisco.com ID. If you don't have one, you will need to register for a new account.

- b) Click the appropriate radio button to accept, decline, or nominate another Approver. To nominate another Approver, enter the person's e-mail address. Click **Continue**.
 - **Note** If the Approver declines, the Cisco Smart Account is deleted. If the Approver nominates another approver, the new Approver must accept the role.

Figure 6: Accepting the Account Approver Role

Cisco Software Workspace Smart Accounts
Smart Account Setup
A Gisso Smart Account has been set up for "NTT Demo Account " and you have been nominated as the Approver for the account. This Smart Account will be used for managing the company's relationship with Classo, Including Initiatives such as Smart Licensing. The account is currently in a Pencing state and will remain so until the approver completes the setup process.
Account Approver
You have been nominated as the Approver for the "NTT Demo Account "Smarl Account. Do you accept this role? This person will approve terms and conditions for the account and will be the one completing the account setup process. Learn None
Yes, I accept the role of Account Approver
No, I do not accept the role of Account Approver
No, but I nominate the person specified below to be the Account Approver
Enfor person's company's crisial address
Account Summary
Account Domain Mentifier Influida.com
Acount Name: NTT Demo Account
Requested By: Headher Deng (hdeng@cieco.com)
Continue

c) After accepting the Approver role, click the appropriate radio button to select the Account Domain Identifier or specify a different Account Domain Identifier.

Figure 7: Completing the Account Information

Cisco Software Smart Accounts	Workspace
Smart Account S	etup
Account Information Below is the information for the co	npany. The Account Domain identifier is based on the email address of the Approver and must belong to the company that will own this account. Learn more
Account Contain Identifier	Installa com- this was entered by person requesting the account, because it does not match your email address, it will require an approval process with Cisco Learn More Origosom - this is based on the email address in your Cisco com profile. If you want to change it, you can Edit your Cisco com Profile Specify a different Account Demain Identifier
Account Name	NTT Denis Account
Back Continue	

d) Enter the Account Name and click Continue.

The Approver role is accepted and Cisco Smart Account is pending Account Domain approval.

- **Step 7** After the Account Domain is approved, the Approver will receive an e-mail and must perform the following:
 - a) Click Complete Smart Account Setup in the received e-mail.

Figure 8: Cisco Smart Account Identifier Approved E-mail

Cisco Smart Account Ident	ifier Approved - Mail
The Account Domain Identifier for Smart Account Setup link below. A you can preview the agreement.	the Cisco Smart Account GMail has completed the review process. You can continue the account creation process via the Complete As a part of this process, you will be asked to accept a Smart Account Agreement. If you'd like to look at the agree re-to-process
Complete Smart Account Setup	
Cisco Smart Account Summary	
Account Domain Identifier:	twister.big-u.edu
Account Name:	big-u.edu
Account Status:	Pending Smart Account Agreement Acceptance
Account Approver:	John Doe(SSLMTester1@mail.com)
Requested by:	John Doe(SSLMTester1@mail.com)

b) Enter the Account Name, Company/Organization Name, Country, and State/Province/Region information.

Figure 9: Completing the Account Information and Company/Organization Information

Cisco Software V Smart Accounts	Vorkspace		
Smart Account Se	tup		
Account Information			
The Account Domain Identifier has b	seen approved and the account pro-	cess can be complet	ed, just a few more steps are required.
Account Domain Identities:	twister big-u edu		
Account Name:	big-u.edu		
Company/Organization Infor	nation		
Enter information about the company	e that will own the account. This inf	ormation will be user	In the next step to search for the company or organization's primary address in Cisco's customer database.
 Company/Organization Name 	K UgU		
· Country.	United States	•	
State/Province/Region:	California	•	
Continue			

- c) Click Continue to select the legal address to be linked to the Cisco Smart Account.
- d) Select the Company/Organization Primary Address using the Refine Search option and click Continue.

Figure 10: Selecting the Company/Organization Primary Address

Cisco Software V Smart Accounts	Vorkspace
Smart Account Se	tup
In order to validate the identity of the primary addresses can be associat	rew account, Clisto requires that the account be associated with an existing primary address in its customer database. All matching results are displayed below but only led with the Smart Account.
Select Company/Organization Prin	any Address: Reine Search
Company/Organization Name:	BigU
· Courty	United States •
Address:	Street address where company is headquartere
City	City where the company is headquartered
StateProvince/Region	(Arizona •
	Baaron
BIGU 170	W TASMAN DR. SAN JOSE, CA. UNITED STATES - (Permary Address)
BIG U BIG U	FOR US INTERNAL DEMO EVAL ONLY 2001 BRAINARD RD 6LD0 57305, FORT HUNCHUCA, AZ, UNITED STATES FOR US INTERNAL DEMO EVAL ONLY 3123 N NADERA MESA PL, TUCSON, AZ, UNITED STATES

e) (Optional) Enter the e-mail addresses of the Additional Account Approvers and Additional Account Administrators.

The initial Approver automatically becomes an Administrator. Additional Administrators can be created or assigned separately from the Approver creation process.

Figure 11: Nominating Additional Account Approvers and Administrators

Cisco Softw Smart Accounts	are Workspace	
Smart Accou	nt Setup	
Additional Account . You will be an Approver ft	Approvers or this account, but you can also nominate other persons to act as Approvers. Learn More	
Additional Approvers:	Enter email addresses, separated by comman	
Additional Account : You will be an Administre Account Administrators:	Adminstrators for for this account, but you can also nominate other persons to act as Administrators. Learn More Enter eneil eddresses, separated by comme	
Back Continue		

- f) Click Continue.
- g) Review the agreement and check the I agree to the terms above check box to accept.
- h) Click Accept and Create Account to create the Cisco Smart Account.

Figure 12: Accepting the Agreement and Creating the Cisco Smart Account

Cisco Software Workspace Imart Accounts	
Smart Account Setup	
USTOMER-02A-00T14, v1.0	
CUSTOMER C2A - SAMPLE	Î
The Licensed Bothware is owned and sopylighted by the individual Sothware Vention. The Bothware is licensed, not solid, only on the terms of this EULA. Autoptance and installation of the software indicates your acceptance of the terms and conditions of this EULA.	
Upon receipt and installation of the software and payment of the license fee, you will acquire the right to use the Software in object code form. You assume responsibility for the select on of the program to active your intercled results, and for the installation, use and results obtained from the Licensee Software.	-
In consideration of your acceptance of the terms and conditions contained in this EULA, you are granted a non-exclusive likense to use the Likensed Software and the associated documentation for your own needs on one device. You are not licensed to rank losse, transfer or distribute the Software. You may not allow any third party to access or view the Software for any raison other than to social you professionally rejour business where the software is comently being used.	
Tide and copyoighting the Software, including object code media and documentation, remain with the includual Software Manufacturer. You may not copy, reproduce or make data transmissions, in whole or in part, except as is necessary for laterk up or antivial purposes. You may not reacte engineer, translate, disastermatic or documulating the Software, in whole or in part. In case, of some Software is previous and the use, the Software is payabre is charged alther quarterly or annually. More information on charge-tack costs and how they are acceled on the fund all Software Software is the software is payabre in charged alther quarterly or annually. More information on charge-tack costs and how they are acceled on the fund all Software is charged alther quarterly or annually. More information on charge-tack costs and how they are acceled on the fund all Software is charged alther quarterly or annually.	
The license is effective upon acceptance and installation of the Licensed Software, and shall continue until ferminated. You may terminate if at any time iny uninstalling the Licensed Software. ESton has the right to terminate this Agreement I you tak to comply with any term or condition of this EULA.	

You will receive an e-mail confirming the creation of the Cisco Smart Account.

Creating Virtual Accounts

This procedure is optional. Virtual accounts are collections of licenses and product instances. You can create virtual accounts in Cisco Smart Software Manager to organize the licenses for your company into logical entities. A single virtual account is available by default.

Before you begin

Set up a Cisco Smart Account. See Setting Up a Cisco Smart Account, on page 5.

- **Step 1** Log in to the Cisco Smart Software Manager.
- **Step 2** Click the + (plus) symbol to create a virtual account.

Figure 13: Creating a Virtual Account

Class Bothware Central Smart Software M	Manager					Feedback	Help
My Corporation							
Virtual Accounts	Default - 🔿 Öefau	ilt Virtual Account					
Dofailk 😸	General Libersis	Product Instances E	vent Log				
My Corp West	Virtual Account E	of This is the default account	4				
Reports	Default Virtual Accou	nt Yes					
Email Notification	Product Instance I The registration token	Registration Tokens s below can be used to regi	ster new product instances to t	his virtual account.			
Uses	New Tokan.						
Smart Account	Taken	Expiration Date	Descript on	Created By	Actions		
			Tuesn 0	s found			

Step 3 In the New Virtual Account dialog box, enter the Name and Description.

Figure 14: New Virtual Account Dialog Box

New Virtual Account	Help ×
Enter a name and optional description for your Virtual Acco Account has been created, you can transfer licenses and p	unt. Once the Virtual roduct instances into it.
Name:	
Description:	
Save Cancel	

I

Step 4 Click Save.

Creating a Product Instance Registration Token

Product instance registration tokens are used to register and consume a product for Cisco Smart Licensing. You must generate a token to register the product and add the product instance to a specified virtual account. Registration tokens can be valid from 1 to 365 days.

- **Step 1** Log in to the Cisco Smart Software Manager.
- **Step 2** Click an existing virtual account.
- **Step 3** In the **General** tab, click **New Token**.

Figure 15: Creating a New Registration Token

Cisco Software Central Smart Software M	anager					Feedback	Support	Halp
My Corporation								
Virtual Accounts 🛛 🔶	My Corp West							
Delaul:	S Mrer Hits Alers							
My Case What	General Licenses	Productinebances	Event Log					
	Virtual Account Edit							
Reports	Description: Detaut Virtus Account	This is the default sif	ual accounterea	ded during company acc	ourt creal on.			
Ersal Notification								
	Product Instance Re	gistration Tokens						
Users	The registration tokens t	elow can be used to	register nav pro	duct instances to this	irtual account.			
David Account	New Yaten .							
	Taken	Expiration D	sle	Description	Created By	Actions		

Step 4 In the **Create Registration Token** dialog box, enter the Description and Expire After information and click **Create Token**.

Figure 16: Create Registration Token Dialog Box

Smart Software Ma	inager account.	
Virtual Account:	My Corp West	
Description:		
Expire After:	30	days
	Enter a value between 1	and 365, but Cisco recommends a
	maximum of 30 days.	

What to do next

Register the router with the Cisco Licensing Cloud. For more details, see the Registering the Router with the Cisco Licensing Cloud Using the Registration Token, on page 15 section.

Communication with CSSM

Table 2: Feature History

Feature Name	Release Information	Feature Description
Support for Smart Transport	Cisco IOS XE Dublin 17.12.1	Smart transport is a transport method where a Smart Licensing (JSON) message is contained within an HTTPs message, and exchanged between a product instance and CSSM. In this release, you can use Smart Transport as the new smart licensing transport, instead of Smart call-home (SCH).

You can configure a product instance to communicate with CSSM in the following ways:

- Use Smart Call Home (SCH) to communicate with CSSM: Call Home provides e-mail-based and web-based notification of critical system events. This method of connecting to CSSM is available in the earlier Smart Licensing environment, and remains available with Smart Licensing Using Policy. The following Call Home configuration options are available:
 - Direct cloud access: In this method, a product instance sends usage information directly over the internet to CSSM; no additional components are needed for the connection.

- Direct cloud access through an HTTPs proxy: In this method, a product instance sends usage information over the internet through a proxy server - either a Call Home Transport Gateway or an off-the-shelf proxy (such as Apache) to CSSM.
- Use Smart transport to communicate with CSSM: Smart transport is a transport method where a Smart Licensing (JSON) message is contained within an HTTPs message, and exchanged between a product instance and CSSM. The following Smart transport configuration options are available:
 - Smart transport: In this method, a product instance uses a specific Smart transport licensing server URL. This must be configured exactly as shown in the workflow section.
 - Smart transport through an HTTPs proxy: In this method, a product instance uses a proxy server to communicate with the licensing server, and eventually, CSSM. The following example shows you how to configure Smart Transport through a HTTP proxy:

```
Router(config)#
Router(config)# license smart proxy address 192.168.0.1
Router(config)# license smart proxy port 3128
```

Ensure that the cBR-8 router can access https://smartreceiver.cisco.com to configure Smart Transport. The following example show hot to configure Smart Transport.

```
Router# conf t
license smart url https://smartreceiver.cisco.com/licservice/license
license smart transport smart
end
```

Note Use the license smart url command only if you want to point to a different CSSM. It is not required if you are using using the default cisco official CSSM.

Registering the Router with the Cisco Licensing Cloud Using the Registration Token

The router registration is performed only once for each product instance.



Ensure that you have the product instance registration token.

To register the router with the Cisco Licensing Cloud using a registration token, use the following commands:

```
enable license smart register idtoken id-token
```

For example:

```
Router#license smart register idtoken
YjBkOWM5YTItMDFiOS00ZjBmLTllY2YtODEzMzg1YTMyZDVhLTEz
ODE0MjE0%0ANzc5NDF8U1BDUTAySWFRTmJqa1NnbmlzRUIyaG1YU
053L0pHZTNvUW9VTFpE%0AekxCOD0%3D%0A
```

The system contacts the Cisco Smart Licensing servers to obtain authorization for Smart Licensing.

The license agent registers the product with Cisco and receives an identity certificate. This certificate is saved and automatically used for all future communications with Cisco. The license agent automatically renews the registration information with Cisco every 30 days.



Smart licensing may fail if IPv6 is configured on any interface, and the router does not have IPv6 connectivity to the Internet or Cisco Smart Software Agent (at tools.cisco.com). Log file error messages similar to the following may appear.

(These messages may also appear as a result of other conditions being true.)

```
%SMART_LIC-3-AGENT_REG_FAILED: Smart Agent for Licensing Registration with Cisco licensing
cloud failed: Fail to send out Call Home HTTP message.
%SMART_LIC-3-COMM_FAILED: Communications failure with Cisco licensing cloud: Fail to send
out Call Home HTTP message.
```

If connectivity fails due to this issue, see the Re-establishing Connectivity to Cisco Smart Call Home Server section.

After connectivity is established, register the router with the Cisco Licensing Cloud.

Reestablishing Connectivity to Cisco Smart Call Home Server

This section describes what to do when the router fails to connect to the Cisco Smart Call Home Server and IPv6 is configured.

The following scenarios are applicable:

- If the interface is configured using the **ip http client source-interface interface** CLI and has the IPv6 address, the router establishes a session with the remote server with IPv6 connectivity.
- If the interface is configured using the **ip http client source-interface interface** command and has the IPv4 address, the router establishes a session with the remote server with IPv4 connectivity.
- If the interface is configured using **ip http client source-interface interface** command, and has an IPv6 address and an IPv4 address, the router establishes a session with the remote server with IPv6 connectivity.
- If the interface isn't configured using the **ip http client source-interface interface**, the router establishes a session with the remote server with the IPv6 address.

For Cisco IOS XE Everest 16.5.1 or later, if an IPv6 address is available for an interface and the device can't connect to the Internet or Cisco Smart Software Agent, configure the interface to only use IPv4 for smart licensing, by running the following configuration mode command.

ip http client source-interface interface

How to Configure Cisco Smart Licensing using Transport Gateway Solution

The steps below describe how to configure Cisco smart licensing using transport gateway solution.

Command or Action Purpose Step 1 enable Enables privileged EXEC mode. Example: • Enter your password if prompted. Router> enable Step 2 configure terminal Enters global configuration mode. Example: Router# configure terminal Step 3 crypto pki trustpoint Declare the trustpoint that the router should use. Example: Router(config) # crypto pki trustpoint cisco Step 4 Specify manual cut-and-paste certificate enrollment. enrollment terminal Example: Router(ca-trustpoint)# enrollment terminal Check the revocation status of a certificate. Method **none** Step 5 revocation-check method means certificate checking is not required. **Example:** Router(ca-trustpoint) # revocation-check none Step 6 Authenticate the certification authority. crypto pki authenticate Example: Router(config) # crypto pki authenticate cisco Step 7 no reporting smart-licensing-data Configure the default profile to not to communicate with tools.cisco.com. Example: Router(config) # call-home Router(cfg-call-home) # profile CiscoTAC-1 Router(cfg-call-home-profile) # no reporting smart-licensing-data Step 8 destination address http address Configure the custom profile to communicate with the transport server, here we use Custom Profile 1 as the name Example: of the custom profile. Router(config) # call-home Router(cfg-call-home) # profile Custom-Profile-1 Router(cfg-call-home-profile) # reporting smart-licensing-data Router(cfg-call-home-profile) # destination transport-method http Router(cfg-call-home-profile) # no destination transport-method email Router(cfg-call-home-profile)# destination address http https://IDS.IP.HERE:8443/Transportgateway/services/DeviceRequestHandle

Procedure

Configuring 100G Licenses for Supervisor 250G

The Cisco cBR Smart Account supports both 100G WAN licenses and 10G WAN licenses.

You need to configure the Cisco cBR to consume 100G WAN licenses for Supervisor 250G. This would accommodate existing 10G WAN licenses for 100G port, in addition to the 100G WAN license.

Starting from Cisco cBR release IOS-XE 16.8.1, there will be two types of WAN licenses in the Smart Account for WAN ports on the Cisco cBR Supervisor 250G module:

- 100G WAN license: By default, the Smart Account will consume the 100G WAN license for 100G WAN port.
- 10G WAN license: Can be applied to 10G and 100G WAN ports.

Overview of 100G License for Supervisor 250G

With the 100G WAN licenses, you can facilitate the ordering and management of WAN license for Supervisor 250G. This would help avoid the overhead of maintaining multiple 10G WAN licenses, and you can manage a single 100G WAN license for one 100G port of Supervisor 250G, instead of ten individual 10G WAN licenses.

However, there is no auto-conversion between 10G WAN licenses and 100G WAN licenses. They must be ordered and managed separately. If you are an existing customer using 10G WAN license for Supervisor 250G and have not purchased any 100G WAN licenses, the Cisco Smart Licensing will report out of compliance when attempting to upgrade to Cisco cBR release IOS-XE 16.8.1.

For information on configuring the Cisco cBR to consume 10G WAN licenses on 100G port for Supervisor 250G, see Applying 10G WAN License to the 100G WAN Ports, on page 18.



Note

- In Supervisor 160, there is no 100G WAN interface and WAN 100G License. The display is same as the
 previous release.
 - The 100G license feature does not support an ISSU downgrade. This might cause a standby SUP crash.

Applying 10G WAN License to the 100G WAN Ports

Ensure that you go through Overview of 100G License for Supervisor 250G, on page 18 for an understanding of the feature and the restrictions.

The Smart Account will consume the 100G WAN license for 100G WAN port by default. To apply the 10G WAN licenses for the 100G WAN port, complete the following step.

SUMMARY STEPS

1. You can apply the 10G WAN license to the 100G WAN ports using the following command:

DETAILED STEPS

	Command or Action	Purpose
Step 1	You can apply the 10G WAN license to the 100G WAN ports using the following command:	
	Example:	
	Router(config)# cable license 100G-conversion	
	To disable the 10G WAN license for 100G WAN ports, run the command with the <i>no</i> option. This would enable the 100G WAN ports to consume 100G WAN license.	
	Router(config)# no cable license 100G-conversion	

Displaying the License Information

You can use the following command options to display the license information, based on wether the license has been configured or not:

SUMMARY STEPS

- 1. Run either of the following command options to display license information.
 - By default, or with the *no* option, the ports will consume a 100G WAN license for a 100G WAN port.

For example if the **no cable license 100G-conversion** command has been issued, the responses to the **show cable license wan** and **show license summary** commands would be in the following format:

```
Router(config) # show cable license wan
    _____
Entitlement: WAN License
Consumed count: 0
Consumed count reported to SmartAgent: 0
Enforced state: No Enforcement
_____
Entitlement: WAN 100G License
Consumed count: 2
Consumed count reported to SmartAgent: 2
Enforced state: No Enforcement
Router(config) # show license summary
Smart Licensing is ENABLED
Registration:
 Status: REGISTERED
 Smart Account: CBR8 DEV 1
 Virtual Account: cbr8-dev-test
 Export-Controlled Functionality: Allowed
 Last Renewal Attempt: None
 Next Renewal Attempt: Jun 13 00:47:13 2018 CST
License Authorization:
 Status: AUTHORIZED
```

Last Communication Attem	npt: SUCCEEDED		
Next Communication Attem	npt: Jan 14 11:34:13 2018 CST		
License Usage: License	Entitlement tag	Count	Status
regid.2017-09.com.ci	(WAN 100G License)	2	AUTHORIZED

• With the **cable license 100G-conversion** command, it will consume 10G WAN license for 100G WAN port.

For example if the **cable license 100G-conversion** command has been issued, the responses to the **show cable license wan** and **show license summary** commands would be in the following format:

```
Router(config) # show cable licenses wan
           _____
_____
Entitlement: WAN License
Consumed count: 20
Consumed count reported to SmartAgent: 20
Enforced state: No Enforcement
_____
Entitlement: WAN 100G License
Consumed count: 0
Consumed count reported to SmartAgent: 0
Enforced state: No Enforcement
Router(config) # show license summary
Smart Licensing is ENABLED
Registration:
 Status: REGISTERED
 Smart Account: CBR8 DEV 1
 Virtual Account: cbr8-dev-test
 Export-Controlled Functionality: Allowed
 Last Renewal Attempt: None
 Next Renewal Attempt: Jun 13 00:47:13 2018 CST
License Authorization:
 Status: AUTHORIZED
 Last Communication Attempt: SUCCEEDED
 Next Communication Attempt: Jan 14 11:25:01 2018 CST
License Usage:
                    Entitlement tag
 License
                                              Count Status
 _____
 regid.2014-11.com.ci... (WAN License)
                                                  20 AUTHORIZED
```

DETAILED STEPS

	Command or Action	Purpose
Step 1	Run either of the following command options to display license information.	
	• By default, or with the <i>no</i> option, the ports will consume a 100G WAN license for a 100G WAN port.	

Command or Action	Purpose
For example if the no cable license 100G-conversion command has been issued, the responses to the show cable license wan and show license summary commands would be in the following format:	
Router(config)# show cable license wan	
Entitlement: WAN License Consumed count: 0 Consumed count reported to SmartAgent: 0 Enforced state: No Enforcement	
Entitlement: WAN 100G License Consumed count: 2 Consumed count reported to SmartAgent: 2 Enforced state: No Enforcement	
Router(config)# show license summary	
Smart Licensing is ENABLED	
Registration: Status: REGISTERED Smart Account: CBR8_DEV_1 Virtual Account: cbr8-dev-test Export-Controlled Functionality: Allowed Last Renewal Attempt: None Next Renewal Attempt: Jun 13 00:47:13 2018 CST	
License Authorization: Status: AUTHORIZED Last Communication Attempt: SUCCEEDED Next Communication Attempt: Jan 14 11:34:13 2018 CST	
License Usage: License Entitlement tag Count Status	
regid.2017-09.com.ci (WAN_100G_License) 2 AUTHORIZED	
• With the cable license 100G-conversion command, it will consume 10G WAN license for 100G WAN port.	
For example if the cable license 100G-conversion command has been issued, the responses to the show cable license wan and show license summary commands would be in the following format:	
Router(config)# show cable licenses wan	
Entitlement: WAN License	

Command or Action	Purpose
Consumed count: 20 Consumed count reported to SmartAgent: 20 Enforced state: No Enforcement	
Entitlement: WAN 100G License Consumed count: 0	
Enforced state: No Enforcement	
Smart Licensing is ENABLED	
Registration: Status: REGISTERED Smart Account: CBR8_DEV_1 Virtual Account: cbr8-dev-test Export-Controlled Functionality: Allowed Last Renewal Attempt: None Next Renewal Attempt: Jun 13 00:47:13 2018 CST	
License Authorization: Status: AUTHORIZED Last Communication Attempt: SUCCEEDED Next Communication Attempt: Jan 14 11:25:01 2018 CST	
License Usage: License Entitlement tag Count Status	
regid.2014-11.com.ci (WAN_License) 20 AUTHORIZED	

Feature Information for 100G License for Supervisor 250G

Use Cisco Feature Navigator to find information about the platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to the https://cfnng.cisco.com/ link. An account on the Cisco.com page is not required.



Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 3: Feature Information for 100G License for Supervisor 250G

Feature Name	Releases	Feature Information
100G License for Supervisor 250G	Cisco IOS-XE Release 16.8.1	This feature was integrated into Cisco IOS-XE Release 16.8.1 on theCisco cBR Series Converged Broadband Routers.

Verifying Cisco Smart Licensing Configuration

Use the following commands to verify the Cisco Smart Licensing Configuration on the Cisco cBR router:

• show license all—Displays all the license information.

The following is a sample output of this command:

```
Router# show license all
Smart Licensing Status
_____
Smart Licensing is ENABLED
Registration:
 Status: REGISTERED
 Virtual Account: auto-test-1
 Initial Registration: SUCCEEDED on Mar 5 02:01:03 2015 UTC
 Last Renewal Attempt: None
 Next Renewal Attempt: Sep 1 02:03:51 2015 UTC
 Registration Expires: Never
License Authorization:
 Status: OUT OF COMPLIANCE on Mar 5 03:34:54 2015 UTC
 Last Communication Attempt: SUCCEEDED on Mar 5 03:35:57 2015 UTC
 Next Communication Attempt: Mar 5 15:35:57 2015 UTC
 Communication Deadline: Jun 3 03:32:51 2015 UTC
License Usage
_____
(US License):
 Description:
 Count: 64
 Version: 1.0
 Status: AUTHORIZED
(DS License):
 Description:
 Count: 768
 Version: 1.0
 Status: AUTHORIZED
(WAN License):
 Description:
 Count: 8
 Version: 1.0
 Status: OUT OF COMPLIANCE
Product Information
_____
```

• show license status—Displays the license status information.

The following is a sample output of this command:

```
Router# show license status

Smart Licensing is ENABLED

Registration:

Status: REGISTERED

Virtual Account: auto-test-1

Initial Registration: SUCCEEDED on Mar 5 02:01:03 2015 UTC

Last Renewal Attempt: None

Next Renewal Attempt: Sep 1 02:03:51 2015 UTC

Registration Expires: Never

License Authorization:

Status: OUT OF COMPLIANCE on Mar 5 03:34:54 2015 UTC

Last Communication Attempt: Mar 5 15:35:56 2015 UTC

Next Communication Attempt: Mar 5 15:35:56 2015 UTC
```

• show license summary—Displays the license summary information.

The following is a sample output of this command:

```
Router# show license summary
Smart Licensing is ENABLED
Registration:
  Status: REGISTERED
  Virtual Account: auto-test-1
  Last Renewal Attempt: None
  Next Renewal Attempt: Sep 1 02:03:51 2015 UTC
License Authorization:
  Status: OUT OF COMPLIANCE
  Last Communication Attempt: SUCCEEDED
  Next Communication Attempt: Mar 5 15:35:56 2015 UTC
License Usage:
                                Entitlement tag Count Status
          License
                                       _____

    (US_License)
    64
    AUTHORIZED

    (DS_License)
    768
    AUTHORIZED

    (WAN_License)
    8
    OUT OF COMPLIANCE

                                    (WAN License) 8
```

• show license tech support—Displays the license technical support information.

The following is a sample output of this command:

```
Router# show license tech support
Smart Licensing Tech Support info
Smart Licensing Status
_____
Smart Licensing is ENABLED
Registration:
  Status: REGISTERED
 Virtual Account: auto-test-1
 Initial Registration: SUCCEEDED on Mar 5 02:01:03 2015 UTC
 Last Renewal Attempt: None
  Next Renewal Attempt: Sep 1 02:03:51 2015 UTC
 Registration Expires: Never
License Authorization:
  Status: OUT OF COMPLIANCE on Mar 5 03:34:54 2015 UTC
  Last Communication Attempt: SUCCEEDED on Mar 5 03:35:57 2015 UTC
  Next Communication Attempt: Mar 5 15:35:57 2015 UTC
 Communication Deadline: Jun 3 03:32:51 2015 UTC
Evaluation Period:
  Evaluation Mode: Not In Use
  Evaluation Period Remaining: 89 days, 23 hours, 25 minutes, 40 seconds
License Usage
_____
Handle: 1
   License: 'nullPtr'
   Entitlement Tag:
regid.2014-11.com.cisco.US License,1.0 a3f32909-2c71-426c-b3e0-eeefc946f9b3
   Description: <empty>
   Count: 64
    Version: 1.0
   Status: AUTHORIZED(3)
   Status time: Mar 5 03:34:54 2015 UTC
   Request Time: Mar 5 03:34:17 2015 UTC
Handle: 2
   License: 'nullPtr'
   Entitlement Tag:
regid.2014-11.com.cisco.DS License,1.0 71ad0ae1-5e5e-4f02-b380-d2e1b8dcfa03
   Description: <empty>
   Count: 768
    Version: 1.0
   Status: AUTHORIZED(3)
   Status time: Mar 5 03:34:54 2015 UTC
   Request Time: Mar 5 03:34:17 2015 UTC
Handle: 3
   License: 'nullPtr'
   Entitlement Tag:
regid.2014-11.com.cisco.WAN_License,1.0_3d8bb7ba-1a92-4f01-a4aa-a4479f1d7612
   Description: <empty>
   Count: 8
    Version: 1.0
   Status: OUT OF COMPLIANCE(4)
   Status time: Mar 5 03:34:54 2015 UTC
   Request Time: Mar 5 03:34:17 2015 UTC
```

```
Product Information
 _____
UDI: PID:CBR-8-CCAP-CHASS, SN:FXS1739Q0NT
HA UDI List:
    Active:PID:CBR-8-CCAP-CHASS, SN:FXS1739Q0NT
    Standby:PID:CBR-8-CCAP-CHASS, SN:FXS1739Q0NT
Agent Version
_____
Smart Agent for Licensing: 1.2.1 throttle/5
Component Versions: SA: (1 2 1 throttle) 1.1.0, SI: (rel20) 1.0.1, CH: (rel4) 1.0.15,
PK: (rel16)1.0.7
Upcoming Scheduled Jobs
_____
Current time: Mar 5 03:37:46 2015 UTC
IdCert Expiration Warning: Jan 4 02:00:41 2016 UTC (304 days, 22 hours, 22 minutes,
55 seconds remaining)
Daily: Mar 6 03:21:11 2015 UTC (23 hours, 43 minutes, 25 seconds remaining)
Certificate Renewal: Sep 1 02:03:51 2015 UTC (179 days, 22 hours, 26 minutes, 5 seconds
remaining)
Certificate Expiration Check: Mar 4 02:00:41 2016 UTC (364 days, 22 hours, 22 minutes,
55 seconds remaining)
Authorization Renewal: Mar 5 15:35:57 2015 UTC (11 hours, 58 minutes, 11 seconds
remaining)
Authorization Expiration Check: Jun 3 03:32:51 2015 UTC (89 days, 23 hours, 55 minutes,
 5 seconds remaining)
Init Flag Check: Not Available
License Certificates
------
Production Cert: True
PIID: 36bf91ae-0577-4213-9e62-1b6ee0add02f
Licensing Certificated:
    Id certificate Info:
       Start Date: Mar 5 01:57:54 2015 UTC
        Expiry Date: Mar 4 01:57:54 2016 UTC
        Version Number: 3
        Serial Number: 134418
        Common Name: 05FB26B1A58A106DEA6878C346432186D08BC1C5::1,2
    Signing certificate Info:
        Start Date: Jun 14 20:18:52 2013 UTC
        Expiry Date: Apr 24 21:55:42 2033 UTC
       Version Number: 3
        Serial Number: 3
       Common Name: MMI Signer
    Sub CA Info:
       Start Date: Apr 24 22:19:15 2013 UTC
        Expiry Date: Apr 24 21:55:42 2033 UTC
       Version Number: 3
       Serial Number: 2
       Common Name: Smart Licensing CA - DEV
HA Info
_____
RP Role: Active
Chassis Role: Active
Behavior Role: Active
RMF: True
CF: True
```

```
CF State: Stateless
Other Info
_____
Software ID: regid.2014-12.com.cisco.CBR8V1,1.0 95948658-0b8b-4e8f-838d-b17020364ca9
Agent State: OOC
TS enable: True
Transport: Callhome
Locale: en US.UTF-8
Debug flags: 0x7
Privacy Send Hostname: True
Privacy Send IP: True
Build type:: Production
sizeof(char) : 1
            : 4
sizeof(int)
sizeof(long) : 4
sizeof(char *): 8
sizeof(time t): 4
sizeof(size_t): 8
Endian: Big
enableOnInit: True
routingReadyByEvent: True
systemInitByEvent: True
WaitForHaRole: False
standbyIsHot: True
chkPtType: 2
delayCommInit: False
roleByEvent: True
maxTraceLength: 150
traceAlwaysOn: False
debugFlags: 7
```

• show license udi-Displays the license Unique Device Identifier (UDI) information.

The following is a sample output of this command:

```
Router# show license udi
UDI: PID:CBR-8-CCAP-CHASS,SN:FXS1739Q0NT
HA UDI List:
Active:PID:CBR-8-CCAP-CHASS,SN:FXS1739Q0NT
Standby:PID:CBR-8-CCAP-CHASS,SN:FXS1739Q0NT
```

• show license usage—Displays the license usage information.

The following is a sample output of this command:

Router# show license usage

```
License Authorization:
   Status: OUT OF COMPLIANCE on Mar 5 03:34:54 2015 UTC
(US_License):
   Description:
   Count: 64
   Version: 1.0
   Status: AUTHORIZED
(DS_License):
   Description:
   Count: 768
   Version: 1.0
   Status: AUTHORIZED
```

```
(WAN_License):
  Description:
  Count: 8
  Version: 1.0
  Status: OUT OF COMPLIANCE
```

• show call-home profile all—Displays the call home profile information for all configured profiles.

The following is a sample output of this command:

Router# show call-home profile all

```
Profile Name: CiscoTAC-1
Profile status: ACTIVE
Profile mode: Full Reporting
Reporting Data: Smart Call Home, Smart Licensing
Preferred Message Format: xml
Message Size Limit: 3145728 Bytes
Transport Method: http
Email address(es): callhome@cisco.com
HTTP address(es): https://tools.cisco.com/its/service/oddce/services/DDCEService
```

Periodic configuration info message is scheduled every 25 day of the month at 10:03

Periodic inventory info message is scheduled every 25 day of the month at 09:48

Alert-group	Severity
crash diagnostic	debug minor
environment	minor
inventory	normal
Syslog-Pattern	Severity
•*	major

• show call-home smart-licensing statistics—Displays the call home smart licensing statistics information.

The following is a sample output of this command:

```
Router# show call-home smart-licensing statisticsSuccess:Successfully sent and response received.Failed :Failed to send or response indicated error occurred.Inqueue:In queue waiting to be sent.Dropped:Dropped due to incorrect call-home configuration.Msg SubtypeSuccess Failed Inqueue Dropped Last-sent (GMT-06:00)REGISTRATION1002015-03-1313:12:13ACKNOWLEDGEMENT100ENTITLEMENT5002015-03-1313:22:18
```

Use the following commands to verify the DOCSIS 3.1 Downstream License on the Cisco cBR router:

• show cable license all | begin D3.1—Displays all the DOCSIS 3.1 downstream license information.

The following is a sample output of this command:

Router# show cable license all | begin D3.1

Use the following commands to verify the DOCSIS 3.1 Upstream Exclusive License on the Cisco cBR router:

show cable licenses us_d31_exclusive—Displays the DOCSIS 3.1 upstream exclusive license information.

The following is a sample output of this command:

Troubleshooting Cisco Smart Licensing

Before taking the steps below to troubleshoot the Cisco Smart Licensing, the customers should first make sure the configuration is correct and see if they are able to ping the HTTP address they have configured for the smart license. The output of the **show call-home smart-licensing statistics** command should have REGISTERED and ACKNOWLEDGE information. And check the output of **show logging** | **include SMART** | **CALL**.

Manually Renewing the Smart License Registration

The license agent automatically renews the registration information with Cisco every 30 days. You may need to manually renew the registration if the license is out of compliance and it needs to be registered immediately.

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Router> enable	
Step 2	license smart renew	Manually renews the license registration of the device
	Example:	instance with Cisco.
	Router# license smart renew	

Procedure

Unregistering the Router from Cisco Smart Licensing

You can unregister the router from Cisco Smart Licensing. You may need to unregister the router for the Return Material Authorization (RMA) of the router.

Procedure

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	• Enter your password if prompted.
	Router> enable	
Step 2	license smart deregister	Removes the Cisco Smart Licensing registration for the
	Example:	device instance. All Cisco Smart Licensing certificates and entitlements are removed
	Router# license smart deregister	entriements are removed.

Flexible Consumption Model (FCM) Licenses

Smart Licensing supports the Flexible Consumption (FCM) licensing model. This model of licensing is available at low initial investment, provides easy scalability, and allows you to increase consumption of licenses as they expand. Flexible Consumption model licenses are checked for usage on a monthly basis. The monthly license usage is reported to the Smart Licensing Manager at Cisco.com.

In order to provide the simplification and flexibility to purchase software capacity as needed, FCM is metering the number of Subscribers(Modems) it has for each tier (Essential, Advantage, or Premier) which is based on the number of channels that are configured per Service Group:

- Essential (ES) tier is for 0-48 channels per Service Group.
- Advantage(AD) tier is for 49–80 channels per Service Group.
- Premier(PR) tier is for 81 and above channels per Service Group.

Benefits of FCM

- *Pay-as-you-grow*: Enables you to lower initial costs and add more capacity over time using Software Innovation Access (SIA)
- Great Value: Select the right tier, based on your needs (Essential, Advantage, Premier).
- Simple: Few pricing and service options.
- *Consistency*: Right-to-Use (RTU) model based on per subscriber (end user) basis aligned with other Cisco Service Provider products.

Pricing for Cisco cBR-8 routers consists of a perpetual license, software innovation access (SIA) subscription, and Cisco Solution Support Services.

 Perpetual licenses are charged as a one-time payment per end customer who is serviced by the platform and entitle permanent right-to-use of the cBR8 software.

- SIA is charged as a three, four, or five year subscription per end customer who is serviced by the platform, and entitles major software version upgrades during the subscription period. At the end of the initial subscription, you can renew the SIA subscriptions on an annual basis.
- Support Services (either SWSS-Basic or Solution Support) is required on the perpetual licenses for access to Technical Support and SW maintenance releases. Term of Support Services must align to the duration of the SIA subscription (i.e. three, four, or five years).

The following table shows the FCM PID list:

Table 4: Flexible Consumption Model License PID List

PID	Option Class	Sub-Option Class	Maximum Supported Channels Per Service Group	Rules
CBR85W	Nested Model			
	CBR-8 Essential RTU SW License			CBR-8 Per subscriber perpetual SW applications
		CBR8-ES-RTU	48 channels	Per subscriber perpetual SW license applications.
		CBR8-ES-SIA-3		Annual subscription 3-year SIA star
		CBR8-ES-SIA-5		Annual subscription 5-year SIA stan
		CBR8-ES-SIA-7		Annual subscription 7-year SIA stan
		CBR8-ES-SIA-ST		Renewal PID for Transactional Esse
	CBR-8 Advantage RTU SW License			CBR-8 Per subscriber perpetual SW applications.
		CBR8-AD-RTU	80 Channels	Per subscriber perpetual SW license
		CBR8-AD-SIA-3		Annual subscription 3 year SIA stan
		CBR8-AD-SIA-5		Annual subscription 5 year SIA stan
		CBR8-AD-SIA-7		Annual subscription 7 year SIA stan
		CBR8-AD-SIA-ST		Renewal PID for Transactional Adva
	CBR-8 Premier RTU SW License			CBR-8 Premier Tier per subscriber I
		CBR8-PR-RTU	Unlimited Channels	Per subscriber perpetual SW license applications
		CBR8-PR-SIA-3		Annual subscription 3-year SIA stan
		CBR8-PR-SIA-5		Annual subscription 5-year SIA stan
		CBR8-PR-SIA-7		Annual subscription 7-year SIA stan

PID	Option Class	Sub-Option Class	Maximum Supported Channels Per Service Group	Rules
		CBR8-PR-SIA-ST		Renewal PID for Transactional Premier

Cisco cBR-8 routers either supports Traditional Mode License or FCM License, it does not allow combining FCM and Traditional Mode License. The Traditional Mode License is enabled by default. Use the cable license enable-FCM command to enable FCM. Use no cable license enable-FCM to disable FCM.

Table 5: Differences Between Traditional Smart License

Traditional Smart License	FCM
Bandwidth based model	Subscriber based model
Enabled by default	Use the cable license enable-FCM command to enable FCM. Use no cable license enable-FCM to disable FCM.
Enforced license types:	Enforced license types:
• LCHA_License	• LCHA_License
• DS_License	• CBR8_ESS_RTU/ CR8_ADV_RTU/
• US_License	CBR8_PRE_RTU
• DS_D31_License	• CBR8_ESS_SIA/ CR8_ADV_SIA/ CBR8_PRE_SIA
• US_D31_License	
• WAN_License	
• NC_License	
• RPHY_BC_Video	
All Cisco IOS XE releases are supported.	Supported on Cisco IOS XE Cupertino 17.9.1w releases or later.

The following example shows the Traditional Mode License Summary:

Traditional Mode License Summary

```
router#show license summary
Load for five secs: 71%/4%; one minute: 62%; five minutes: 59%
Time source is NTP, 00:05:01.752 CST Mon Oct 17 2022
Smart Licensing is ENABLED
Registration:
   Status: REGISTERED
   Smart Account: BU Production Test 1
```

```
Virtual Account: CBR8-STG2
  Export-Controlled Functionality: ALLOWED
 Last Renewal Attempt: None
  Next Renewal Attempt: Apr 14 22:51:18 2023 CST
License Authorization:
  Status: AUTHORIZED
 Last Communication Attempt: PENDNG
 Next Communication Attempt: Oct 17 23:07:06 2022 CST
License Usage:
                        Entitlement Tag
 License
                                                     Count Status
  _____
            -------
 CBR8 DOCSIS 3.0 Upst... (US License)
                                                      1279 AUTHORIZED
 CBR8 VOD/SDV Downstr... (NC License)
                                                      744 AUTHORIZED
  CBR8 DOWNSTREAM RPHY... (RPHY_BC_Video)
                                                       5 AUTHORIZED
  CBR8 Supervisor 10G ... (WAN_License)
                                                       12 AUTHORIZED
  CBR8 DOCSIS 3.0 Down... (DS License)
                                                      3005 AUTHORIZED
  CBR8 D3.1 Downstream... (DS D31 License)
                                                      1324 AUTHORIZED
  cBR8 DOCSIS 3.0 Line-...(DLCHA License)
                                                        1 AUTHORIZED
```

Determining Service Group(SG) Size

Service Group size only considers DOCSIS channels. Service Group only considers DS channel and does not consider US channel.

- For I-CMTS, one SG is a DS port. The DS port is DS controller port from CMTS.
- For RPHY, one SG is an RPD DS port.

Service Group considers max channels that are configured in the group, regardless if channel is up or down. The OFDM channels are calculated as the sums total of all licensed spectrum, which is divided by 6, and then rounded up. For example:

- In a Service Group –24 SC QAMs for DOCSIS 3.0 + 96 MHz (equivalent to 16- 6-Mhz channels) of OFDM for D3.1 = 40 total channels (24 + 16). This is an Essential Tier.
- In a Service Group -32 SC QAMs for DOCSIS 3.0 + 192 MHz (equivalent to 32- 6-Mhz channels) of OFDM for D3.1 = 64 total channels (32 + 32). This is an Advantage Tier.

Determining Service Tier

A Cisco cBR-8 router can only have one service tier i.e Essential, Advantage, or Premier, but can't have a mixture of them. Here is the chassis level service tier Algorithm with 5% Allowance:

- Essential SG count >= total SG count * (1–5%), Cisco cBR-8 router service tier is Essential.
- Premier SG count > total SG count * 5%, Cisco cBR-8 router service tier is **Premier**.
- If the previous two conditions are not met, then Cisco cBR-8 router service tier is Advantage.

For example, on a Cisco cBR-8 router, there are 19 Essential SGs (48 DS channels) and 1 Advantage SG (64 DS channels), then this chassis level service tier is **Essential** Tier (19/(19+1) = 95%).

Cisco cBR-8 Router Reporting to CSSM

Cisco cBR-8 routers report the number of subscribers that it has for each tier (Essential, Advantage, or Premier). Every license has two entitlements. The entitlement types are the right-to-use (RTU) and Software Innovation Access (SIA). Cisco cBR-8 routers report same number of licenses in both RTU and SIA to server. Cisco

cBR-8 routers report subscribers to Cisco Smart Software Manager (CSSM) in one hour after bootup or SUP switchover, post that it reports Monthly. Cisco cBR-8 routers keeps track of the number of channels per SG and total modems count over the whole month. For example, if Cisco cBR-8 routers did 30 samples in one month, and the highest modems count and tier of the 30 samples are used for reporting. Cisco cBR-8 routers store the highest subscriber(modem) count during the reporting period, regardless if the modem is online or offline. DSG STB devices are excluded from subscriber statistics.(Use the show cable modem docsis device-class command.). Traditional licenses types are not reported in FCM model except LCHA license.

CSSM Response to Cisco cBR-8 Router

The Hierarchy license structure is as follows: Premier>Advanced>Essential. If there are sufficient RTU/SIA licenses in reported tier, then server response is **Compliance**. If the server does not have insufficient RTU/SIA licenses in the reported or higher tier, then server response is **Out of Compliance** (**OOC**). If there are insufficient RTU/SIA licenses in reported tier, then the server automatically tries to use licenses of a higher level than what is reported.

The following is an example where the server response is **Compliance**:

CSSM has licenses: 1000 Essential-RTU License, 100 Advantage-RTU, 10 Premier-RTU. cBR-8 reports 1050 Essential-RTU to CSSM, CSSM uses 1000 Essential-RTU License + 50 Advantage-RTU. 1000 + 100 > 1050.

The following is an example where the server response is **Out of Compliance (OOC)**:

CSSM has licenses: 100 Essential -RTU License, 1000 Advantage-RTU, 10 Premier-RTU. cBR-8 reports 1050 Advantage-RTU to CSSM, CSSM uses 1000 Advantage -RTU License + 10 Premier-RTU, 1000 + 10 < 1050.

Order the required amount of RTU & SIA subscriptions licenses, based on the service tier and number of subscribers that you plan to deploy.

FCM License Summary

The following example shows how to deploy an FCS License.

```
router(config)#cable license enable-FCM
router#show license summary
Load for five secs: 26%/2%; one minute: 31%; five minutes: 31%
Time source is NTP, 00:07:14.392 CST Mon Oct 17 2022
Smart Licensing is ENABLED
Registration:
  Status: REGISTERED
 Smart Account: BU Production Test 1
  Virtual Account: CBR8-STG2
 Export-Controlled Functionality: ALLOWED
 Last Renewal Attempt: None
 Next Renewal Attempt: Apr 12 10:32:34 2023 CST
License Authorization:
  Status: AUTHORIZED
  Last Communication Attempt: SUCCEEDED
 Next Communication Attempt: Nov 16 00:07:12 2022 CST
License Usage:
                       Entitlement Tag
                                                  Count Status
 License
  _____
 CBR DOCSIS 3.0 Line-... (LCHA License)
                                                      5 AUTHORIZED
```

L

CBR8 - Advantage ·	- RTU	(CBR8_ADV_RTU)	264	AUTHORIZED
CBR8 - Advantage S	Sub	(CBR8_ADV_SIA)	164	AUTHORIZED

Additional References

Related Documents

Related Topic	Document Title
Cisco Smart Licensing	Cisco Smart Software Licensing

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.	http://www.cisco.com/support
To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.	
Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	

Feature Information for Cisco Smart Licensing

Use Cisco Feature Navigator to find information about the platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to the https://cfnng.cisco.com/ link. An account on the Cisco.com page is not required.



Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 6: Feature Information for Cisco Smart Licensing

Feature Name	Releases	Feature Information
Cisco Smart Licensing	Cisco IOS XE Fuji 16.7.1	This feature was integrated on theCisco cBR Series Converged Broadband Routers.
DOCSIS 3.1 US Channel Licensing	Cisco IOS XE Fuji 16.7.1	This feature was integrated on theCisco cBR Series Converged Broadband Routers.