New Features for Cisco IOS-XE 17.4.1

The following are the new features available on the IR1101 for IOS-XE release 17.4.1:

New Features for Cisco IOS-XE 17.4.1

The following features are introduced for IoT Routing.

Cisco Cyber Vision Support feature is found further below in this chapter.

Out Of Band Management is found here: https://www.cisco.com/c/en/us/td/docs/routers/access/1101/software/configuration/guide/b_IR1101config/m-out-of-band-management.html

DSL capability by using a Small Form-factor Pluggable (SFP) network interface module is found here: https://www.cisco.com/c/en/us/td/docs/routers/access/1101/software/configuration/guide/b_IR1101config/m_configuring_dsl.html

Cyber Vision Support

Cisco Cyber Vision Center (CVC) gives more visibility into Industrial IoT networks across Industrial Control Systems (ICS) with real-time monitoring of control and data networks. On IoT IOS-XE platforms beginning with release 17.4, integration of CVC is supported by deploying IOX Cyber Vision sensor. With this sensor deployed on IoT Routers, the platform can forward the traffic from IOX applications to Cyber Vision Center for real-time monitoring and we can forward any captured PCAP files to Vision center from IOX application.

Deployment of Cyber Vision Center (CVC) on IOS-XE platform

Step 1 Download Cisco supported Cyber Vision IOX application from the following location:

https://software.cisco.com/download/home/286325414/type/286325316/release/3.1.1?catid=268438162

Select **Cisco Cyber Vision Sensor IOx Application 3.1.1 for IE3400 and IR1101**.

Step 2 Install CVC version 3.1.1 on Virtual Machine or on any Hypervisor. The following location is the download link for different versions of CVC:

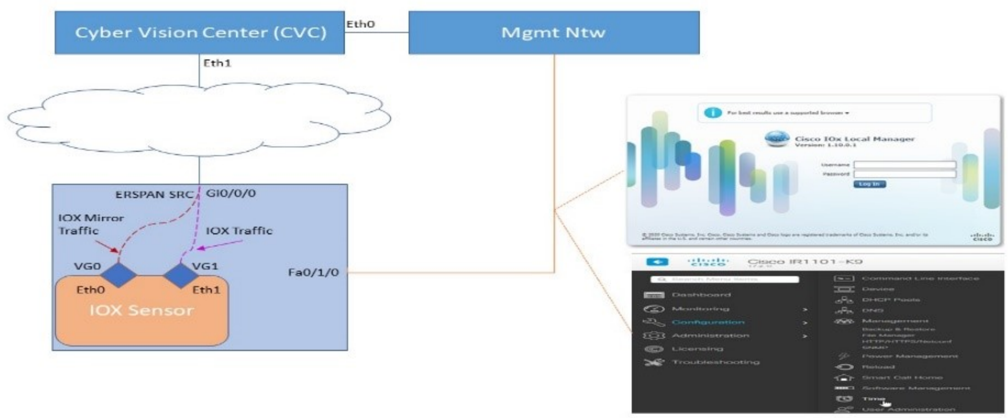
https://software.cisco.com/download/home/286325414/type

Release Notes for Cisco Cyber Vision Release 3.1.1:

https://www.cisco.com/c/dam/en/us/td/docs/security/cyber_vision/Cisco-Cyber-Vision_Release-Note-3-1-1.pdf

Step 3 The CVC sensor requires two VirtualPort Group interfaces. One on the platform where one interface is used for IOX traffic, and the other for mirror traffic which is forwarded to physical, SVI or Tunnel interface which ERSPAN source. Refer to the following illustration:

Figure 1: CVC over L3 interface



Step 4 The CVC Sensor deployment can be installed from either the LMGUI or CLI.

Example Configuration for ERSPAN over L3 configuration along with Virtual Port Groups

Physical and Virtual Port Configuration:

```
interface virtualportgroup 0
ip address 169.254.1.1 255.255.255.252
interface virtualportgroup 1
ip nat inside
ip address 169.254.0.1 255.255.255.252
interface gi0/0/0
ip address 101.0.0.151 255.255.255.0
ip nat outside
no shut
```

ERSPAN Configuration:

```
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
```

NAT Configuration with Access-list:

```
ip nat inside source list NAT_ACL interface Gi0/0/0 overload
ip access-list standard NAT_ACL
 10 permit 169.254.0.0 0.0.0.3
```

CLI Installation

To install the app through the CLI, copy the CVC sensor to bootflash, USB, or mSATA. Then install the app using the app-hosting CLI, and provide the docker options before activating the app.

For example:

```
Router(config-if)#iox
Router# app-hosting install app-id <app-id> package {bootflash:/|usbflash0:|msata:}
app-hosting appid  <app-id>
 app-vnic gateway0 virtualportgroup 0 guest-interface 0
  guest-ipaddress 169.254.1.2 netmask 255.255.255.252
 app-vnic gateway1 virtualportgroup 1 guest-interface 1
  guest-ipaddress 169.254.0.2 netmask 255.255.255.252
 app-default-gateway 169.254.0.1 guest-interface 1
 app-resource docker
  run-opts 1 "--rm --tmpfs /tmp:rw,size=128m"
Router# app-hosting {activate|start|stop|deactivate|uninstall} app-id <app-id>
```

LMGUI Installation

Configure the following to reach the LMGUI:

```
iox
ip http server
ip http secure-server
ip http authentication local
Username cisco privilege 15 password cisco
Login URL: http://<Mgmt_IP>/iox/login
```

Additional details can be found in Installing CVC Sensor using LM GUI, on page 8

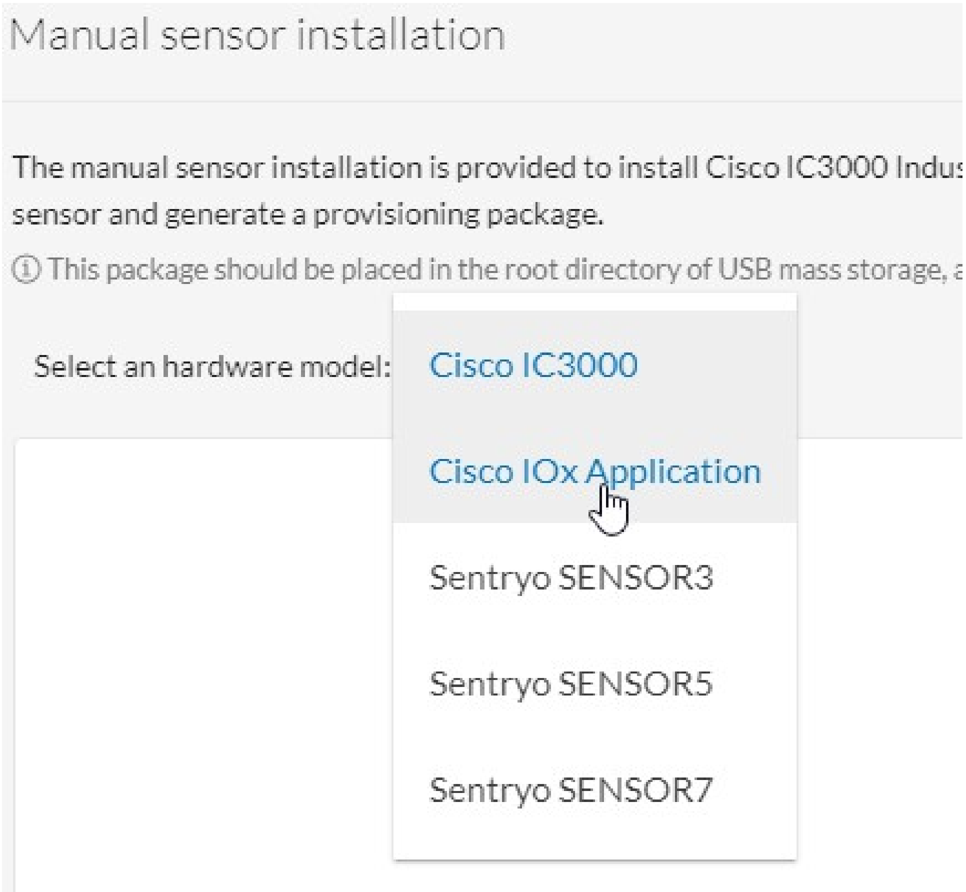
Register the Router Details

Step 1 Register the IOS-XE Router details on CVC by logging in and navigating to:

Admin > Sensors > Install Sensor Manually

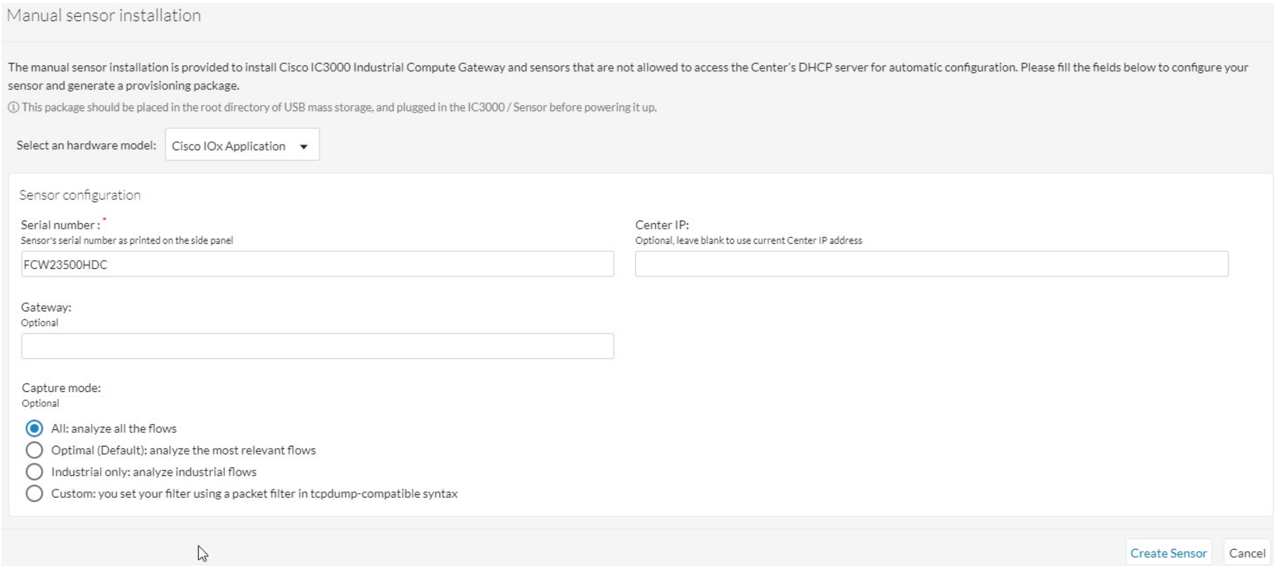
Then click on Cisco IOx Application. Refer to the following:

Figure 2: Sensor install



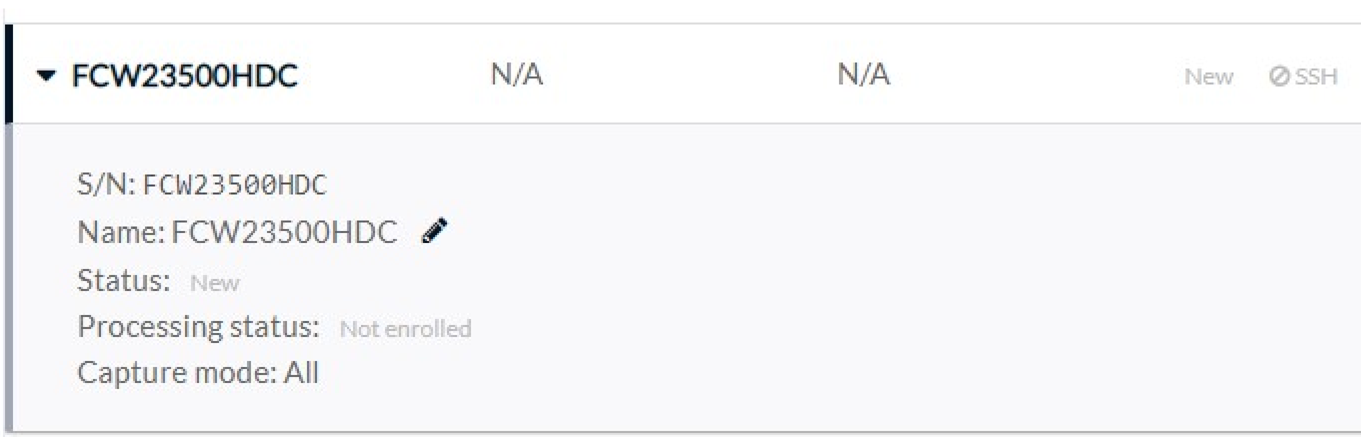
Step 2 Provide the serial number of the Router. It should be an exact match from the output of **show inventory**, and then click on **Create Sensor**. Refer to the following:

Figure 3: Router Serial Number



Step 3 Generate the Provisioning file from CVC by clicking on Get Provisioning File. Refer to the following:

Figure 4: Generate Provisioning File



Step 4 Download the provisioning file to a local directory. The file comes as a zip file with a file name like the following:

Example:

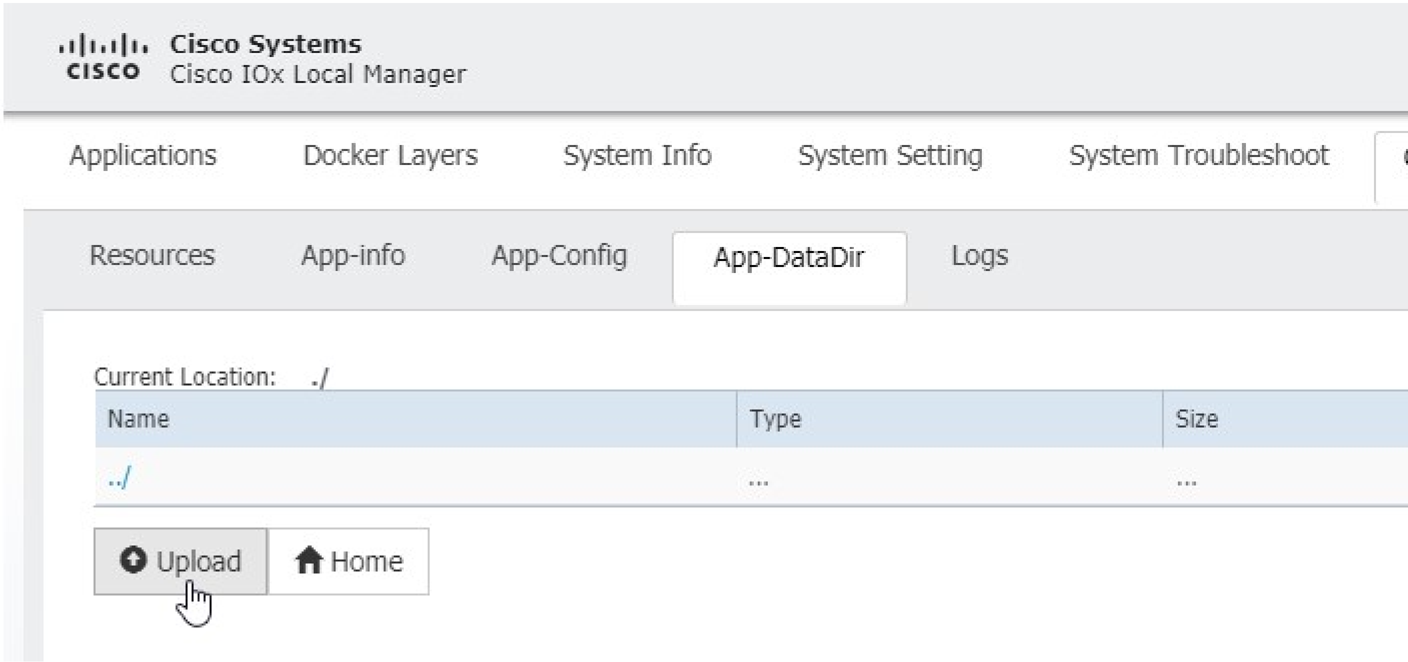
`sbs-sensor-config-``<S/N of Router>.zip`

Step 5 Import the Provisioning file to Router through the LM GUI. From the LM GUI Applications, navigate to:

Applications > CVC App (Application Name) > Manage > App-DataDir

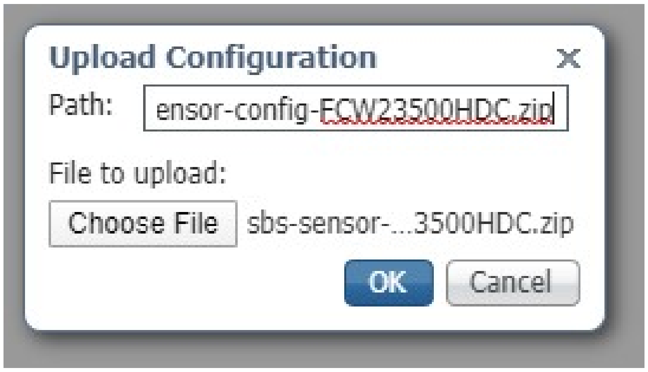
Refer to the following:

Figure 5: Upload Provision File



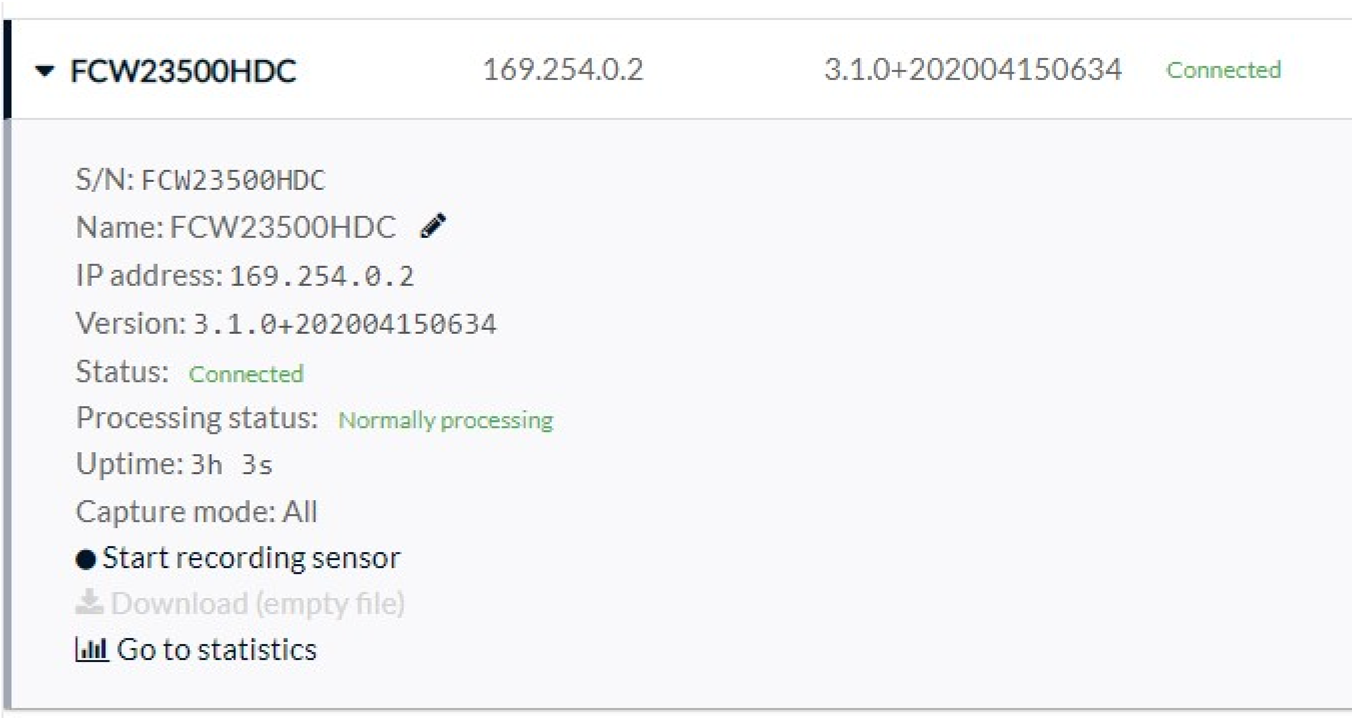
Step 6 Click **Upload**. The Upload Configuration window appears. Upload the downloaded provisioned file from CVC with the same name. Refer to the following:

Figure 6: Upload Configuration



Step 7 Verify the Authentication on CVC. Validate if the installed sensor Status changed to **Connected** or **Waiting for Data**. Refer to the following:

Figure 7: Sensor Status



Capture Live Traffic

Step 1 Sync the date and time between CVC and Router. To capture the live traffic there should be exact clock sync between Router and CVC.

Step 2 Simulate IOX Traffic or play captured PCAP files. The CVC Sensor installed on the Router is a docker app. To login to the console of the App, perform the following command:

Example:

```
app-hosting connect app-id <app-name> session
```

Step 3 Upload the PCAP Files to the App from LM-GUI. Navigate to:

Applications > CVC App (Application Name) > Manage >App-Dir

The following commands show how to play the PCAP file:

Example:

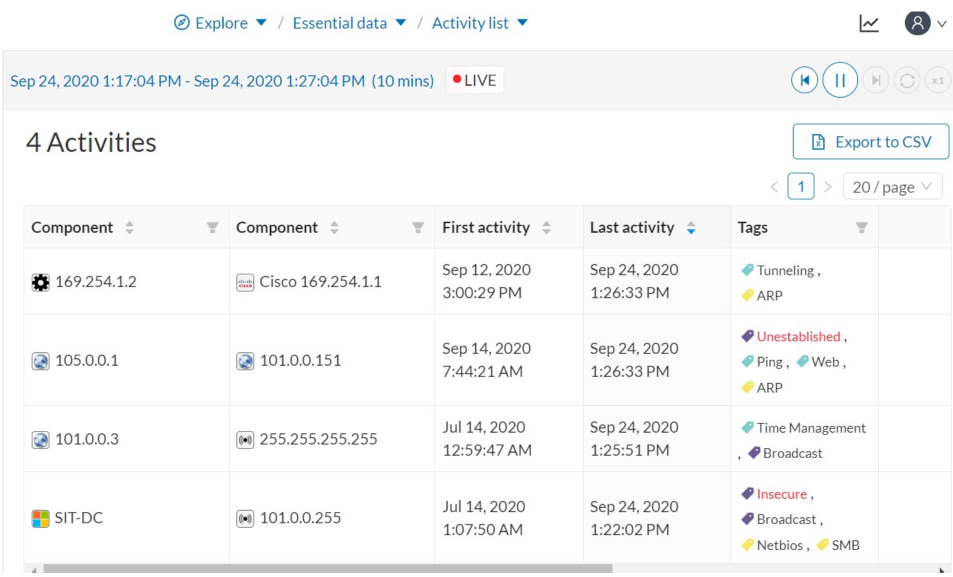
```
Router# show app-hosting list
App id     State
-------------------------------------------------
CVC Sensor    RUNNING

Router# app-hosting connect appid CVCSensor session
```

```
sh-5.0#
*Jul 14 08:45:05.603: %SELINUX-3-MISMATCH: R0/0: audispd: type=AVC msg=audit(15! in/busybox.nosuid"
 dev="overlay" ino=72930 scontext=system_u:system_r: polaris_bexecute_*
sh-5.0# flowctl read-capture-file /iox_data/appdata/tl04
OK
sh-5.0#
```

Step 4 Monitor the traffic on CVC. Navigate to **Explore** > **Essential Data** > **Activity List**

Refer to the following:

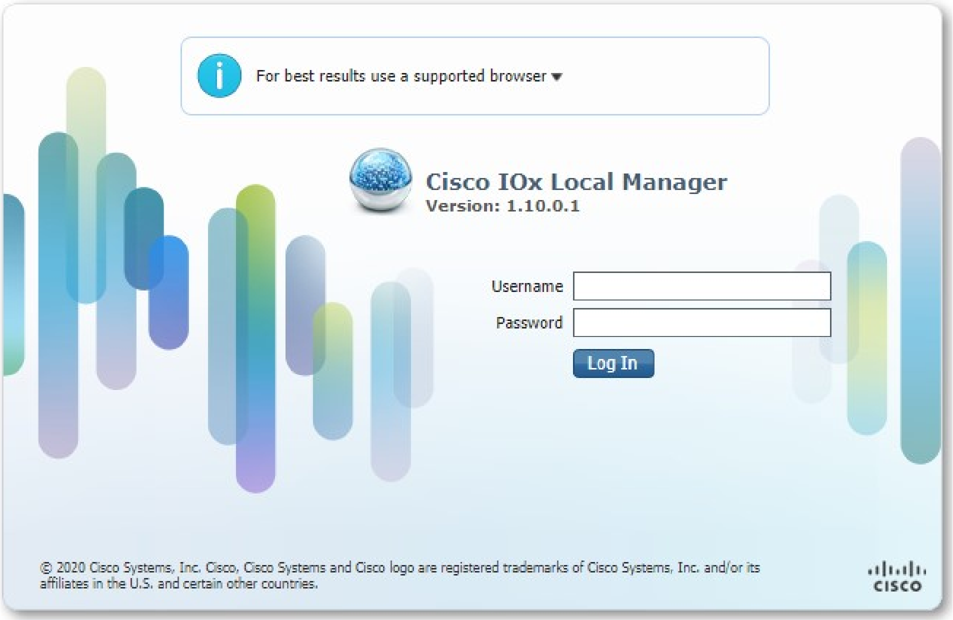
Figure 8: Activity List



Installing CVC Sensor using LM GUI

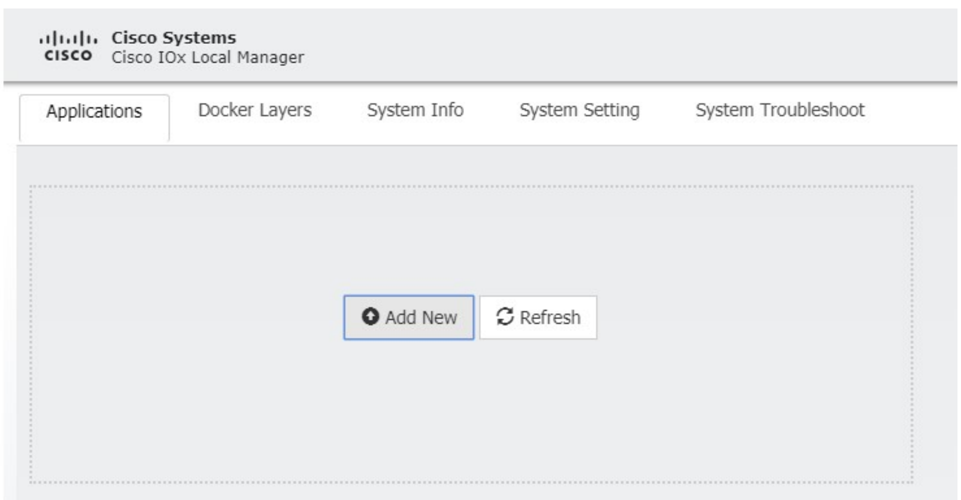
Step 1 Login using user account and password.

Figure 9: Local Manager Login



Step 2 Install the sensor virtual application. Once you are logged in, the following menu will appear:

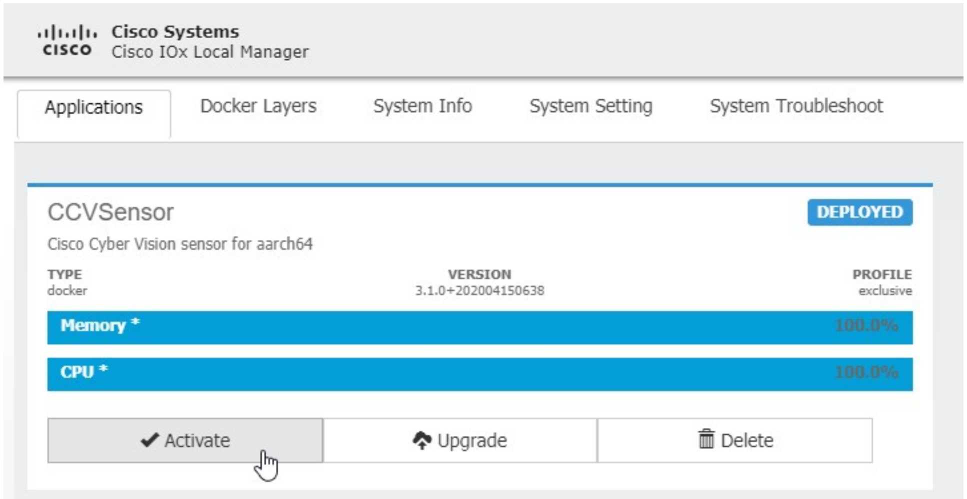
Figure 10: LM GUI Application Install



Step 3 Click on **Add New**. Navigate to the app file, for example, CiscoCyberVision-IOx-aarch64-xxx.tar. Add the name of the app, for example, **CCVSensor**.

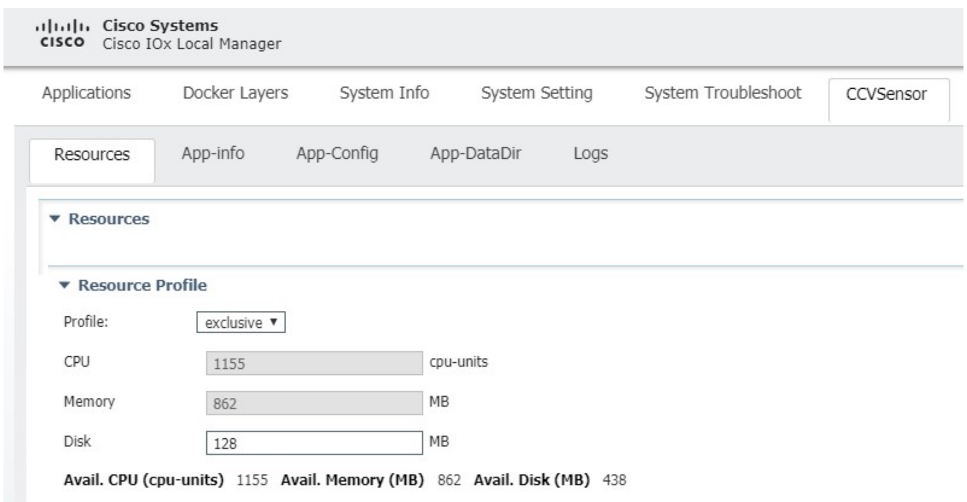
Configure the sensor virtual application. Refer to the following:

Figure 11: CCVSensor Activation



Step 4 Click on **Activate** to launch the configuration of the sensor application. Click on the **CCVSensor** Tab, and click on **Resources**. Refer to the following:

Figure 12: Setup Sensor LM IOXAppDisk



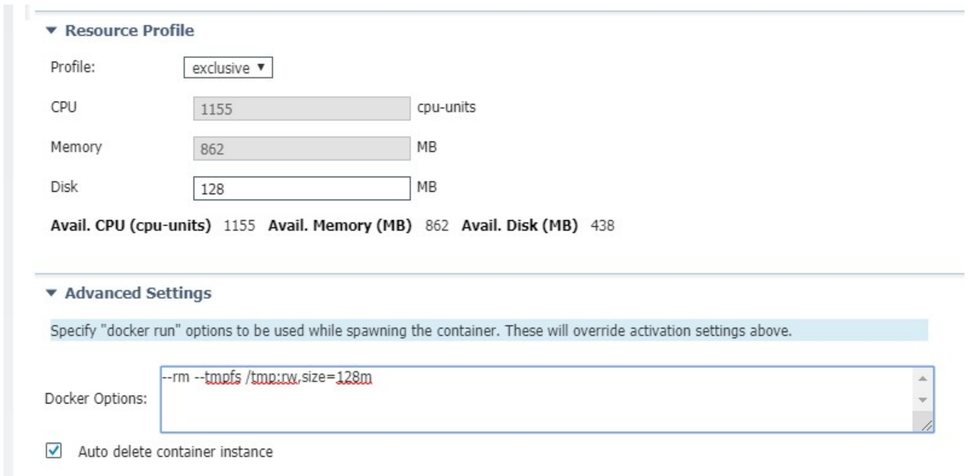
Change the disk size to 128MB.

Note Do not use more space than that.

Step 5 Navigate to **Advanced Settings**. In advanced options, configure the tmpfs by adding the following in the text area beside Docker Options:

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

Figure 13: Advanced Settings



Step 6 Bind interfaces in the container to an interface on the host in the **Network Configuration** section.

What to do next

Move to the next sections Binding eth0 and Binding eth1.

Binding eth0

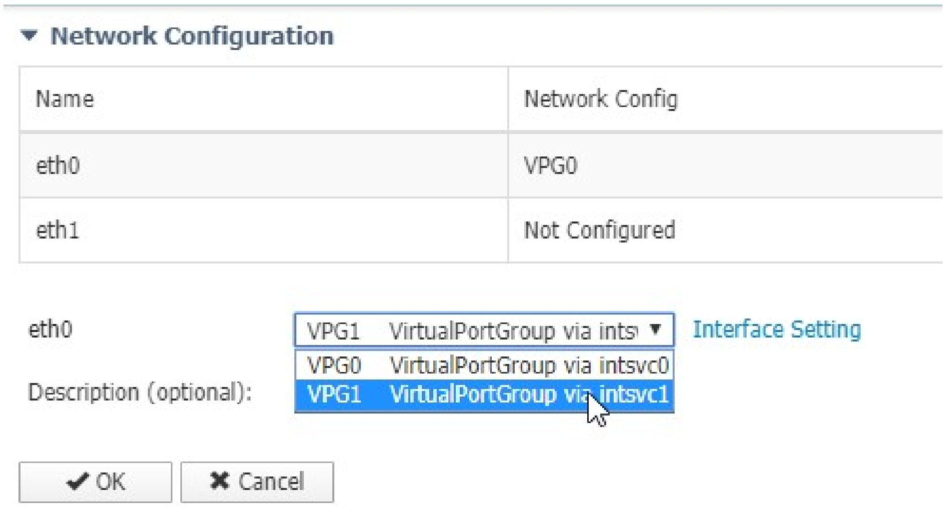
To configure eth0:

Step 1 Select interface eth0, and then click on **edit**.

Figure 14: eth0

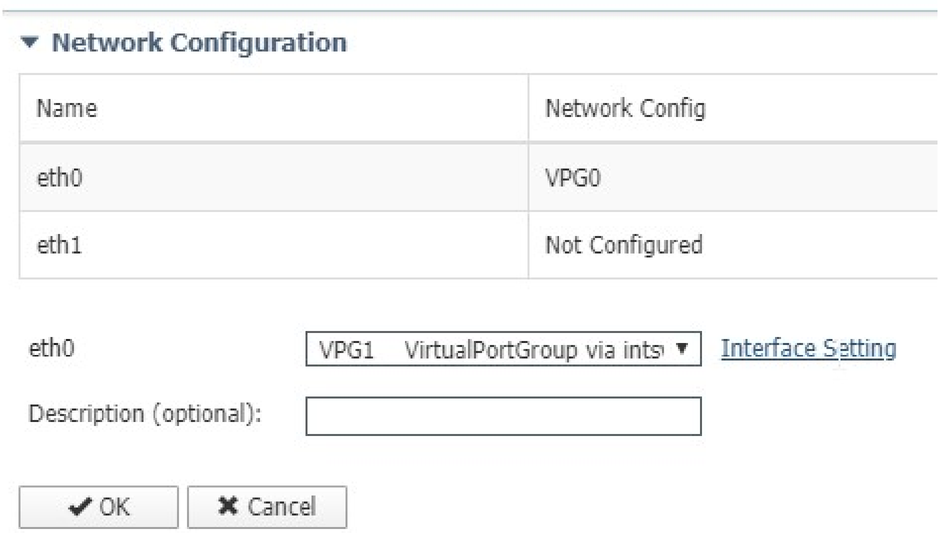
Step 2 Select the Interface **VPG1**.

Figure 15: VPG1



Step 3 Click on **Interface Setting**.

Figure 16: Interface Setting



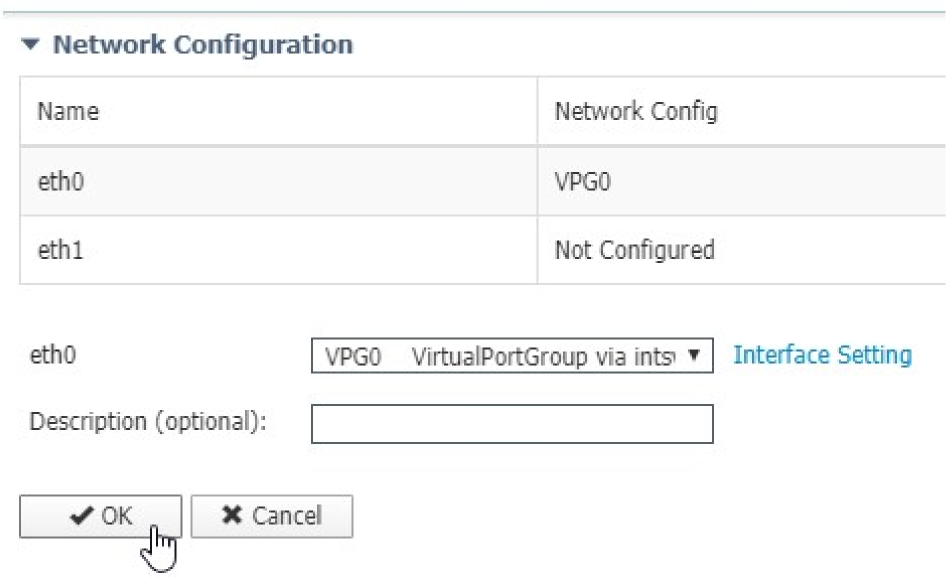
Step 4 Apply the following configuration:

- Choose the **Static** option
- IP/Mask add **169.254.0.2 / 30**
- Default Gateway IP is **169.254.0.1**

Then click on **OK**.

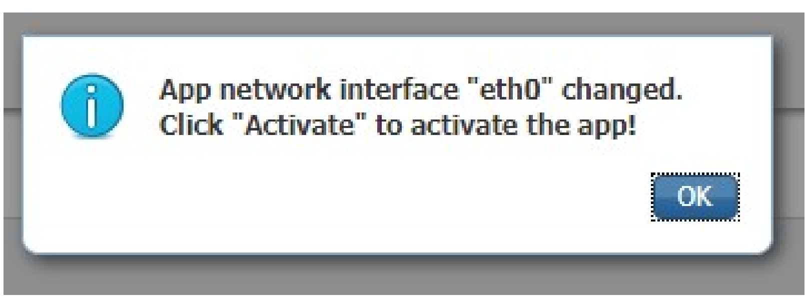
Figure 17: IPv4 Setting

Step 5 Click on **OK** again.



Step 6 The **Activate** window appears. Click on **OK**.

Figure 18: Activate Window

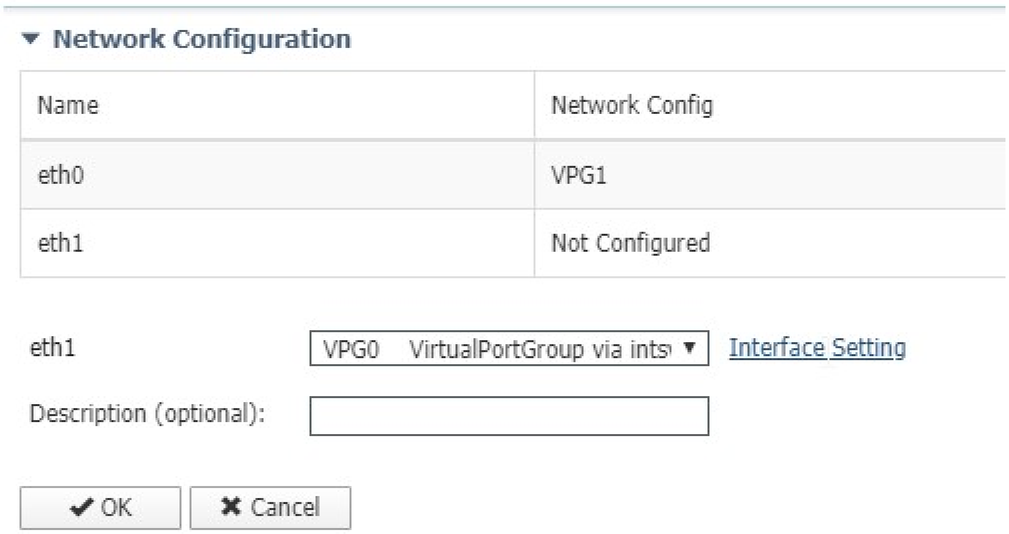


Binding eth1

To configure the eth1 interface:

Step 1 Select VPG0.

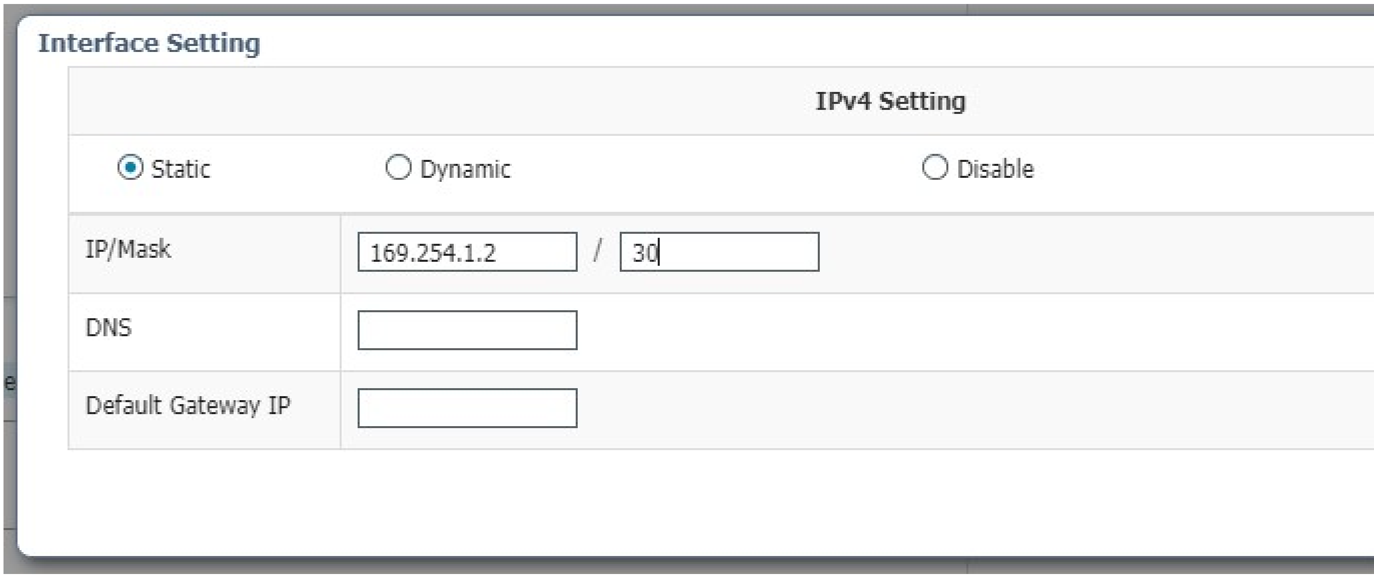
Figure 19: VPG0



Step 2 Click **Interface Setting** and apply the following configuration:

- Choose the **Static** option
- IP/Mask add **169.254.1.2 / 30**

Figure 20: IPV4 Setting

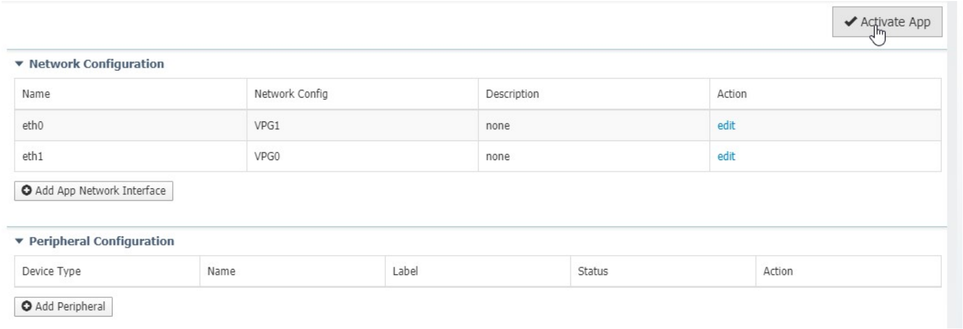


Activate the Application

Now the sensor application should be activated.

Step 1 Click on **Activate App**. Refer to the following:

Figure 21: Activate the Application

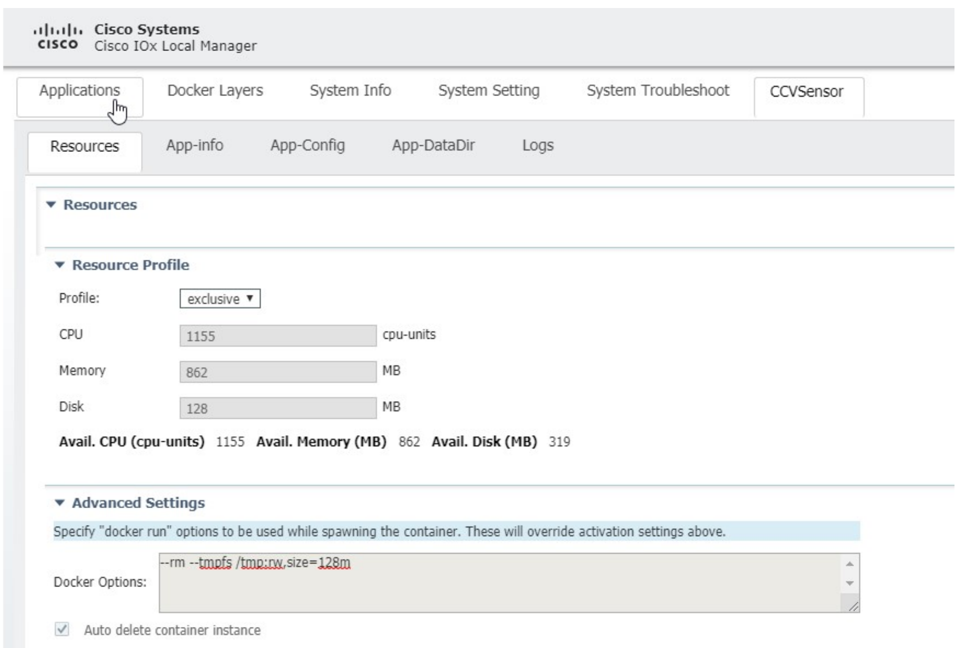


Step 2 The progress window appears. This may take several seconds to finish.

Figure 22: Activation Progress

Step 3 Click on **Applications** to display the app status. Refer to the following:

Figure 23: Applications Resources

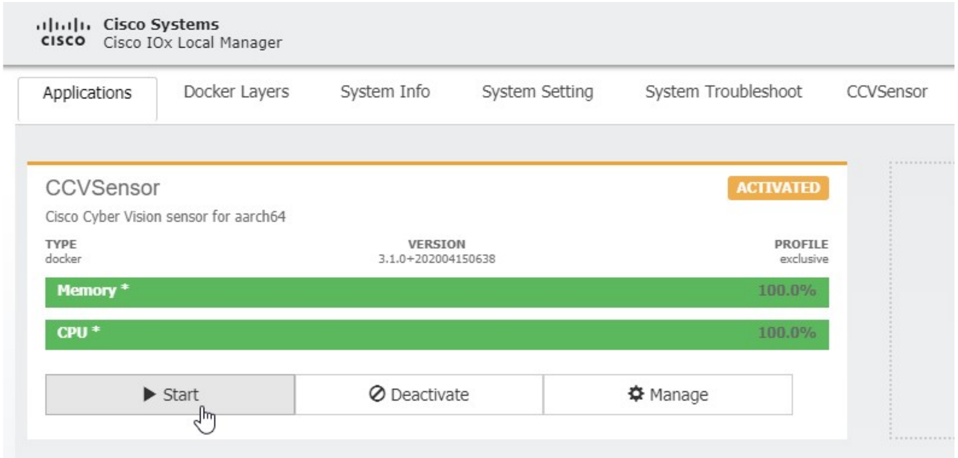


Step 4 The application is activated and needs to be started.

Starting the Application

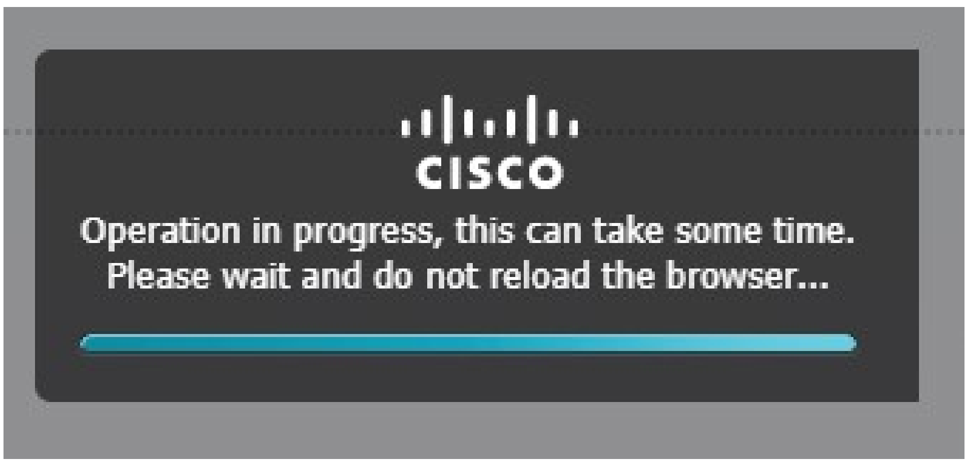
Step 1 Click on **Start**. Refer to the following:

Figure 24: Start Application



Step 2 The progress window appears. This may take several seconds to finish.

Figure 25: Progress Window



Step 3 After some time, the app status will change to running.

Figure 26: Application Running