Cisco Cyber Vision Network Sensor Installation Guide for Cisco IR1101, Release 4.4.1

First Published: 2019-01-01

Last Modified: 2023-12-14

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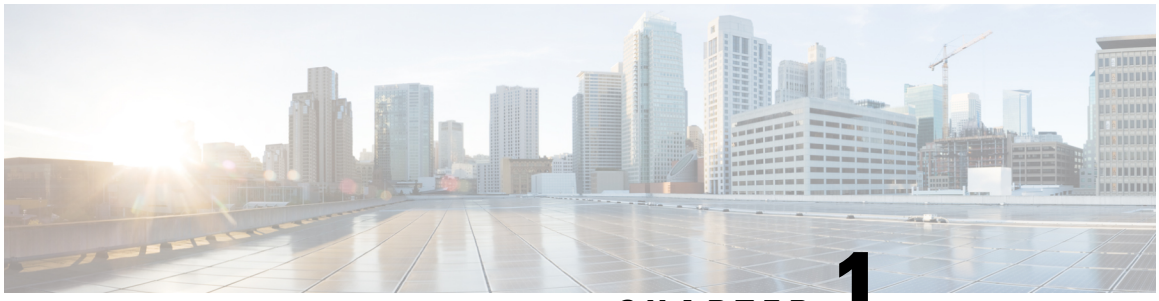


CHAPTER 1

About this documentation

- Document purpose, on page 1
- Warnings and notices, on page 1

Document purpose

This installation guide describes how to perform a clean installation of Cisco Cyber Vision on the following devices:

- Cisco Catalyst IR1101 Rugged Series Router
- Cisco Catalyst IR1800 Rugged Series Router

Moreover, this document describes how to upgrade sensors through different methods.

This documentation is applicable to **system version 4.4.1**.

Note To be able to use the Cisco Cyber Vision sensor management extension, an IP address reachable by the Center Collection interface must be set on the Collection VLAN.

Warnings and notices

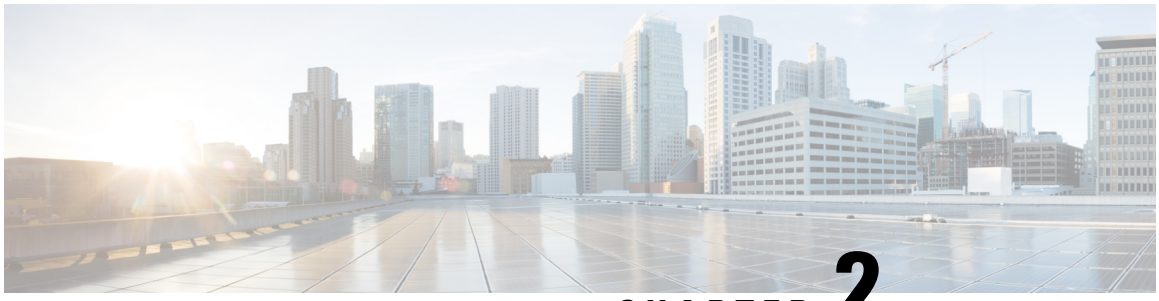
This manual contains notices you have to observe to ensure your personal safety as well as to prevent damage to property.

The notices referring to your personal safety and to your property damage are highlighted in the manual by a safety alert symbol described below. These notices are graded according to the degree of danger.

Warning Indicates risks that involve industrial network safety or production failure that could possibly result in personal injury or severe property damage if proper precautions are not taken.

Important Indicates risks that could involve property or Cisco equipment damage and minor personal injury if proper precautions are not taken.

Note Indicates important information on the product described in the documentation to which attention should be paid.



CHAPTER 2

Overview

• Overview, on page 3

Overview

The architecture proposed and described in this document is for demonstration. The local network engineer should be consulted before applying the parameters used in this document. IP addresses, port numbers and VLAN IDs used should be verified beforehand as wrong configurations could stop normal exchanges and stop the process.

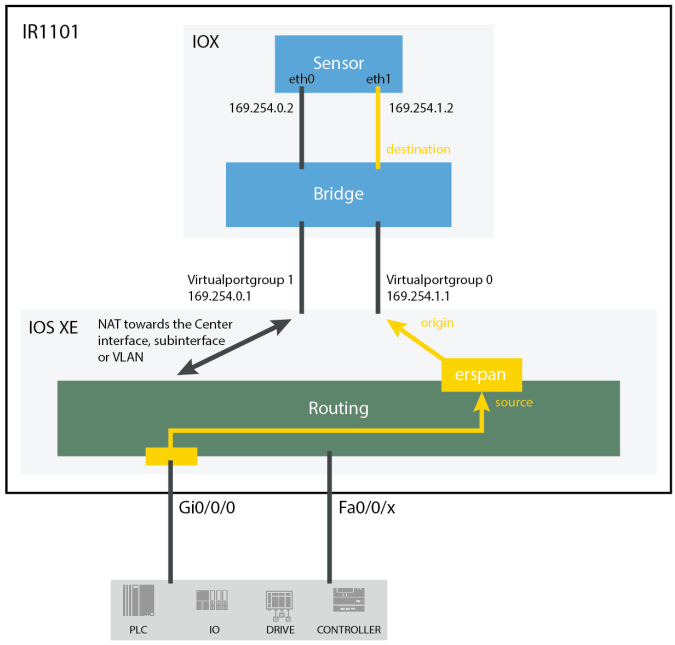
The schema below explains the architecture virtually deployed in the router to embed the sensor application. VLAN and physical ports configuration will allow OT traffic to be copied and communication with the Cisco Cyber Vision Center to be established.

The communication between the Cisco Cyber Vision Center and the sensor is represented in black on the schema. Mirrored OT traffic is represented in yellow.

Any port of the router can be used for the communication with the Center.

Only the routed traffic to the port gi0/0/0 can be spanned to the sensor.

Figure 1: Cisco IR1101 Integrated Services Router Rugged:

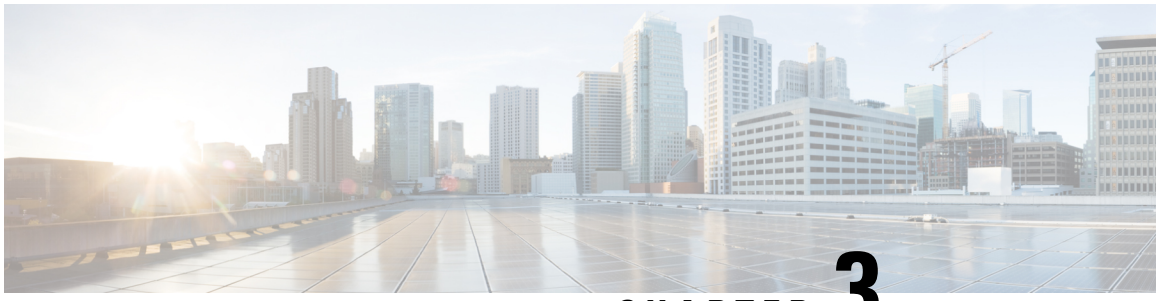


The sensor can be installed on the Cisco IR1101 with different disk configurations: on a SSD, or on the flash if there is no SSD.

SD card is not supported and will be ignored.

In case the sensor management extension is used and if a SSD is detected, Cisco Cyber Vision will be automatically deployed on it. If there is none, the application will be installed on the flash memory.

For other deployment modes (IOx Local Manager or CLI), the procedures describe how the installation is done for both cases.



CHAPTER 3

Requirements

- Requirements, on page 5

Requirements

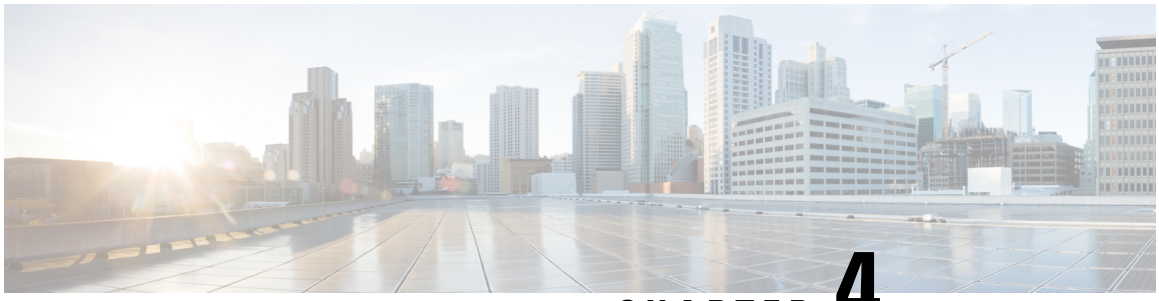
The Cisco IR1101 needs to be configured with access to the CLI (ssh or console port). An access to the IOx Local Manager could be necessary depending on the installation procedure chosen.

To be able to use the Cisco Cyber Vision sensor management extension, it has to be deployed on the Center and an IP address reachable by the Center Collection interface must be set on the device.

In case of manual installation (IOx Local Manager or CLI), the Cisco Cyber Vision Sensor application must be collected from Cisco.com, i.e.

CiscoCyberVision-sensor-IOx-aarch64-<VERSION>.tar

Requirements



CHAPTER 4

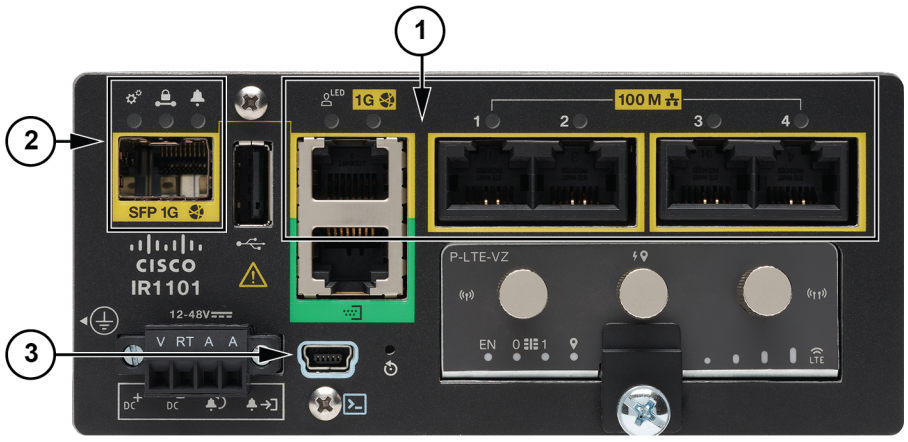
Hardware front view

• Hardware front view, on page 7

Hardware front view

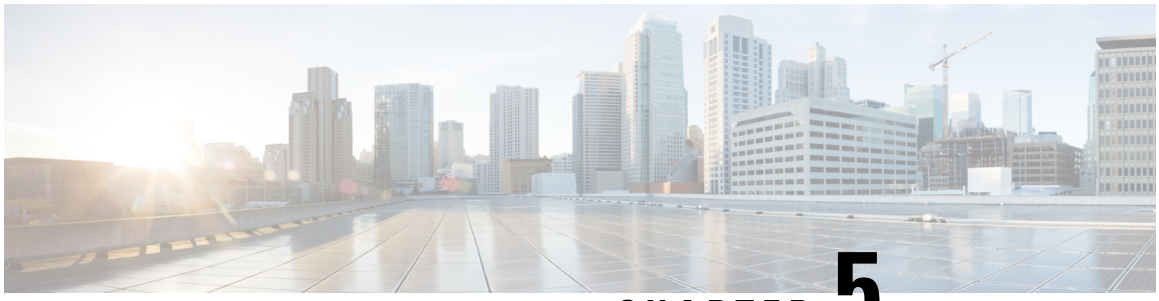
Before starting, take a moment to note the following parts you're going to use during the procedure.

Cisco Cisco IR1101 Integrated Services Router Rugged:



- 1x RJ45 10/100/1000 BaseT connector (the one on the left) **(1)**
- 4x RJ45 10/100 BaseT connector (the ones on the right) **(1)**
- SFP fiber port **(2)**
- mini-USB console connector **(3)**

Hardware front view



CHAPTER 5

Known issues

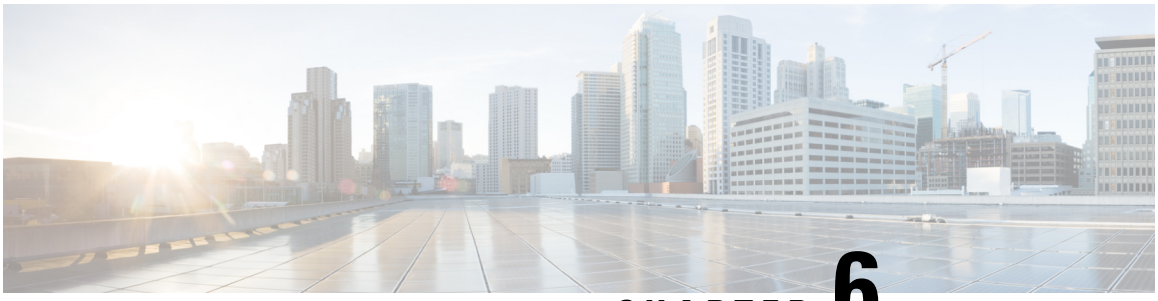
- Known issues, on page 9

Known issues

The deployment procedure with the Local Manager is not supported by firmware version 17.3.x.

Perform the procedure with Procedure with the Cisco Cyber Vision sensor management extension instead.

Known issues



CHAPTER 6

Initial configuration

To install Cisco Cyber Vision on the Cisco IR1101, you must perform the Initial configuration which steps are described in this section.

- Check the software version, on page 11
- Check date and time, on page 11
- Enable IOx, on page 12
- Setup ERSPAN, on page 13
- Setup NAT, on page 14

Check the software version

- Check the software version using the following command in the router's CLI:

  ```
  Show version
  ```

  The displayed version must be 17.2.1 or higher to be compatible with the Cisco Cyber Vision Sensor Application.

  ```
  IR110CCV#
  IR110CCV#Show version
  Cisco IOS XE Software, Version 17.02.01r
  Cisco IOS Software [Amsterdam], ISR Software (ARMV8EL_LINUX_IOSD-UNIVERSALK9-M), Version 17.2.1r, RELEASE SOFTWARE (fc2)
  Technical Support: http://www.cisco.com/techsupport
  Copyright (c) 1986-2020 by Cisco Systems, Inc.
  Compiled Thu 09-Apr-20 22:45 by mcpre
  ```

  If the version is lower, you must update the router firmware. To do so, go to cisco.com and refer to the Cisco IR1101's documentation.

Check date and time

The internal clock of the router must be synchronized and configured properly.

Note The Cisco Cyber Vision IOx sensor application gets the time from the host. Therefore, it is critical that the host synchronizes its time with the Center or a valid NTP server. If the time difference is large (hours or more), the user should adjust the Cisco IR1101 time using the CLI or the WebUI so it is close to the reference time. If not, the synchronization may take many update cycles.

1. Check the date and time using the following command:

   ```
   Show clock
   ```

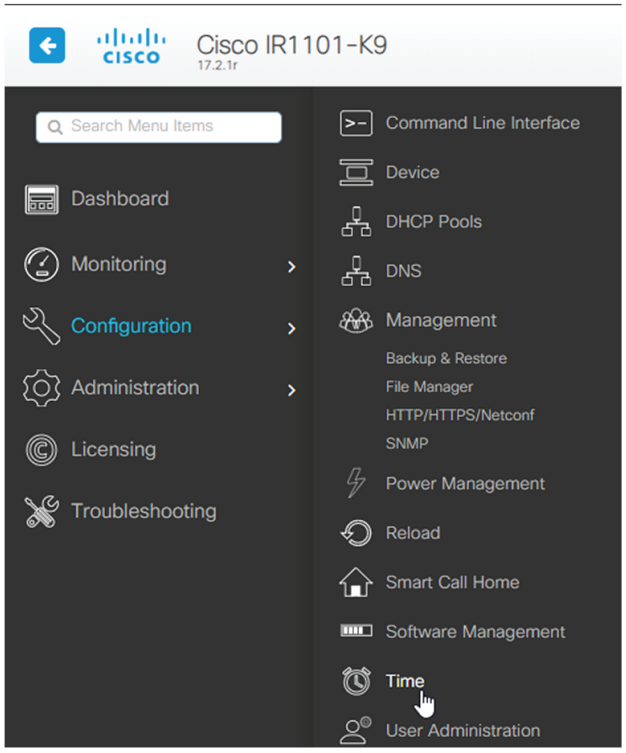
2.

   ```
   IR110CCV#
   IR110CCV#Show clock
   *14:33:05.354 UTC Fri Apr 17 2020
   IR110CCV#
   ```

   If needed, adjust to the UTC time using the following command:

   ```
   clock set [hh:mm:ss] [month] [day] [year]
   ```

Or in the WebUI, navigate to Configuration > Time.



Enable IOx

Before installing the Cisco Cyber Vision sensor on the Cisco IR1101, you must enable IOx.

Procedure

Step 1 Enable IOx using the following command.

```
configure terminal
iox
```

Step 2 Check that the CAF and IOxman services are running using the following command.

```
exit
show iox
```

```
IR110CCV(config)#
IR110CCV(config)#exit
IR110CCV#show iox

IOx Infrastructure Summary:
---------------------------
IOx service (CAF) 1.10.0.1 : Running
IOx service (HA)           : Not Supported
IOx service (IOxman)       : Running
IOx service (Sec storage) : Not Supported
Libvirtd   1.3.4           : Running
Dockerd    18.03.0         : Running

IR110CCV#
```

Setup ERSPAN

In order to receive traffic in the Cisco Cyber Vision IOx application, the application:

- must be connected to a VirtualPortGroup,
- must have the correct IP address assigned,
- must have a monitor session created.

1. Connect the application to a VirtualPortGroup and set an IP address using the following commands:

```
Configure terminal
ip routing
interface virtualportgroup 0
ip address 169.254.1.1 255.255.255.252
exit
```

```
IR110CCV#
IR110CCV#Configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
IR110CCV(config)#ip routing
IR110CCV(config)#interface virtualportgroup 0
IR110CCV(config-if)#ip address 169.254.1.1 255.255.255.252
IR110CCV(config-if)#
IR110CCV(config-if)#
IR110CCV(config-if)#exit
IR110CCV(config)#
```

2. Create the monitor session using the following commands:

```
monitor session 1 type erspan-source
source interface Gi0/0/0
no shutdown
destination
erspan-id 1
mtu 1464
ip address 169.254.1.2
origin ip address 169.254.1.1
end
```

```
IR110CCV(config)#monitor session 1 type erspan-source
IR110CCV(config-mon-erspan-src)#source interface Gi0/0/0
IR110CCV(config-mon-erspan-src)#no shutdown
IR110CCV(config-mon-erspan-src)#destination
IR110CCV(config-mon-erspan-src-dst)#erspan-id 1
IR110CCV(config-mon-erspan-src-dst)#mtu 1464
IR110CCV(config-mon-erspan-src-dst)#ip address 169.254.1.2
IR110CCV(config-mon-erspan-src-dst)#origin ip address 169.254.1.1
IR110CCV(config-mon-erspan-src-dst)#end
IR110CCV#
```

Setup NAT

You must add NAT rules so that the container can reach the outside. This will be on a different virtual port group from the ERSPAN to separate the traffic.

Procedure

Step 1 Type the following commands to achieve this configuration.

```
Configure terminal
interface GigabitEthernet 0/0/0
ip nat outside
media-type rj45
exit
interface VirtualPortGroup 1
ip address 169.254.0.1 255.255.255.252
ip nat inside
```

```
exit
ip nat inside source list NAT_ACL interface GigabitEthernet 0/0/0 overload
ip access-list standard NAT_ACL
10 permit 169.254.0.0 0.0.0.3
exit
```

```
IR110CCV#
IR110CCV#Configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
IR110CCV(config)#interface GigabitEthernet 0/0/0
IR110CCV(config-if)#ip nat outside
IR110CCV(config-if)#media-type rj45
IR110CCV(config-if)#exit
IR110CCV(config)#interface VirtualPortGroup 1
IR110CCV(config-if)#ip address 169.254.0.1 255.255.255.252
IR110CCV(config-if)#ip nat inside
IR110CCV(config-if)#exit
IR110CCV(config)#ip nat inside source list NAT_ACL interface GigabitEthernet 0/0/0 overload
IR110CCV(config)#ip access-list standard NAT_ACL
IR110CCV(config-std-nacl)#10 permit 169.254.0.0 0.0.0.3
IR110CCV(config-std-nacl)#exit
IR110CCV(config)#
```

Step 2 Save the configuration.

```
exit
write mem
```

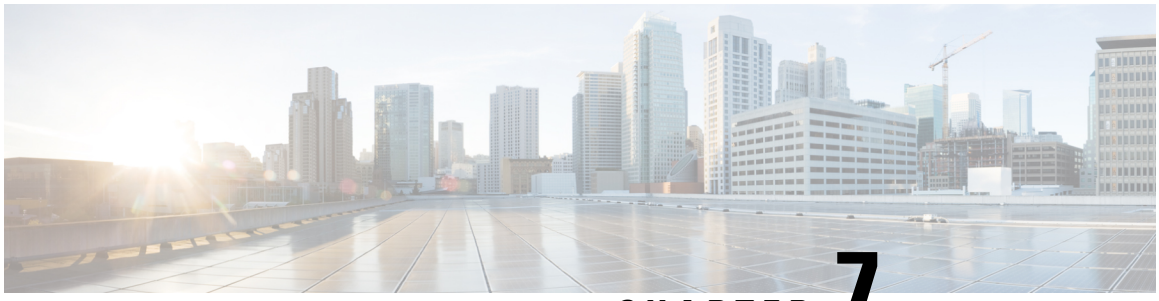
```
IR110CCV#
IR110CCV#write mem
Building configuration...

[OK]
IR110CCV#
*Apr 17 16:22:58.709: %SYS-2-PRIVCFG_ENCRYPT: Successfully encrypted private config file
IR110CCV#
```

What to do next

Proceed with one of the following procedures:

- Procedure with the Cisco Cyber Vision sensor management extension, on page 17
- Procedure with the Local Manager, on page 23
- Procedure with the CLI, on page 37



CHAPTER 7

Procedure with the Cisco Cyber Vision sensor management extension

After the Initial configuration, proceed to the steps described in this section.

- Install the sensor management extension, on page 17
- Create a sensor, on page 19
- Configure the sensor, on page 20

Install the sensor management extension

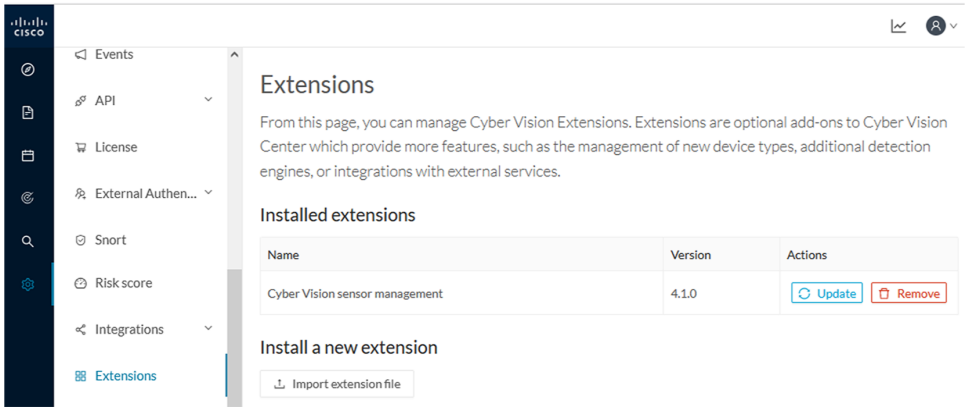
To install the Sensor Management extension, you must:

Procedure

Step 1 Retrieve the extension file (i.e. CiscoCyberVision-sensor-management-<version>.ext) from cisco.com.

Step 2 Access the Extensions administration page in Cisco Cyber Vision.

Step 3 Import the extension file.

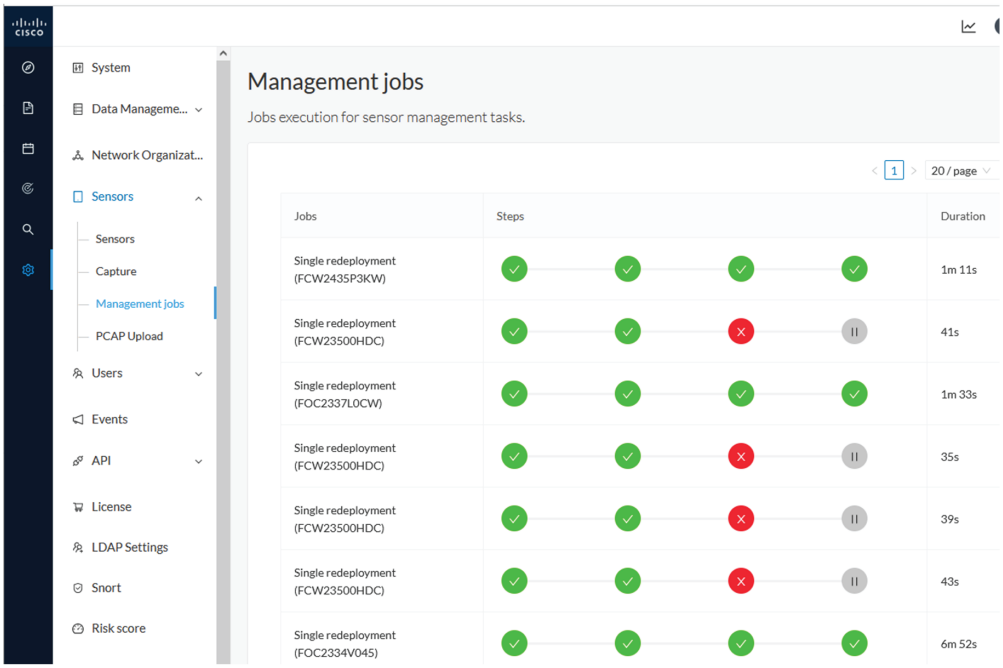


Once the sensor management extension is installed, you will find a new management job under the sensor administration menu (Management jobs), and the Install via extension button will be enabled in the Sensor Explorer page.

Management jobs

As some deployment tasks on sensors can take several minutes, this page shows the jobs execution status and advancement for each sensor deployed with the sensor management extension.

This page is only visible when the sensor management extension is installed in Cisco Cyber Vision.



You will find the following jobs:

- Single deployment

  This job is launched when clicking the Deploy Cisco device button in the sensor administration page, that is when a new IOx sensor is deployed.

- Single redeployment

  This job is launched when clicking the Reconfigure Redeploy button in the sensor administration page, that is when deploying on a sensor that has already been deployed. This option is used for example to change the sensor's parameters like enabling active discovery.

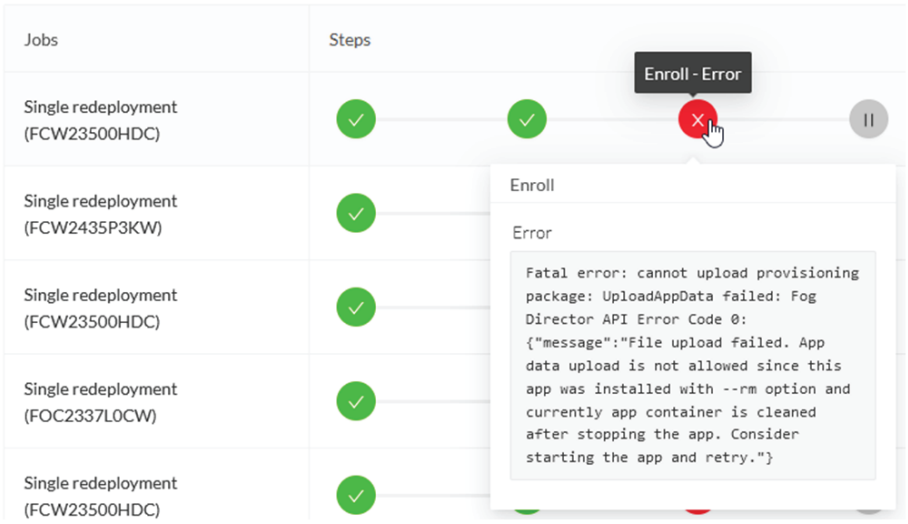
- Single removal

  This job is launched when clicking the Remove button from the sensor administration page.

- Update all devices

This job is launched when clicking the Update Cisco devices button from the sensor administration page. A unique job is created for all managed sensors that are being updated.

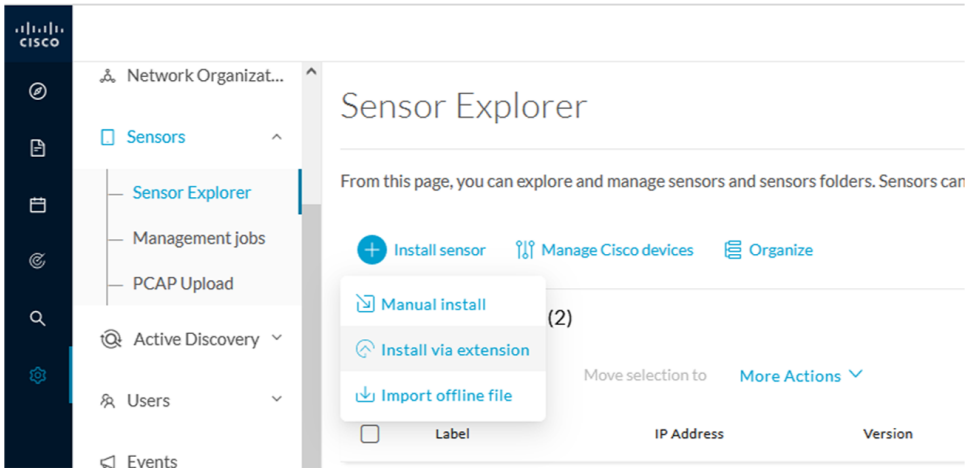
If a job fails, you can click on the error icon to view detailed logs.



Create a sensor

Procedure

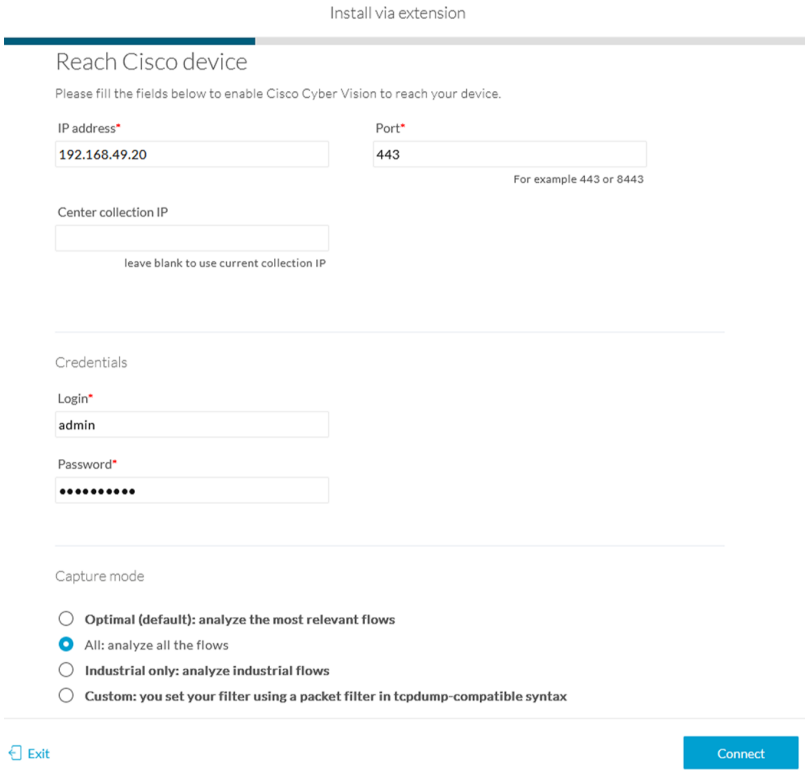
Step 1 In Cisco Cyber Vision, navigate to Admin > Sensors > Sensor Explorer and click **Install sensor**, then **Install via extension**.



Step 2 Fill the requested fields so Cisco Cyber Vision can reach the device:

- IP address: admin address of the device.

- Port: management port (443).
- Login: user with the admin rights of the device.
- Password: password of the admin user.
- Capture Mode: Optionally, select a capture mode.

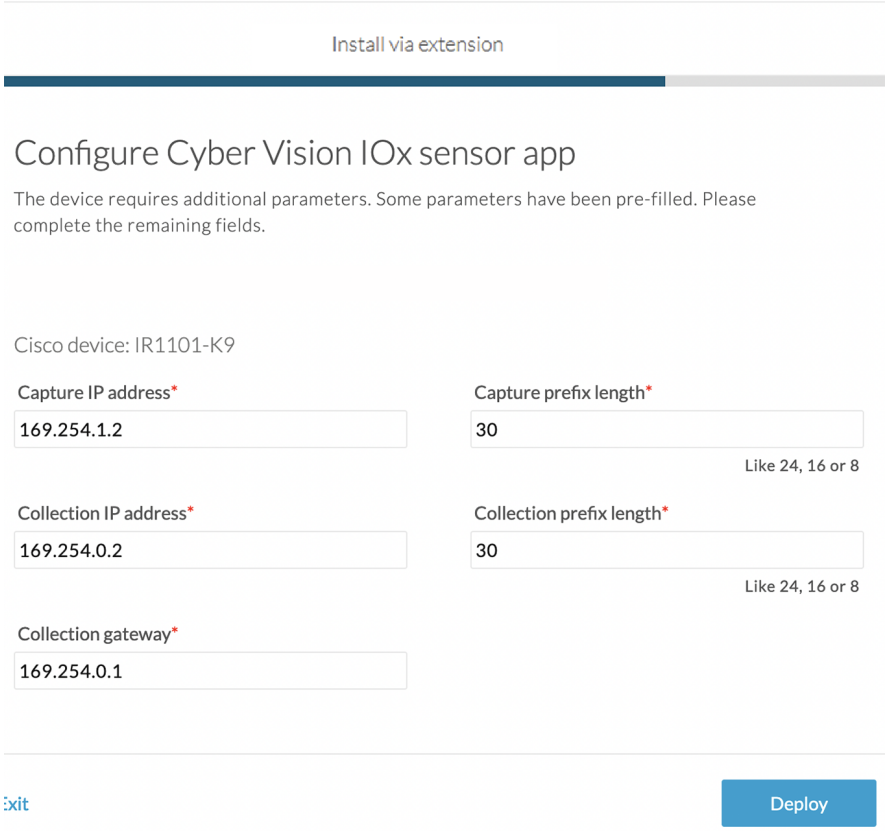


Step 3 Click **Connect**.

The Center will join the device and the second parameter list will be displayed. For this step to succeed, the device needs to be reachable by the Center on its eth1 connection.

Configure the sensor

If the Center can join the device, the following form appears:



While some parameters are filled automatically, you can still change them if necessary.

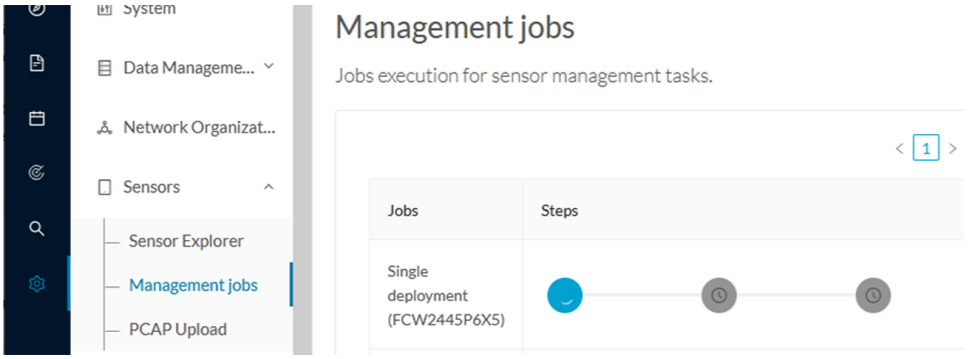
Procedure

Step 1 Fill the following parameters for the Collection interface:

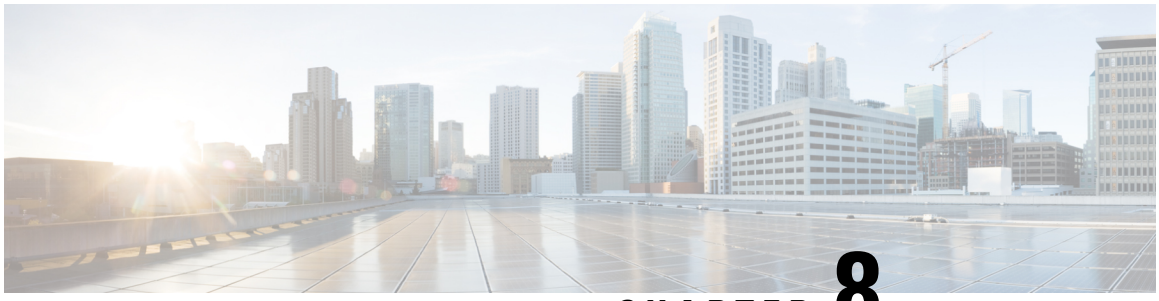
- Capture IP address: IP address destination of the monitor session in the Cisco IR1101
- Capture prefix length: mask of the capture IP address
- Collection IP address: IP address of the sensor in the Cisco IR1101
- Collection prefix length: mask of the Collection IP address
- Collection gateway: gateway of the Collection IP address

Step 2 Click **Deploy**.

The Center starts deploying the sensor application on the target equipment. This can take a few minutes. You can go to the Management jobs page to check the deployment advancements.



Once the deployment is finished, a new sensor appears in the sensors list of the Sensor Explorer page. The sensor's status will eventually turn to Connected.



CHAPTER 8

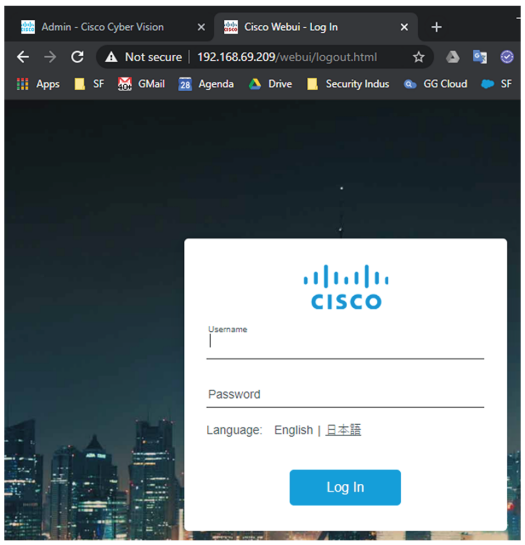
Procedure with the Local Manager

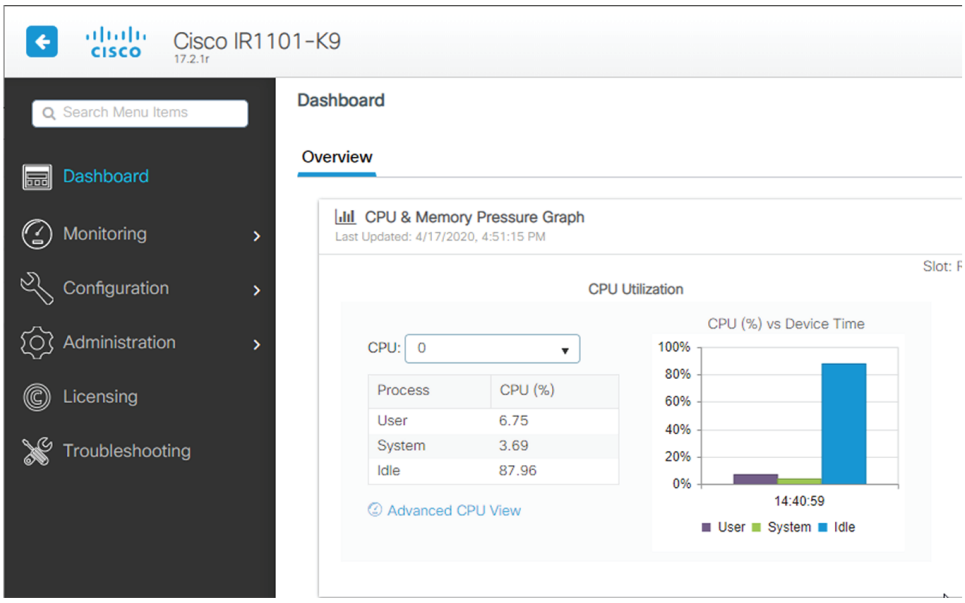
After the Initial configuration, proceed to the steps described in this section.

- Access the IOx Local Manager, on page 23
- Install the sensor virtual application, on page 25
- Configure the sensor virtual application, on page 26
- Generate the provisioning package, on page 32
- Import the provisioning package, on page 34

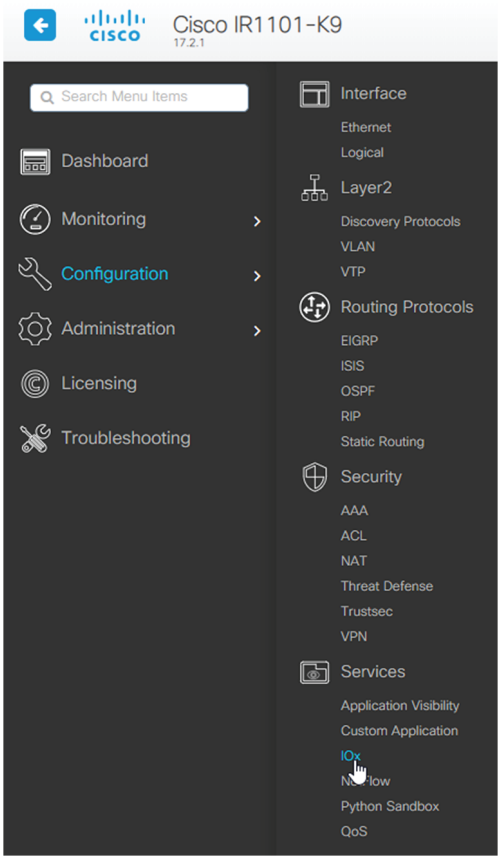
Access the IOx Local Manager

1. Open a browser and navigate to the IP address you configured on the interface you are connected to.
2. Log in using the Cisco IR1101 admin user account and password.

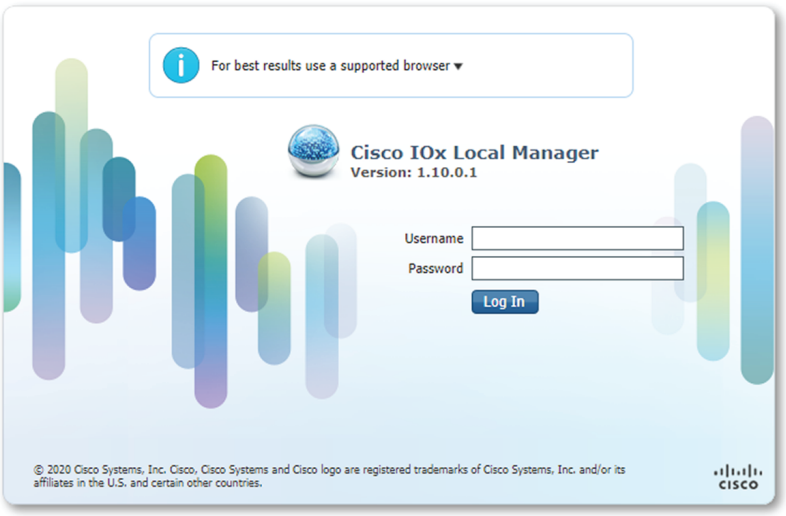




3. Once logged into the Local Manager, navigate to Configuration > Services > IOx.

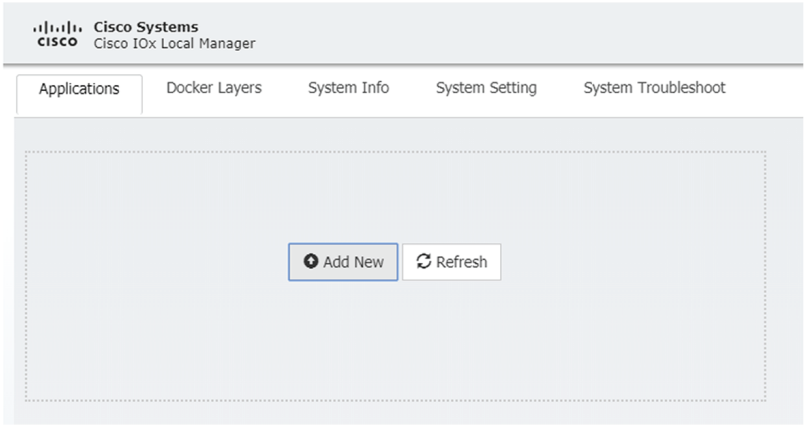


4. Log in using the user account and password.



Install the sensor virtual application

Once logged in, the following menu appears:

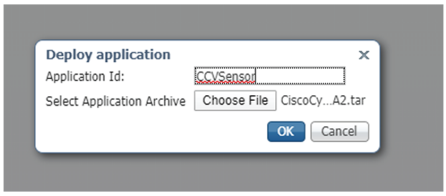


1. Click **Add New**.
2. Add an Application id name (e.g. CCVSensor).
3. Select the application archive file

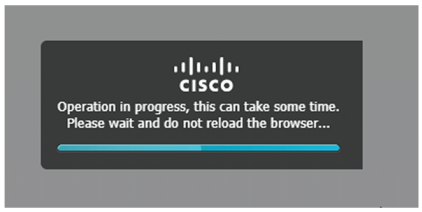
   (i.e. "CiscoCyberVision-IOx-aarch64-<version>.tar").

Note If you aim to install a sensor with **Active Discovery**, select the required application archive file

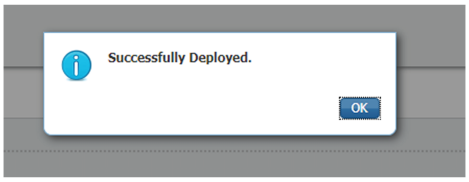
(i.e. "CiscoCyberVision-IOx-Active-Discovery-aarch64-<version>.tar").

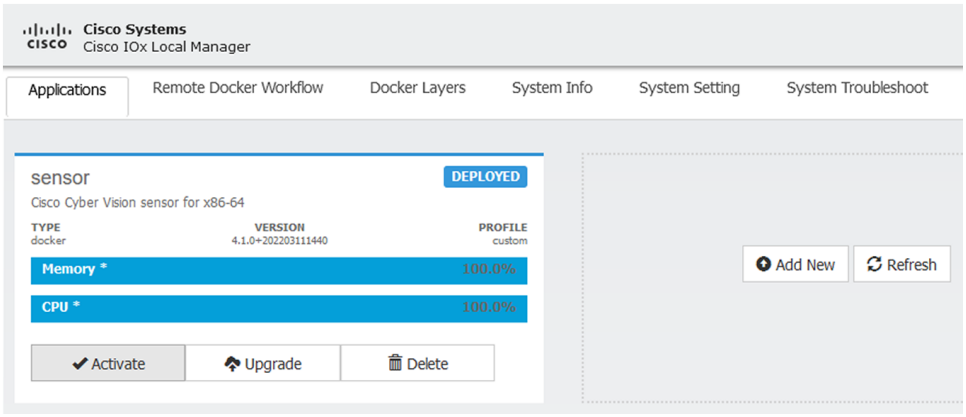


The installation takes a few minutes.



When the application is installed, the following message is displayed and the sensor application appears:

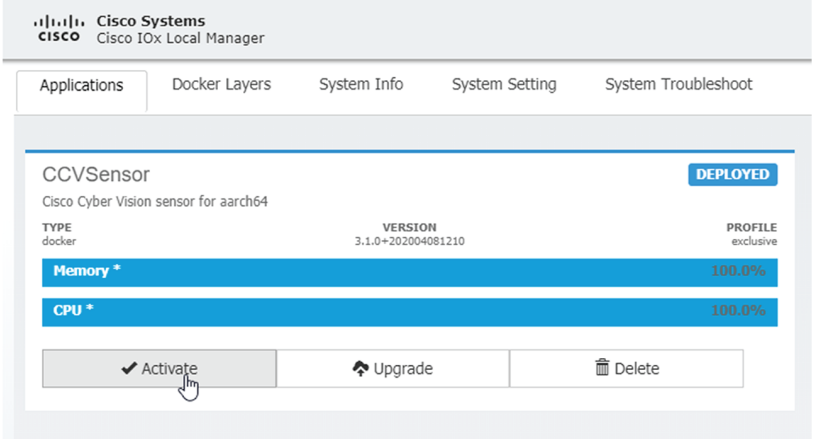




Configure the sensor virtual application

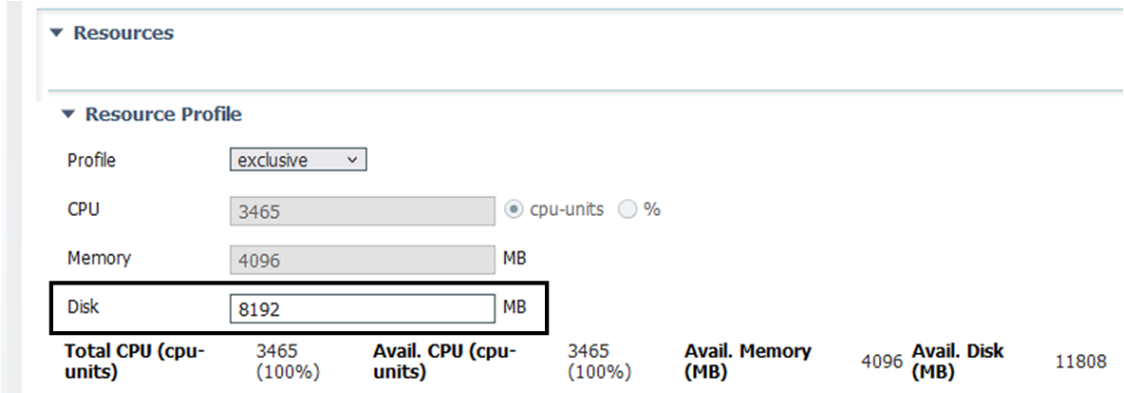
Procedure

Step 1 Click **Activate** to launch the configuration of the sensor application.



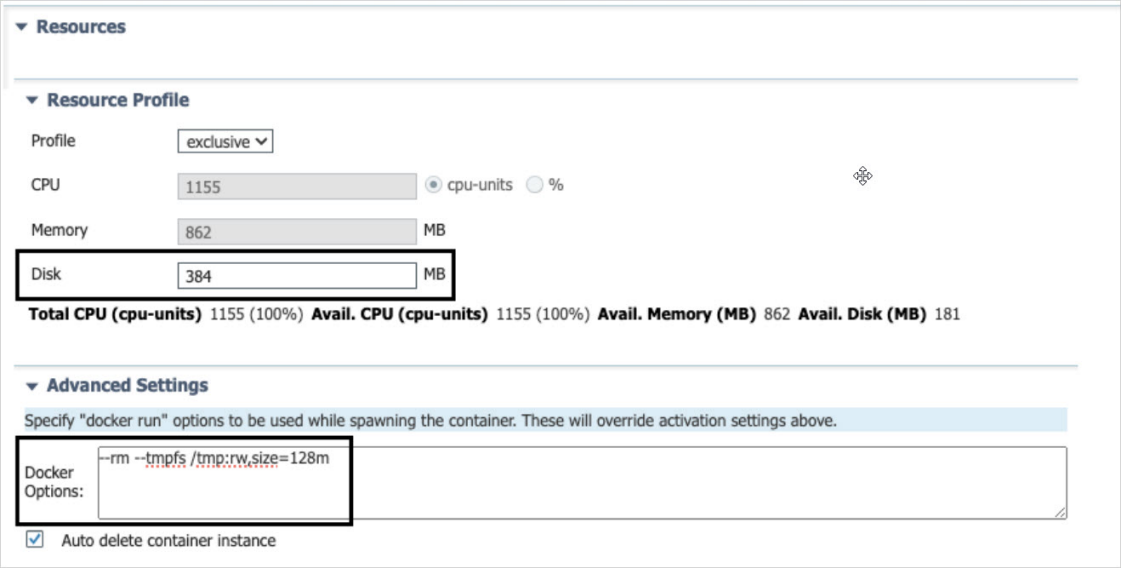
Step 2 Deploy the Resource Profile menu and set the disk size. The procedure differs whether the device has a SSD or not:

- If the device has a SSD, set the necessary disk size. It should be at least 4GB.



- If the device has no SSD, set the disk size to 384MB, then deploy the Advanced Settings menu and configure tmpfs by filling the docker options text area with:

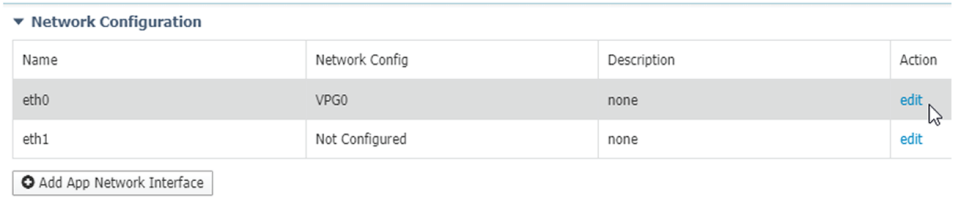
```
--tmpfs /tmp:rw,size=128m
```



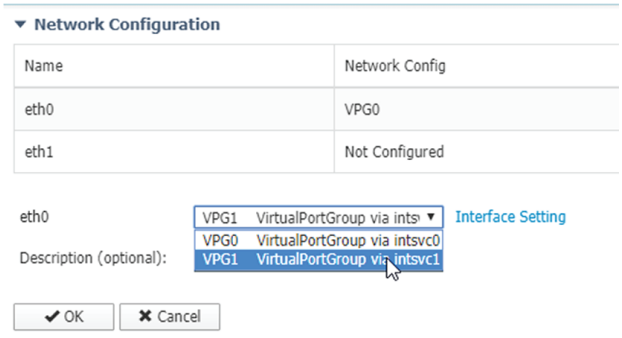
Step 3 Bind the eth0 and eth1 interfaces in the container to an interface on the host in the Network Configuration menu.

eth0:

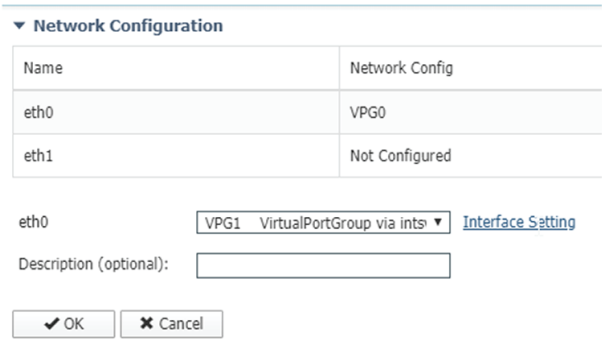
a) Click **edit** in the eth0 line.



b) Select the **VPG1** interface.



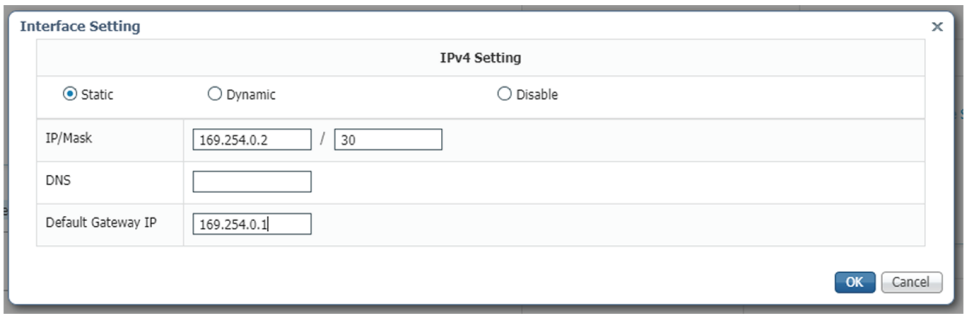
c) Click **Interface setting**.



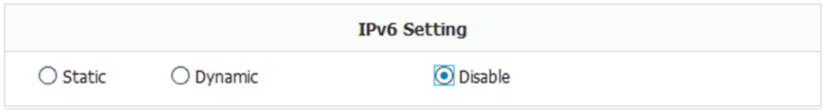
The Interface Setting window pops up.

d) Apply the following configurations:

- Set IPv4 as **Static**.
- IP/Mask: 169.254.0.2 / 30
- Default gateway: 169.254.0.1

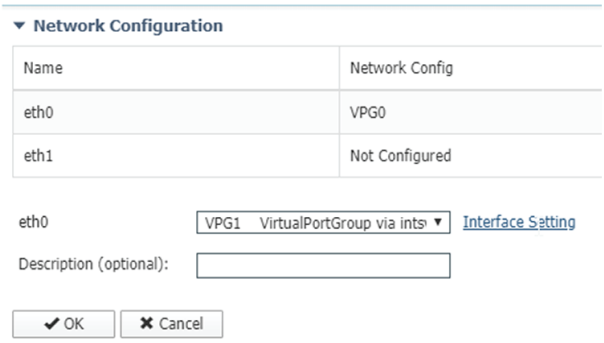


e) Check that IPV6 is set to **Disable**.



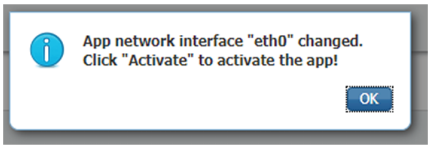
f) Click **OK** to save the interface settings.

You're back to the Network Configuration menu.



g) Click **OK** to save the network configurations.

A popup that confirms changes appears.

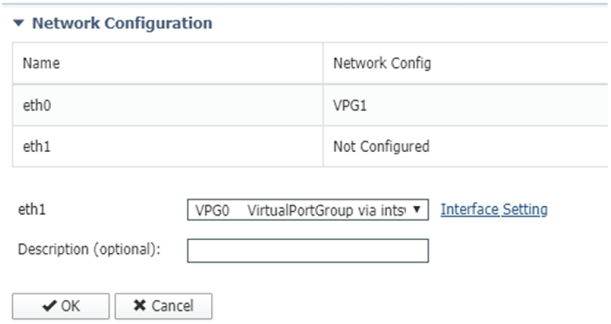


h) Click **OK**.

Step 4 **eth1:**

a) Click **edit** in the eth1 line.

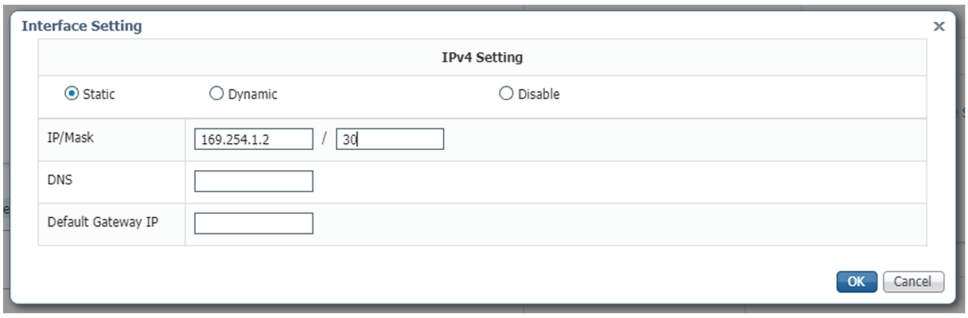
b) Select the **VPG0** interface.



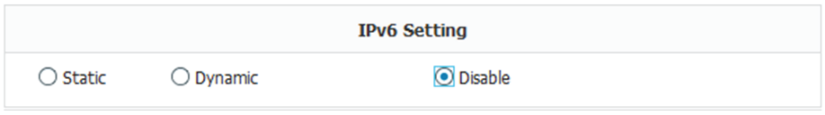
c) Click **Interface setting**.

d) Apply the following configurations:

- Set IPv4 as **Static**.
- IP/Mask: 169.254.1.2 / 30



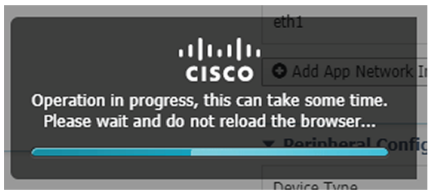
e) **Disable** IPv6.



f) Click **OK**, and click **OK** again when you're back to the Network Configuration menu to save the interface settings.

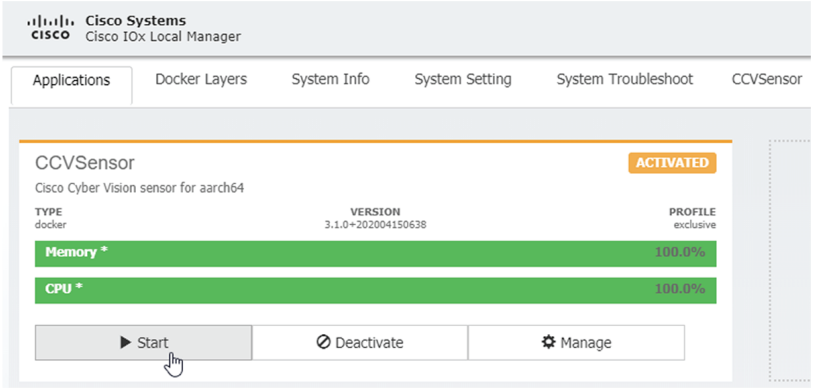
Step 5 Click the **Activate App** button.

The operation takes several seconds.



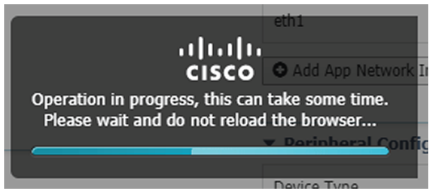
Step 6 Go to the Applications menu to see the application's status.

The application is activated and needs to be started.

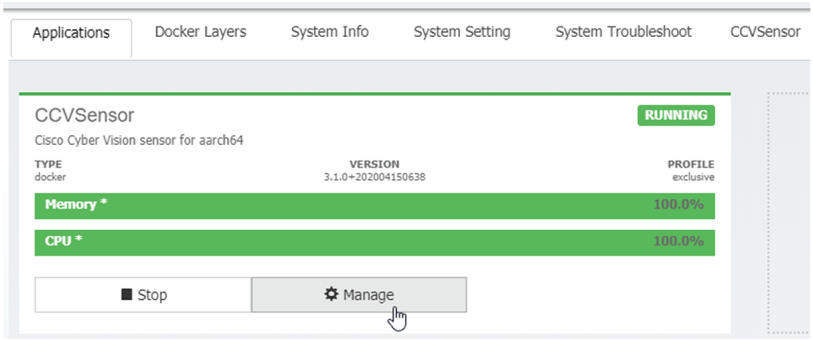


Step 7 Click the **Start** button.

The operation takes several seconds.

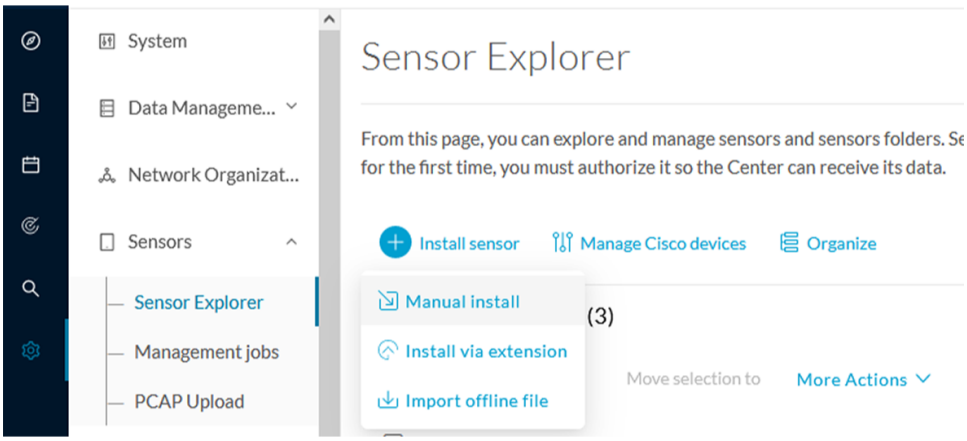


The applications' status changes to RUNNING.



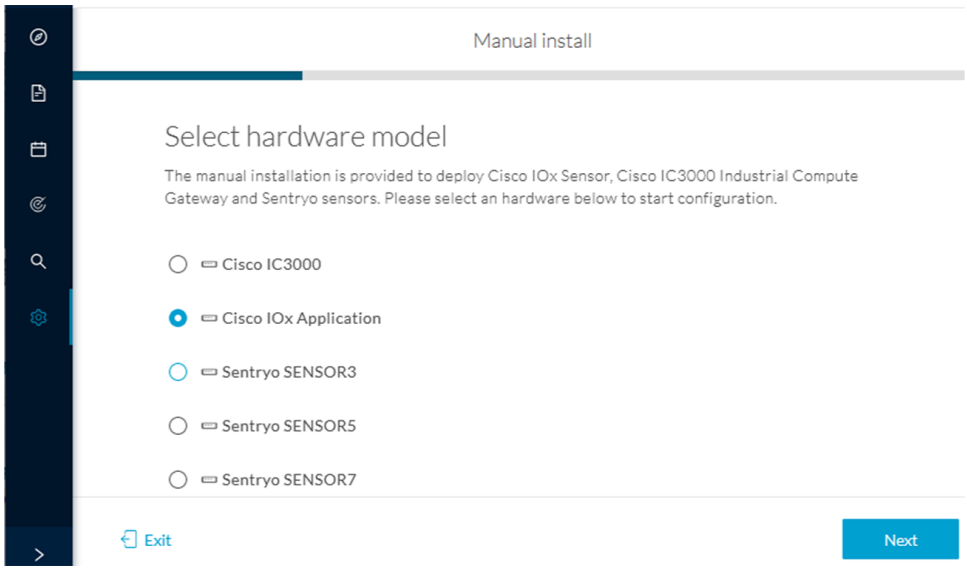
Generate the provisioning package

1. In Cisco Cyber Vision, navigate to Admin > Sensors > Sensor Explorer and click **Install sensor**, then **Manual install**.

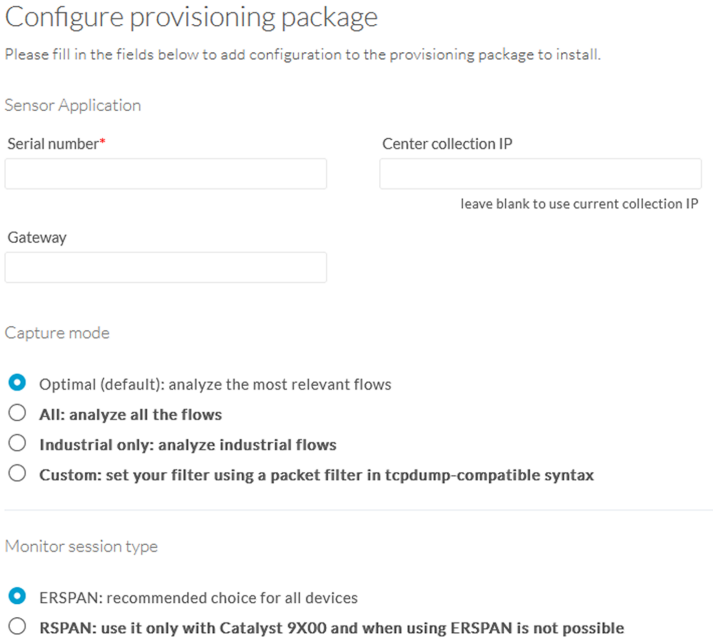


   The manual install wizard appears.

2. Select **Cisco IOx Application** and click **Next**.

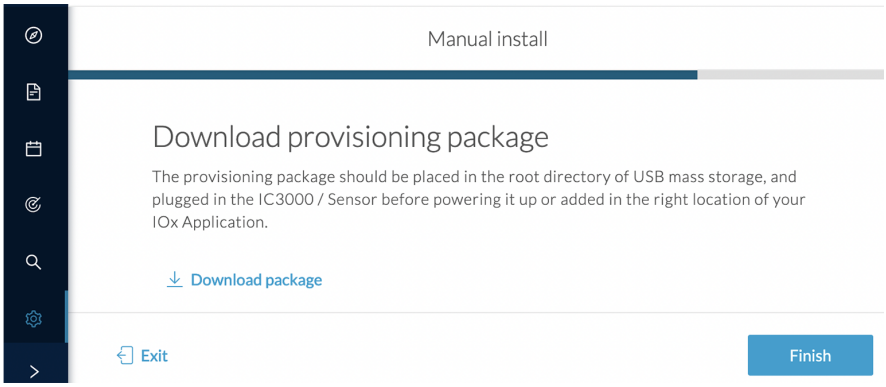


3. Fill the fields to configure the sensor provisioning package:
   - The serial number of the hardware.
   - Center IP: leave blank.
   - Gateway: add if necessary.
   - Optionally, select a capture mode.
   - Optionally, select RSPAN (only with Catalyst 9x00 and if using ERSPAN is not possible).



4. Click **Create sensor**.

5. Click the link to download the provisioning package.

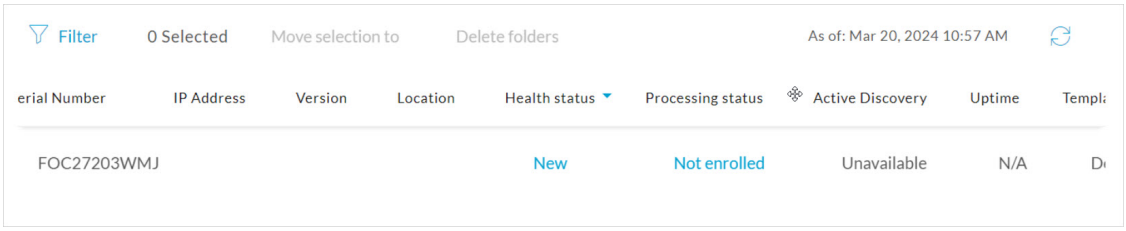


This will download the provisioning package which is a zip archive file with the following name structure: sbs-sensor-config-<serialnumber>.zip (e.g. "sbs-sensor-configFCW23500HDC.zip").

6. Click **Finish**.

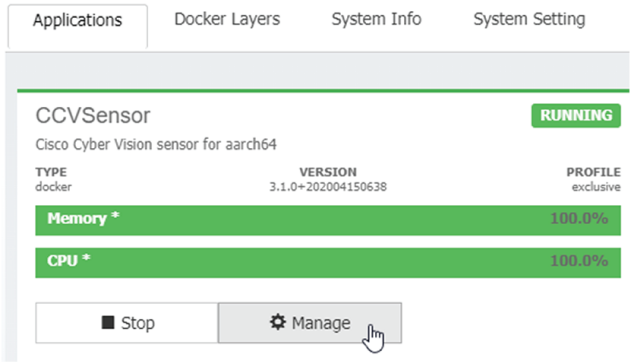
7. A new entry for the sensor appears in the Sensor Explorer list.

   The sensor status will switch from Disconnected to New.

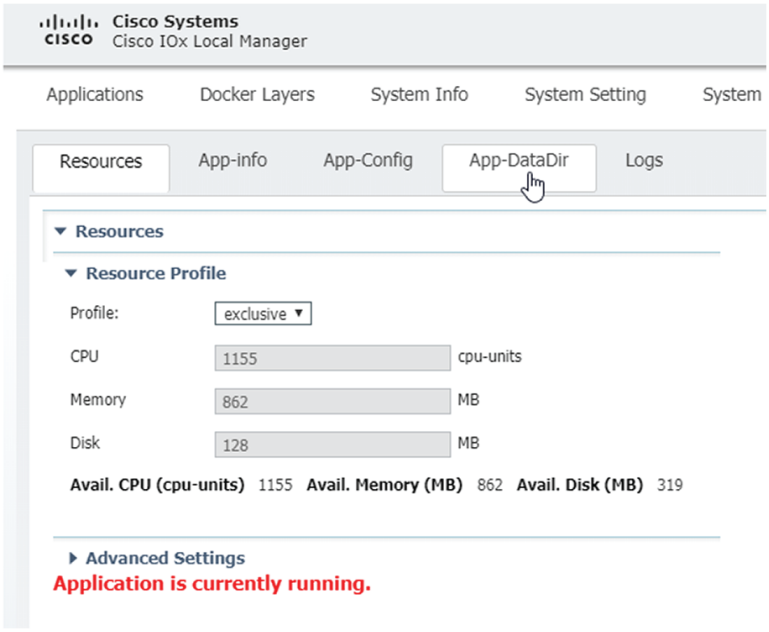


Import the provisioning package

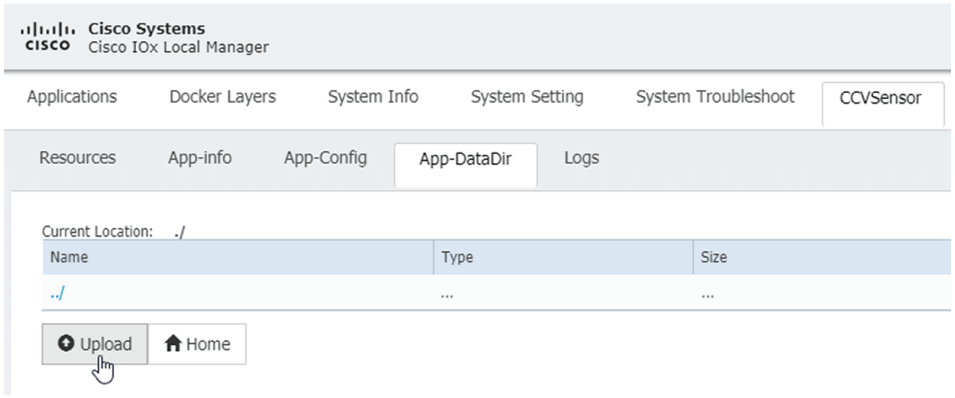
1. In the Local Manager, in the IOx configuration menu, click **Manage**.



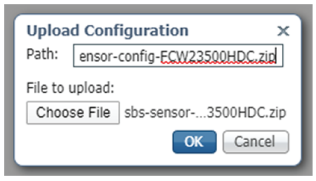
2. Navigate to **App-DataDir**.



3. Click **Upload**.

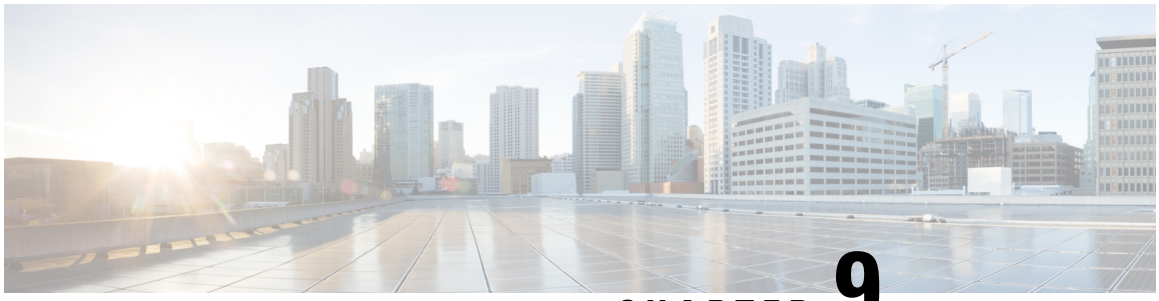


4. Choose the provisioning package downloaded (i.e. "sbs-sensor-config-FCW23500HDC.zip"), and add the exact file name in the path field (i.e. "sbs-sensor-config-FCW23500HDC.zip").
5. Click **OK**.



6. After a few seconds, the sensor appears as Connected in Cisco Cyber Vision.

FCW2445P6X5
192.168.49.21
4.1.0+202202151440
Connected
Pending data
Enabled
4 days



CHAPTER 9

Procedure with the CLI

After the Initial configuration, proceed to the steps described in this section.

- Configure the sensor application, on page 37
- Install the sensor application, on page 38
- Copy the sensor application's provisioning package, on page 39

Configure the sensor application

without SSD

Note In this section, "CCVSensor" is used as the appid.

Procedure

Step 1 Connect to the Cisco IR1101 through SSH or a console.

Step 2 Configure the application payload by typing the following commands:

```
enable
configure terminal
app-hosting appid CCVSensor
  app-vnic gateway0 virtualportgroup 1 guest-interface 0
    guest-ipaddress 169.254.0.2 netmask 255.255.255.252
  app-vnic gateway1 virtualportgroup 0 guest-interface 1
      guest-ipaddress 169.254.1.2 netmask 255.255.255.252
  app-default-gateway 169.254.0.1 guest-interface 0
  app-resource docker
    run-opts 1 "--tmpfs /tmp:rw,size=128m"
end
```

with SSD

Note In this section, "CCVSensor" is used as the appid.

Procedure

Step 1 Connect to he Cisco IR1101 through SSH or a console.

Step 2 Configure the application payload by typing the following commands:

```
enable
configure terminal
app-hosting appid CCVSensor
  app-vnic gateway0 virtualportgroup 1 guest-interface 0
    guest-ipaddress 169.254.0.2 netmask 255.255.255.252
  app-vnic gateway1 virtualportgroup 0 guest-interface 1
      guest-ipaddress 169.254.1.2 netmask 255.255.255.252
  app-default-gateway 169.254.0.1 guest-interface 0
  app-resource docker
    run-opts 1
end
```

Install the sensor application

The sensor package needs to be collected from cisco.com. The file has the following name structure:

CiscoCyberVision-IOx-aarch64-<version>.tar.

1. Copy the package to a USB key or in the flash memory.
2. Type the following command on the Cisco IR1101's CLI:

   ```
   app-hosting install appid CCVSensor package
   usbflash0:CiscoCyberVision-IOx-aarch64-4.1.0.tar
   ```

   ```
   IR110CCV#
   IR110CCV#app-hosting install appid CCVSensor package usbflash0:CiscoCyberVision-IOx-aarch64-3.1.0-RC4.tar
   Installing package 'usbflash0:CiscoCyberVision-IOx-aarch64-3.1.0-RC4.tar' for 'CCVSensor'. Use 'show app-hosting list' f
   or progress.

   IR110CCV#
   ```

Note Adjust "usbflash0:" in accordance with the sensor package's localization (USB port or flash memory).

Note Replace "CiscoCyberVision-IOx-aarch64-4.1.0.tar" with the right filename.

3. Check that the application is in DEPLOYED state:

```
show app-hosting list
```

```
IR110CCV#
IR110CCV#show app-hosting list
App id                                   State
---------------------------------------------------------
CCVSensor                                DEPLOYED

IR110CCV#
```

4. Activate the application using the following command:

```
app-hosting activate appid CCVSensor
```

```
IR110CCV#
IR110CCV#app-hosting activate appid CCVSensor
CCVSensor activated successfully
Current state is: ACTIVATED

IR110CCV#
```

5. Start the application using the following command:

```
app-hosting start appid CCVSensor
```

```
IR110CCV#
IR110CCV#app-hosting start appid CCVSensor
CCVSensor started successfully
Current state is: RUNNING
IR110CCV#
```

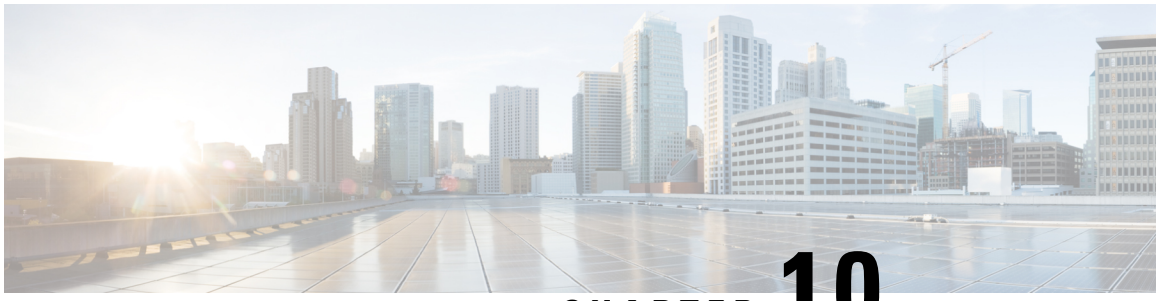
Copy the sensor application's provisioning package

- Copy the provisioning package from the USB key to the application by typing the following command:

```
app-hosting data appid CCVSensor copy usbflash0:sbs-sensor-config-<serialnumber>.zip
sbs-sensor-config-<serialnumber>.zip
```

```
IR110CCV#
IR110CCV#$ data appid CCVSensor copy usbflash0:sbs-sensor-config-FCW23500HDC.zip sbs-sensor-config-FCW23500HDC.zip
Successfully copied file /usbflash0/sbs-sensor-config-FCW23500HDC.zip to CCVSensor as sbs-sensor-config-FCW23500HDC.zip
IR110CCV#
```

The sensor will appear as Connected in Cisco Cyber Vision's Sensor Explorer page.



CHAPTER 10

Configuration

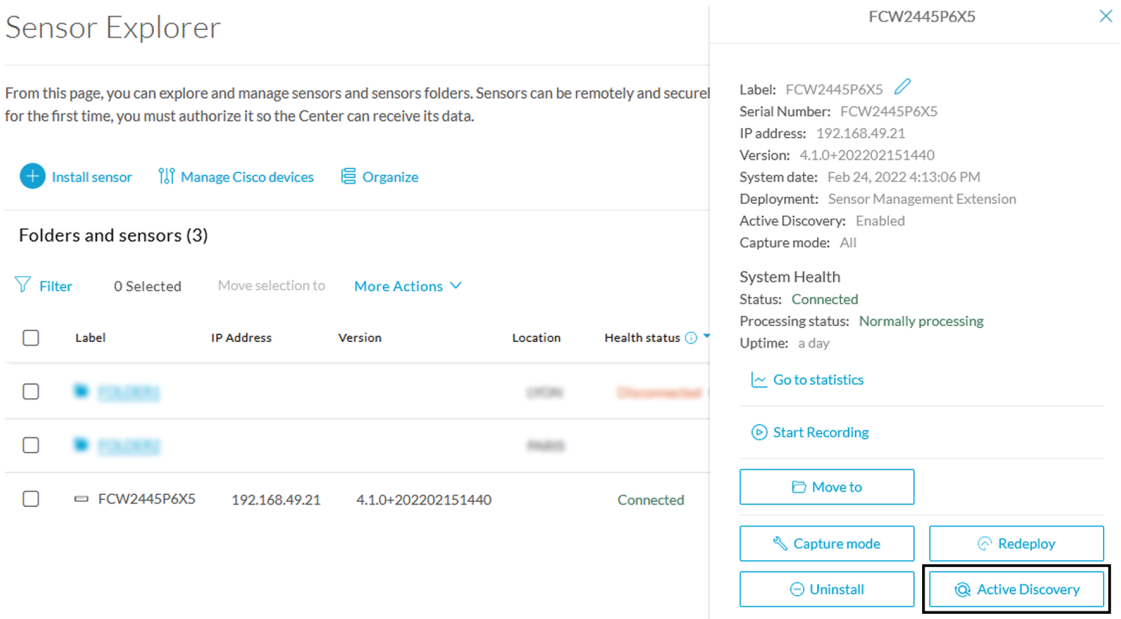
- Configure Active Discovery, on page 41
- Configure sensor configuration template, on page 43
- Set a capture mode, on page 48

Configure Active Discovery

Once the sensor is connected, you can change the Active Discovery's network interface so it uses the Collection network interface instead, and add several network interfaces for the sensor to perform Active Discovery on several subnetworks at the same time.

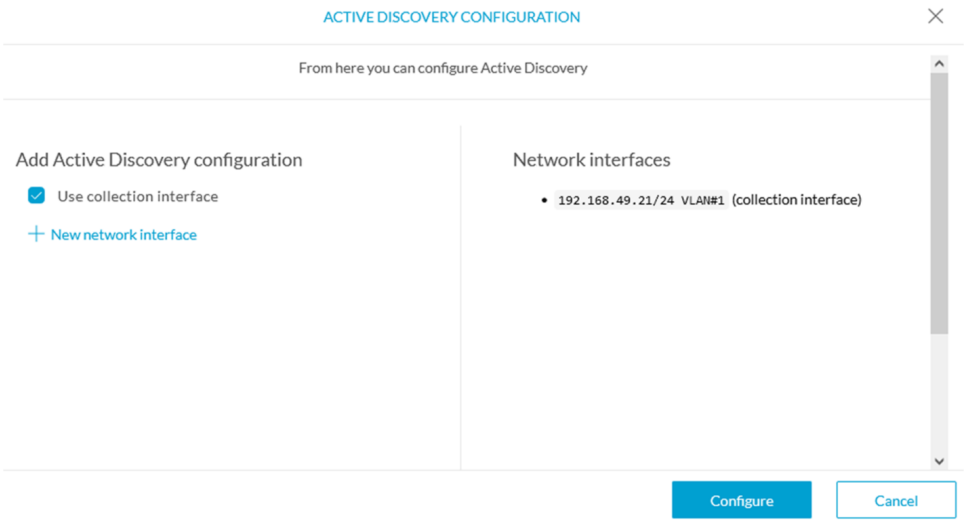
Procedure

Step 1 Click the sensor to configure and click the **Active Discovery** button on its right side panel.



The Active Discovery configuration appears with the interface currently set.

Step 2 Select **Use collection interface** for the Active Discovery to use the Collection network interface.



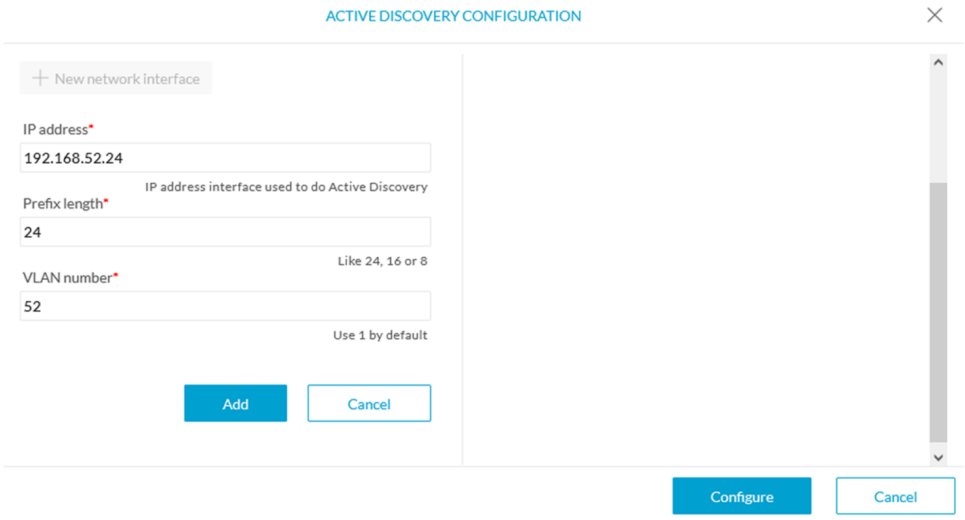
To add a network interface to Active Discovery for the sensor to perform active monitoring on another subnetwork:

Step 3 Add a new network interface by clicking the corresponding button.

Step 4 Fill the following parameters to set dedicated network interfaces:

- IP address
- Prefix length
- VLAN number

Step 5 Click **Add**.



You can add as many network interfaces as needed.

Step 6 When you are done, click **Configure**.

A message saying that the configuration has been applied successfully appears.

Configure sensor configuration template

Templates

This page allows you to create and set templates with protocol configurations and assign them to specific sensors.

Sensor templates contain protocol configurations which allow you:

- To enable or disable protocol DPI (Deep Packet Inspection) engines.
- To map UDP and TCP ports for each protocol's packet received by the sensor.

By enabling/disabling a protocol DPI engine you can decide which protocols will be analyzed.

Disabling a protocol DPI engine avoid false positives in Cisco Cyber Vision, that is when a protocol appears on the user interface when it's actually not the case because same UDP/TCP ports can be used by other non-standardized protocols.

Some protocols are disabled in the Default template because they are not commonly used or used in specific fields such as transportation. The Default template is applied on all compatible sensors.

As previously mentioned, UDP/TCP ports default configurations are mostly standardized, but conflicts still exist among field-specific protocols or with limited usage. Mapping UDP/TCP port numbers will allow packets to be sent to the correct DPI engine so they can be accurately analyzed and correctly represented in the user interface.

If the protocol's packet is sent to the wrong port, related information will end up in Security Insights/Flows with no tag.

A sensor can be associated with a single template only. Deployment of the template can fail:

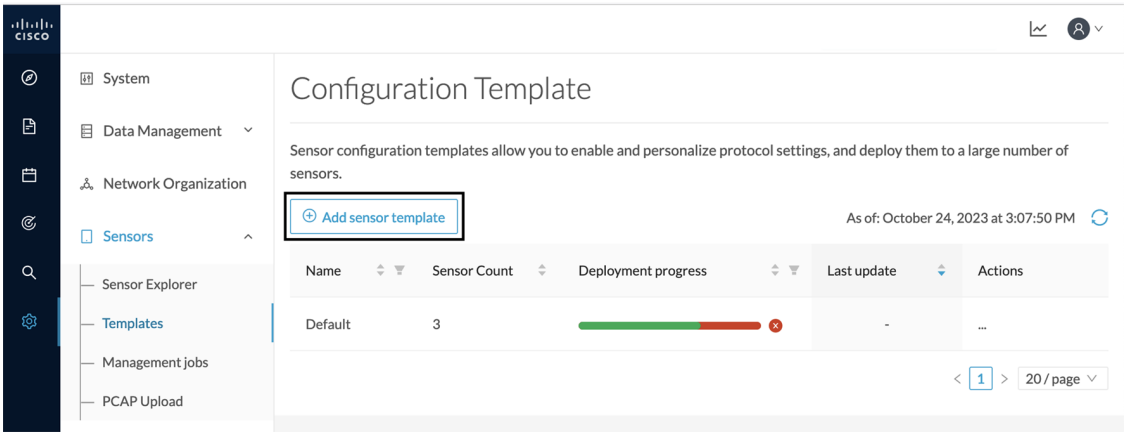
- if the sensor is disconnected,
- if there is connection issues,
- if the sensor version is too old.

Create templates

Procedure

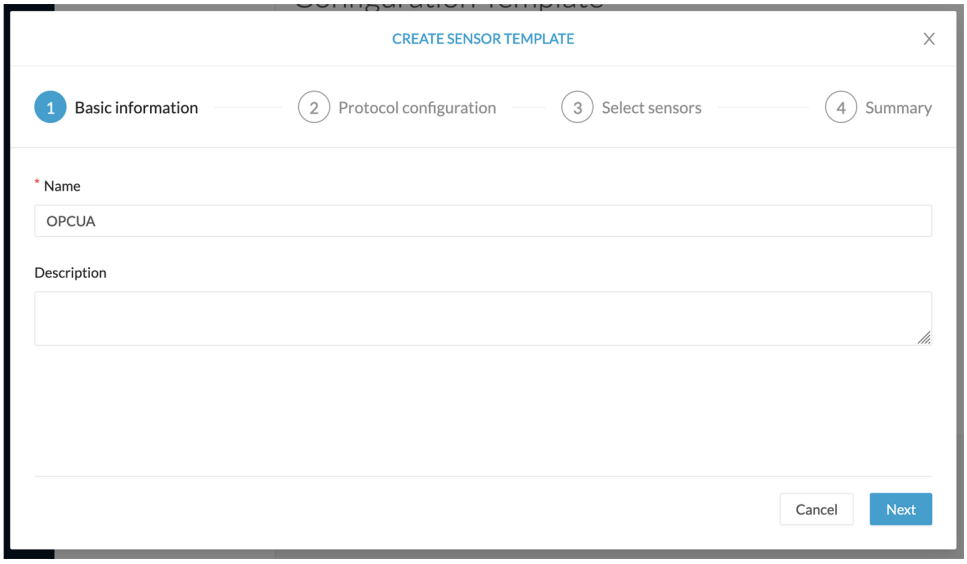
Step 1 In Cisco Cyber Vision, navigate to Admin > Sensors > Templates.

Step 2 Click **Add sensor template**.



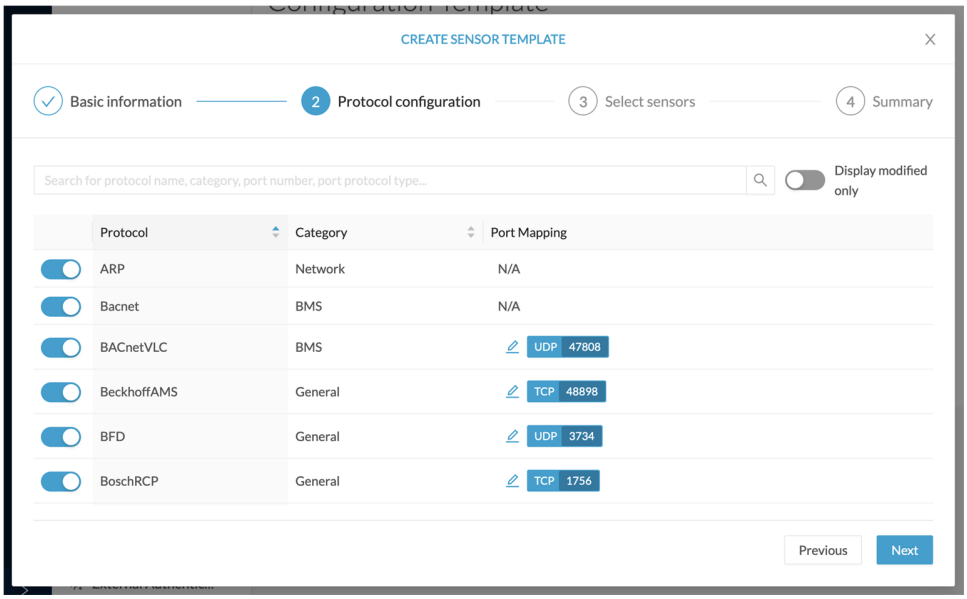
The Create sensor template window pops up.

Step 3 Add a name to the template. You can also add a description.



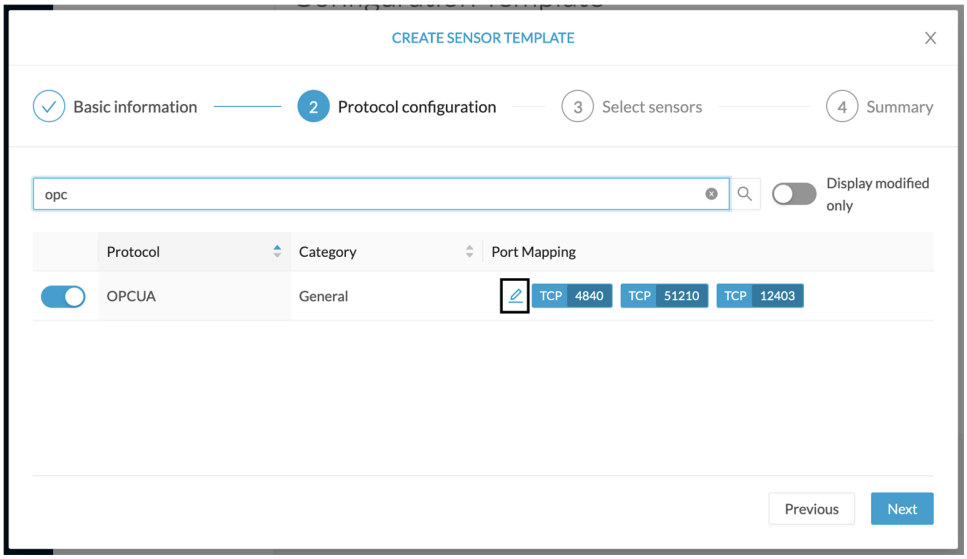
Step 4 Click **Next**.

The list of protocol DPI engines with their basic configurations appears.



Step 5 In the search bar, type the protocol you want to configure.

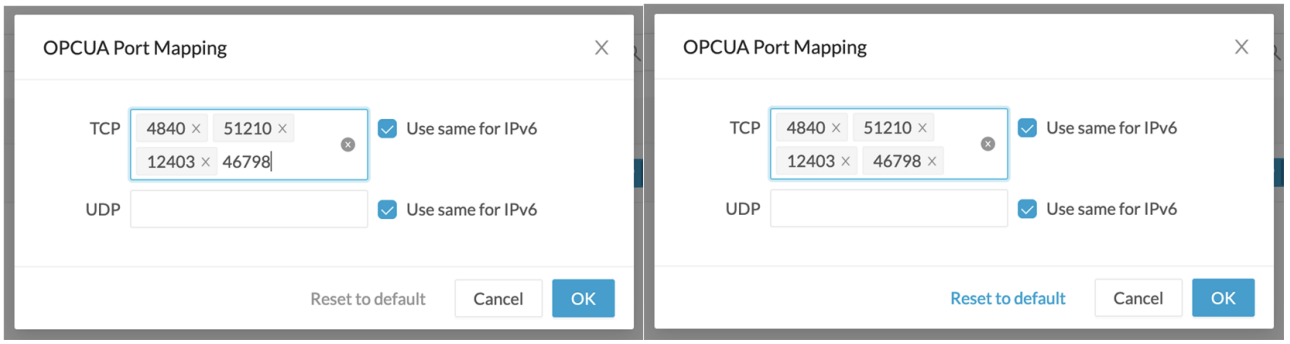
In our example, we will add a port to the OPCUA default settings.



Step 6 Under the Port Mapping column, click the **pen** button to edit its settings.

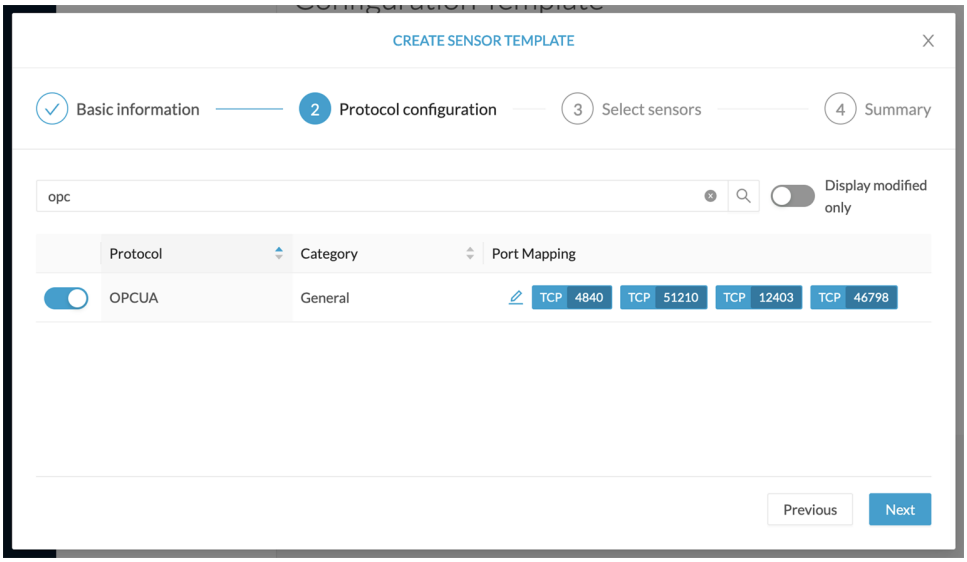
The protocol's port mapping window pops up.

Step 7 Write down the port number you want to add and hit enter.

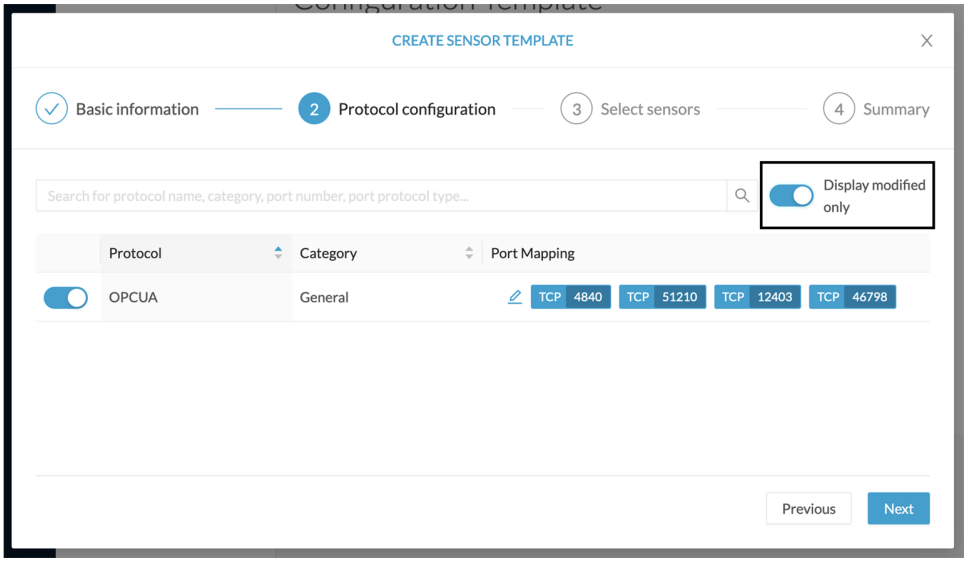


Step 8 Click **OK**.

The port number is added to the protocol's default settings.

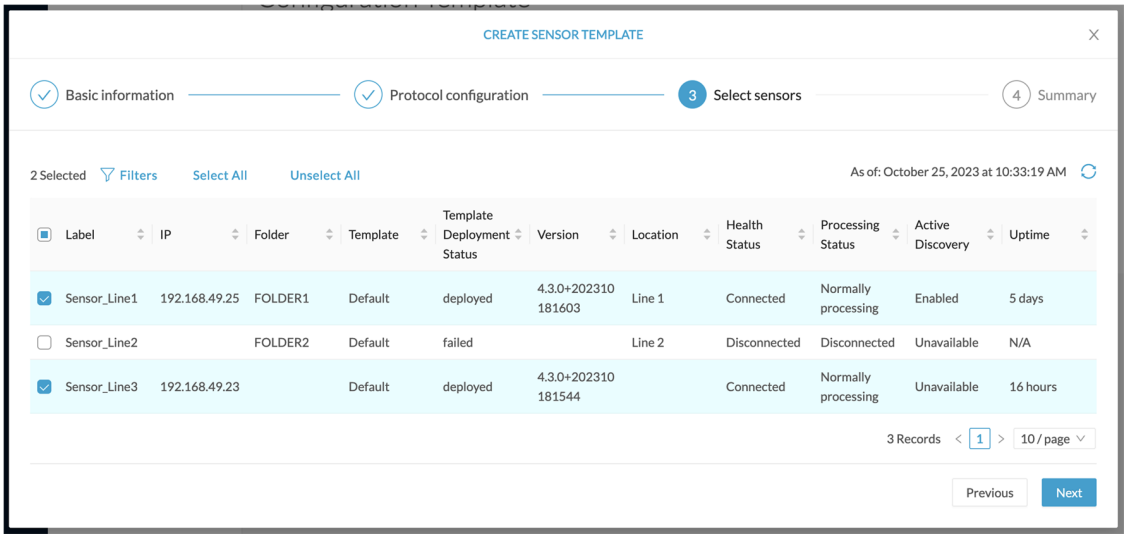


Toggling ON the **Displayed modified only** button allows you to quickly find this protocol.



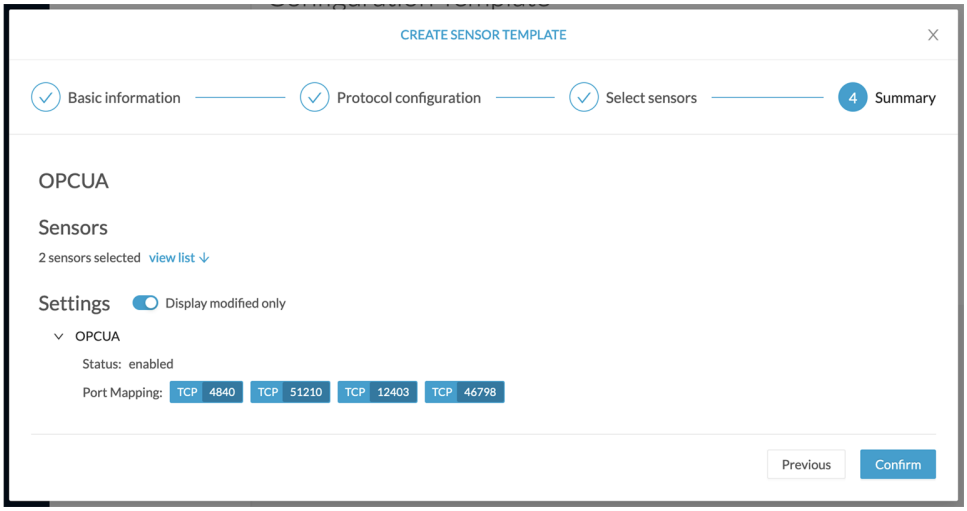
Step 9 Click **Next**.

Step 10 Select the sensor(s) you want to apply the template to.



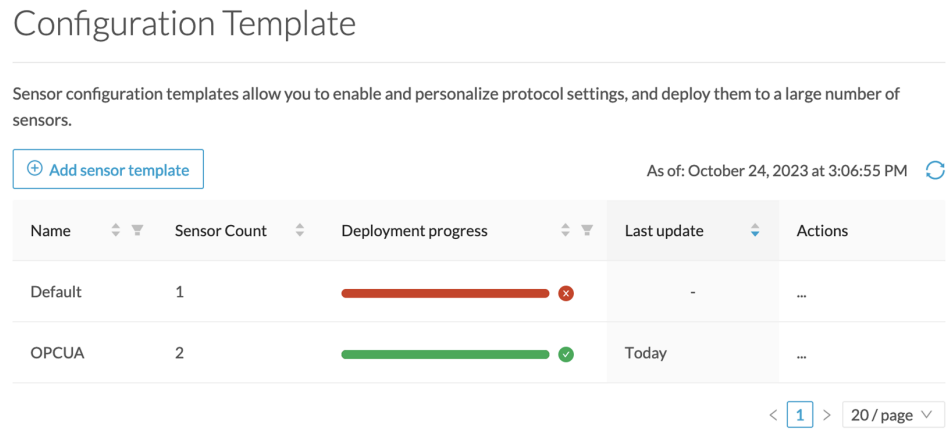
Step 11 Click **Next**.

Step 12 Check the template configurations and **Confirm** its creation.



The configuration is sent to the sensors. Configuration deployment will take a few moments.

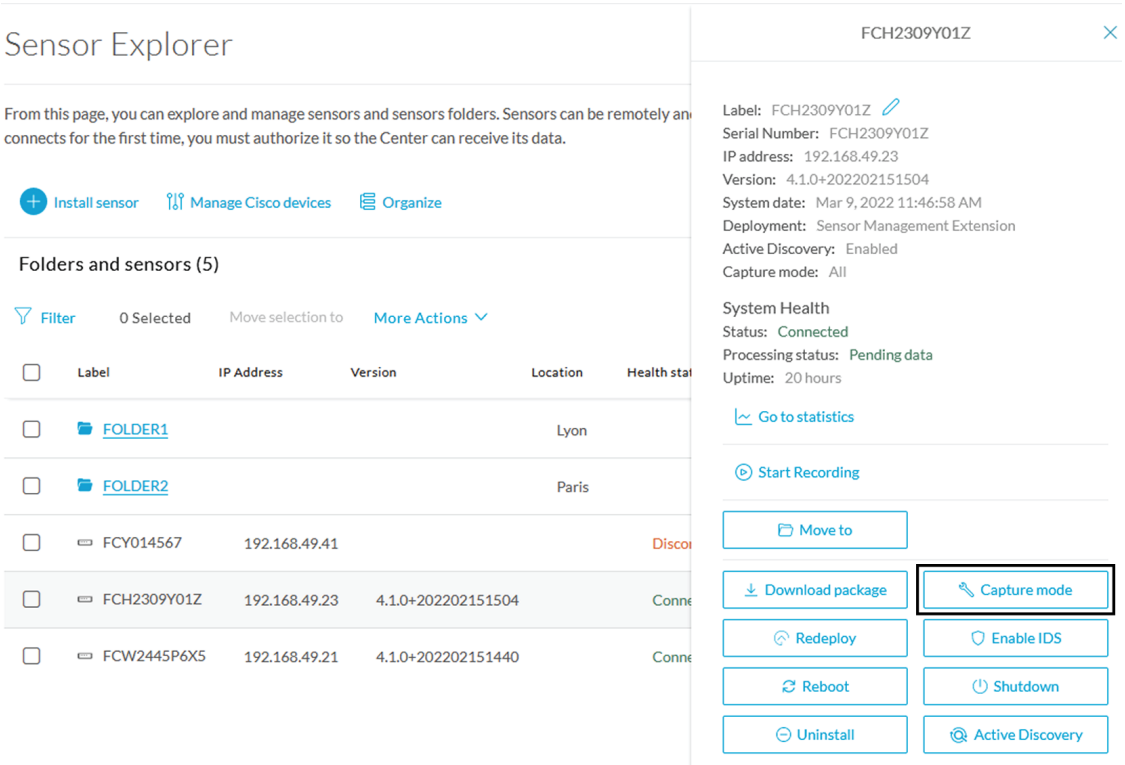
The OPCUA template appears in the template list with its two assigned sensors.



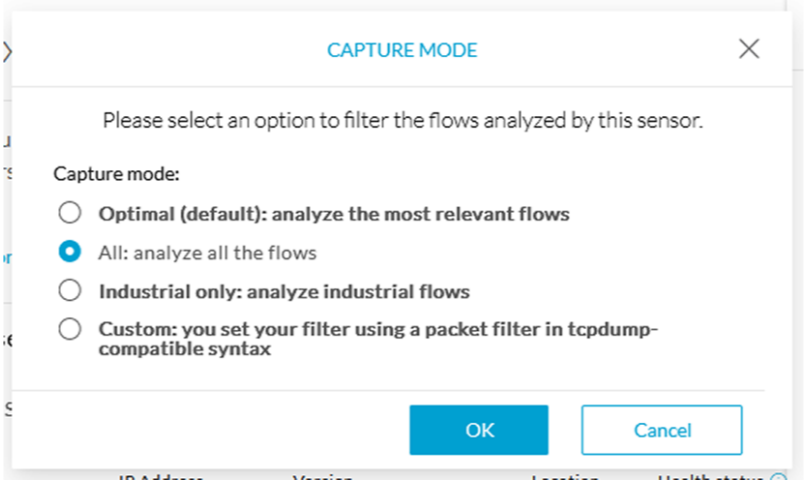
Set a capture mode

The Capture mode feature lets you choose which network communications will be analyzed by the sensors. You can set it by clicking an online sensor in the sensors list of the Sensor Explorer page or during a sensor installation.

Setting the capture mode on a sensor from the right side panel:



Capture modes:



The aim is mainly to focus the monitoring on relevant traffic but also to reduce the load on the Center.

For example, a common filter in a firewall can consist of removing the network management flows (SNMP). This can be done by setting a filter like "not (port 161 and host 10.10.10.10)" where "10.10.10.10" is the network management platform.

Using Capture mode Cisco Cyber Vision performance can be improved on large networks.

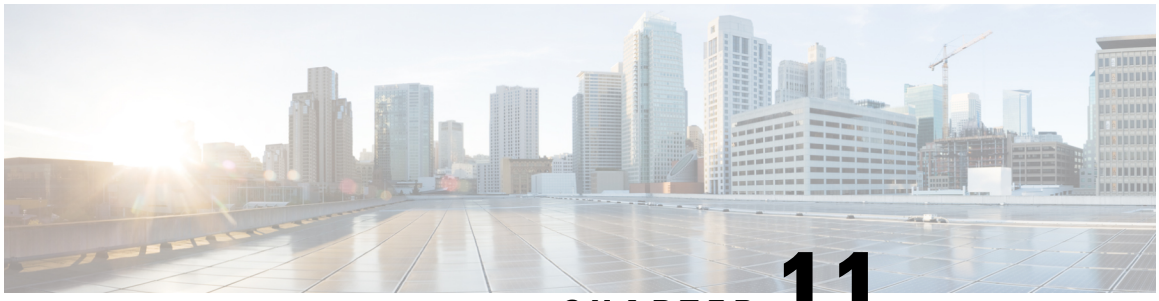
Capture modes operate because of filters applied on each sensor. Filters are set to define which types of incoming packets are to be analyzed by the sensors. You can set a different filter on each sensor according to your needs.

You can set the capture mode in the installation wizard when enrolling the sensors during the Center installation. This option is recommended if you already know which filter to set. Otherwise, you can change it at any time through the Sensor Explorer page in the GUI (provided that the SSH connection is allowed from the Center to the sensors).

Note You can set a capture mode to offline sensors from a file containing the filter and registered on the USB drive. This will be then plugged on the Offline USB port of the device. For more information about setting a capture mode on an offline sensor contact the support.

The different capture modes are:

- ALL: No filter is applied. The sensor analyzes all incoming flows and they will all be stored inside the Center database.
- OPTIMAL (Default): The applied filter selects the most relevant flows according to Cisco expertise. Multicast flows are not recorded. This capture mode is recommended for long term capture and monitoring.
- INDUSTRIAL ONLY: The filter selects industrial protocols only like modbus, S7, EtherNet/IP, etc. This means that IT flows of the monitored network won't be analyzed by the sensor and won't appear in the GUI.
- CUSTOM (advanced users): Use this capture mode if you want to fully customize the filter to be applied. To do so you will need to use the tcpdump syntax to define the filtering rules.



CHAPTER 11

Maintenance

- Upgrade procedures, on page 51
- Certificate renewal, on page 66

Upgrade procedures

Sensor Self Update

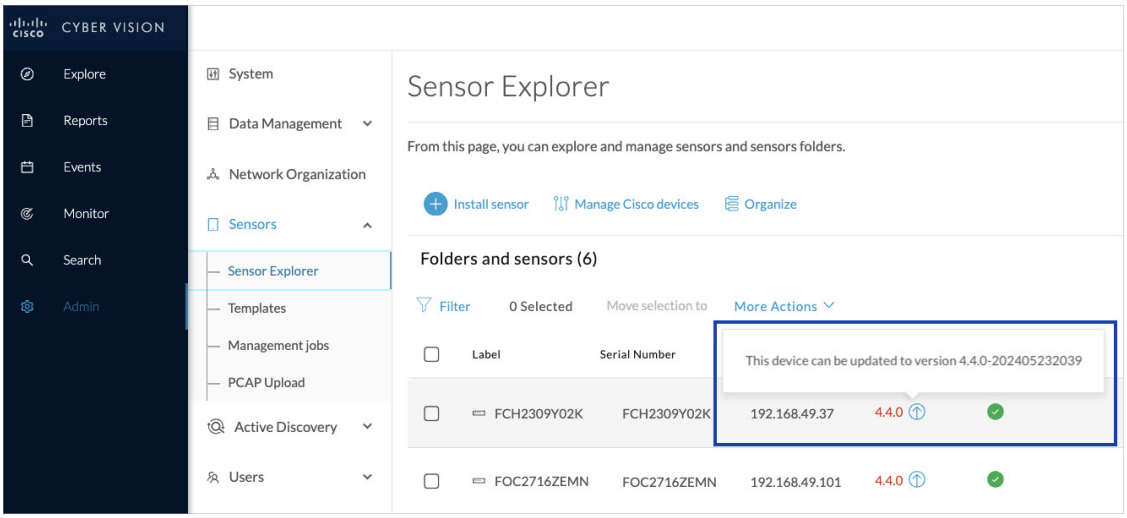
Cisco Cyber Vision now allows sensor updates regardless of the install method (i.e., without the extension). Release 4.4.1 provides the necessary foundation for sensor self-updates. However, the self-update feature will only be functional in future releases.

Starting with Cisco Cyber Vision release 4.4.1, you can update all sensors automatically. The required steps are:

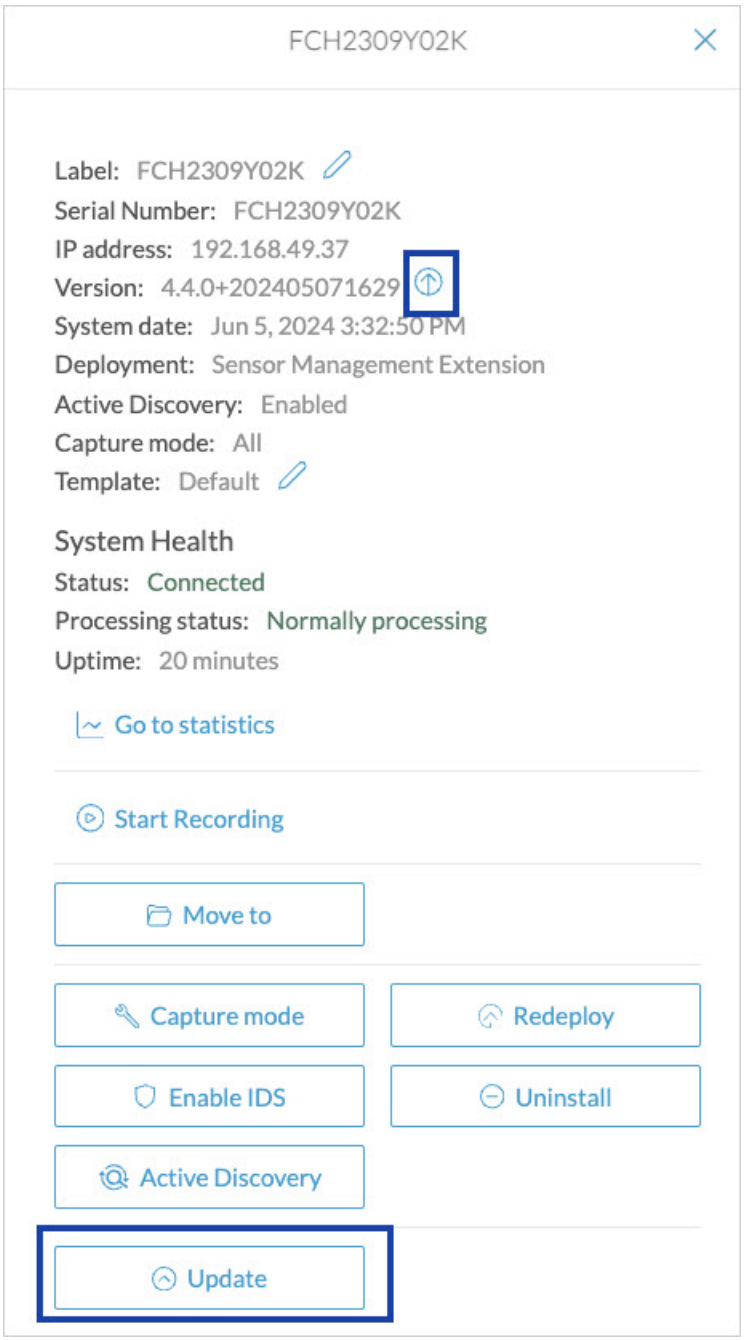
- Select sensors to update.
- The Center adds a new job to the sensor queue.
- The sensor automatically collects and validates the update file.
- The sensor restarts with the new version.

Update Warnings

In the Cisco Cyber Vision center on the Sensor Explorer page (Admin – Sensors – Sensor Explorer), users receive an alert to update the sensor. When this happens, the version number turns red, and a blue arrow with a tooltip indicates the sensor is upgradeable.



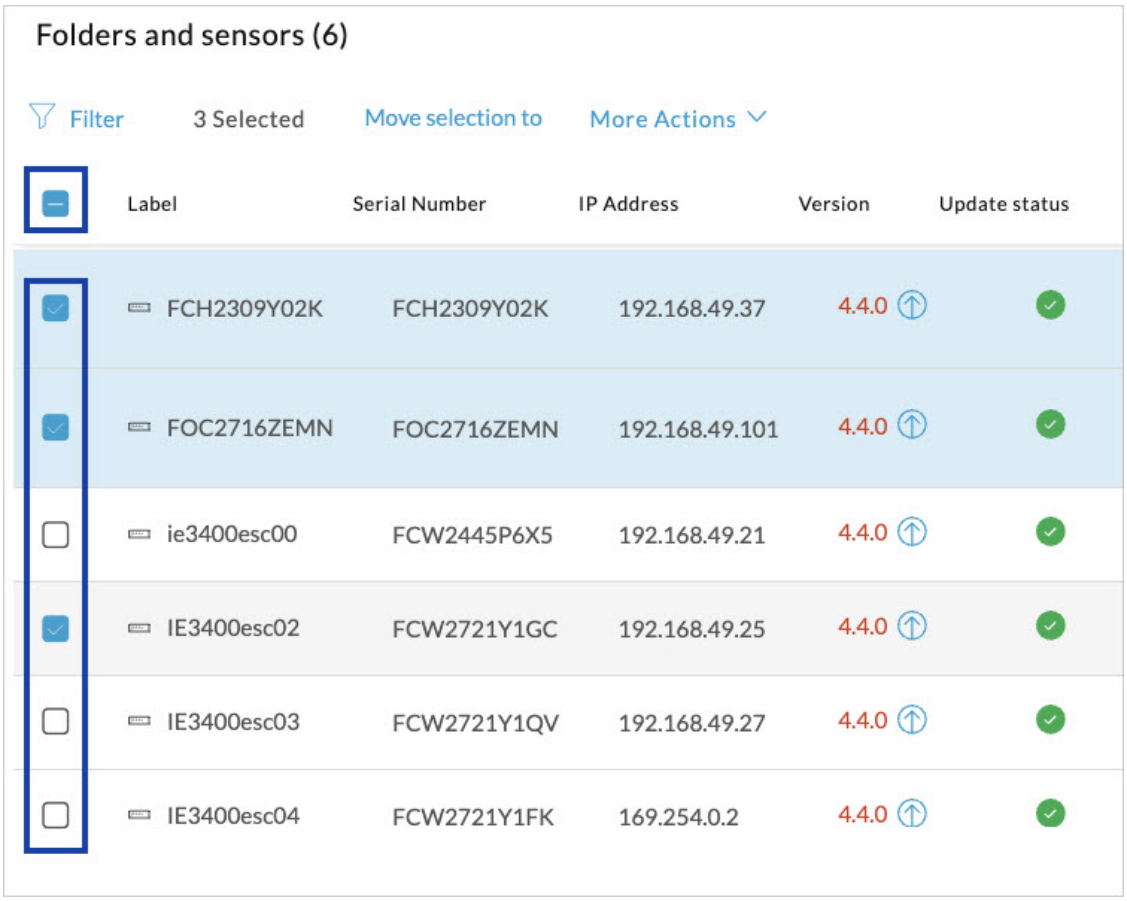
On the sensor's right-side, the same blue arrow and an **Update** button is visible.



Update Procedure

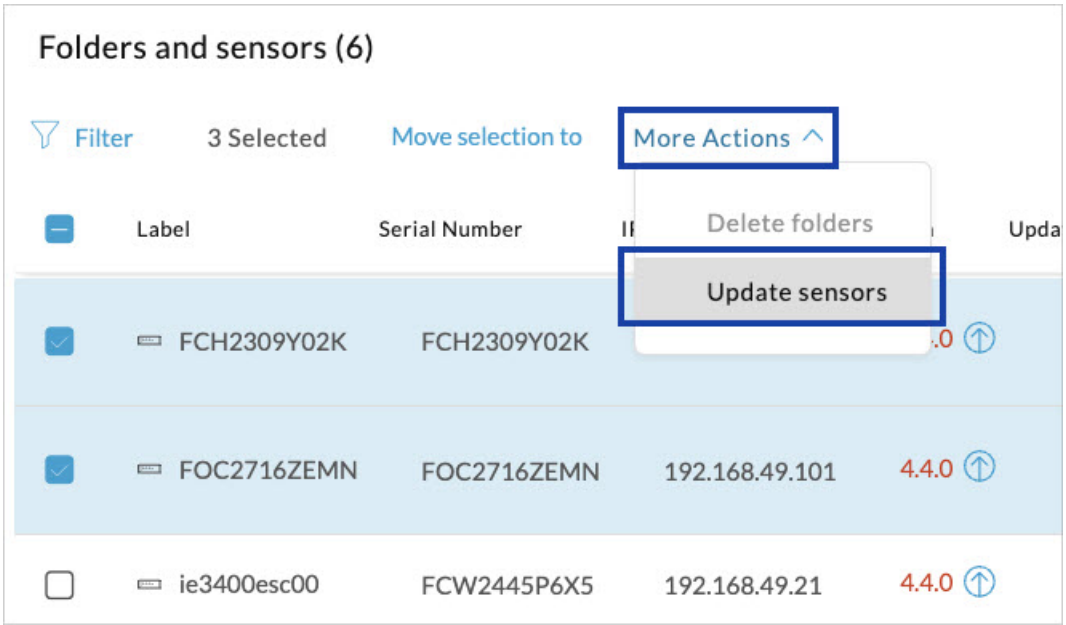
Procedure

Step 1 Use the checkboxes on the left to select multiple sensors.

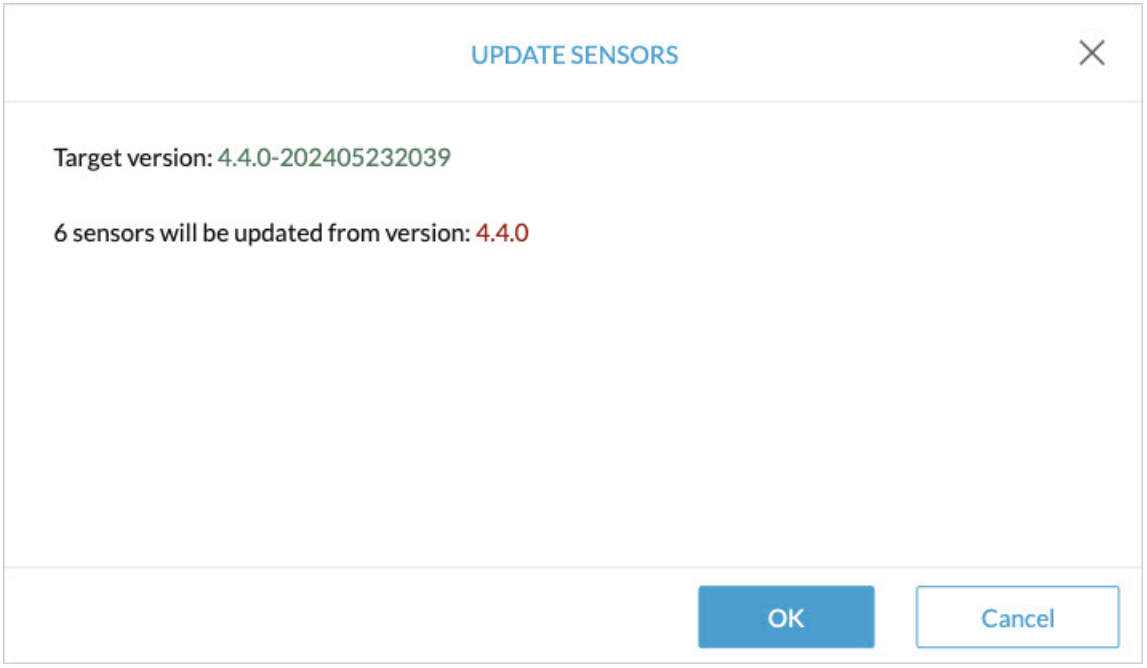


Step 2 Go to the **More Actions** and click **Update sensors**.

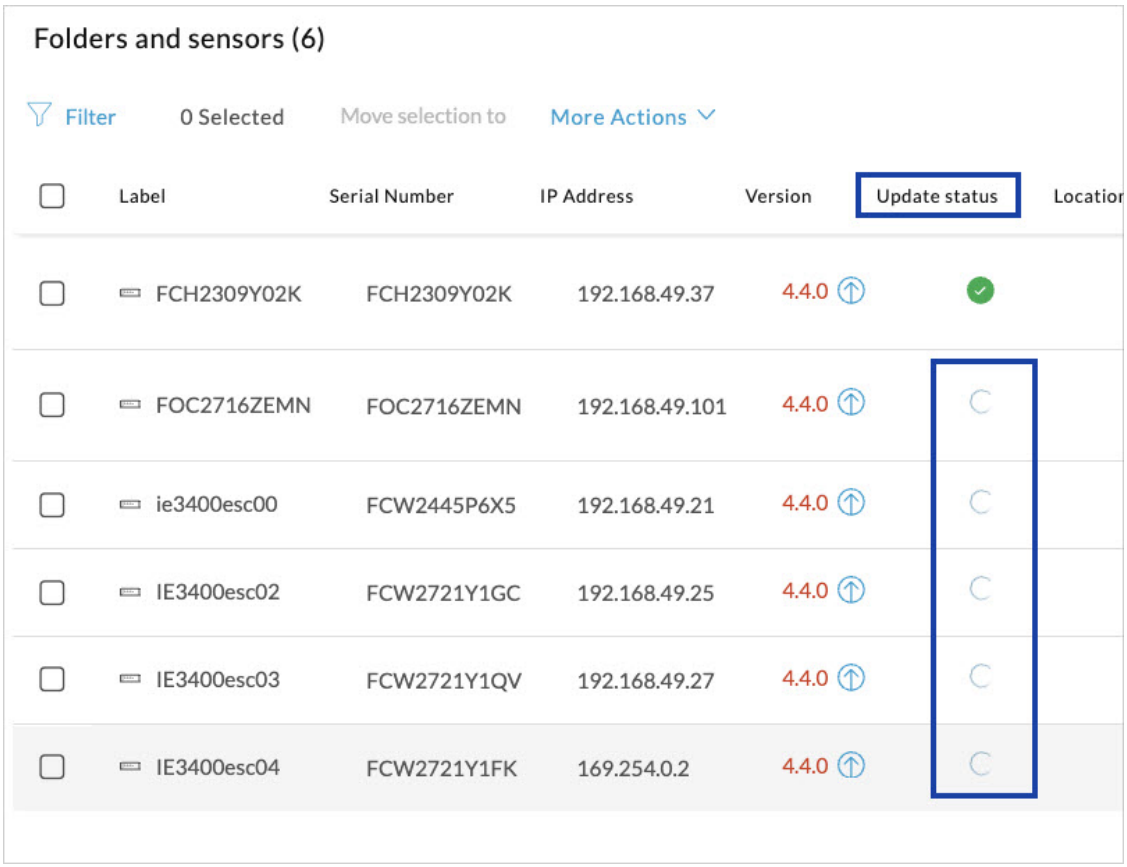
The sensor self-update menu appears.



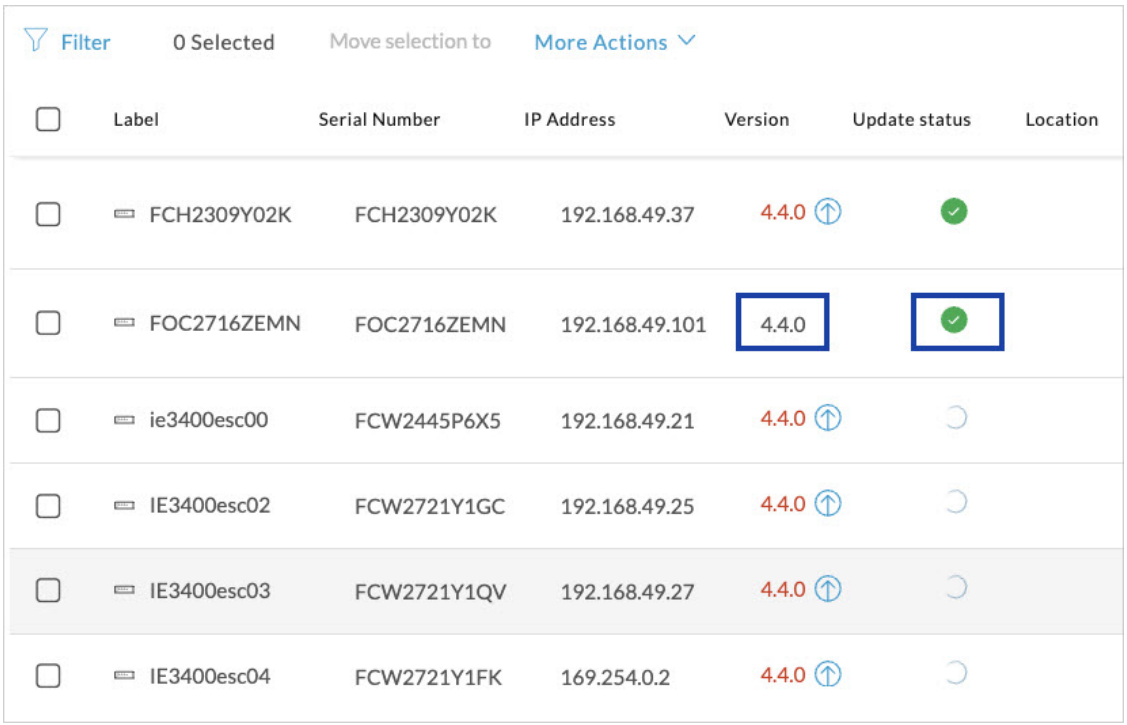
Step 3 Click **OK**.



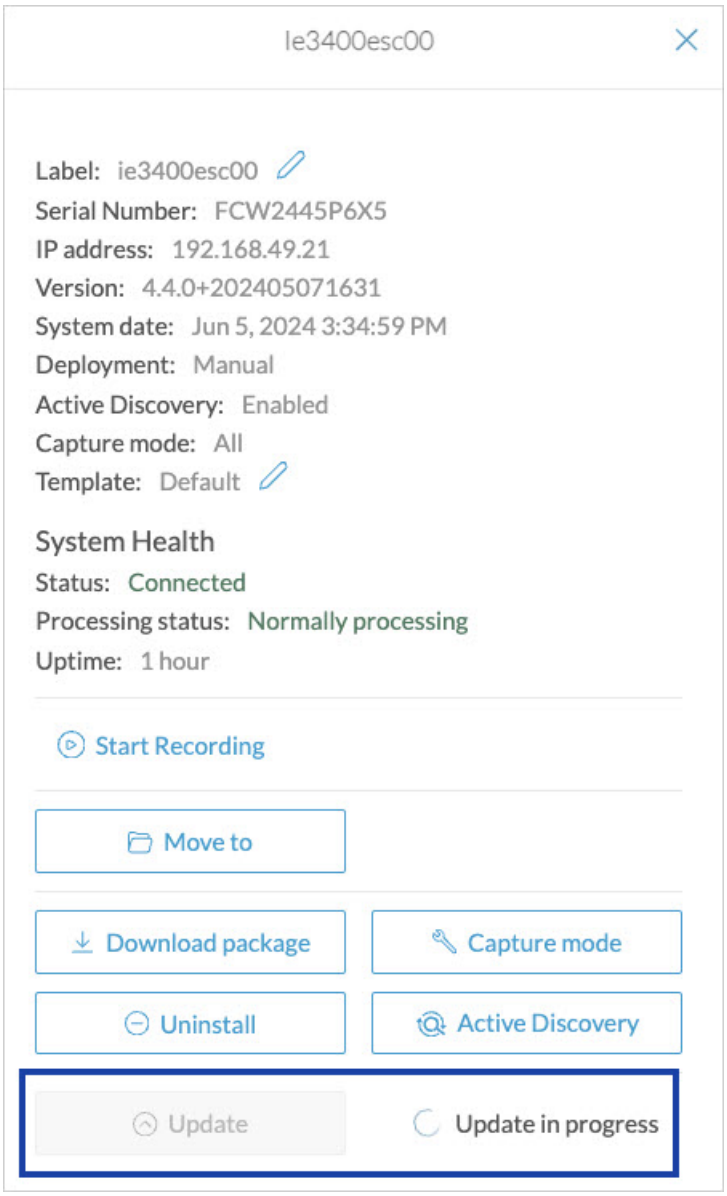
Step 4 During the update, a blue circle appears in the **Update status** column.



Step 5 After the update, the version number turns black, and a green symbol appears in the **Update status** column.

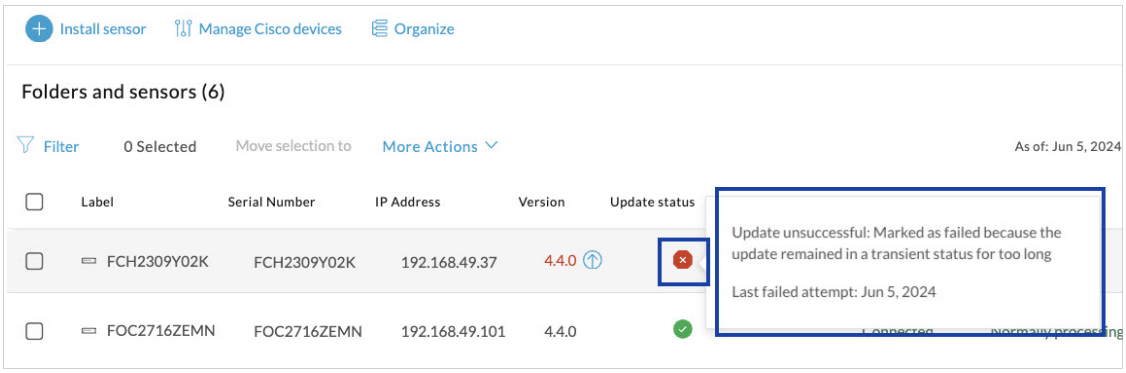


Step 6 The **Update in progress** status is visible.



Update Failure

If the update is unsuccessful, the **Update status** column displays a red cross and a message that provides the details.



Upgrade through the Cisco Cyber Vision sensor management extension

Before updating sensors, the Cisco Cyber Vision sensor management extension must be up-to-date.

It is possible to select which sensors to update. The update status will be visible in the Management jobs, on page 18 page.

Update the sensor management extension

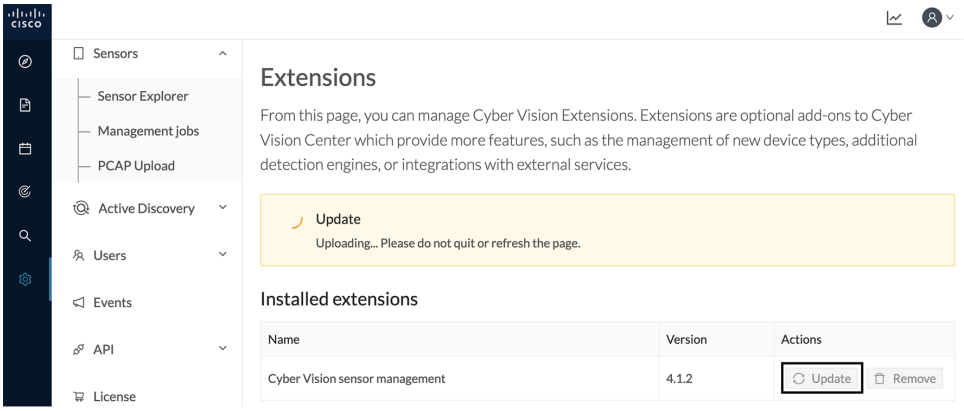
The Cisco Cyber Vision sensor management extension must be up-to-date to update IOx sensors.

Procedure

Step 1 Retrieve the sensor management extension file (i.e. CiscoCyberVision-sensor-management-<version>.ext) on cisco.com.

Step 2 In Cisco Cyber Vision, navigate to Admin > Extensions.

Step 3 Click **Update** to browse the new version of the extension file.



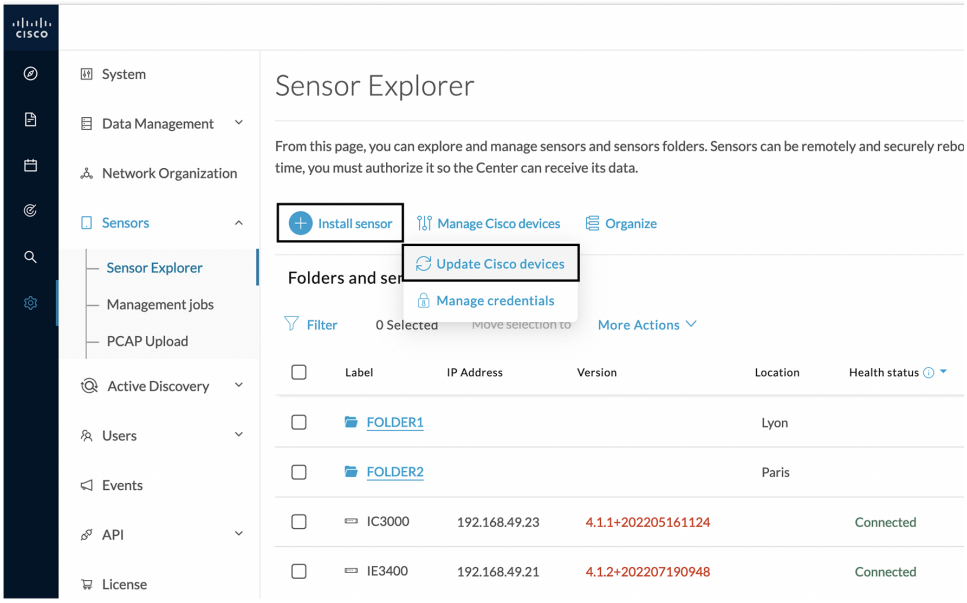
Update the sensors

Procedure

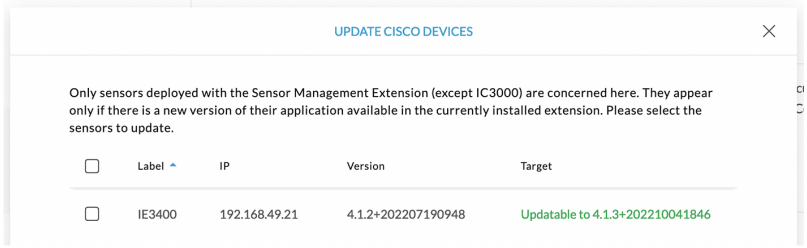
Step 1 In Cisco Cyber Vision, navigate to Admin > Sensors > Sensor Explorer.

Sensors that are not up-to-date have their version displayed in red.

Step 2 Click **Install sensor**, then **Update Cisco devices**.



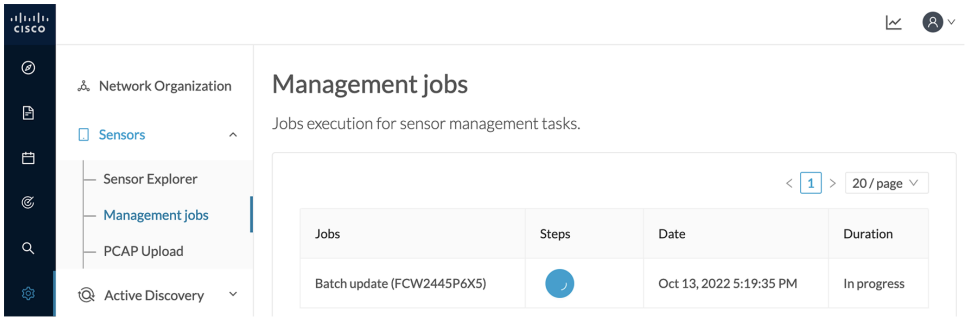
The update Cisco devices window pops up listing all sensors that have been deployed with the sensor management extension.



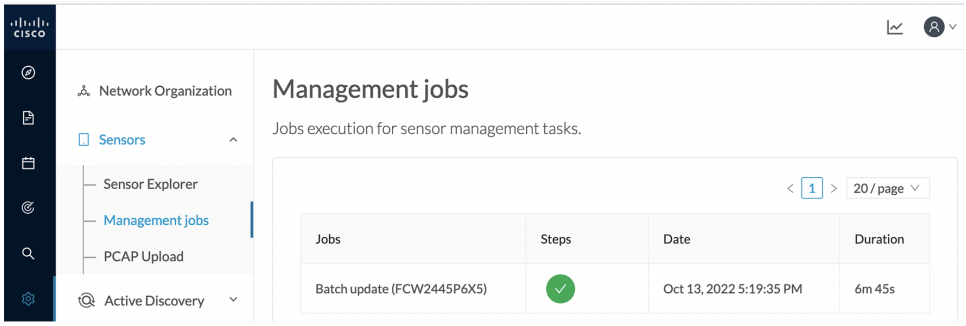
Step 3 Select the sensors you want to update.

Step 4 Click **Update**.

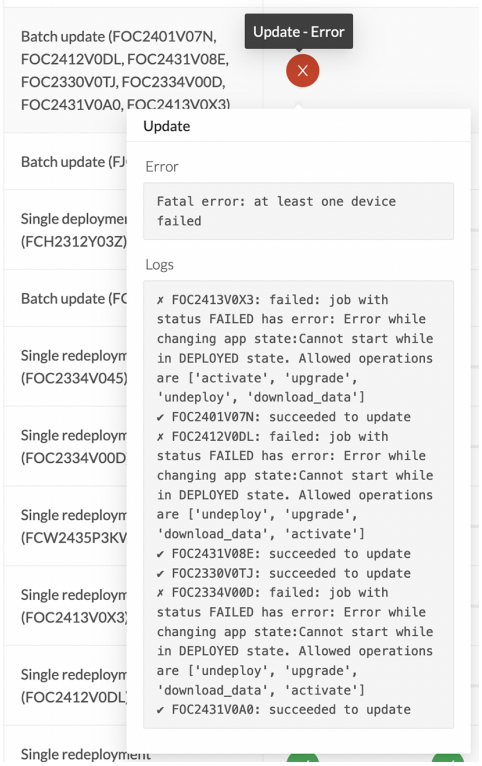
The sensors' update status appear in the Management jobs page in batches per sensor type and of maximum ten sensors per batch.



Herebelow the management jobs indicate that the batch of sensors updated successfully.



If the batch update fails, click the red update error icon to see logs.

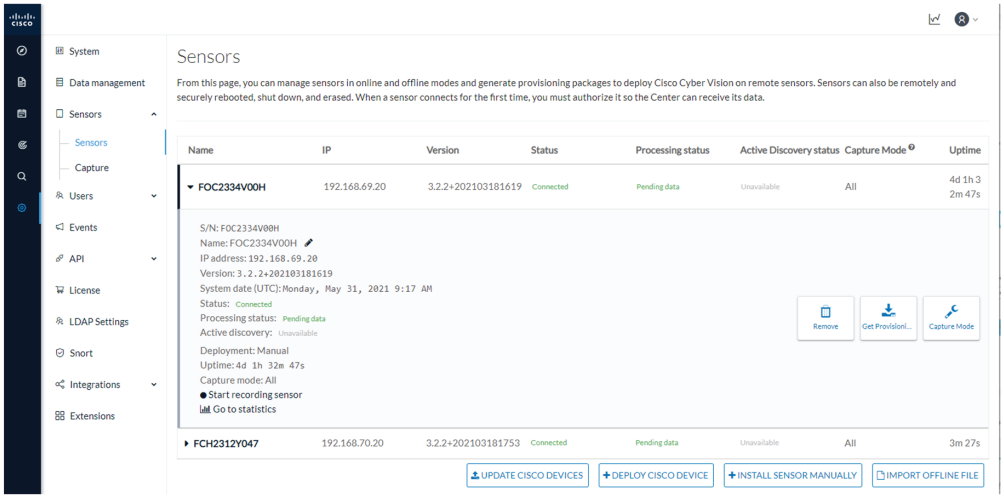


Upgrade through the IOx Local Manager

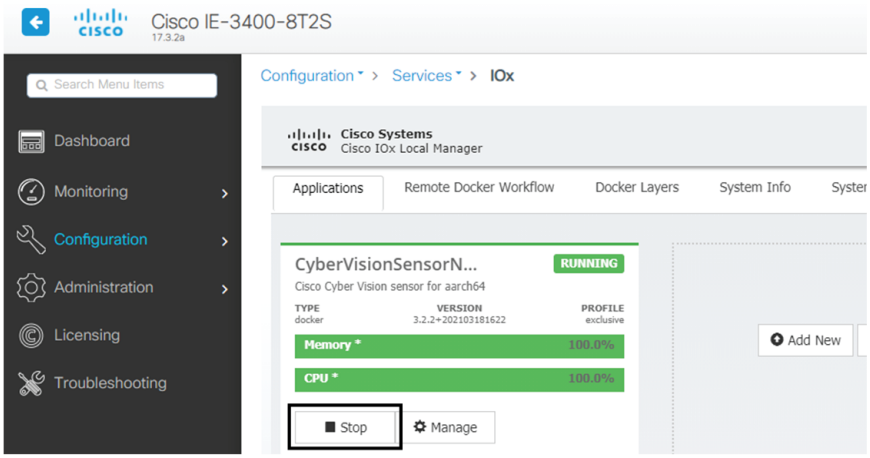
The following section explains how to upgrade the sensor through the IOx Local Manager.

In the example below, the sensor is upgraded from Cisco Cyber Vision version 3.2.2 to version 3.2.3.

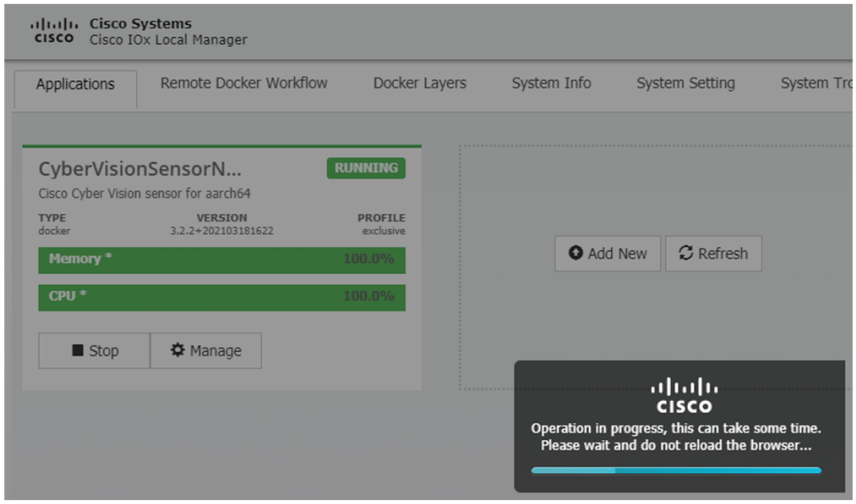
Figure 2: The sensor in version 3.2.2 in the Sensors administration page of Cisco Cyber Vision



1. Access the IOx Local Manager.
2. Stop the application.

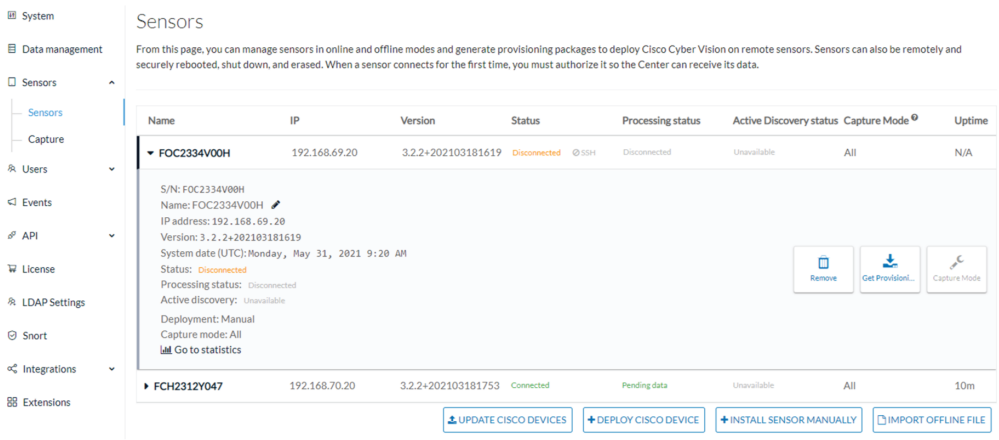


The operation takes a few moments.



The application status switches to STOPPED.

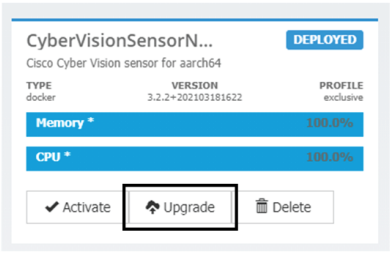
In Cisco Cyber Vision, the sensor status switches to Disconnected.



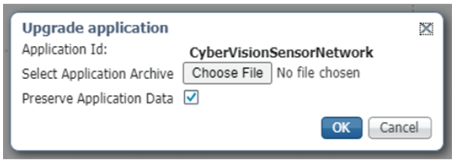
3. In the IOx Local Manager, click the **Deactivate** button.

   The application status moves to DEPLOYED.

4. Click **Upgrade**.

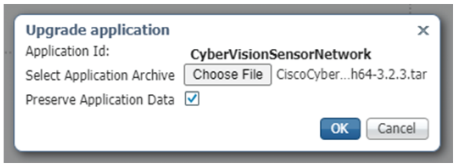


   The pop up Upgrade application appears.

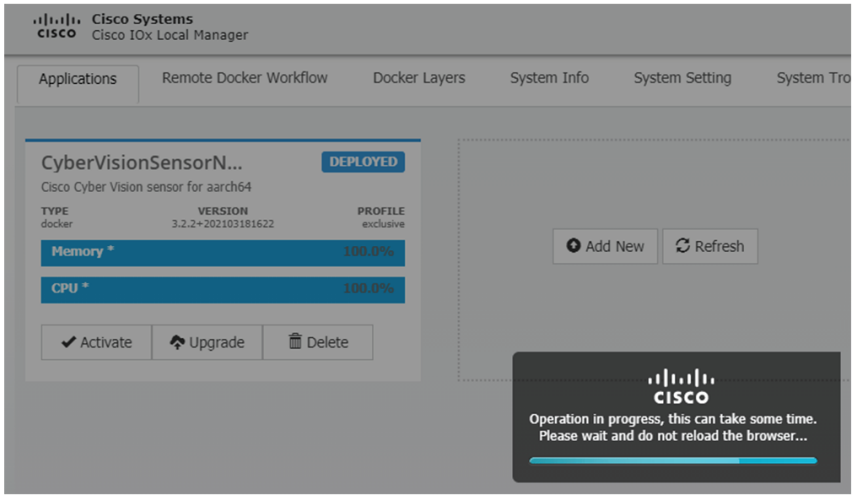


5. Select the **Preserve Application Data** option.
6. Select the new version of the application archive file.

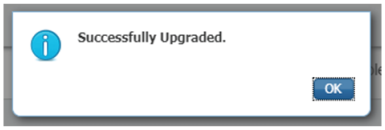
   e.g. CiscoCyberVision-IOx-aarch64-3.2.3.tar



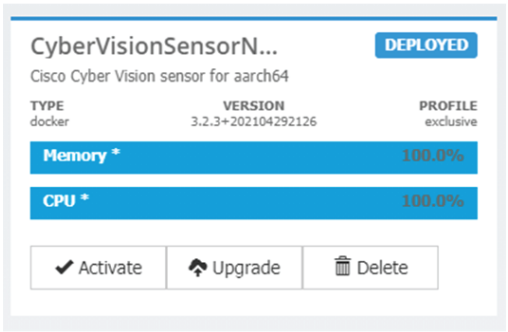
   The operation takes a few moments.



A message indicating that the sensor has been successfully upgraded is displayed.



7. Check the number of the new version.
8. Click **Activate**.

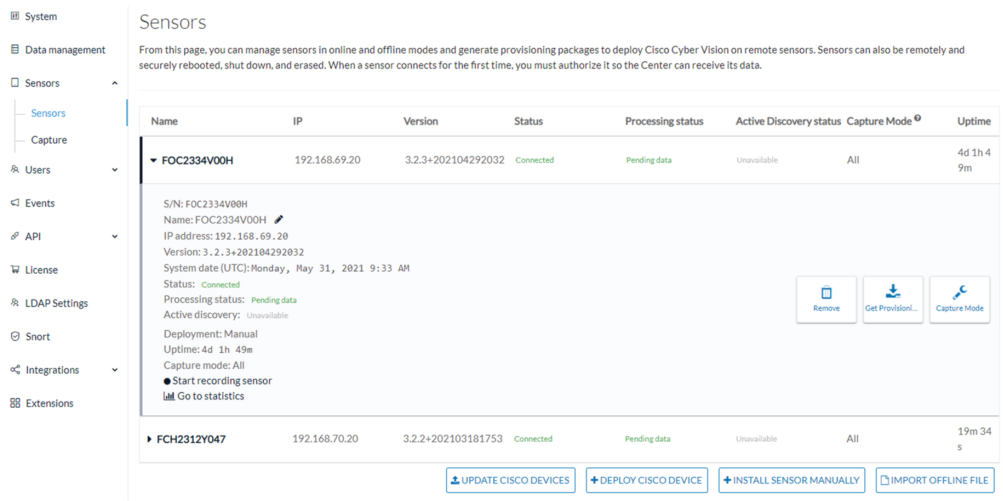


9. Check configurations.
10. Click the **Activate App** button.

    The application status moves to ACTIVATED.
11. Click the **Start** button.

    The application status changes to RUNNING.

    In Cisco Cyber Vision, the sensor is upgraded from version 3.2.2 to 3.2.3 and its status moves to Connected.



Certificate renewal

The certificates generated by Cisco Cyber Vision have a validity of two years.

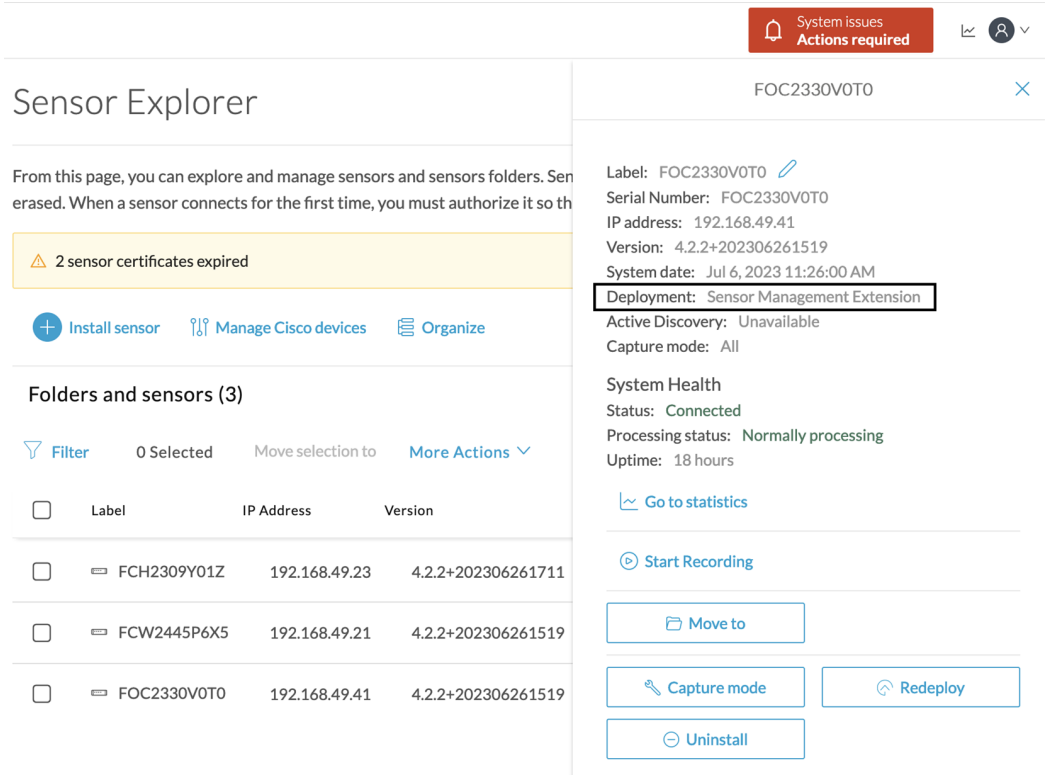
Sensor certificates must be renewed manually. The procedure used differs whether the certificate is already expired or not and whether the sensor has been deployed using the sensor management extension.

- If the certificate is still valid, refer to Sensor certificate renewal, on page 66.
- If the sensor was deployed with the sensor management extension, refer to Sensor certificate renewal, on page 66.
- If the certificate is outdated, and was deployed manually, refer to Sensor certificate renewal through the Local Manager, on page 70.

Sensor certificate renewal

The following procedure applies to:

- Sensors deployed with the sensor management extension, whether the certificate expiration date is exceeded or not (i.e. the deployment method is indicated in the sensor's right side panel).

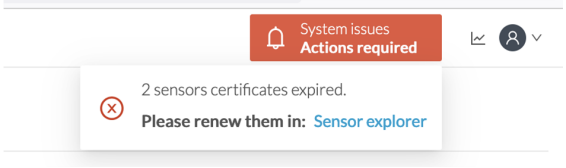


- In the case of sensors deployed manually, it only applies if the sensors certificate have not expired yet (i.e. the sensor certificate status is Expire Soon).

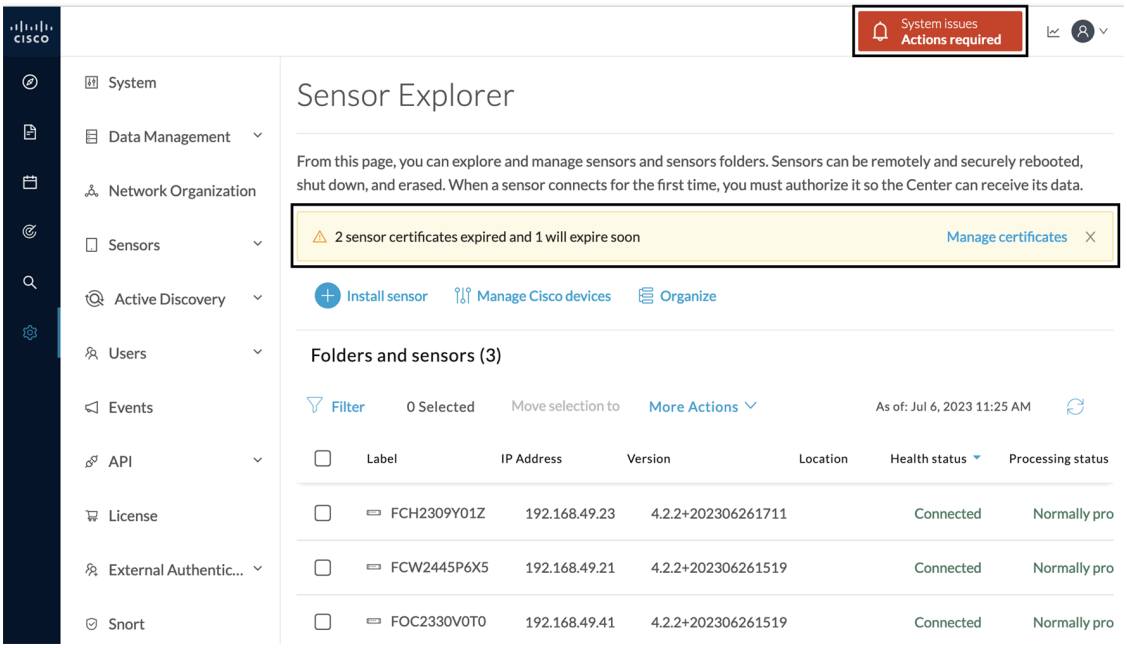
If sensors have been deployed manually and the certificate expiration date is exceeded, refer to Sensor certificate renewal through the Local Manager, on page 70.

Procedure

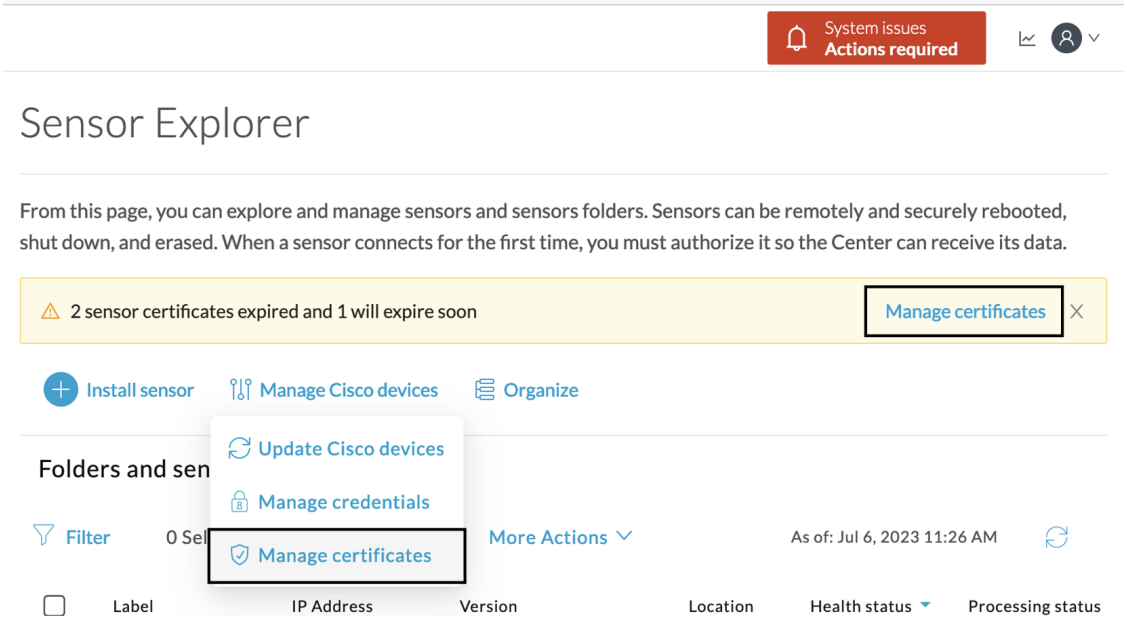
Step 1 In Cisco Cyber Vision, navigate to Admin > Sensors > Sensor Explorer or click the top banner alert to access the Sensor Explorer page directly.



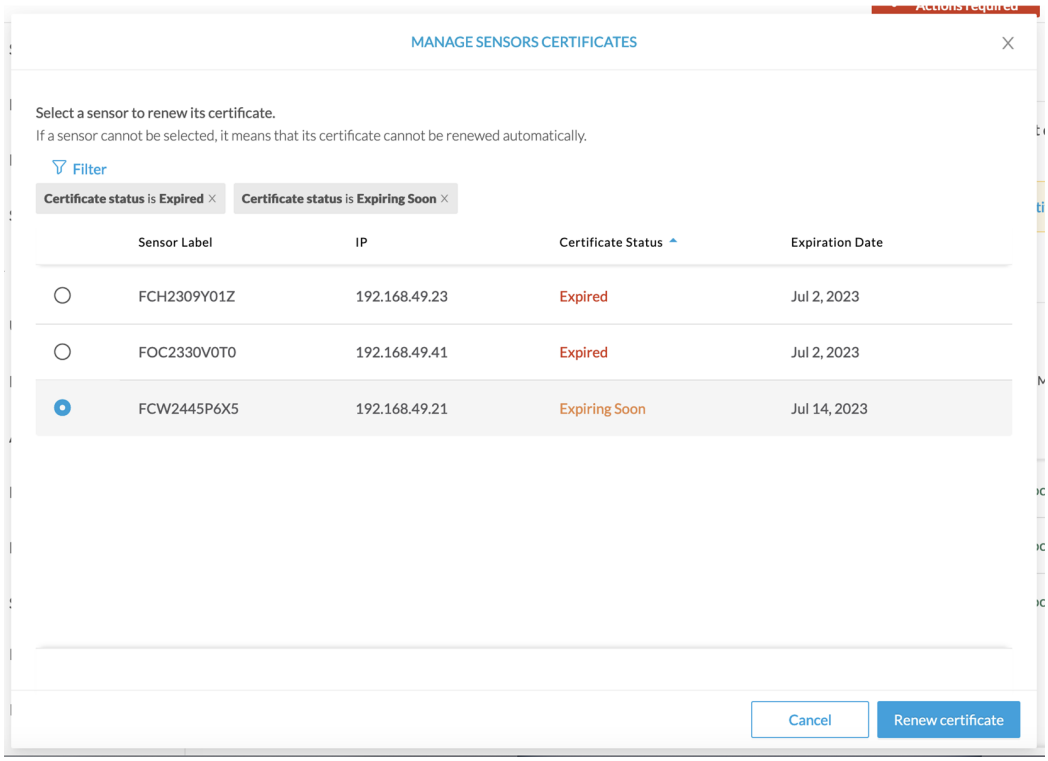
Another alert is displayed.



Step 2 Click **Manage certificates** in the alert or **Manage Cisco devices** > **Manage certificates**.

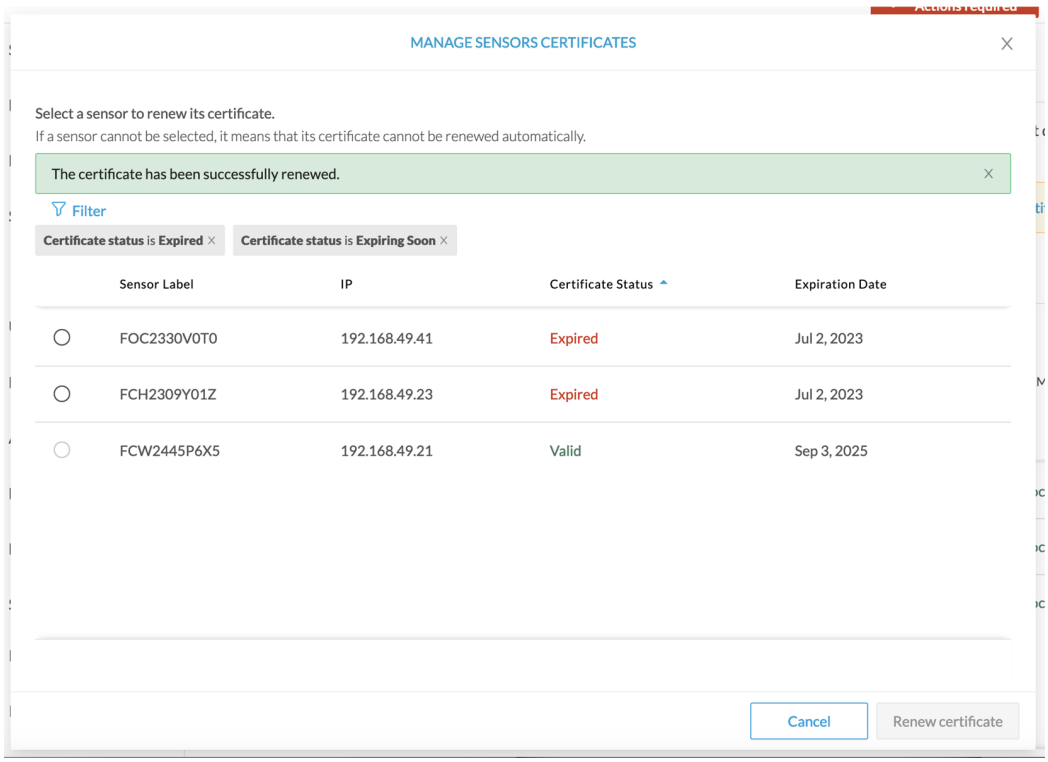


The **Manage sensors certificates** window opens.



Step 3 Select the sensor with the status Expiring Soon.

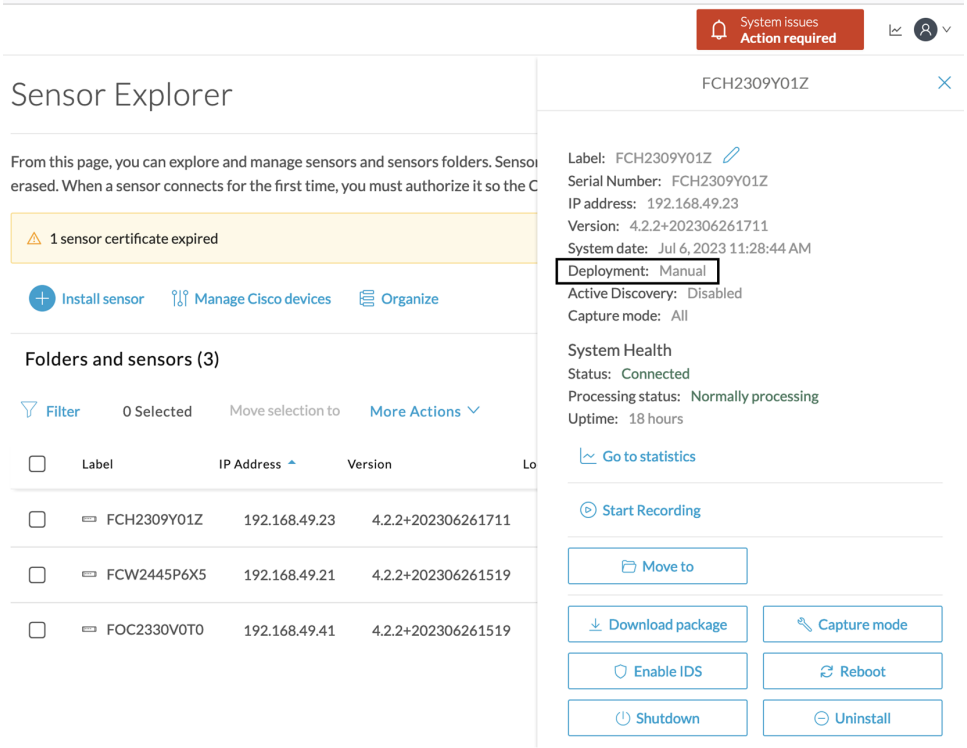
Step 4 Click **Renew certificate**.



The certificate is renewed and automatically sent to the sensor. Its status switches to Valid and the new expiration date appears.

Sensor certificate renewal through the Local Manager

In case of certificate expiration, communication with the sensor is no longer possible if it was deployed manually (i.e. without the sensor management extension). In this case, the certificate is renewed by sending it to the sensor manually. As the certificate is part of the provisioning package, the action consists in generating the provisioning package and sending it to the sensor application through the Local Manager.

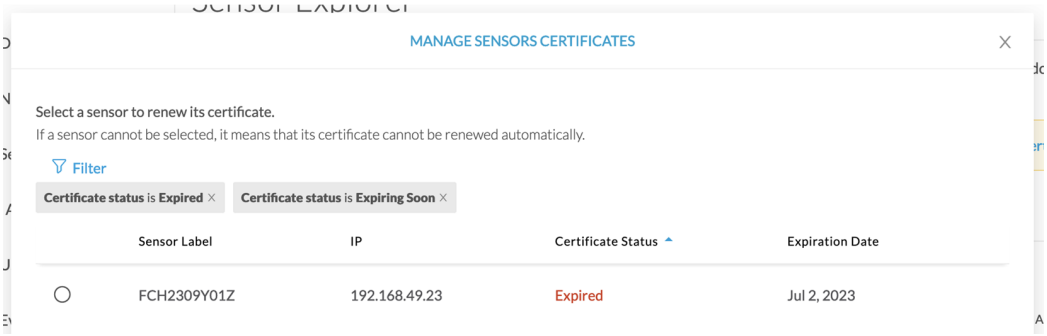


Procedure

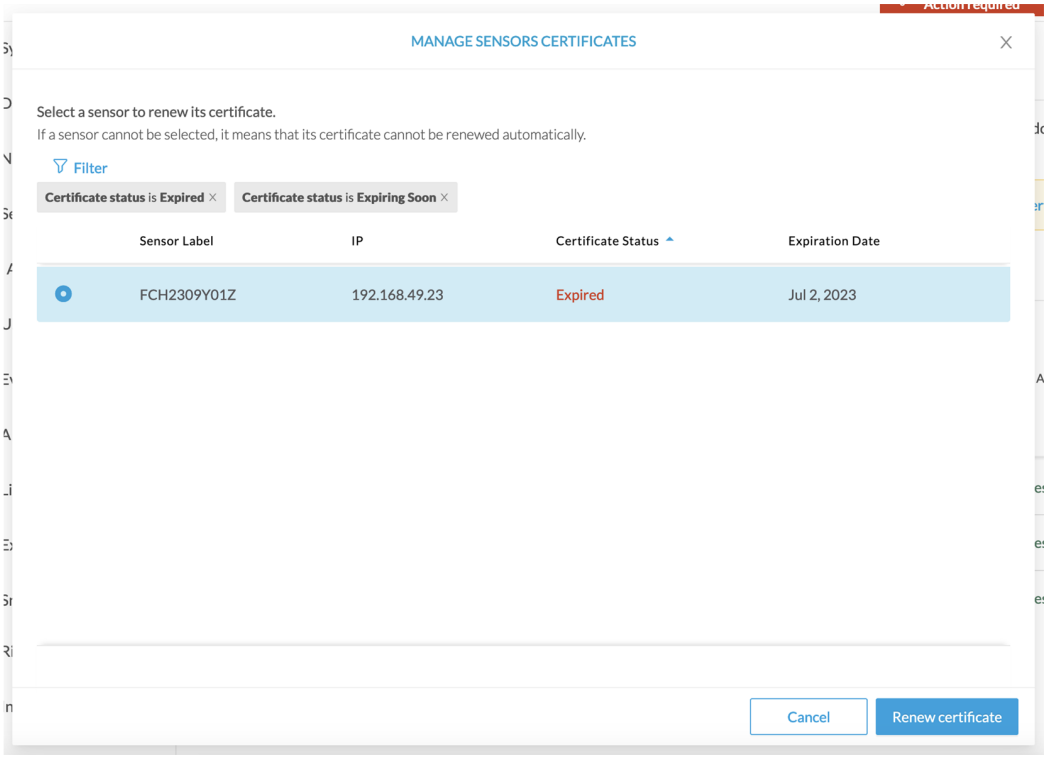
Step 1 In Cisco Cyber Vision, navigate to Admin > Sensors > Sensor Explorer.

Step 2 Click **Manage Certificates**.

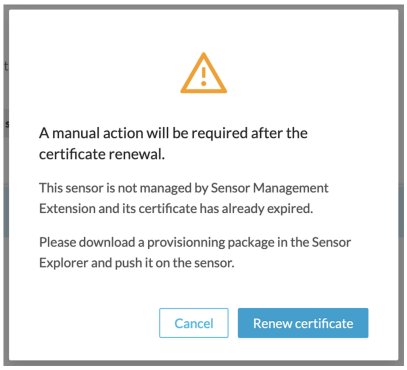
The Manage sensors certificates window appears.



Step 3 Select the sensor and click **Renew Certificate**.

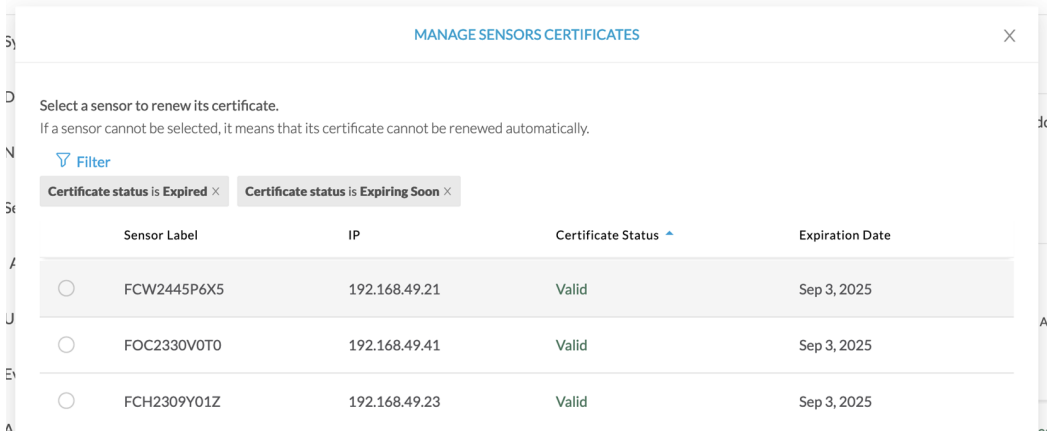


A message is displayed.



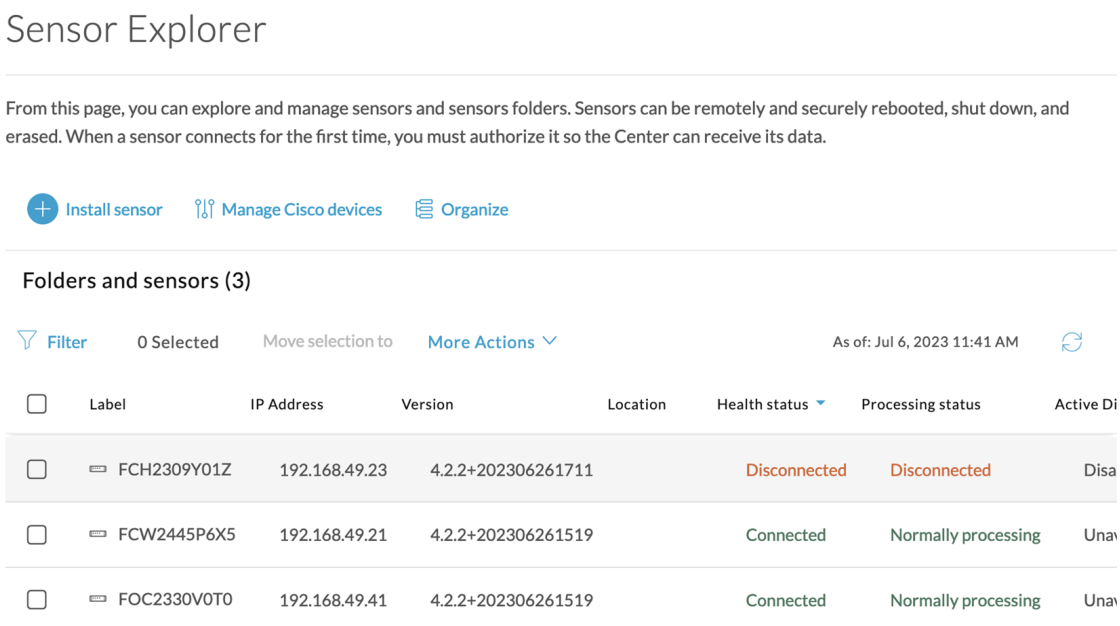
Step 4 Click **Renew certificate** again.

The sensor certificate status appears as valid.



Step 5 Close the Manage sensors certificates window.

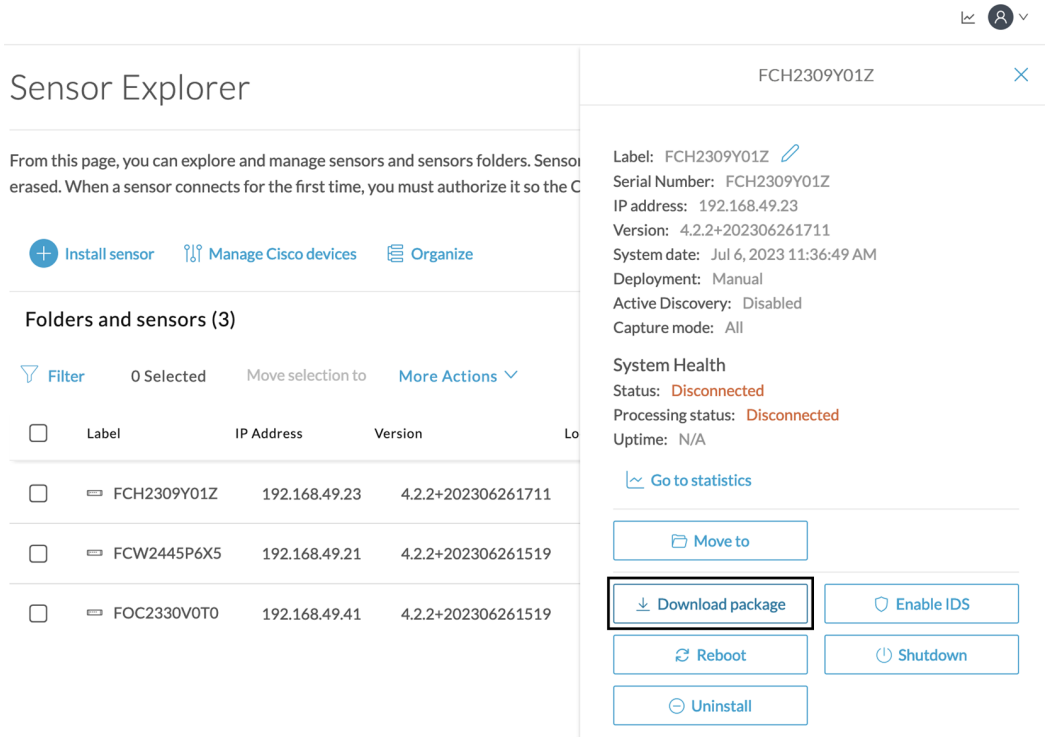
The sensor's health and processing status appear as Disconnected.



Step 6 Click the sensor in the list.

Its right side panel opens.

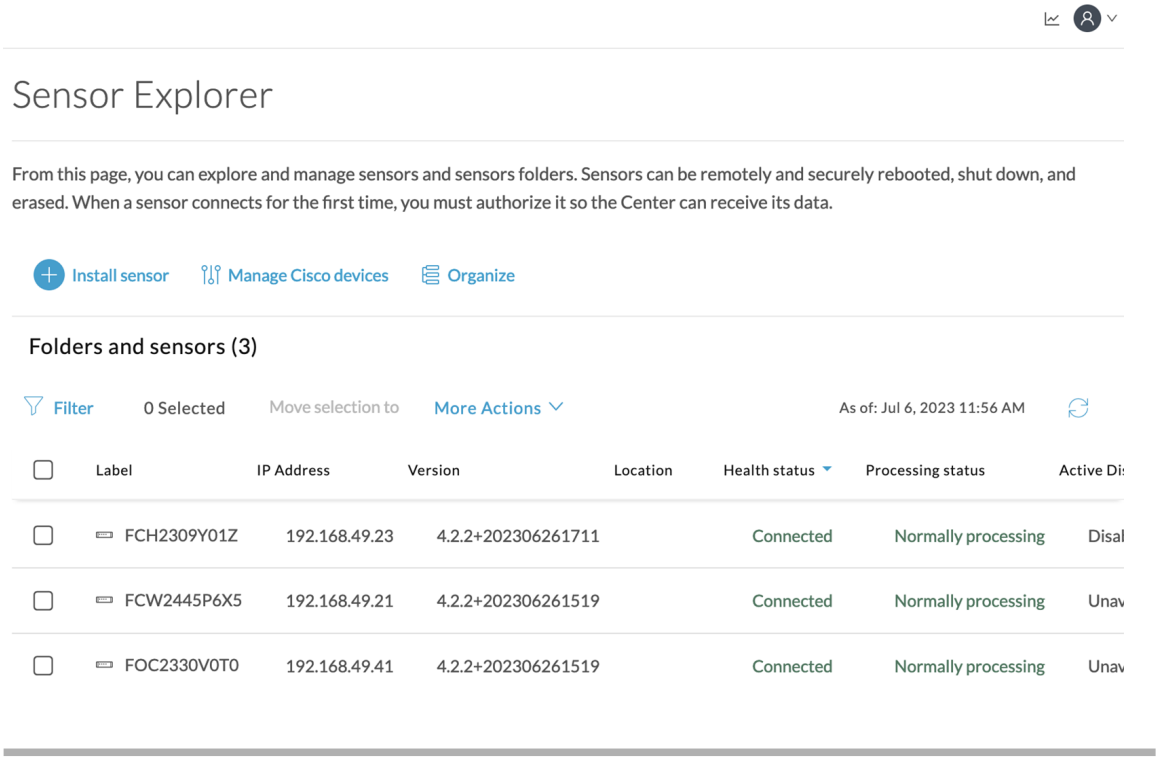
Step 7 Click the **Download package** button.

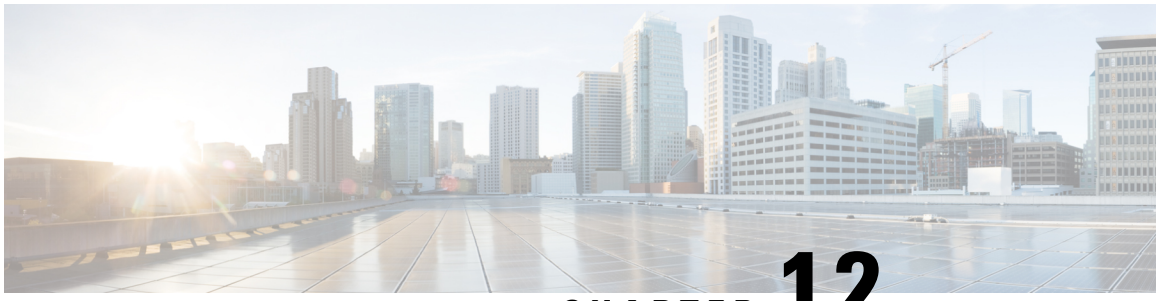


Step 8

Step 9 Import the provisioning package in the Local Manager. To do so, refer to Import the provisioning package, on page 34

Step 10 The sensor's health status switches to Connected and its processing status to Normally processing.


Sensor Explorer
From this page, you can explore and manage sensors and sensors folders. Sensors can be remotely and securely rebooted, shut down, and erased. When a sensor connects for the first time, you must authorize it so the Center can receive its data.
Install sensor
Manage Cisco devices
Organize
Folders and sensors (3)
Filter
0 Selected
Move selection to
More Actions
As of: Jul 6, 2023 11:56 AM
Label
IP Address
Version
Location
Health status
Processing status
Active Di
FCH2309Y01Z
192.168.49.23
4.2.2+202306261711
Connected
Normally processing
Disal
FCW2445P6X5
192.168.49.21
4.2.2+202306261519
Connected
Normally processing
Unav
FOC2330V0T0
192.168.49.41
4.2.2+202306261519
Connected
Normally processing
Unav



CHAPTER 12

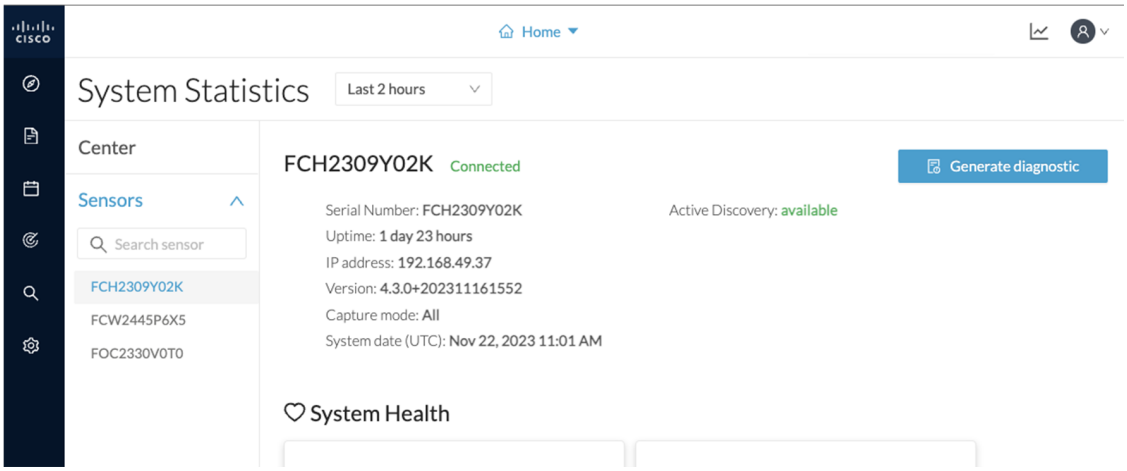
Troubleshooting

- Collect IOx sensor logs, on page 75
- Collect IOx sensor logs from the Local Manager, on page 76

Collect IOx sensor logs

In case of sensor issues Cisco Cyber Vision support can ask you to retrieve IOx sensor logs.

If the sensor is communicating with the Center, use the Cisco Cyber VisionGUI to generate the sensor diagnostic from the sensor statistics page.



If the sensor is not communicating with the Center, you can collect the logs from the sensor command line. To do so:

Procedure

Step 1 Connect to the sensor in ssh.

Step 2 Use the following command to get the sensor application id:

```
show app-hosting list
```

```
IE3400esc00#
IE3400esc00#
IE3400esc00#
IE3400esc00#show app-hosting list
App id                                   State
---------------------------------------------------------
CVSensor                                 RUNNING

IE3400esc00#
IE3400esc00#
IE3400esc00#
```

Step 3 Use the following command to connect to the sensor application:

`app-hosting connect appid` **`<sensor-app-id>`** `session`

```
IE3400esc00#
IE3400esc00#
IE3400esc00#app-hosting connect appid CVSensor session
sh-5.0#
sh-5.0#
sh-5.0#
```

Step 4 Use the following command and copy the results returned in a file to be sent to Cisco Cyber Vision support.

`flowctl diagnostic`

```
sh-5.0#
sh-5.0# flowctl diagnostic > iox_data/appdata/sensor-diag.log
sh-5.0#
sh-5.0#
sh-5.0#
```

Collect IOx sensor logs from the Local Manager

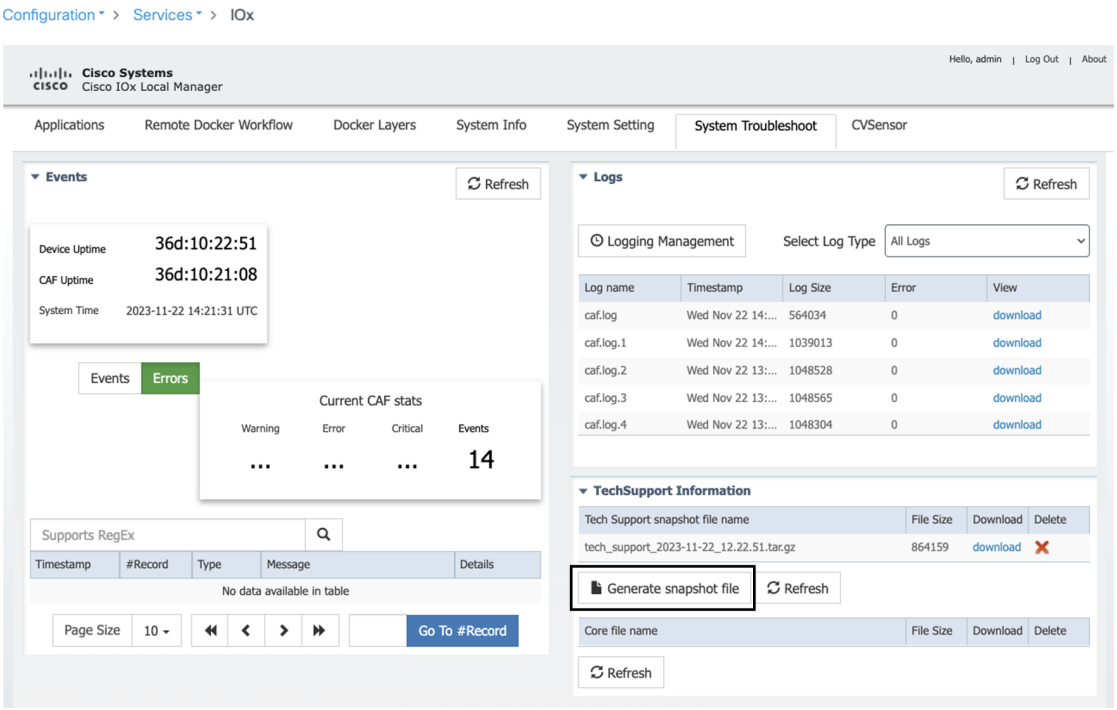
In case of sensor issues Cisco Cyber Vision support can ask you to retrieve IOx sensor logs. You can retrieve them through the IOx Local Manager.

Procedure

Step 1 Access the sensor's IOx Local Manager.

Step 2 Click the **System Troubleshoot** tab.

Step 3 Click the **Generate snaptshot file** button.


Configuration > Services > IOx
Cisco Systems
Cisco IOx Local Manager
Hello, admin | Log Out | About
Applications
Remote Docker Workflow
Docker Layers
System Info
System Setting
System Troubleshoot
CVSensor
Events
Refresh
Device Uptime 36d:10:22:51
CAF Uptime 36d:10:21:08
System Time 2023-11-22 14:21:31 UTC
Events
Errors
Current CAF stats
Warning Error Critical Events
... ... 14
Supports RegEx
Timestamp #Record Type Message Details
No data available in table
Page Size 10
Go To #Record
Logs
Refresh
Logging Management
Select Log Type All Logs
Log name Timestamp Log Size Error View
caf.log Wed Nov 22 14:... 564034 0 download
caf.log.1 Wed Nov 22 14:... 1039013 0 download
caf.log.2 Wed Nov 22 13:... 1048528 0 download
caf.log.3 Wed Nov 22 13:... 1048565 0 download
caf.log.4 Wed Nov 22 13:... 1048304 0 download
TechSupport Information
Tech Support snapshot file name File Size Download Delete
tech_support_2023-11-22_12.22.51.tar.gz 864159 download
Generate snapshot file
Refresh
Core file name File Size Download Delete
Refresh