Configure Smart License XRv 9000 via Smart Software Manager Satellite

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Related Information

Introduction

This document describes the procedure to enable Cisco Smart License on XRv 9000 when no direct access to the Internet from the VM hosting the XRv 9000.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Basic knowledge of Virtual Machines.
- Knowledge about Cisco IOS® XRv 9000 Router installed either on VMware or KVM Hypervisors.
- Basic Knowledge of Cisco IOS XRv 9000 Router Licensing Model.
- Basic knowledge of Cisco Smart Software Manager (SSM) satellite.

Components Used

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

- Cisco IOS XRv 9000 Router -xrv9k-xr-6.0.1
- Smart Software Manager satellite- Version 3.0.4

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.

Cisco Smart Licensing

Cisco Smart Licensing is a cloud-based, software license management solution which enables you to automate manual licensing tasks. It assists you in purchasing, management and reporting functions. Cisco Smart Licensing uses Cisco Smart Call Home feature to communicate with the Cisco Smart Software Manager. Smart Call Home is auto-configured for default Smart Licensing Setup.

In Cisco IOS XRv 9000 Router, the licensing would be Smart Licensing only. Therefore, you need to enable Smart Licensing, and it would not include a Node Locked Licensing implementation at all. The XRv 9000 Router communicates to the Cisco Licensing Cloud to provide a report of which features and to what scale the system is being used.

These are the benefits of using Cisco Smart License:

- You can automatically self-register the software installed in your network without Product Activation Key (PAKs).
- You do not have 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.
- You can have an integrated view of the licenses you have purchased, and what has been actually deployed in your network via the portal.

Cisco IOS XRv 9000 Router Licensing Model

The Cisco IOS XRv 9000 Router (Sunstone) licensing model includes demo and production modes. This table gives a short description of each mode:

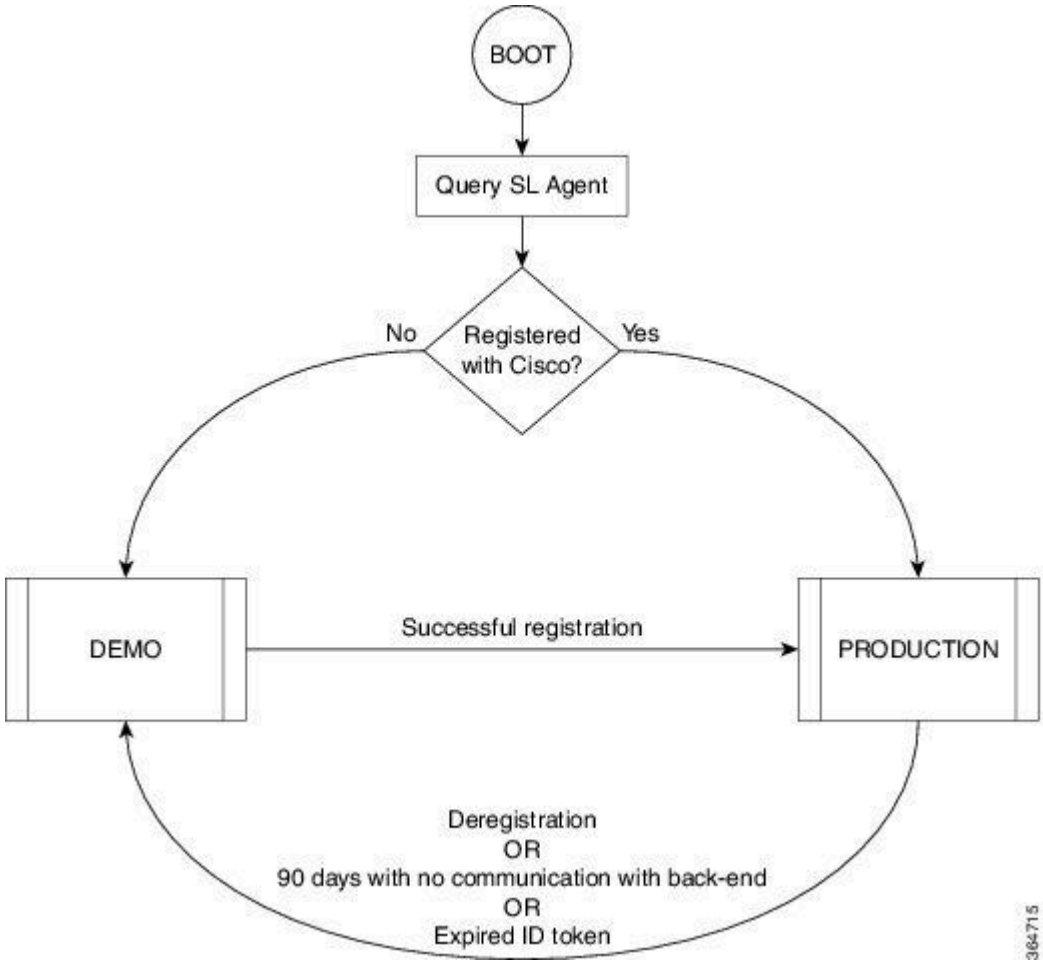
Mode	Description
Demo	· This is the default mode when the router is launched. · No cloud connectivity is required. · No feature level enforcement. · Rate limitations of 200 Kbps
Production	· This mode requires registration. · No enforcement applied.

This table shows Cisco IOS XRv Router Licensing Mode (Source: Cisco IOS XRv 9000 Router Installation and Configuration Guide- Chapter: Cisco IOS XRv 9000 Router Smart Licensing)

XRv 9000 (Sunstone) by default is running in Demo mode, which applies high scale limit on the number of supported routes and amount of throughput. It expires after certain number of days and keeps showing the warning alarm.

You can utilize all the available capacity of your XRv 9000 when it is in production mode. However to enable the production mode, router's license needs to be registered with back-end (Cisco Software Central) and purchased entitlements (directly, through a proxy, or through a Smart Licensing Satellite).

This image shows the basic state transitions between Demo and Production mode.



Transition between Demo and Production mode is shown in the image

A default Smart Call Home configuration on Cisco IOS XRv 9000 (XRv9k) Router is enough to run Smart Licensing. This configuration is triggered by Smart Licensing internally, using a built-in CiscoTAC-1 profile. However, you need to ensure that there is connectivity to Cisco.com via traffic or management ports on XRv9k Router. Therefore the only requirement is to configure IP connectivity to have access to the Cisco cloud from XRv9k Router.

By default, Smart Licensing is always enabled on XRv9k routers and to use the router in production mode, you must register with Cisco. Using the ID token, the license agent on the router registers the product with Cisco and receives an identity certificate. This certificate is used for all future communications with Cisco. The license agent on the router automatically renews the registration information with Cisco every 30 days. You can refer to the following link for further information about registering XRv9k Router:

Cisco IOS XRv 9000 Router Installation and Configuration Guide- Chapter: Cisco IOS XRv 9000 Router Smart Licensing

Problem: No Internet Access to Register XRv9k Router License

Due to security reason or corporate policy, you cannot connect the XRv9k or VM host to the Internet or even Cisco Cloud. Therefore the license agent on XRv9k Router cannot reach Cisco Software Central to

register the product and renew it every 30 days. Therefore, you cannot enable production mode. Is there any other solution?

Solution

Depending on the requirements with respect to security, manageability, and operational mode of your network, you can deploy Smart Licensing in several ways:

1. You can choose not to allow the XRv9K to connect directly with Cisco Cloud/Backend servers. In this case, you can use a proxy server on your premises and manage the firewall, traffic flow, and how the Smart Licensing application fits in the organization's security needs. This can be easily set up via Open Source Apache software that runs on Windows or Linux Operating Systems.

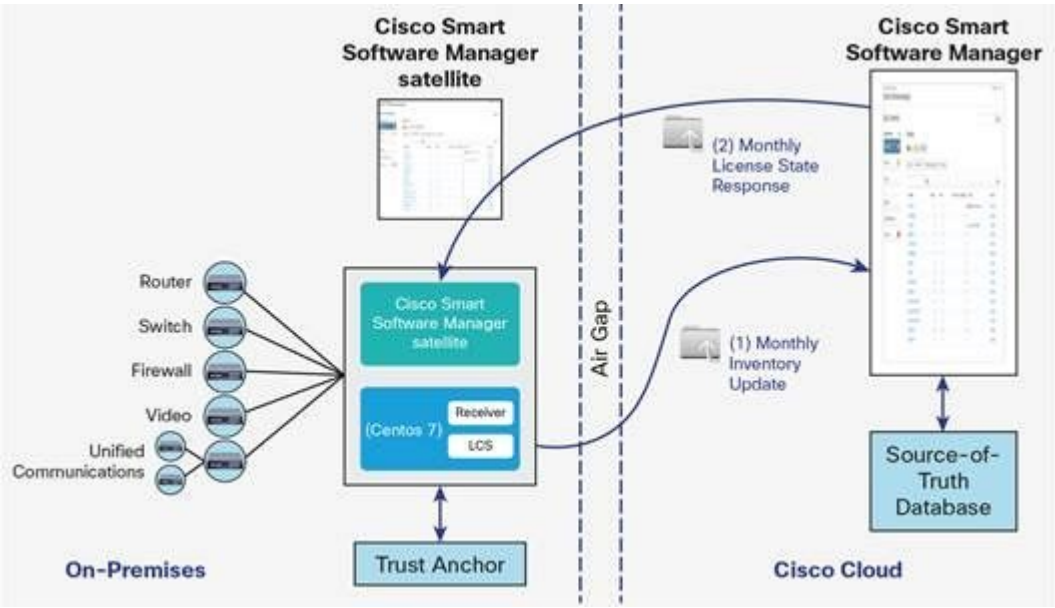
2. You can want to have all your XRv9K devices connected to an aggregator host, which can receive all the local requests from all the XRv9K devices before you forward them to Cisco Backend Servers. This is a job for Transport Gateway software that runs on Linux and Windows and is available for download at Cisco Transport-Gateway download: Cisco Transport Gateway – Release and General Information

3. You can want to operate totally offline with On-Premise software that runs on Linux and Windows and allows you to have only this On-Premise host to do the talking for licensing information exchange with the Cisco Cloud and in turn provide information to the end devices as to their state of compliance. This software can be available in Release 5.3.1 or later.

This discussion describes a scenario which includes Smart Software Manager Satellite as an On-Premise software to communicate with Cisco cloud and register the XRv9k Router in Production mode as well as renew the license.

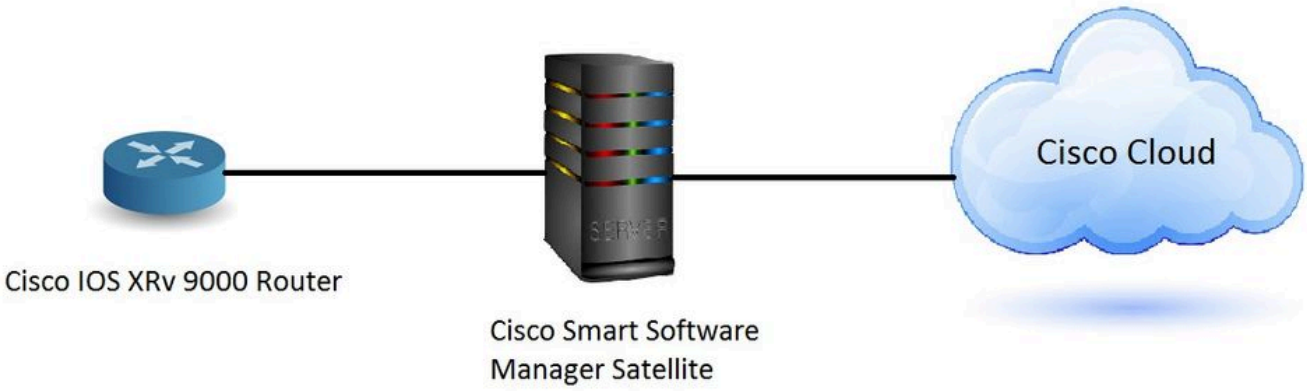
Implementing Smart Software Manager Satellite

Smart Software Manager Satellite is a component of Cisco Smart Licensing. It works in conjunction with Cisco Smart Software Manager (SSM) to intelligently manage your product licenses. It is providing near real-time visibility and reporting of Cisco licenses that you purchase and consume. The image shows Smart Software Manager Satellite implementation:



This image shows Smart Software Manager Satellite Deployment (Source: [Cisco Smart Software Manager satellite Data Sheet])

If you decide to install the XRv9k Router totally, offline, without direct connection to the Internet, you can use Cisco Smart Software Manager Satellite to communicate with the Cisco cloud. You can implement this solution as per the topology shown in the image :



Install Smart Software Manager Satellite

Smart Software Manager Satellite is packaged as an Open Virtual Appliance (OVA) and requires these configurations:

- 50GB - 200GB hard disk
- 8 GB memory
- 4 vCPUs

Smart Software Manager Satellite supports these web browsers:

- Chrome 32.0 and later versions
- Firefox 25.0 and later versions
- Safari 6.0.5

When you open the OVA file, Smart Software Manager satellite extracts the VM and imports it into whatever virtualization software you have installed on your computer.

You must provide, install, and configure these external components before you install the OVA file:

- ESXi v5.x or higher host with sufficient OVA resources
- vSphere Client v5.x

To deploy and install the Smart Software Manager Satellite OVA, there is a document which guides you through the installation step by step:

Smart Software Manager satellite Installation Guide

Configure the IP Address on Smart Software Manager Satellite

After you deploy the Satellite successfully, power it on and open the console of the Satellite on your vSphere client.

You are asked for default User name and Password:

- Default User: admin
- Default Password: Admin!23

Note: When you log in for the first time, you are asked to change the password.

You must configure IP address for the Satellite to have access to it via a Web browser.

- To configure IPv4: **sudo conf ip** <interface-name(eth0)> <IP> <NetMask> <Gateway>
- To configure DNS: **sudo conf dns** [DNS ip-address2]

This is an example:

```
[admin@satellite-node-01 ~]$ sudo conf ip
This script is used to configure IPv4 networking - Usage:
=========================================================

Configure IPv4:
---------------
          /sbin/conf ip <interface-name(eth0)> <IP> <NetMask> <Gateway>

Configure IPv6:
---------------
          /sbin/conf ip6 <interface-name(eth0)> <IP> <Gateway>

Configure DNS:
---------------
          /sbin/conf dns <DNS ip-address1> [DNS ip-address2]

[admin@satellite-node-01 ~]$ sudo conf ip eth0 10.66.70.125 255.255.255.128 10.66.70.1
Configuring Network......
IP = 10.66.70.125
NETMASK = 255.255.255.128
GATEWAY = 10.66.70.1
Restarting network (via systemctl):                        [  OK  ]
Configuring satellite......
success
[admin@satellite-node-01 ~]$ sudo conf dns 8.8.8.8
Configuring DNS.........
DNS nameserver: 8.8.8.8
Restarting network (via systemctl):                        [  OK  ]
[admin@satellite-node-01 ~]$
```

Access to Smart Software Manager Satellite via Web Browser

After you configure IP address on Satellite via CLI then you can log in to it via a Web browser:

Step 1. Open the **web browser** and enter the address: **http://<ip-address>:8080 or https://<ip-address>:8443**

For example: https://10.66.70.125:8443

Step 2. The log in window as shown in the image appears. Log in to **Satellite** using default User and Password.

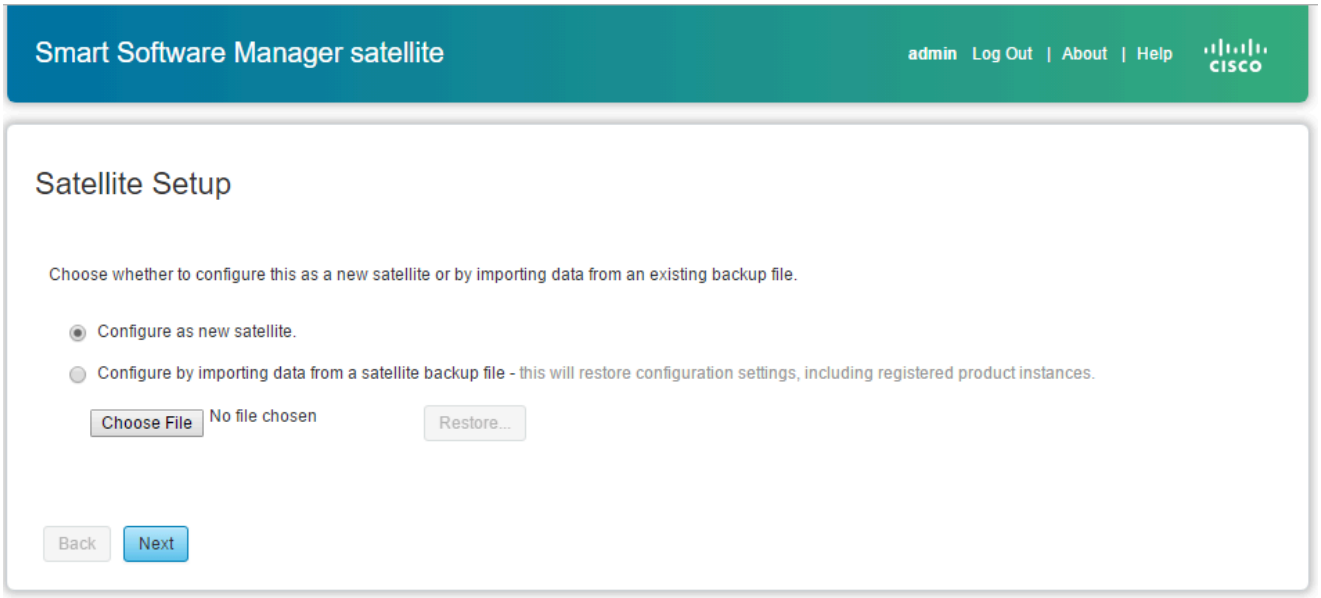


Step 3. As it is the first time, you are prompted to change the password. Enter your **new password** as shown in the image:



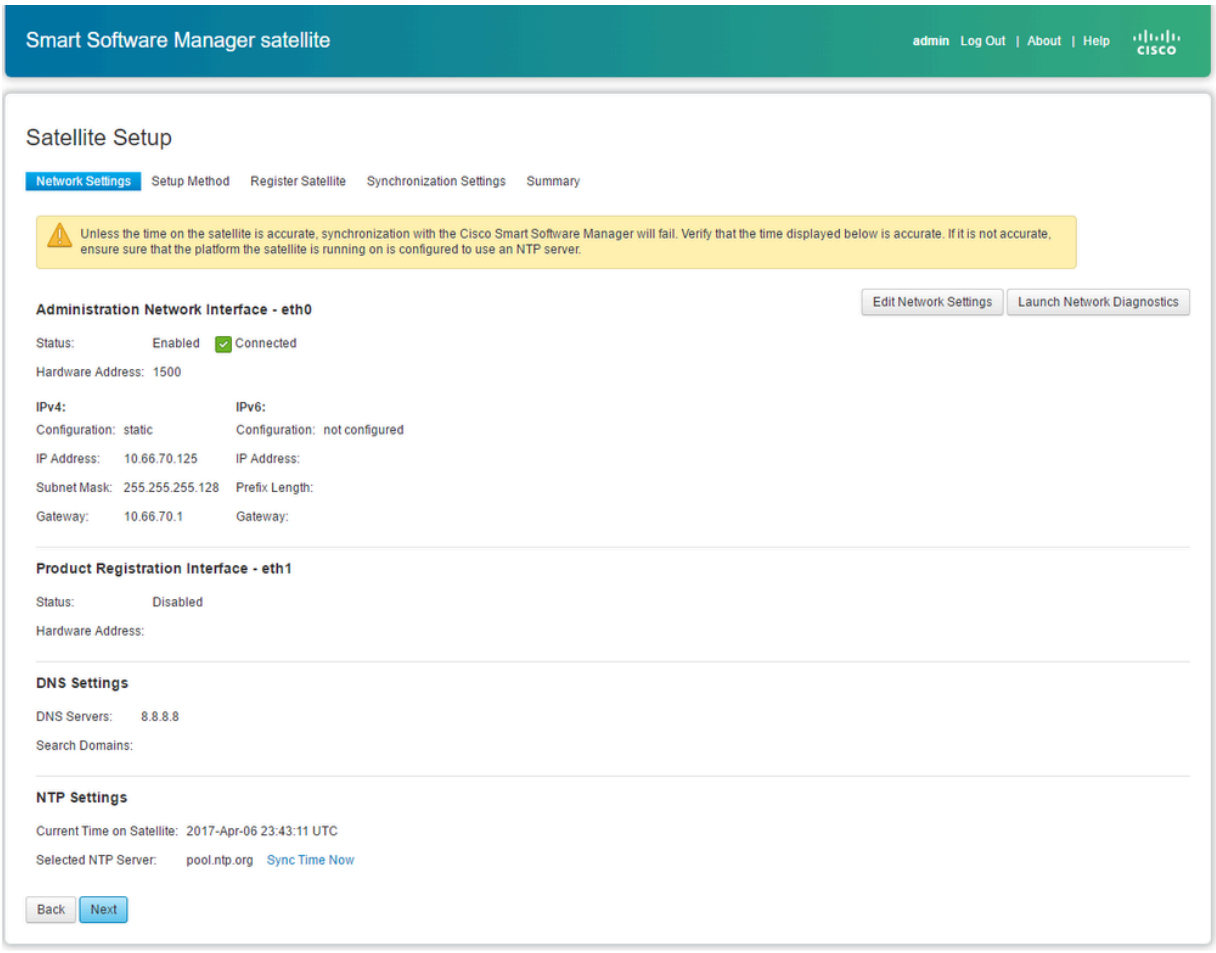
Then this is the procedure to continue Satellite configuration:

Step 1. To install new Satellite, check **Configure as new Satellite**, as shown in the image:



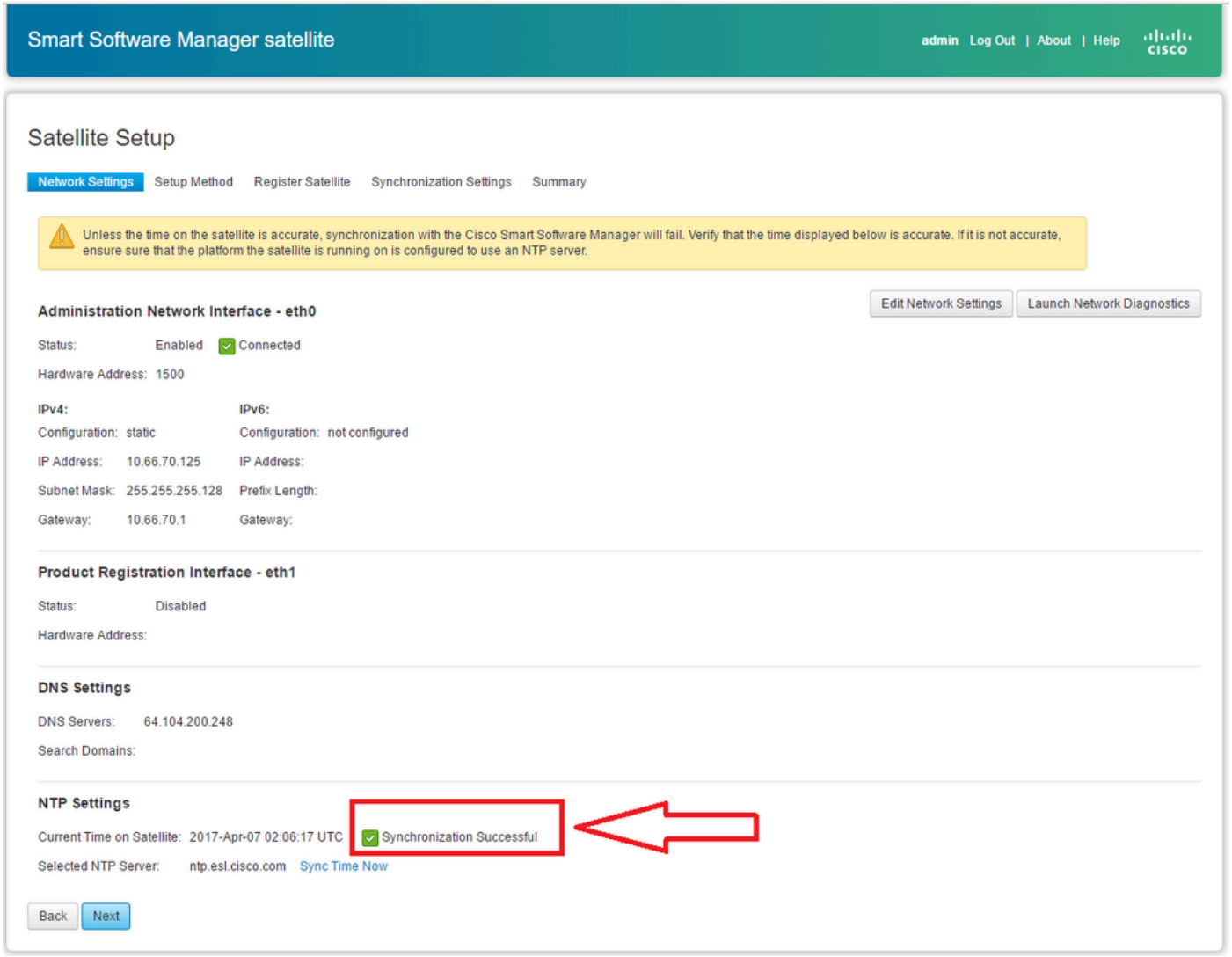
Step 2. The next window shows the initial configuration that you have done via CLI.

Step 3. Verify the clock setting and if it is not synchronized, you must edit the **NTP Settings**.





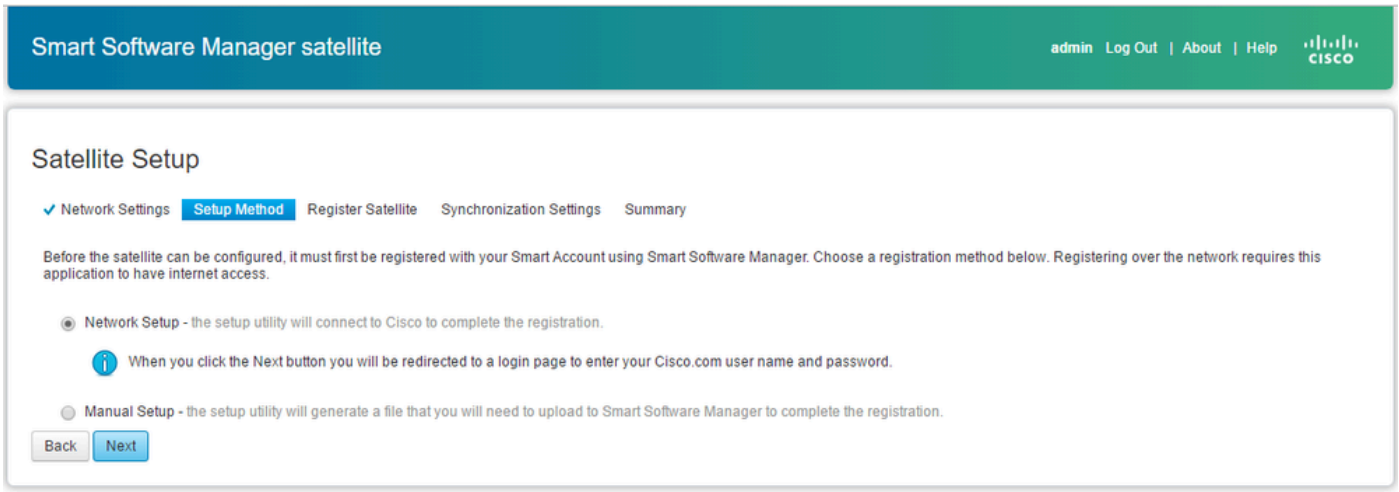
Step 4. Select **Sync Time Now.** You receive a successful message as shown image:



You can choose setup method:

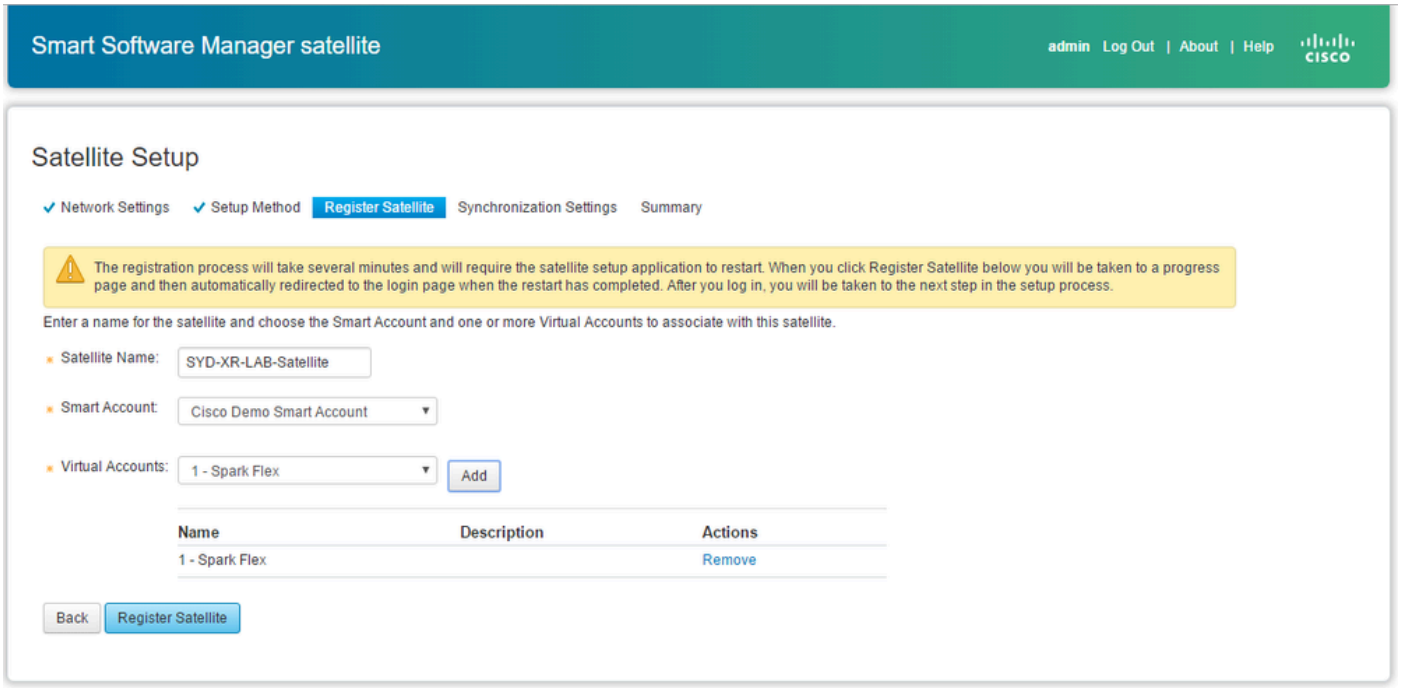
- Network setup
- Manual setup

In this scenario, network Setup has been selected, as shown in the image:

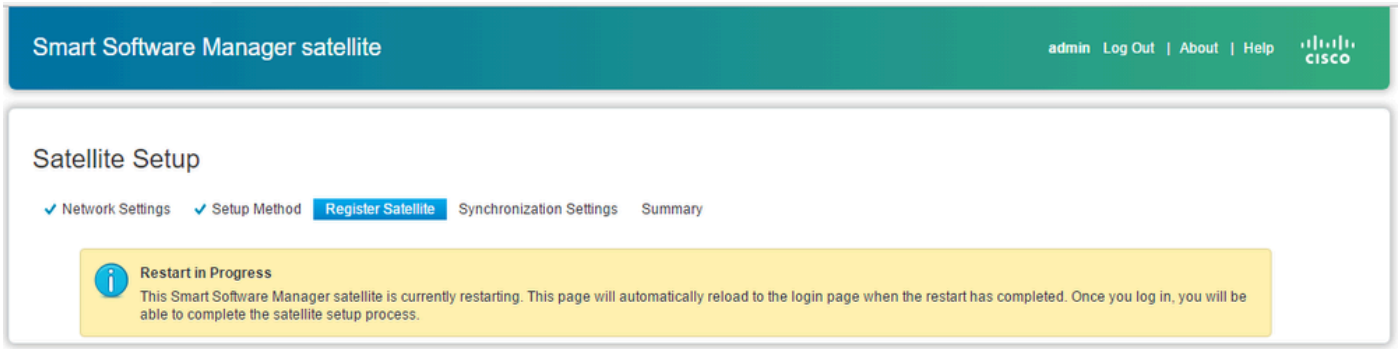


Smart Licensing requires products to be associated withSmart Accounts, which can be created onCisco Software Central. A Smart Account is associated with a unique company ID and is like an online banking account containing Cisco License Central and devices for that customer. From the Cisco Smart Software Manager, sub-accounts (also calledvirtual accounts) can be created to represent various sub-divisions or buying centers of the company.

Step 1. To register Satellite, you must select a **name** for Satellite, then enter **Smart account** and **Virtual account** information. Click **Register Satellite** to continue, as shown in the image:

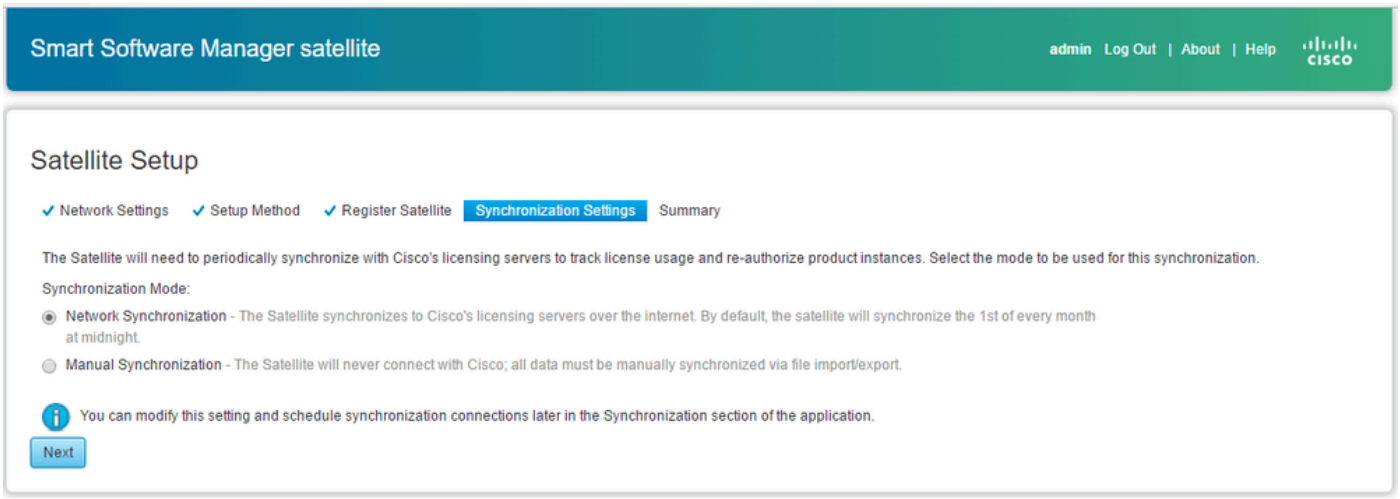


Step 2. Satellite restarts automatically after registration, then the log in prompt appears again, as shown in the image:

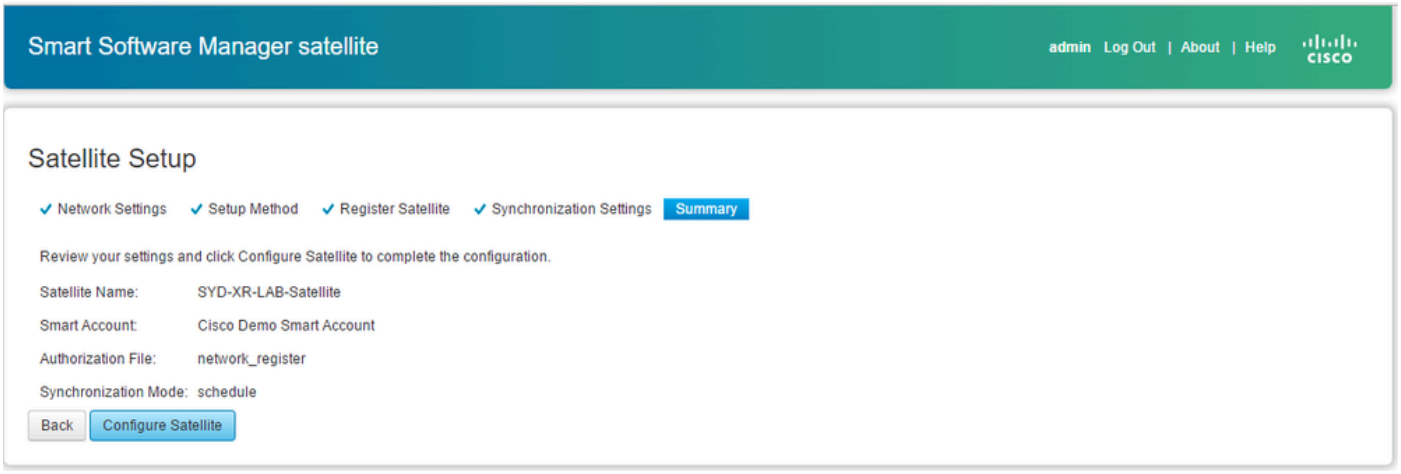


You can register the satellite using the online or offline method through the GUI. The online (network) option requires a network connection; you would use the offline (manual) when you are disconnected from the Cisco Smart Software Manager portal. After you complete the satellite registration process, you receive an immediate response, confirming the registration, from Cisco Smart Software Manager.

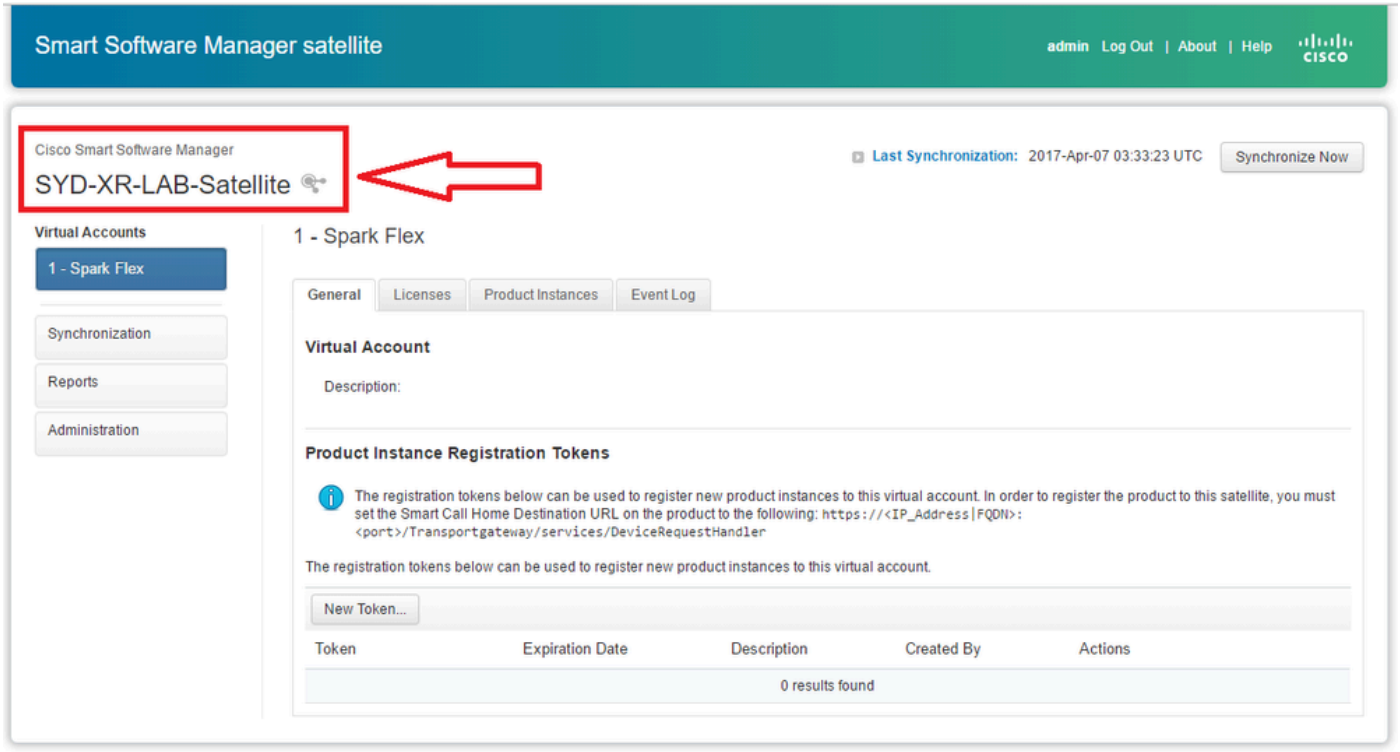
Step 1. As shown in the image, check **Network synchronization**, if you have internet access from Satellite.



Step 2. As shown in the image, click **Configure Satellite** to be synchronized with Cisco Smart Software Manager.

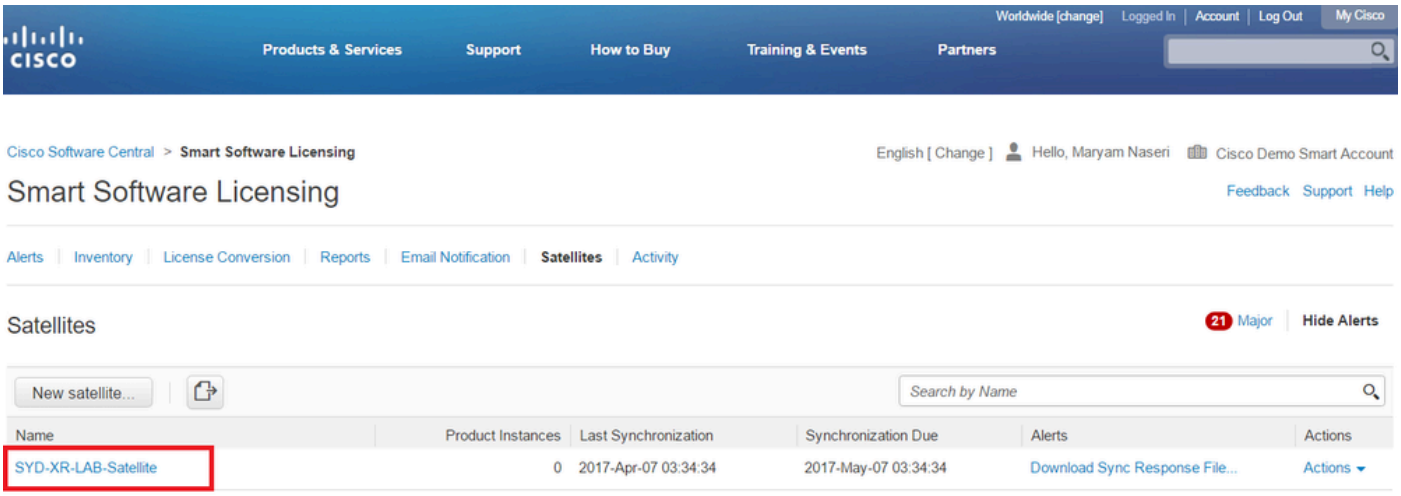


When Satellite is registered with Smart Software Manager (SSM), you can see the link icon in the main page, as shown in the image:

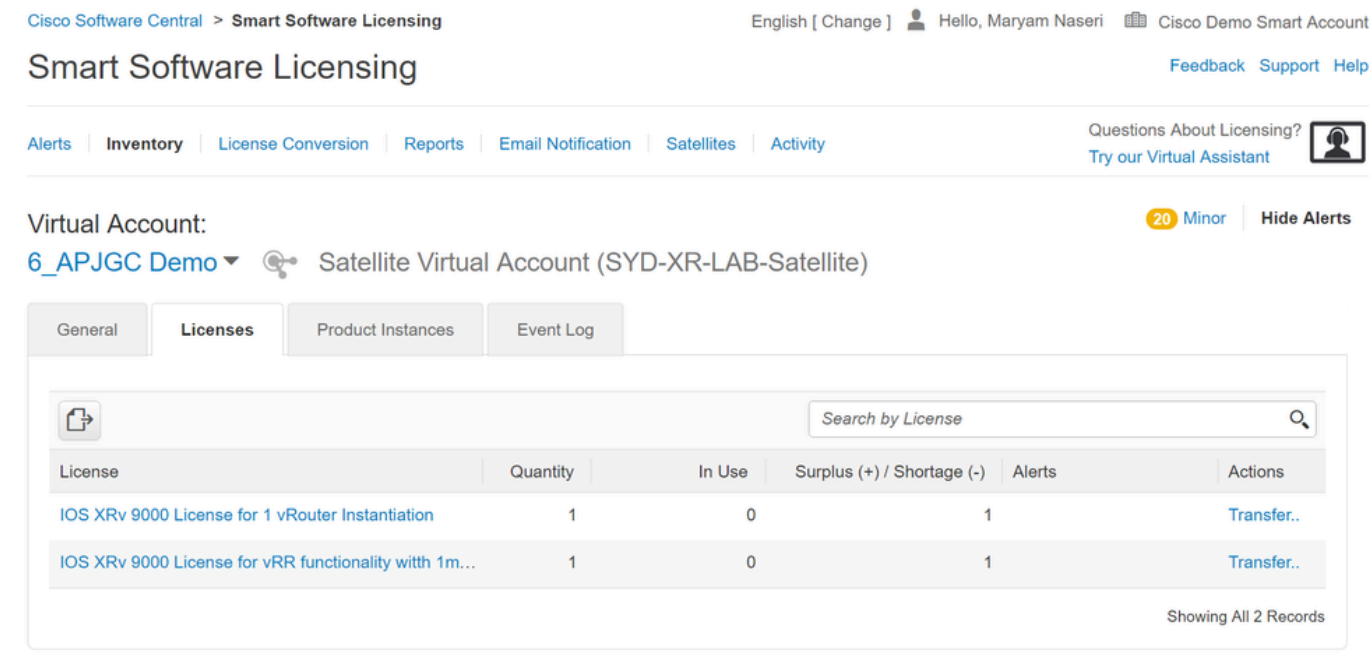


Verify on Cisco Smart Software Manager

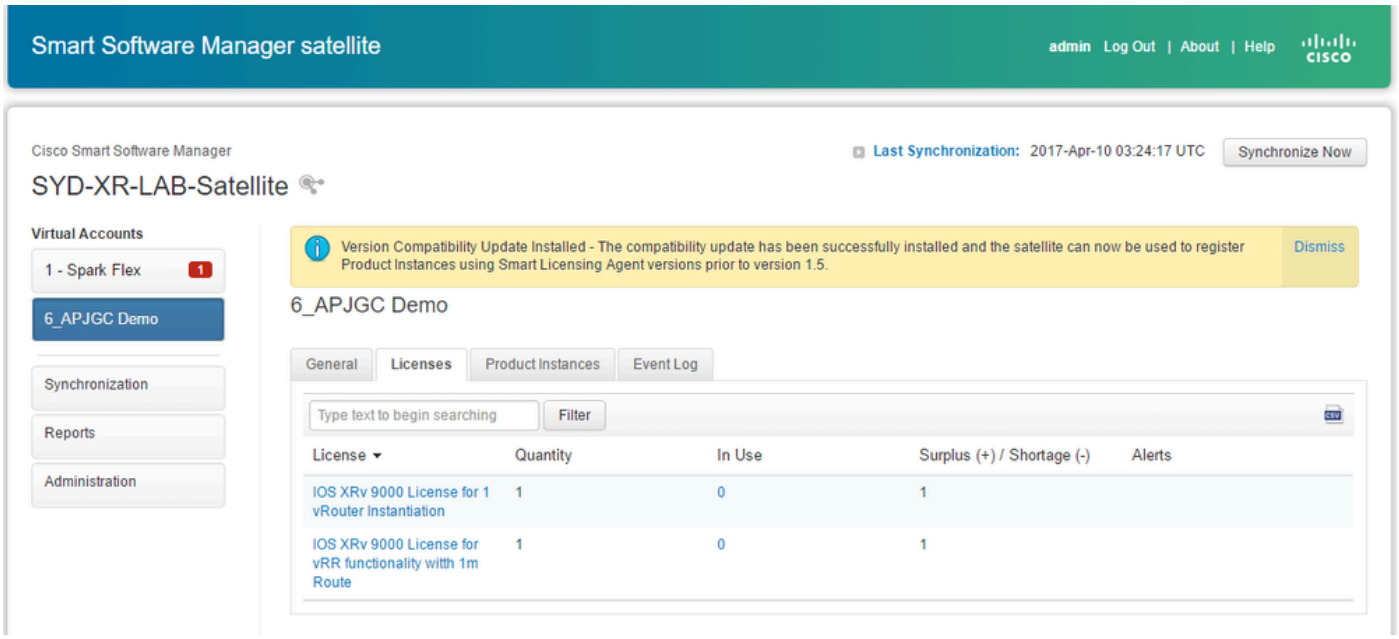
Step 1. Log in to your **Smart account** then click the **Satellite** tab. You can see the linked Satellite in the list, as shown in the image.



Step 2. When you order a license, you can see the available license for specific smart account and virtual account in **Inventory > License** as shown in the image:



Step 3. After Satellite synchronization, the license is available at Satellite Licenses tab, as shown in the image:



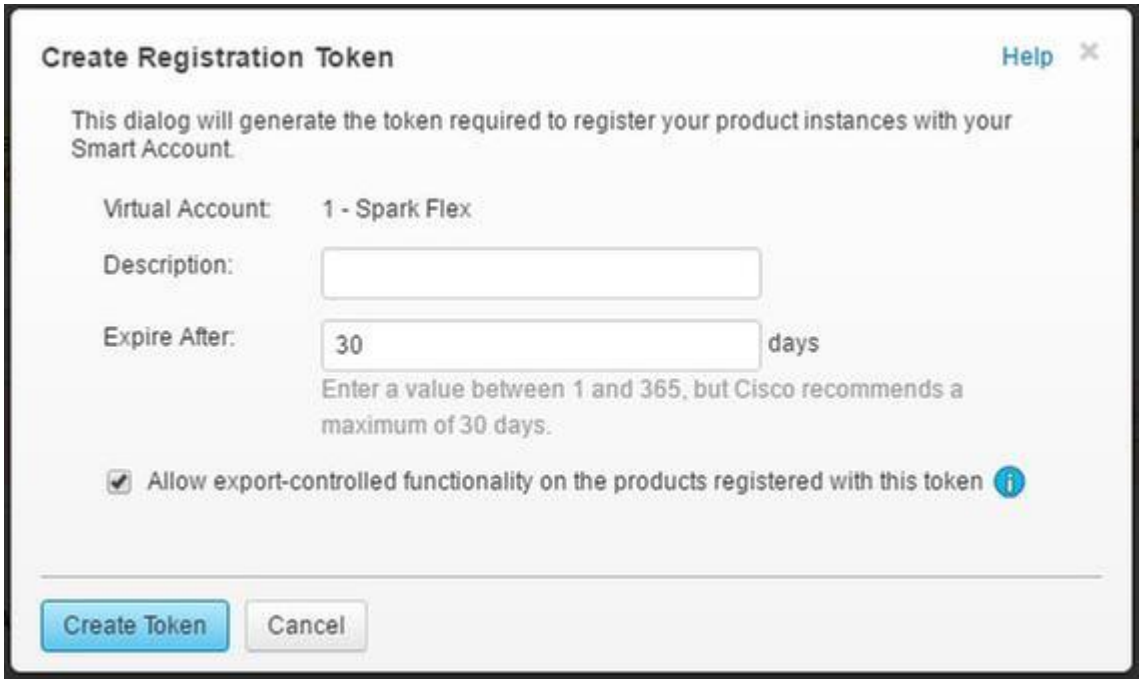
Create Registration Token at Satellite

In the general tab of the Satellite, click the **New Token**. then enter a **description** of the token in the **Create Registration Token** dialog box.

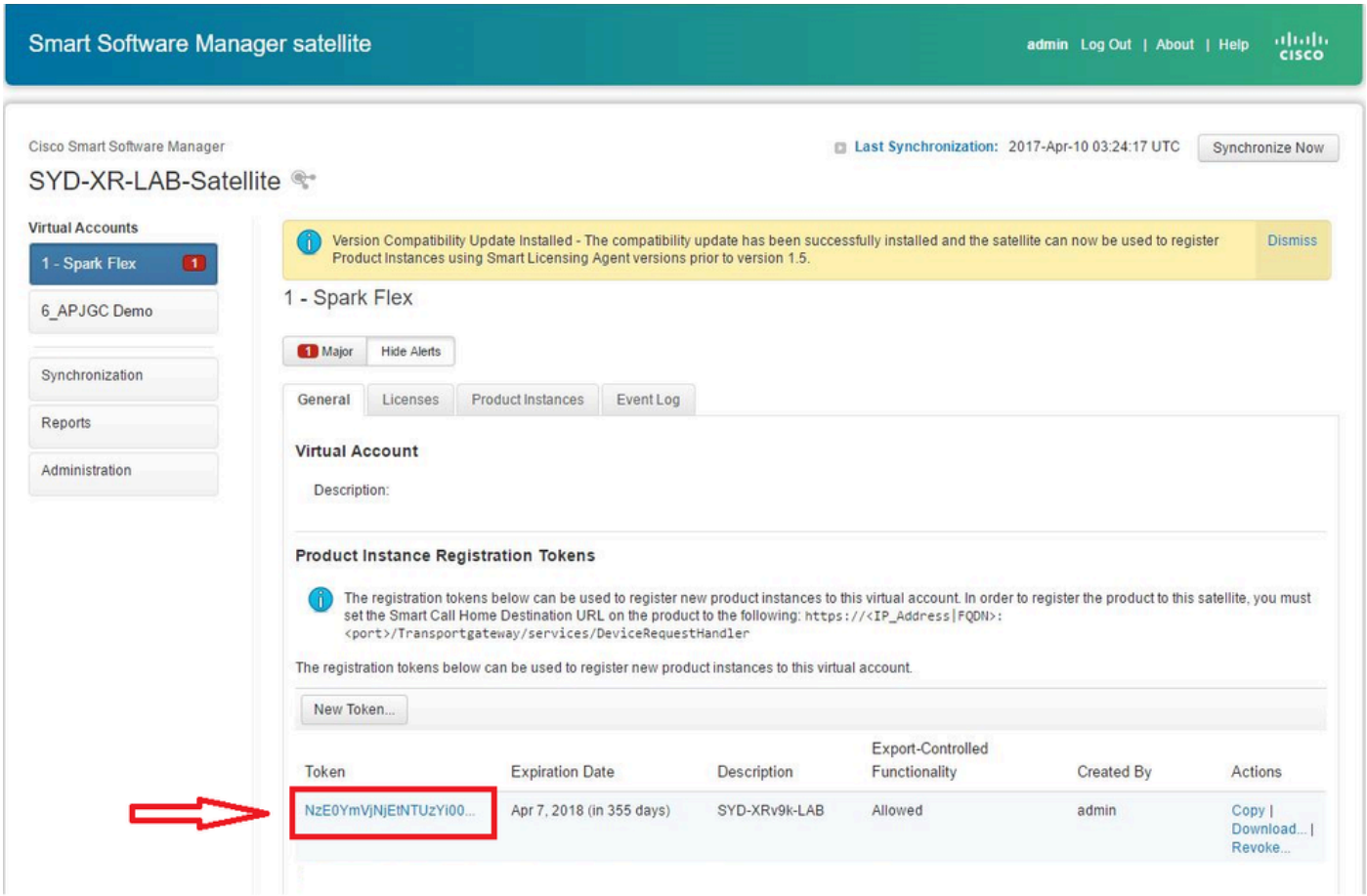
Step 1. Enter the **# of days** you want the token to be valid for.

Note: The default is 30 days and maximum is 365.

Step 2. Click **Create Token** button, as shown in the image.

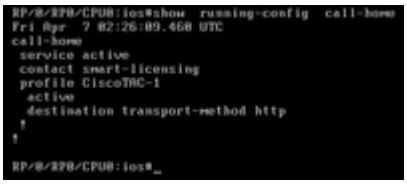


Step 3. You can see the generated Token in the list which is needed for XRv9k configuration.



XRv9k Router Configuration

This default configuration is already available in XRv9k as shown in the image:



If you check the license, you can see Smart Licensing is enabled by default. However, it is not registered. Therefore XRv9k state is also in DEMO state:

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license all
Fri Apr  7 03:09:56.674 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: UNREGISTERED
  Smart Account:
  Virtual Account:

License Authorization:
  Status: No Licenses in Use

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

No licenses in use

Product Information
===================
UDI: PID:R-IOSXRV9000-IMG,SN:2651B9AEF31,SUVI:R-IOSXRV9000-IMG2651B9AEF31,UUID:423F5DA9-773D-43AC-56FB-A6656291FE6B

Agent Version
=============
Smart Agent for Licensing: 2.2.0_rel/5
RP/0/RP0/CPU0:SYD-XRV9k-LAB#
```

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show license platform summary
Fri Apr  7 03:12:26.465 UTC
Current state:    DEMO

Collection: LAST: (disabled)
            NEXT: (disabled)
Reporting:  LAST: (disabled)
            NEXT: (disabled)

                                                                Count
Feature/Area     Entitlement                                  Last Next
================ ============================================ ==== ====

RP/0/RP0/CPU0:SYD-XRV9k-LAB#
```

Configuring Connectivity between XRv9k and Satellite

Configure required route to have connectivity between Satellite and XRv9k.

You can configure static route to satellite as this:

```
RP/0/RP0/CPU0:XRv9000(config)#router static
RP/0/RP0/CPU0:XRv9000(config-static)# address-family ipv4 unicast
RP/0/RP0/CPU0:XRv9000(config-static-afi)#  10.66.70.0/25 MgmtEth0/RP0/CPU0/0 1
RP/0/RP0/CPU0:XRv9000(config-static-afi)#commit
```

Ping Satellite IP address to ensure about the connectivity.

Configuring Call-home Profile to Use Smart Software Manager Satellite on the XRv9k

You must add the destination address which points to Satellite as this:

```
RP/0/RP0/CPU0:XRv9000(config)#call-home
RP/0/RP0/CPU0:XRv9000(config-call-home)# service active
RP/0/RP0/CPU0:XRv9000(config-call-home)# profile CiscoTAC-1
RP/0/RP0/CPU0:XRv9000(config-call-home-profile)#  active
RP/0/RP0/CPU0:XRv9000(config-call-home-profile)# destination address http http://10.66.70.125:80/Transp
RP/0/RP0/CPU0:XRv9000(config-call-home-profile)#  destination transport-method http
RP/0/RP0/CPU0:XRv9000(config-call-home-profile)#  no destination address http https://tools.cisco.com/i
RP/0/RP0/CPU0:XRv9000(config-call-home-profile)#commit
```

Registration of XRv9k with Cisco Smart Software Manager Satellite

Register the XRv9000 with CSSM Satellite with the token ID generated at CSSM Satellite.

Example:

RP/0/RP0/CPU0:XRv9000#**license smart register idtoken ZTZlMDE5ODgtOTIzZC00MDd**

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB# license smart register idtoken NzE0YmVjNjEtNTUzYi00N2Q4LWEzOGQtZWVhNzA3YzE2Y2Fi
Mon Apr 10 03:58:04.287 UTC

License command "license smart register idtoken " completed successfully.
Registration process is in progress. Use the 'show license status' command to check the progress and result
```

Step 1.You can see initial registration is successful. It can take time to find the license.

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license status
Fri Apr  7 03:24:57.692 UTC

Smart Licensing is ENABLED
  Initial Registration: SUCCEEDED on Fri Apr 07 2017 03:23:52 UTC
  Last Renewal Attempt: None
  Registration Expires: Never

License Authorization:
  Status: No Licenses in Use
  Last Communication Attempt: SUCCEEDED on Mon Apr 03 2017 23:56:05 UTC
  Next Communication Attempt: Thu Jan 01 1970 00:00:00 UTC
  Communication Deadline: Thu Jan 01 1970 00:00:00 UTC
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license platform summary
Fri Apr  7 03:25:09.601 UTC
Current state:     DEMO

Collection: LAST: (disabled)
            NEXT: (disabled)
Reporting:  LAST: (disabled)
            NEXT: (disabled)

                                                                 Count
Feature/Area     Entitlement                                   Last Next
=============== ============================================== ==== ====

RP/0/RP0/CPU0:SYD-XRV9k-LAB#
```

Step 2. You can log in to the Satellite and synchronise it manually. Then, you see the status is changed to **Registered**, as shown in the image:

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show license all
Mon Apr 10 03:00:07.162 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Demo Smart Account
  Virtual Account: 1 - Spark Flex
  Initial Registration: SUCCEEDED on Fri Apr 07 2017 12:47:22 UTC
  Last Renewal Attempt: None
  Next Renewal Attempt: Wed Oct 04 2017 12:47:23 UTC
  Registration Expires: Sat Apr 07 2018 12:11:35 UTC

License Authorization:
  Status: OUT OF COMPLIANCE on Fri Apr 07 2017 12:49:21 UTC
  Last Communication Attempt: SUCCEEDED on Mon Apr 10 2017 00:49:35 UTC
  Next Communication Attempt: Mon Apr 10 2017 12:49:35 UTC
  Communication Deadline: Sat Apr 07 2018 12:11:34 UTC

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

IOS XRv 9000 License for 1 vRouter Instantiation (IOS-XRv-9000-vRouter-VM):
  Description: IOS XRv 9000 License for 1 vRouter Instantiation
  Count: 1
  Version: 1.0
  Status: OUT OF COMPLIANCE

Product Information
===================
UDI: PID:R-IOSXRV9000-IMG,SN:2651B9AEF31,SUVI:R-IOSXRV9000-IMG2651B9AEF31,UUID:423

Agent Version
=============
Smart Agent for Licensing: 2.2.0_rel/5
```

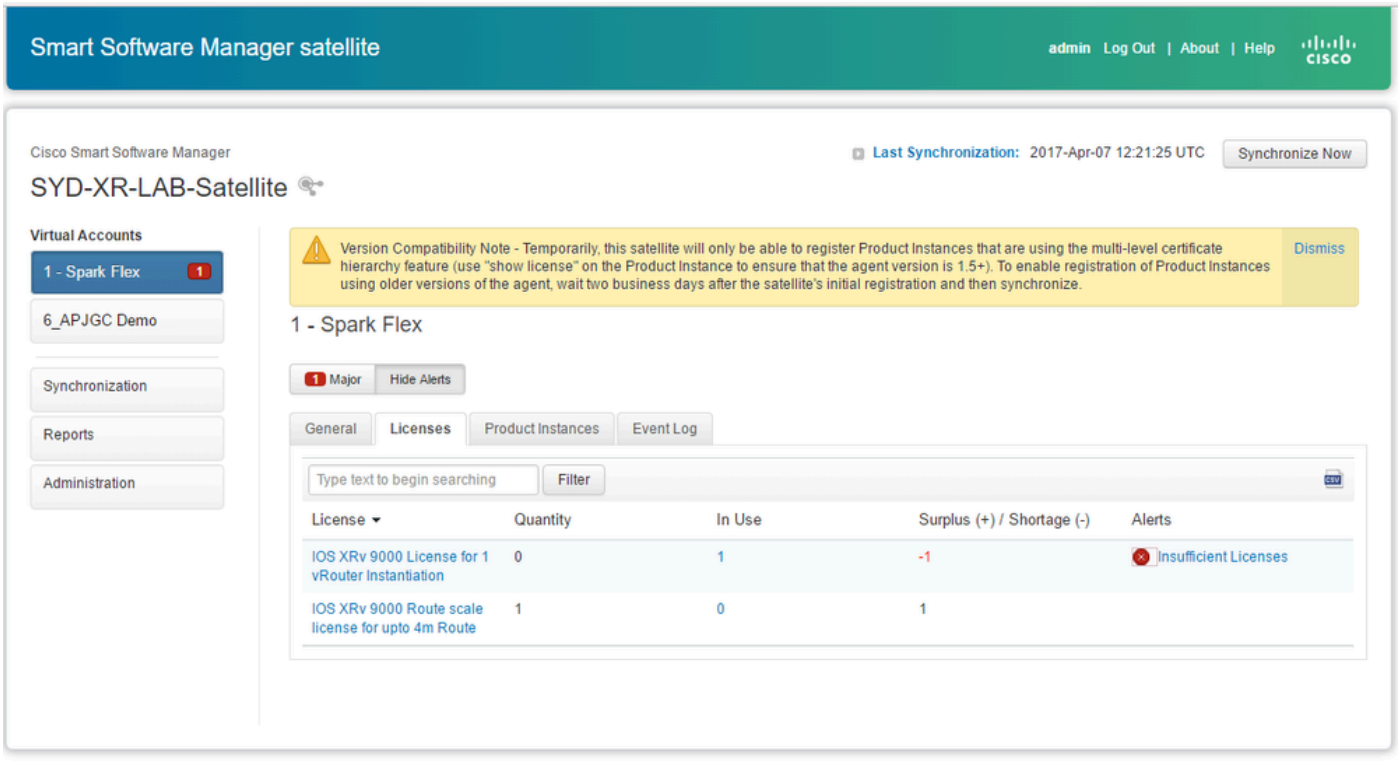
Step 3. If the required licence is not in your Smart account or your defined virtual account, the status of the license usage shows Out Of Compliance. However, the current state is changed to PRODUCTION, as shown in the image:

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license platform summary
Mon Apr 10 03:31:01.804 UTC
Current state:    PRODUCTION

Collection: LAST: Mon Apr 10 02:53:48 2017
            NEXT: Mon Apr 10 03:53:48 2017
Reporting:  LAST: Sun Apr  9 12:53:48 2017
            NEXT: Mon Apr 10 12:53:48 2017

                                                                  Count
Feature/Area     Entitlement                                  Last Next
================ ============================================ ==== ====
System           Product: Right to Use                         1    1
```

Step 4. The Smart Software Manager Satellite also shows the major alarm as "Insufficient Licenses" and shortage of one license (-1).

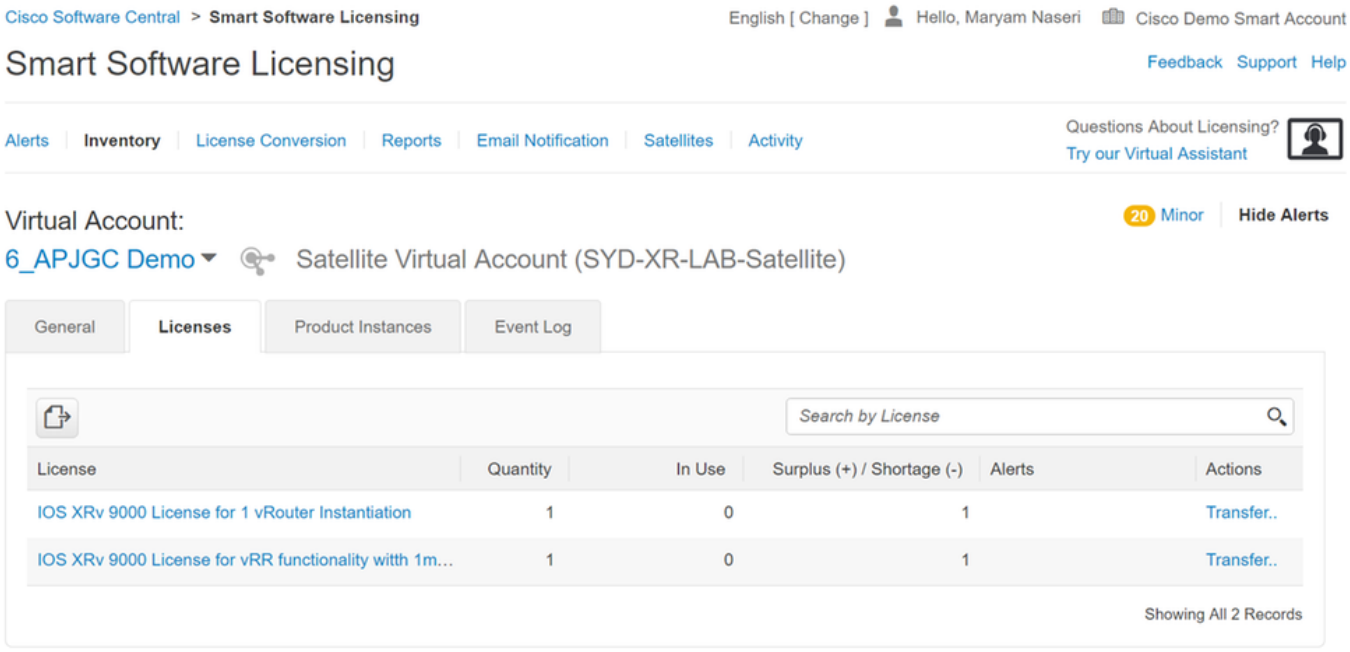


Transfer Required License to the Related Virtual Account

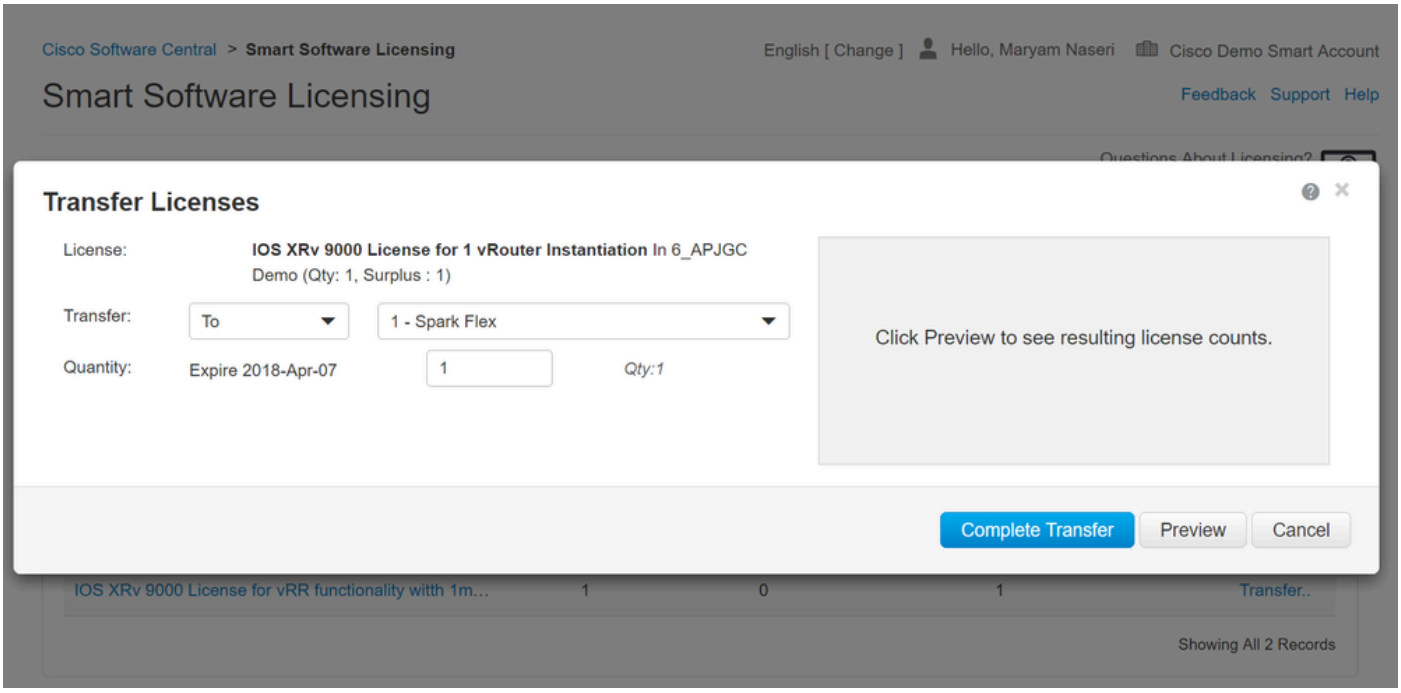
You must transfer the required license to the related smart account and virtual account to be able to use it.

Step 1. In case you ordered a license and it is in a different virtual account, you can lo gin to your Smart

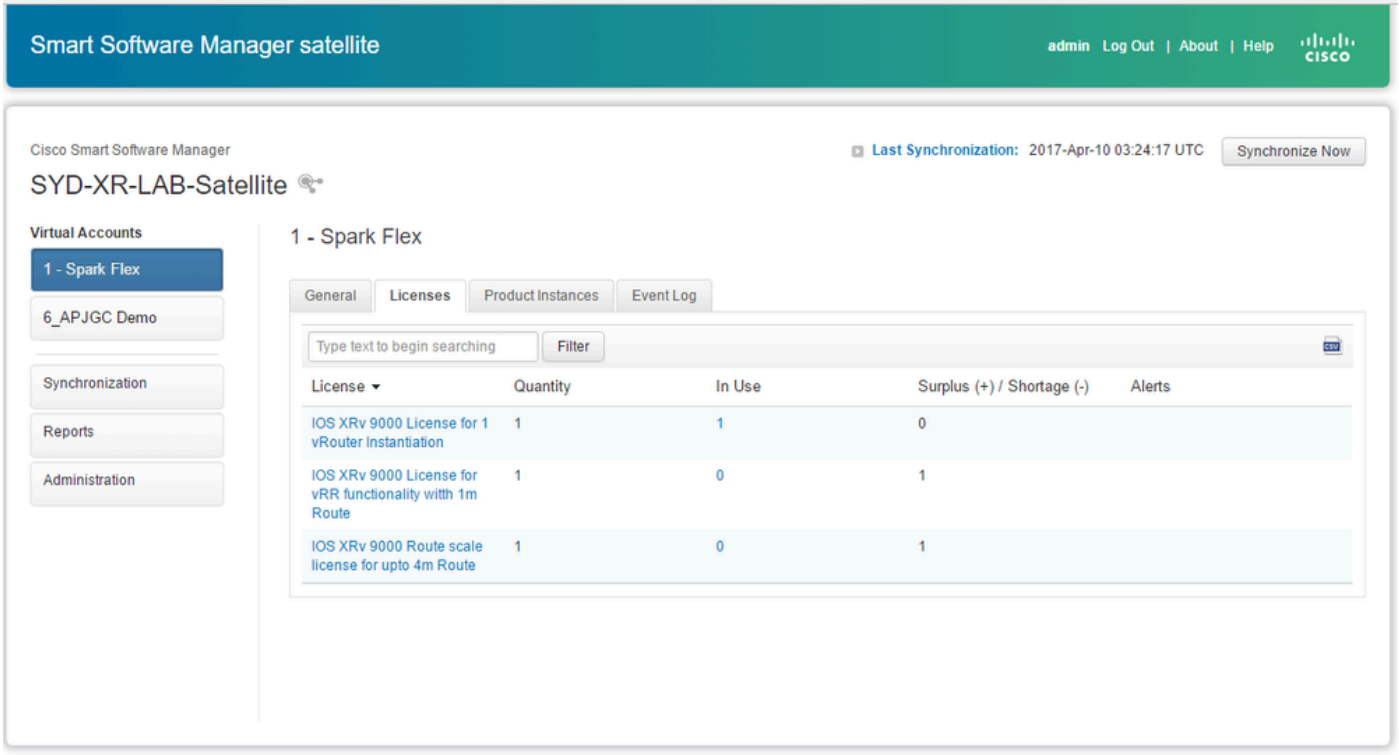
Software Licensing account and transfer it to the virtual account where you have generated token for XRV9k router and then click **Transfer**, as shown in the image:



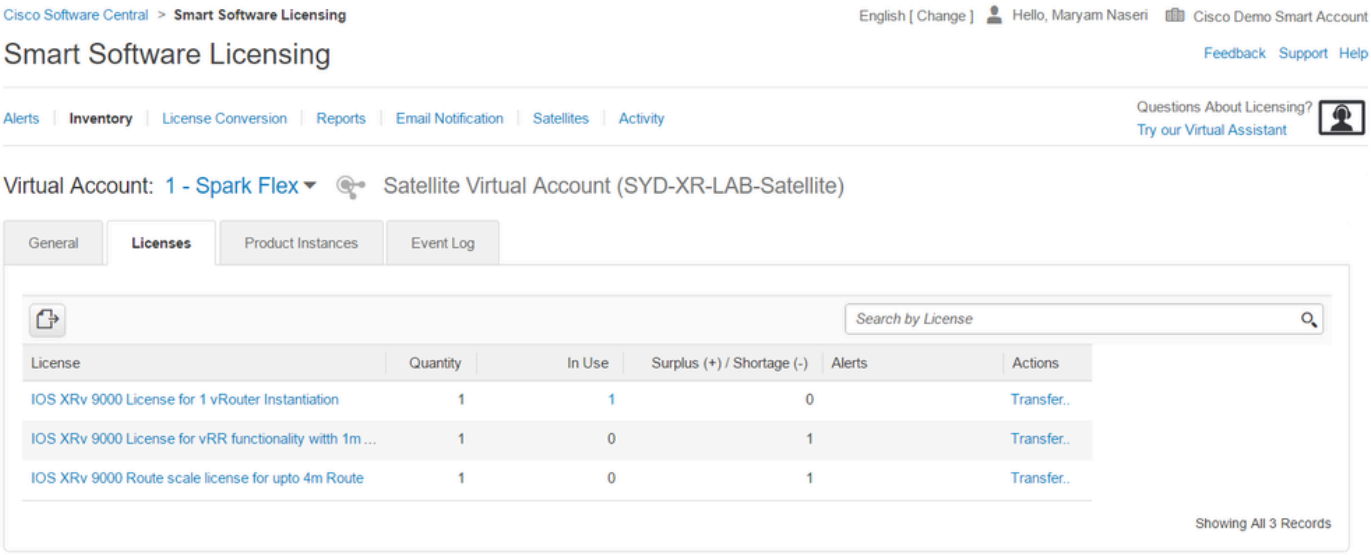
Step 2. Enter the **information** about correct virtual account and the quantity of the license, then click **Complete Transfer**, as shown in the image.



Step 3. When License is transferred, you can manually synchronize the Satellite and the Major alarm is cleared.



Step 4. You can also verify on the Smart Software Licensing and ensure the number of In-use licenses.



Verify the License Status in XRv9k

You can verify the license status of the XRv9k router by using these commands:

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license all
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show license platform summary
```

The status of the license is changed to **Authorized** after communicating with Satellite and finding required license.

Note: You can register the license by using existing token, in case the status has not been changed.

```
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license status
Mon Apr 10 03:58:12.175 UTC

Smart Licensing is ENABLED
  Initial Registration: SUCCEEDED on Mon Apr 10 2017 03:58:10 UTC
  Last Renewal Attempt: SUCCEEDED on Mon Apr 10 2017 03:55:37 UTC
    Failure reason:
  Next Renewal Attempt: Sat Oct 07 2017 03:58:10 UTC
  Registration Expires: Tue Apr 10 2018 03:14:27 UTC

License Authorization:
  Status: OUT OF COMPLIANCE on Fri Apr 07 2017 12:49:21 UTC
  Last Communication Attempt: SUCCEEDED on Mon Apr 10 2017 00:49:35 UTC
  Next Communication Attempt: Mon Apr 10 2017 12:49:35 UTC
  Communication Deadline: Sat Apr 07 2018 12:11:34 UTC
RP/0/RP0/CPU0:SYD-XRV9k-LAB#show  license all
Mon Apr 10 03:58:26.510 UTC

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

Smart Licensing is ENABLED

Registration:
  Status: REGISTERED
  Smart Account: Cisco Demo Smart Account
  Virtual Account: 1 - Spark Flex
  Initial Registration: SUCCEEDED on Mon Apr 10 2017 03:58:10 UTC
  Last Renewal Attempt: SUCCEEDED on Mon Apr 10 2017 03:55:37 UTC
    Failure reason:
  Next Renewal Attempt: Sat Oct 07 2017 03:58:09 UTC
  Registration Expires: Tue Apr 10 2018 03:14:26 UTC

License Authorization
  Status: AUTHORIZED on Mon Apr 10 2017 03:58:18 UTC
  Last Communication Attempt: SUCCEEDED on Mon Apr 10 2017 03:58:18 UTC
  Next Communication Attempt: Wed May 10 2017 03:58:17 UTC
  Communication Deadline: Tue Apr 10 2018 03:14:26 UTC

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

IOS XRv 9000 License for 1 vRouter Instantiation (IOS-XRv-9000-vRouter-VM):
  Description: IOS XRv 9000 License for 1 vRouter Instantiation
  Count: 1
  Version: 1.0
  Status: AUTHORIZED

Product Information
===================
UDI: PID:R-IOSXRV9000-IMG,SN:2651B9AEF31,SUVI:R-IOSXRV9000-IMG2651B9AEF31,UUID:423F5DA9-773D-43AC-56FB-A6656291FE6B

Agent Version
=============
Smart Agent for Licensing: 2.2.0_rel/5
```

Your XRv9k Router is using the license and the Satellite synchronizes itself with Smart software account.

Related Information

- You can refer to this link for more information about provisioning the VM:

Cisco IOS XRv 9000 Router Installation and Configuration Guide-Chapter: Preparing for Installation

- You can refer to this link for more information about system requirements for XRv 9000 release 6.0.0:

  Release Notes for Cisco IOS XRv 9000 Router for Cisco IOS XR Software Release 6.0.0-System Requirements

- You can refer to this link to get more information about Cisco IOS XRv 9000 Router Installation and Configuration Guide:

  Cisco IOS XRv 9000 Router Installation and Configuration Guide- Chapter: Installing the Cisco IOS XRv 9000 Router in VMware ESXi Environments

- You can refer to this link for further information:

  Cisco IOS XRv 9000 Router Installation and Configuration Guide- Chapter: Cisco IOS XRv 9000 Router Smart Licensing

- You can refer to these links for further information:

  Smart Account Manager Satellite

Cisco Smart Software Manager Satellite Data Sheet