Monitor Power over Ethernet

About PoE

The Cisco DNA Center Power over Ethernet (PoE) enables you to monitor the PoE-capable devices in your network. It also monitors the power summary of switches supplying PoE, which provides information such as a switch's power budget, used power, remaining power, and power usage and allows viewing the allocated power and power load of switches.

Setup Workflow for PoE Telemetry

To enable PoE telemetry and analytics in Assurance, you need to perform the required setup tasks. A basic workflow for setup involves the following tasks:

1. Configure NETCONF on the network devices used for PoE telemetry.

   For details, see Configure NETCONF on Your Devices for PoE Telemetry, on page 3.

2. Update the telemetry settings in Cisco DNA Center.

   For details, see Update Telemetry Settings for PoE Telemetry, on page 5.

Setup Workflows

The setup workflow for PoE telemetry varies depending on the software version and configuration of Cisco DNA Center and network devices that support PoE telemetry.

If you are doing a fresh installation of Cisco DNA Center, refer to the following table:

Fresh Installation of Cisco DNA Center	
Network Device Configuration	**Required Setup Tasks**
• IOS XE version is 16.12.3s. • NETCONF is disabled.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.
• IOS XE version is upgraded from 16.12.2 to 16.12.3s with SWIM. • NETCONF is disabled.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.
• IOS XE version is upgraded from 16.12.2 to 16.12.3s with SWIM. • NETCONF is enabled.	1. Update the telemetry settings in Cisco DNA Center.

If you are upgrading to Cisco DNA Center from an earlier release, refer to the following table:

Upgrade from an Earlier Release	
Network Device Configuration	**Required Setup Tasks**
• IOS XE version is upgraded from 16.12.2 to 16.12.3s with SWIM. • NETCONF disabled.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.
• IOS XE version is upgraded from 16.12.2 to 16.12.3s with SWIM. • NETCONF is enabled.	1. Update the telemetry settings in Cisco DNA Center.
• IOS XE version is 16.12.3s. • NETCONF is disabled.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.
• IOS XE version is 16.12.3s. • NETCONF is enabled.	1. Update the telemetry settings in Cisco DNA Center.

If there are changes to the network device that supports PoE telemetry in **Inventory**, refer to the following table:

Network Device Changes in Inventory	
Change to Network Device	**Required Setup Tasks**
Remove a device from Cisco DNA Center **Inventory**, and then add it back.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.

Network Device Changes in Inventory	
Change to Network Device	**Required Setup Tasks**
Add a new device to Cisco DNA Center **Inventory**.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.
Use a replacement device in Cisco DNA Center **Inventory**.	1. Enable NETCONF on the device. 2. Update the telemetry settings in Cisco DNA Center.

Configure NETCONF on Your Devices for PoE Telemetry

Use this procedure to configure NETCONF on your network devices for PoE telemetry. To use PoE telemetry, the supporting network devices must have NETCONF enabled.

Before you begin

Depending on the configuration of your Cisco DNA Center and network devices, you might not need to do this procedure to set up PoE telemetry. For details, see .

Step 1 Configure the NETCONF port for an existing network device:

a) From the top-left corner, click the menu icon and choose **Provision** > **Inventory**.

The **Inventory** window appears.

b) Check the check box of the network device to be configured to enable NETCONF.
c) From the **Actions** drop-down list, choose **Inventory** > **Edit Device**.
d) From the **Type** drop-down list, choose **Network Device**.
e) Expand the **NETCONF** area.
f) In the **Port** field, enter `830`.

> **Note** NETCONF provides a mechanism to install, manipulate, and delete configurations of network devices.

g) Click **Update**.

The device's NETCONF port is configured.

Step 2 Create a **Template Editor** project for NETCONF configuration:

a) From the top-left corner, click the menu icon and choose **Tools** > **Template Editor**.

The **Template Editor** window appears.

b) From the left pane, click the ⊕ icon and choose **Create Project**.
c) In the **Name** field, enter a name for the project.
d) Click **Add**.

The project is added to the left pane of **Template Editor**.

Step 3   Create a template in the project for NETCONF configuration:

a) From the left pane, hover your cursor over the ✿ icon to the right of the project and choose **Add Template**.
b) In the **Name** field, enter a name for the template.
c) In the **Device Type(s)** field, click **Edit**.
d) Check the check box of **Switches and Hubs** to apply the template to add switches and hubs.

> **Note**   If you want to specify the exact models of the switches, expand **Switches and Hubs** and check the check box of the specific switch model.

e) Click **Back to Add New Template**.
f) Click the **Software Type** drop-down list and choose **IOS-XE**.
g) Click **Add**.

The template is created and appears.

Step 4   Add content in the template:

a) In the template, enter the following:

```
netconf-yang
```

b) From the **Actions** drop-down list, choose **Save**.

The content is saved to the template.

c) From the **Actions** drop-down list, choose **Commit**.
d) In the **Commit Note** text box, enter a note.
e) Click **Commit**.

Step 5   Create a network profile and associate the template:

a) From the top-left corner, click the menu icon and choose **Design** > **Network Profile**.

The **Network Profiles** window appears.

b) Click +**Add Profile** and choose **Switching**.
c) In the **Profile Name** field, enter a name for the network profile.
d) Click the **Day-N Templates** tab.
e) Click +**Add**.
f) From the **Device Type** drop-down list, choose **Switches and Hubs**.
g) From the **Template** drop-down list, choose the template that was created in Step 3.
h) Click **Save**.

The network profile is created and appears in the **Network Profiles** window.

Step 6   Assign the site(s) for the network profile:

a) From the **Sites** column, click **Assign Site**.
b) Check the check box of the site that the network device is assigned to.
c) Click **Save**.

Step 7   Provision the NETCONF configuration to the network device:

a) From the top-left corner, click the menu icon and choose **Provision** > **Inventory**.

The **Inventory** window appears.

b) Check the check box of the network device for PoE telemetry.

c) From the **Actions** drop-down list, choose **Provision** > **Provision Device**.

d) In the **Assign Site** step, click **Next**.

e) In the **Advanced Configuration** step, check the **Provision these templates even if they have been deploy before** check box.

f) Click **Next**.

g) In the **Summary** step, click **Deploy**.

h) Click **Apply**.

Provisioning starts and the NETCONF configuration is pushed to the network device.

Update Telemetry Settings for PoE Telemetry

Use this procedure to update the telemetry settings in Cisco DNA Center. This is a required step after setting the NETCONF port and pushing the NETCONF configuration to the network devices for PoE telemetry.

Before you begin

Ensure that the network devices being set up for PoE telemetry have an established NETCONF port and the correct NETCONF configuration. For details, see Configure NETCONF on Your Devices for PoE Telemetry, on page 3.

Step 1 From the top-left corner, click the menu icon and choose **Provision** > **Inventory**.

The **Inventory** window appears.

Step 2 Check the check boxes of the network devices that have been set up for PoE telemetry.

Step 3 From the **Actions** drop-down list, choose **Telemetry** > **Update Telemetry Settings**.

Step 4 Check the **Force Configuration Push** check box.

Note   This option pushes the configuration changes to the device.

Step 5 Click **Next**.

Step 6 Set the schedule for when the telemetry settings are updated by clicking a radio button:

• **Now**: Choose this option to update the telemetry settings immediately.

• **Later**: Choose this option to schedule the task for another time. Specific the time and date.
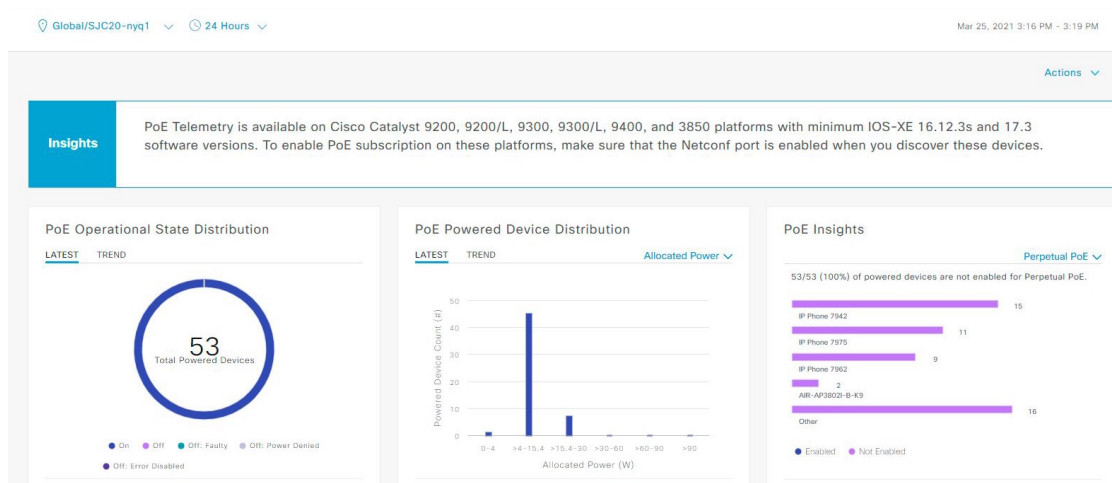
Step 7 Click **Apply**.

Monitor PoE-Capable Devices in Your Network

Use this procedure to get a global view of PoE-capable devices in your network.

Step 1 From the top-left corner, click the menu icon and choose **Assurance** > **PoE**.

The **PoE** dashboard appears.

Figure 1: PoE Dashboard

Step 2 Click the location option (ⓥ Global ∨) in the top-menu bar to display the location pane.

The location pane has the following functionality:

Location Option	
Item	**Description**
☰ 🗺 toggle button **List View**	Click this toggle button to display the sites and buildings from your network in a list format. Click the drop-down list for the following options: • **Hierarchical Site View**: Sorts the list at a site level. From the **Apply to Page Location** column, click **Apply** for a site or building to display data only for that location on to the **Network** dashboard. • **Building View**: Sorts the list at a building level. From the **Apply to Page Location** column, click **Apply** for a building to display data only for that building on to the **Network** dashboard.
☰ 🗺 toggle button **Map View**	Click this toggle button to display the health of all the network sites on a geographic location-oriented network health map. By default, the network sites that are represented are color-coded according to the severity of the problem.

Location Option	
Item	**Description**

⁂
 	
Topology tool
	Click this icon to open the **Topology** tool. The **Topology** window, has the following views:
	
	• 🗺️ ⁂ **Geographical View**: Click this toggle button to display your network in a geographical map.
	
	  Hover your cursor over a location to view the percentage of healthy devices.
	
	• 🗺️ ⁂ **Topology View**: Click this toggle button to display a topology of how the components in the network are connected.
	
	  Hover your cursor over a device to display device information, such as device role, IP address, and software version. To obtain a 360° view of the device, click **View Details 360**.

Step 3   Click the time range setting (🕐) in the top-menu bar to specify the time range of data that appears on the dashboard.

     a)   From the drop-down menu, choose the time range: **3 Hours**, **24 Hours**, or **7 Days**.

     b)   Specify the **Start Date** and time; and the **End Date** and time.

     c)   Click **Apply**.

Step 4   Click the **Actions** drop-down list in the top-menu bar for the following functionality:

     • **Export Dashboard**: Enables you to export the PoE dashboard to PDF format. Click **Export Dashboard** to view the preview page and click **Save**.

     • **Edit Dashboard**: Enables you to customize the dashboard display. See Change the Position of a Dashlet and Create a Custom Dashboard.

Step 5   Use the PoE dashlets for the following functionality:

AP Power Save Mode Distribution

AP Power Save Mode Distribution displays AP power save capability as well as the average number of APs in Power Save vs Normal mode.

The **Latest** tab shows the number of APs that support the Power Save Capability and the Power Save mode versus Normal mode.

The **Trend** tab provides the following information:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

Note   The data point that is displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available at the end of the corresponding time window.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, hover your cursor over the color-coded chart to view the total number of APs distributed in power save capability over Power save mode and Normal mode at a specific time. You can filter the data in the table that is displayed below the chart based on the number of the APs in the top sites and top device types.

AP Power Savings

AP Power Savings mode will either shut down AP's radio or reduce their radio spatial stream to decrease power consumption, and displays overall power consumed and saved during the time range.

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

Note   The data point displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available at the end of the corresponding time window.

Click **View Details** to open a **AP Power Savings** slide-in pane with additional details. On the slide-in pane, the color-coded chart shows the power consumed by APs over a time range. Hover your cursor over the chart to view the total number of APs, power saved in power save mode, and normal mode over a period of time.

PoE AP Power Mode Distribution

Displays the distribution of fully powered and partially powered APs.

The **Latest** tab provides a 10-minute snapshot view.

The **Trend** tab provides the following:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

Note	The data point displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available after the end of the corresponding window.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a color segment in the chart or its corresponding legend to refresh the data in the table that is displayed below the chart.

PoE Operational State Distribution

Displays the number of PoE-capable devices in your network. The color-coded chart provides the count of devices based on whether they are being supplied with PoE or not. For devices that are not being supplied with PoE, this is further characterized by the reason why.

The **Latest** tab provides a 10-minute snapshot view.

The **Trend** tab provides the following:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

Note	The data point displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available after the end of the corresponding window.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a color segment in the chart or its corresponding legend to refresh the data in the table that is displayed below the chart.

PoE Powered Device Distribution

View the distribution of the devices currently using PoE for a certain criteria. Use the drop-drop list to specify the following criteria:

- **Allocated Power**

- **Powered Device Class**

The **Latest** tab provides a 10-minute snapshot view.

The **Trend** tab provides the following:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

  Note   The data point displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available after the end of the corresponding window.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a color segment in the chart or its corresponding legend to refresh the data in the table that is displayed below the chart.

Power Allocation Load Distribution

View the distribution of switches based on its power load for PoE.

The **Latest** tab provides a 10-minute snapshot view.

The **Trend** tab provides the following:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

  Note   The data point displayed is the start time of the corresponding 10-minute or 1-hour window. For example, all the data that is received between 10:00 to 10:10 is displayed with the time value of 10:00. Similarly, for the hourly window, the data that is received between 10:00 to 11:00 is displayed with a time stamp of 10:00. This data point is available after the end of the corresponding window.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a color segment in the chart or its corresponding legend to refresh the data in the table that is displayed below the chart.

PoE Insights

View the percentage of the devices currently using PoE which are configured to support the following PoE technologies or meet IEEE Compliance:

- **Perpetual PoE**

- **Fast PoE**

- **IEEE Compliant**

- **UPOE+**

Use the drop-down list to choose the characteristic.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a color segment in the chart or its corresponding legend to refresh the data that is displayed in the table below the chart.

Power Usage

View the total power consumption and allocated power by devices currently using PoE. Use the drop-down list to select **Consumption** or **Allocation** view to display the respective data in the Latest and Trend tab.

The **Latest** tab provides a 10-minute snapshot view. The pie chart displays the Power Allocation details such as PoE Power Allocation, System Power Allocation, and Available Power, and Power Consumption details such as PoE Power Consumption and System Power Consumption measured in watts.

The **Trend** tab provides the following:

- If you chose 24 hours in the time range settings, the trend chart provides 10-minute data points for the entire 24-hour range of power usage.

- If you chose greater than 24 hours in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click on a color segment in the chart or its corresponding legend to view the System Power information (System Power Consumption and System Power Allocation) and PoE Power information (PoE Power Consumption and PoE Power Allocation) of the devices over a time period in the table that is displayed below the chart.

You can select the data displayed as horizontal bars to filter the preceding table that is displayed based on the power usage, device role and location.

PoE Port Availability

View the availability of ports based on their power load for PoE.
 	
The **Latest** tab provides a 10-minute snapshot view.
 	
The **Trend** tab provides the following:
 	
    • If you chose 24 hours or less in the time range settings, the trend chart provides 1-hour data points (aggregated from the 10-minute data) for the entire time range.
 	
    • If you chose 7 days in the time range settings, the trend chart provides 12-hour data points (aggregated from the 1-hour data) for the entire time range.
 	
Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can click a 1-hour data point in the chart to refresh the data in the table that is displayed below the chart.