

Configure Smart Licensing Using Policy on Cisco IOS XE Routers

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Introduction

This document describes the steps required for the configuration and registration of a Cisco IOS® XErouter with Smart Licensing Using Policy feature.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Smart Licensing Using Policy registration
- Smart Licensing Using Policy transport methods

Components Used

The information in this document is based on these software versions:

- Cisco Smart License Utility version 1.0.0-2 installed on Windows Personal Computer (PC) with Smart Account and Virtual Account configured.
- On Integrated Services Routers (ISR), Aggregation Services Routers (ASR) 1000, Catalyst 8300, 8500 and 9000: Cisco IOS XE 17.3.2
- On Catalyst 8200 and 1100: Cisco IOS XE 17.4.1
- Cloud Services Router (CSR) and ISR virtual require an upgrade to Catalyst 8000v and Cisco IOS XE 17.4.1.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configure

This document describes the next four possible topologies and configurations required when you use Smart Licensing Using Policy. These options depend on how the router is connected to the network.

- Router connected to Cisco Smart Software Manager (CSSM) through Cisco Smart License Utility (CSLU).
- Router directly connected to CSSM.
- Router connected to CSLU and CSLU disconnected from CSSM.
- Router not connected to the CSSM and without CSLU in place.

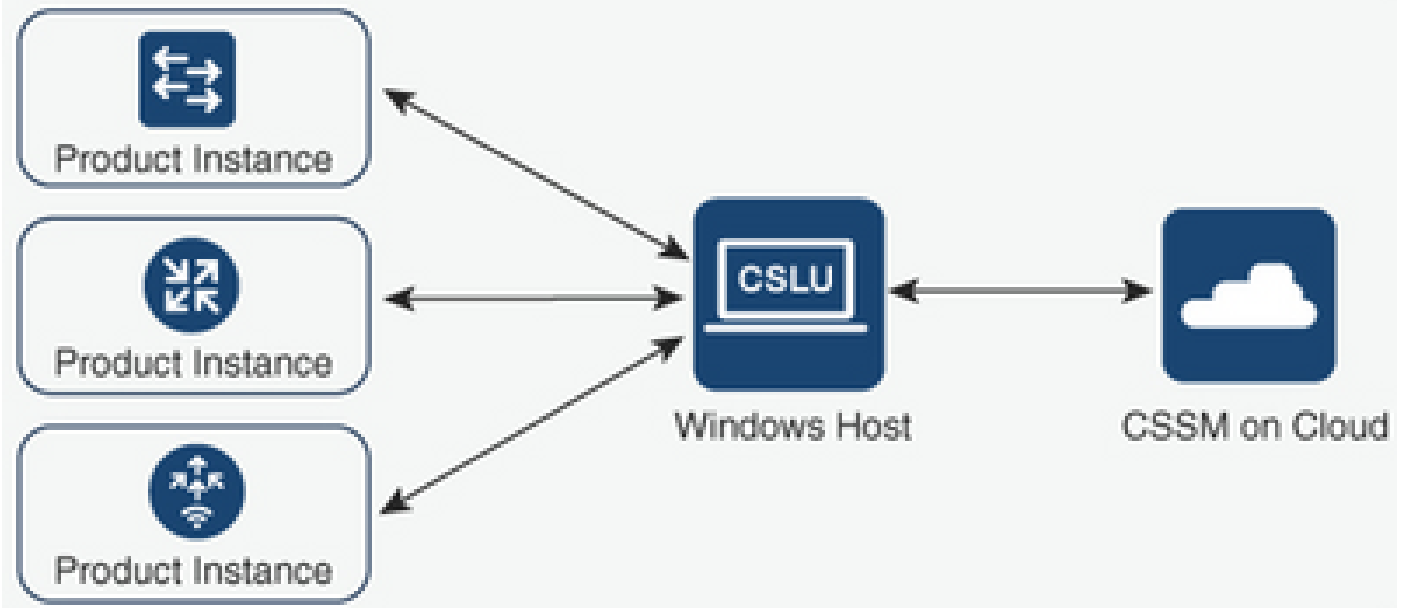
Router Connected to CSSM Through CSLU

On this topology, the product instances in the network are connected to CSSM through CSLU. CSLU becomes the single point of communication with CSSM.

In this section, it is explained Pull and Push methods and their respective configuration.

Network Diagram

Connected to CSSM Through CSLU



Push Method Configuration

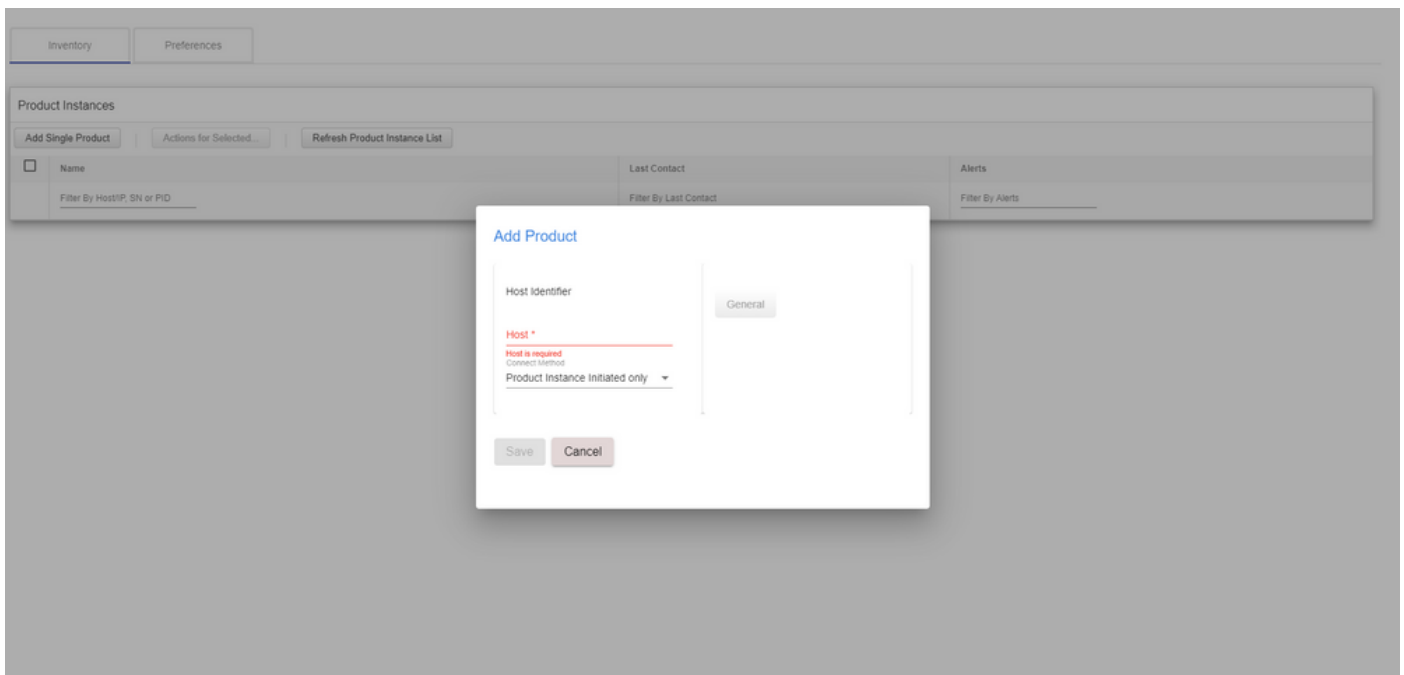
On this method, the product instance initiates the communication with CSLU, by a connection to a Representational State Transfer (REST) endpoint in CSLU.

The data that is sent includes Real User Monitoring (RUM) reports and requests for authorization codes, trust codes and policies.

Configuration Steps

Step 1. Log in to CSLU Interface and choose **Add Single Product**.

Step 2. Choose **Product Instance Initiated** only, and define the IP address of the product instance to be registered.



Step 3. On the router, configure the transport method to csLu.

```
Device(config)# license smart transport csLu
```

Step 4. Enter the CSLU URL with the CSLU IP address.

```
Device(config)# license smart url csLu http://<csLu-ip>:8182/csLu/v1/pi
```

Step 5. Configure the interface by which the HTTP message is sent.

5.1. Configure the interface by which the HTTP message is sent with this command:

```
Device(config)# ip http client source-interface interface-type-number
```

5.2. If you use a VRF to reach CSLU, and instead of an ip address you use csLu-local to resolve, you need to add the hostname resolution for csLu-local with this command:

```
Device(config)# ip host vrf Name_VRF csLu-local csLu-ip-address
```

Step 6. Initiate the communication and report of usage. Verify logs for correct policy installation.

Device# license smart sync

*Apr 14 12:08:06.235: %SMART_LIC-6-POLICY_INSTALL_SUCCESS: A new licensing policy was successfully inst

Pull Method Configuration

On this method, CSLU initiates the communication with the product instance in order to retrieve its information.

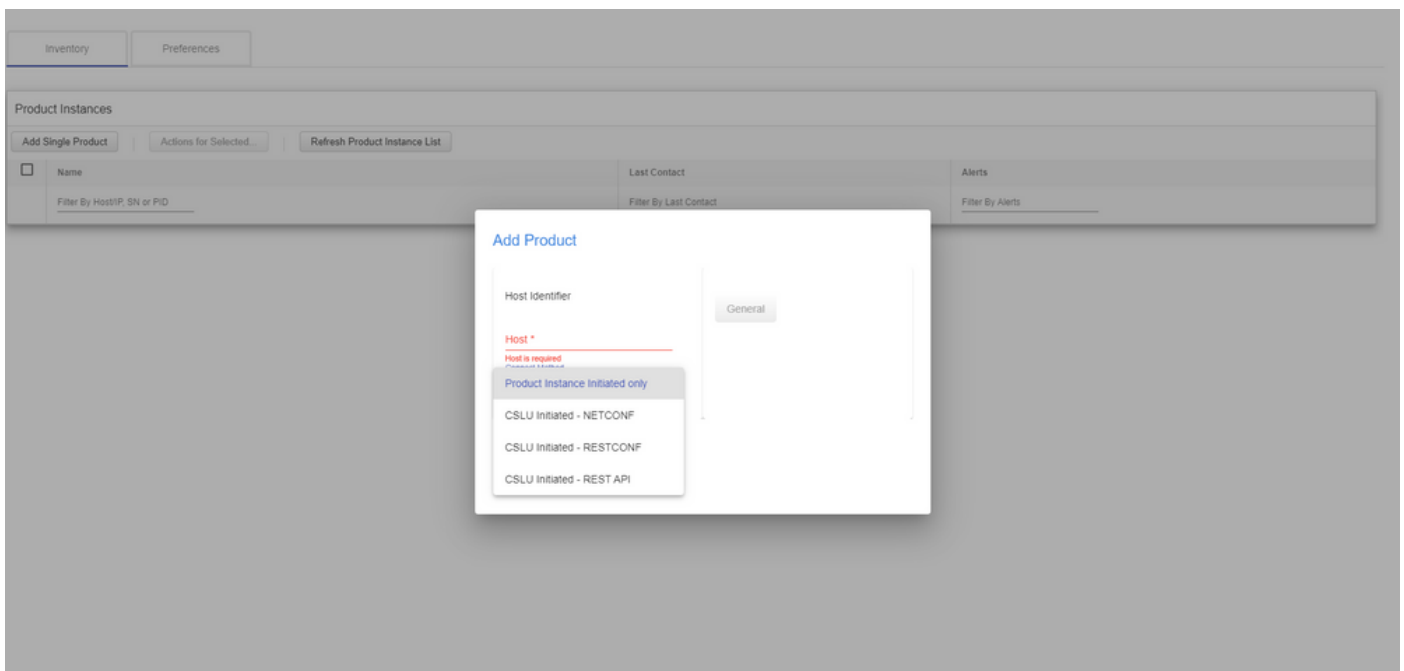
CSLU uses Network Configuration Protocol (NETCONF), Representational State Transfer Configuration Protocol (RESTCONF), google Remote Procedure Calls (gRPC) with Yet Another Next Generation (YANG) models, or REST Application Programming Interfaces (APIs) to connect to the product instances.

Configuration Steps

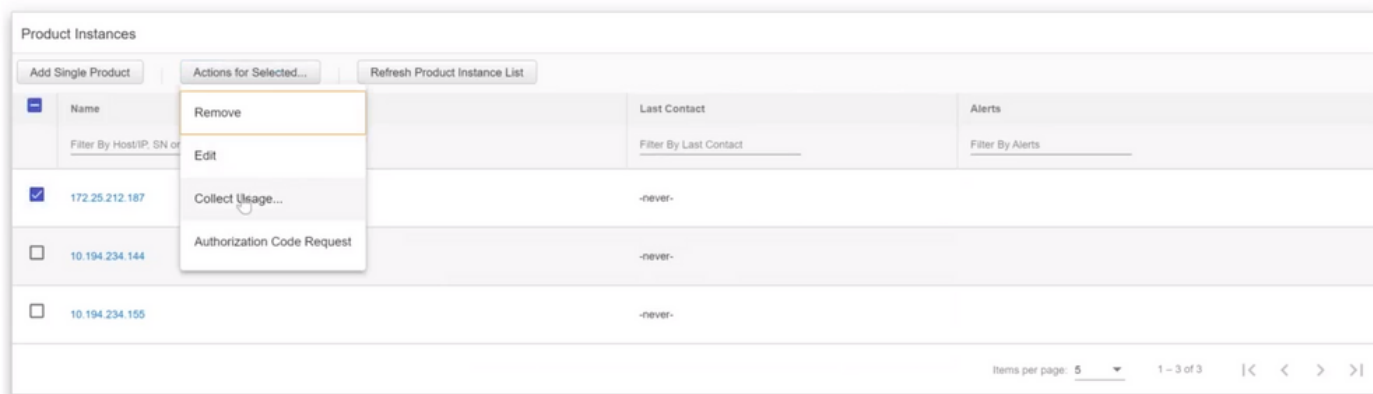
Step 1. On the router, configure your preferred method of connectivity (NETCONF, RESTCONF, or REST API).

Step 2. Log in to CSLU Interface and choose **Add Single Product**.

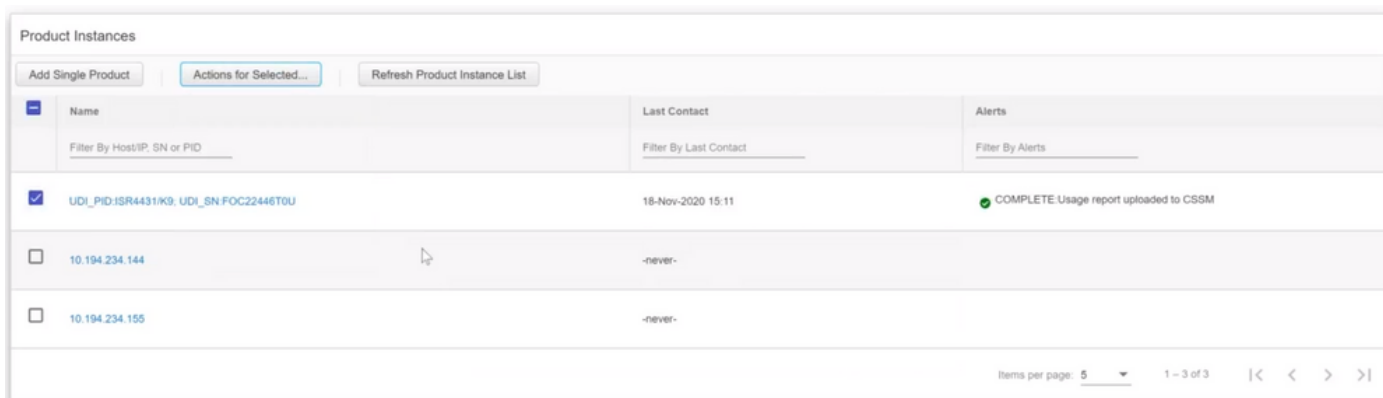
Step 3. Choose any of the CSLU Initiated options related to the desired connection method (NETCONF, RESTCONF, or REST API), and define the IP address of the product instance to be registered.



Step 4. Choose from the list of Product Instances, the device to be registered, and navigate to **Actions for Selected and Collect Usage**.



Step 5. Verify the completion of the collection of license usage under that product instance.



Step 6. On the registered device, you must see a licensing policy installation successful log.

*Nov 18 23:22:12.929: %SMART_LIC-6-POLICY_INSTALL_SUCCESS: A new licensing policy was successfully inst

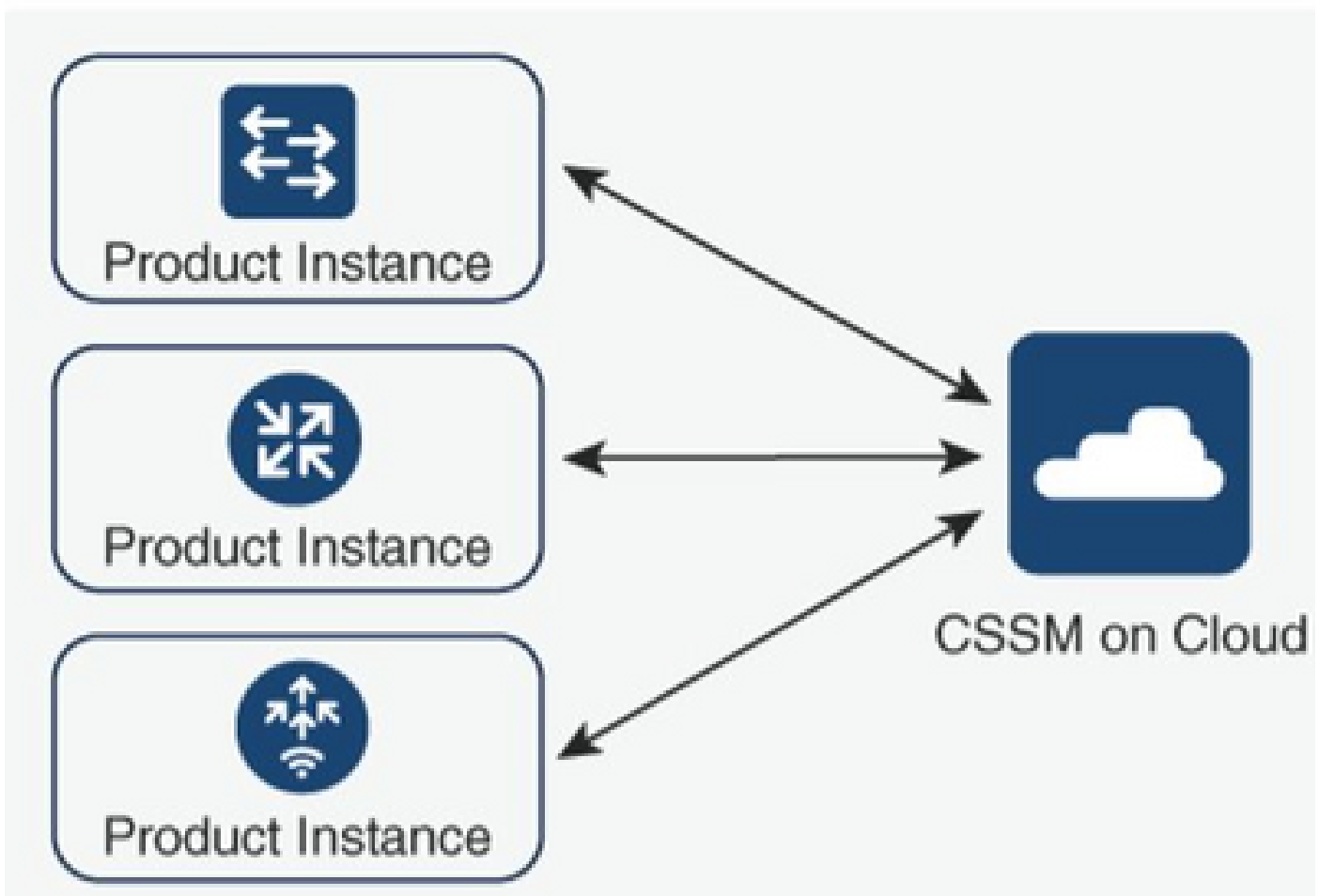
Router Directly Connected to CSSM

On this topology, you establish a direct and trusted connection from a product instance to CSSM, and you have 2 possible transport methods:

- Smart Transport Method. A Smart Licensing JavaScript Object Notation (JSON) message is contained within a HyperText Transfer Protocol (HTTP) message and exchanged between a product instance and the CSSM.
- Call-home Transport Method. Call-home provides e-mail-based and web-based notification of critical system events.

Network Diagram

Directly Connected to CSSM



Smart Transport Method Configuration

Configuration Steps

Step 1. Configure the interface by which the HTTP message is sent.

```
Device(config)# ip http client source-interface interface-type-number
```

Step 2. Define smart transport method, as the desired license transport method.

```
Device(config)# license smart transport smart
```

Step 3. Set the license smart Uniform Resource Locator (URL) as default.

3.1. In order to set license smart URL as default, use this command:

```
Device(config)# license smart url default
```

3.2. If you use a proxy to reach CSSM, you need to add the proxy for smart:

```
Device(config)# license smart proxy X.X.X.X port XXXX
```

Step 4. Generate a new token from CSSM under your Smart Account and Virtual Account and copy the generated token.

Cisco Software Central > Smart Software Licensing BU Production Test

Smart Software Licensing Feedback Support Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: **Mex CATS West** 10 Major | 21 Minor | Hide Alerts

General | Licenses | Product Instances | Event Log

Virtual Account

Description: TAC CATS West Account
Default Virtual Account: No

Product Instance Registration Tokens

The registration tokens below can be used to register new product instances to this virtual account.

Token	Expiration Date	Uses	Export-Controlled	Description	Created By	Actions
OWI00TFjNDAiZDVkZ...	2021-May-13 02:29:05 (in 30...		Allowed	asamanoo-691058171	asamanoo	Actions

Token



```
OGQ2Yjg5YjEiZTEwYTIyLWE1MTEtNDMxYjBmMDFhMDU0LTE2MTY2OTk5%0AMzU3OTd8b3FRZHImLy95QXJNNHIMWWDIXWmZ4MGxUUk1TOW1sZzI0by8xTFRJ%0AL2NJWT0%3D%0A
```

Press ctrl + c to copy selected text to clipboard.

Step 5. Register the device with the token generated.

```
Device# license smart trust idtoken id_token_value {local| all} [force]
```


Step 6. Verify in **show license status** command the correct installation. At the end of the output, on **Trust Code Installed** section, it must be updated with the registration date.

```
Device# show license status
Transport:
  Type: Smart
  URL: https://smartreceiver.cisco.com/licservice/license
  Proxy:
    Not Configured
<snippet>
Trust Code Installed: Feb 10 20:56:02 2021 UTC
<snippet>
```

Call-Home Transport Method Configuration

Configuration Steps

Step 1. Configure the interface by which the HTTP message is sent.

```
Device(config)# ip http client source-interface interface-type-number
```

Step 2. Define call-home transport method, as the desired license transport method.

```
Device(config)# license smart transport callhome
```

Step 3. Modify the license smart URL.

3.1. In order to set license smart URL, use this command:

```
Device(config)# license smart url https://tools.cisco.com/its/service/oddce/services/DDCEService
```

3.2. If you use Virtual Routing and Forwarding (VRF) you must specify the source interface used by the VRF on call-home in addition to the VRF used:

```
Device(config)# call-home
Device(cfg-call-home)# source-interface interface-type-number
Device(cfg-call-home)# vrf Name_of_VRF
```

3.3. If you use a proxy to reach CSSM, you need to add the proxy to the call-home configuration, with the interface used to reach the proxy:

```
Device(config)# call-home
Device(cfg-call-home)# source-interface interface-type-number
Device(cfg-call-home)# http-proxy "X.X.X.X" port XXXX
```

Step 4. Generate a new token from CSSM under your Smart Account and Virtual Account, and copy the generated token.

Cisco Software Central > Smart Software Licensing BU Production Test

Smart Software Licensing Feedback Support Help

Alerts | **Inventory** | Convert to Smart Licensing | Reports | Preferences | On-Prem Accounts | Activity

Virtual Account: **Mex CATS West** 10 Major | 21 Minor | Hide Alerts

General | Licenses | Product Instances | Event Log

Virtual Account

Description: TAC CATS West Account
Default Virtual Account: No

Product Instance Registration Tokens

The registration tokens below can be used to register new product instances to this virtual account.

Token	Expiration Date	Uses	Export-Controlled	Description	Created By	Actions
OWi0OTFjNDAiZDVkZ.	2021-May-13 02:29:05 (in 30...		Allowed	asamanoo-691058171	asamanoo	Actions ▾

Token



```
OGQ2Yjg5YjEiZTEwYTIyLWE1MTEtNDMxYjBmMDFhMDU0LTE2MTY2OTk5%0AMzU3OTd8b3FRZHlmLy95QXJNNHIMWDIXWmZ4MGxUUk1TOW1sZzI0by8xTFRJ%0AL2NJWT0%3D%0A
```

Press ctrl + c to copy selected text to clipboard.

Step 5. Register the device with the token generated.

```
<#root>
```

```
Device# license smart trust idtoken
```

```
id_token_value
```

```
{local| all} [force]
```

Step 6. Verify in **show license status** command, the correct installation. At the end of the output, on Trust Code Installed section, it must be updated with the registration date.

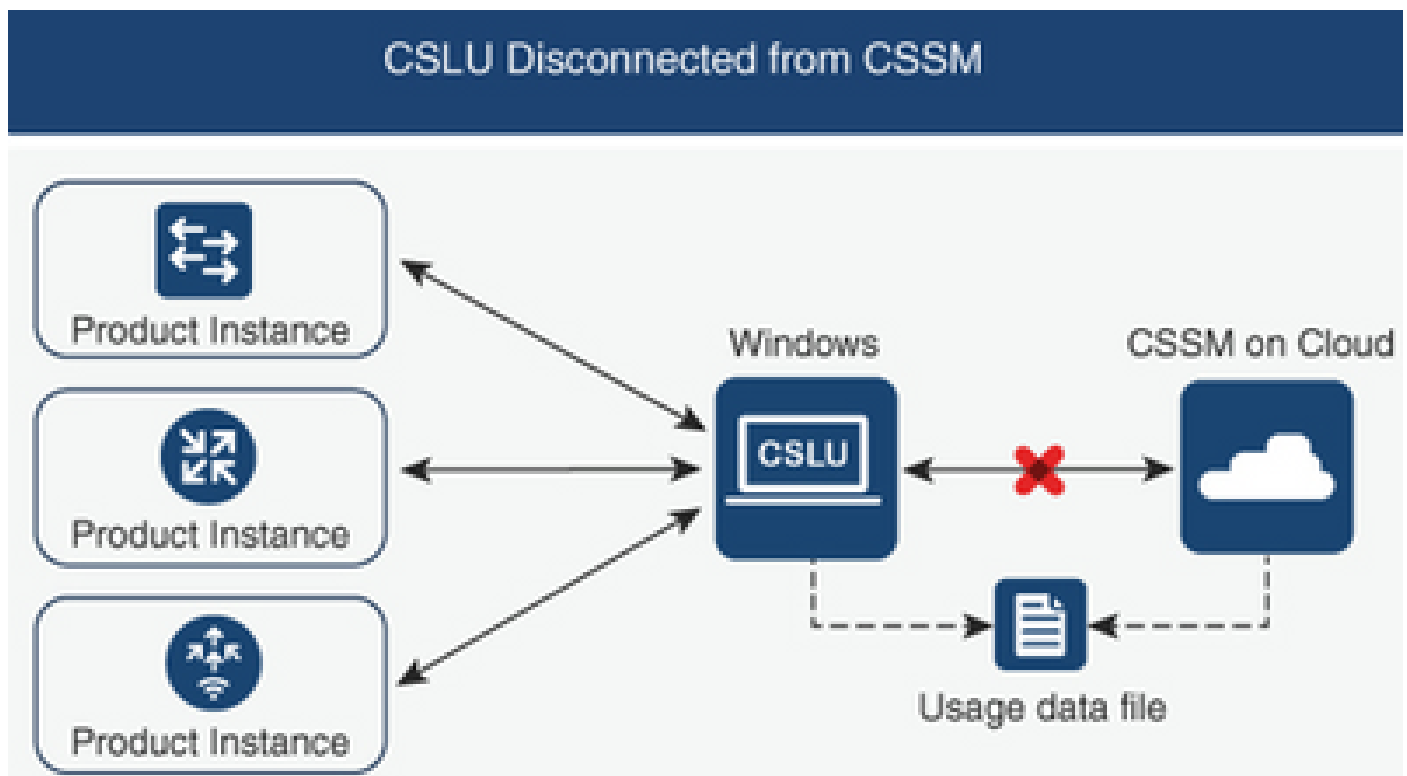
```
Device# show license status
Transport:
  Type: Callhome
  URL: https://tools.cisco.com/its/service/oddce/services/DDCEService
  Proxy:
    Not Configured
<snippet>
Trust Code Installed: Feb 10 20:56:02 2021 UTC
<snippet>
```

Router Connected to CSLU and CSLU Disconnected from CSSM

The communication between the CSLU and CSSM is sent and received in the form of signed files that are saved offline and then uploaded to or downloaded from the CSLU or CSSM.

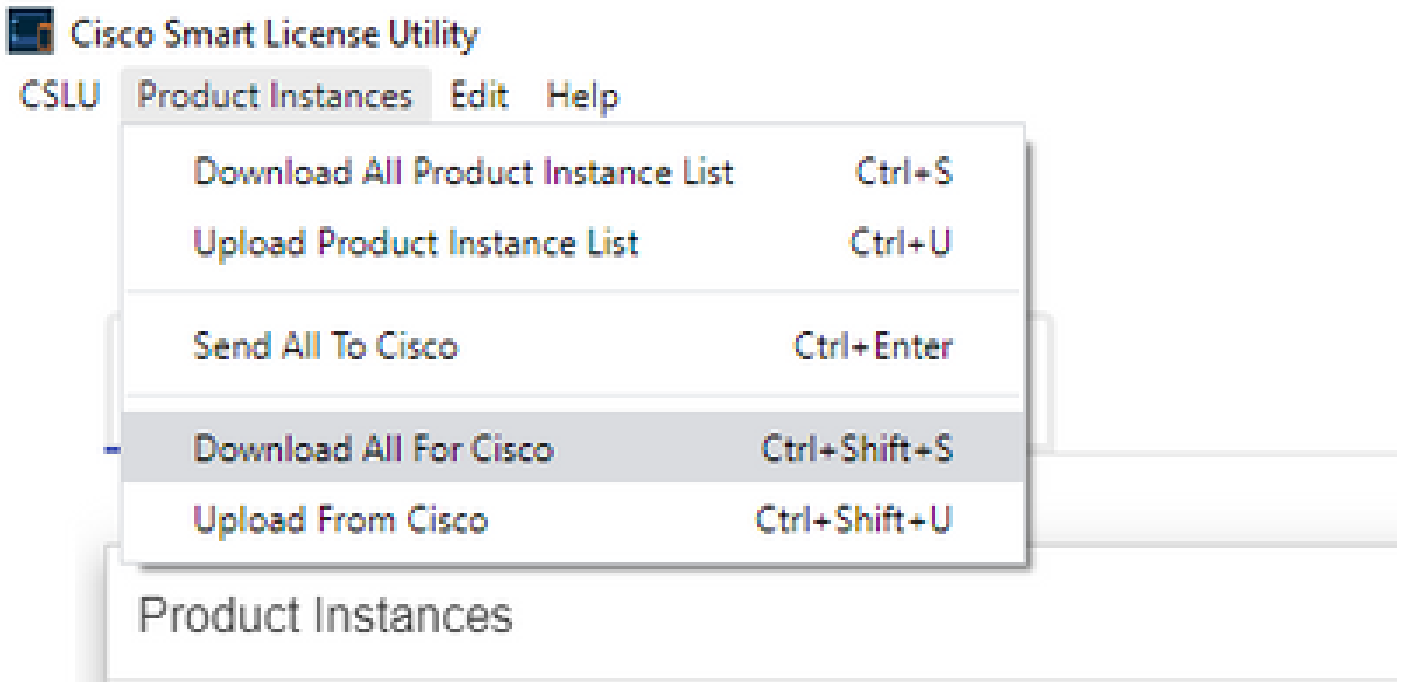
On this topology, CSLU provides you the option to work disconnected from the CSSM.

Network Diagram



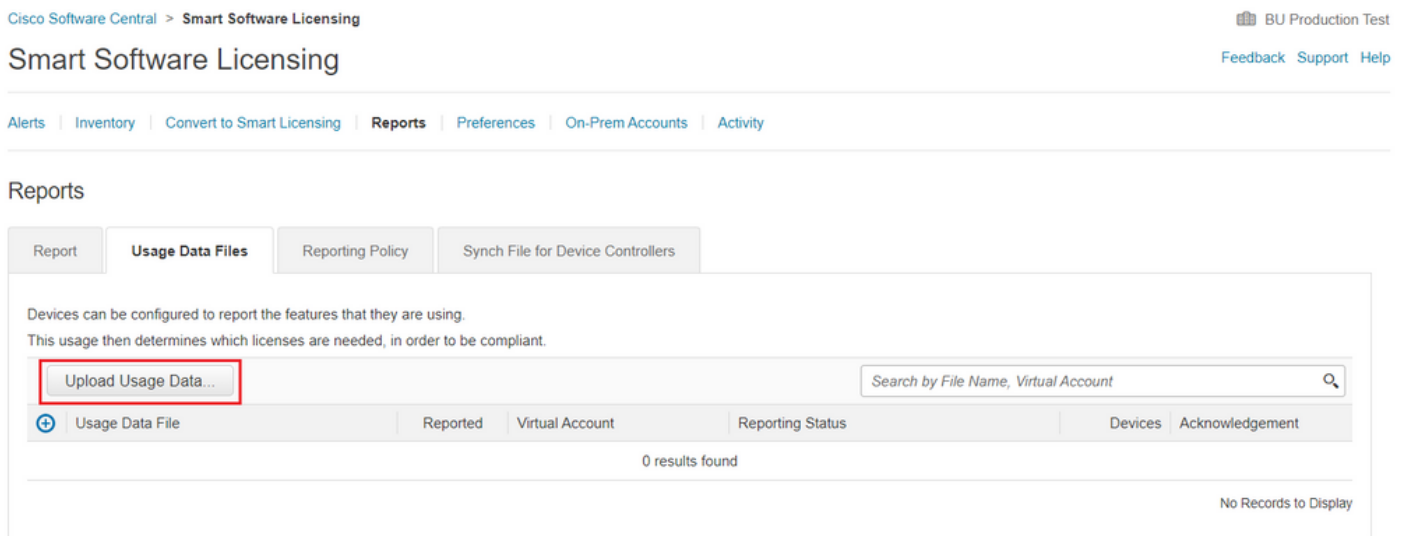
Configuration Steps

Step 1. On the CSLU navigate to **Product Instances** and choose **Download All For Cisco**.



Step 2. On the CSSM, navigate to **Reports** and choose **Usage Data Files**.

Step 3. Upload the file downloaded from the CSLU.



Step 4. Download the Acknowledge file generated. It is presented on the Usage Data Files list.

Step 5. On the CSLU, navigate to **Product Instances** and choose **Upload from Cisco**. Upload the Acknowledge file downloaded from CSSM.

Cisco Smart License Utility

CSLU Product Instances Edit Help

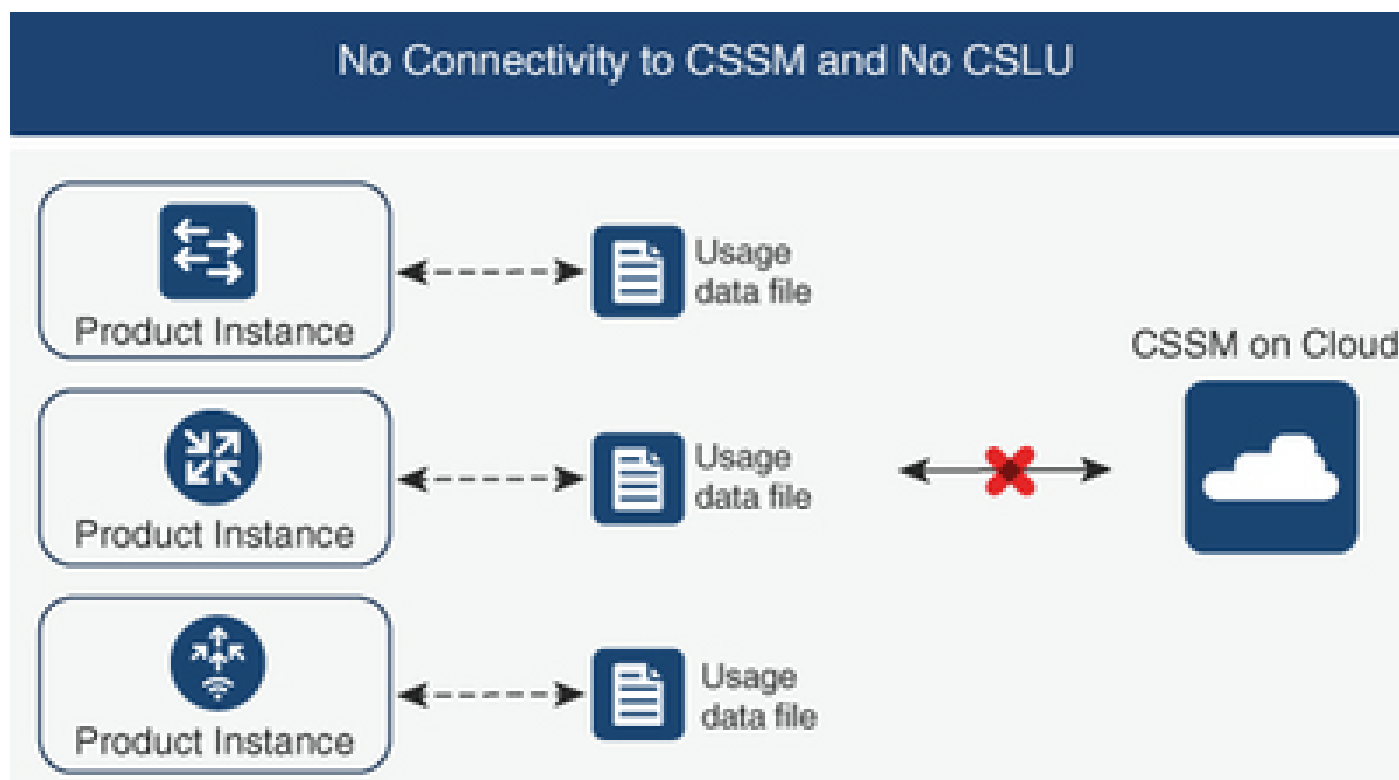
Download All Product Instance List	Ctrl+S
Upload Product Instance List	Ctrl+U
Send All To Cisco	Ctrl+Enter
Download All For Cisco	Ctrl+Shift+S
Upload From Cisco	Ctrl+Shift+U

Product Instances

Router not Connected to the CSSM and Without CSLU in Place

On this topology, you have a product instance that is disconnected from CSSM, and without any other intermediary utilities or components. All communication is in the form of uploaded and downloaded files.

Network Diagram



Configuration Steps

Step 1. Configure on the instance, the smart-off license transport method and **save** the configuration.

```
Device(config)# license smart transport off
Device(config)# exit
Device# copy running-config startup-config
```

Step 2. **Save** the usage of licenses on a text file inside of the bootflash and extract it out of the router.

```
Device# license smart save usage all file bootflash:all_rum.txt
Device# copy bootflash:all_rum.txt tftp://X.X.X.X/all_rum.txt
```

Step 3. On the CSSM, navigate to **Reports**, choose **Usage Data Files**, and upload the usage data file created by the router.

The screenshot shows the Cisco Software Central interface for Smart Software Licensing. The breadcrumb is "Cisco Software Central > Smart Software Licensing". The page title is "Smart Software Licensing". There are links for "Feedback", "Support", and "Help". A navigation bar includes "Alerts", "Inventory", "Convert to Smart Licensing", "Reports", "Preferences", "On-Prem Accounts", and "Activity". The "Reports" section is active, with sub-tabs for "Report", "Usage Data Files", "Reporting Policy", and "Synch File for Device Controllers". Below the tabs, there is a text box explaining that devices can be configured to report features and that usage determines license needs. A red box highlights the "Upload Usage Data..." button. To the right is a search bar labeled "Search by File Name, Virtual Account". Below this is a table with columns: "Usage Data File", "Reported", "Virtual Account", "Reporting Status", "Devices", and "Acknowledgement". The table shows "0 results found" and "No Records to Display".

Step 4. Download the Acknowledge file generated, and transfer it to the device.

Step 5. On the router, import the file and verify the correct installation.

```
Device# license smart import bootflash:ack_usage.txt
Import Data Successful
```

```
*Apr 14 12:08:06.235: %SMART_LIC-6-POLICY_INSTALL_SUCCESS: A new licensing policy was successfully inst
```

Verify

Use this section to confirm that your configuration works properly.

On all of the topologies, you can verify the registered product instances on CSSM. The next options are suggested steps in order to confirm the successful registration of the device.

Step 1. Navigate to **Product Instances** and in the search box, type the **Serial Number** of the registered device. You must see the device with its UDI as the name of the instance.

```
Device# show license udi
UDI: PID:ISR4451-X/K9,SN:FOC17513VM6
```

The screenshot shows the Cisco Software Central interface for Smart Software Licensing. The breadcrumb navigation is "Cisco Software Central > Smart Software Licensing". The page title is "Smart Software Licensing". There are navigation links for "Alerts", "Inventory", "Convert to Smart Licensing", "Reports", "Preferences", "On-Prem Accounts", and "Activity". The virtual account is "Mex CATS West". There are alert indicators for "11 Major" and "21 Minor" alerts, and a "Hide Alerts" button. The "Product Instances" tab is selected. A search box contains "FOC17513VM6". Below the search box is a table with the following data:

Name	Product Type	Last Contact	Alerts	Actions
UDI_PID:ISR4451-X/K9; UDI_SN:FOC17513VM6;	4400ISR	2021-Mar-18 21:21:59		Actions

At the bottom right of the table, it says "Showing 1 Record".

Step 2. Verify the correct status of license installation with **show license status**.

```
Device# show license status
```

```
Smart Licensing Using Policy:
Status: ENABLED
```

```
<snippet>
```

```
Policy:
Policy in use: Installed On Mar 18 21:20:38 2021 UTC
Policy name: SLE Policy
Reporting ACK required: yes (Customer Policy)
Unenforced/Non-Export Perpetual Attributes:
First report requirement (days): 30 (Customer Policy)
Reporting frequency (days): 60 (Customer Policy)
Report on change (days): 60 (Customer Policy)
Unenforced/Non-Export Subscription Attributes:
First report requirement (days): 120 (Customer Policy)
Reporting frequency (days): 150 (Customer Policy)
Report on change (days): 120 (Customer Policy)
Enforced (Perpetual/Subscription) License Attributes:
First report requirement (days): 0 (CISCO default)
Reporting frequency (days): 90 (Customer Policy)
Report on change (days): 60 (Customer Policy)
```

Export (Perpetual/Subscription) License Attributes:
First report requirement (days): 0 (CISCO default)
Reporting frequency (days): 30 (Customer Policy)
Report on change (days): 30 (Customer Policy)

Miscellaneous:
Custom Id: <empty>

Usage Reporting:
Last ACK received: Mar 18 21:20:38 2021 UTC
Next ACK deadline: May 17 21:20:38 2021 UTC
Reporting push interval: 30 days
Next ACK push check: Feb 23 20:24:13 2021 UTC
Next report push: Mar 30 15:45:55 2021 UTC
Last report push: Mar 18 21:16:38 2021 UTC
Last report file write: <none>

<snippet>

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

1. Ensure the correct DNS resolution with CSLU (Connected to CSSM Through CSLU topology), smartreceiver.cisco.com and tools.cisco.com (Connected Directly to CSSM topology).

```
Device# nslookup cslu-local
Device# nslookup smartreceiver.cisco.com
Device# nslookup tools.cisco.com
```

2. Ensure the correct connectivity with CSLU (Connected to CSSM Through CSLU topology), smartreceiver.cisco.com and tools.cisco.com (Connected Directly to CSSM topology).

```
Device# ping cslu-local
Device# ping smartreceiver.cisco.com
Device# ping tools.cisco.com
```

3. Check that port 443 is open to the CSSM with Connected Directly to CSSM topology.

```
Device# telnet smartreceiver.cisco.com 443
```

or

```
Device# telnet tools.cisco.com 443
```


4. Use available debugs to verify logs generated on the registration and installation process, and to have further information.

```
Device# debug license ?  
agent    License agent information  
core     License Core  
errors   License warnings and errors  
events   License Events  
feature  License feature  
ipc      License IPC communication
```

Related Information

- [Enable License Boot Level And Addon On Catalyst 8000V Edge Software](#)
- [Technical Support & Documentation - Cisco Systems](#)