



Monitor and Troubleshoot Network Health

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Monitor and troubleshoot the health of your network

Use this procedure to get a global view of your network and to determine if there are potential issues that must be addressed.

A network consists of one or more devices, including routers, switches, wireless controllers, and access points. Be aware that clients and devices in maintenance mode are not part of the network health score.

Assurance supports site-based, role-based access control (SRBAC), which limits a user's scope of access to certain network sites. You must ensure you have access to the sites and devices while using the network health dashboard. For more information on user roles and permissions, see [Cisco Catalyst Center Administrator Guide](#)

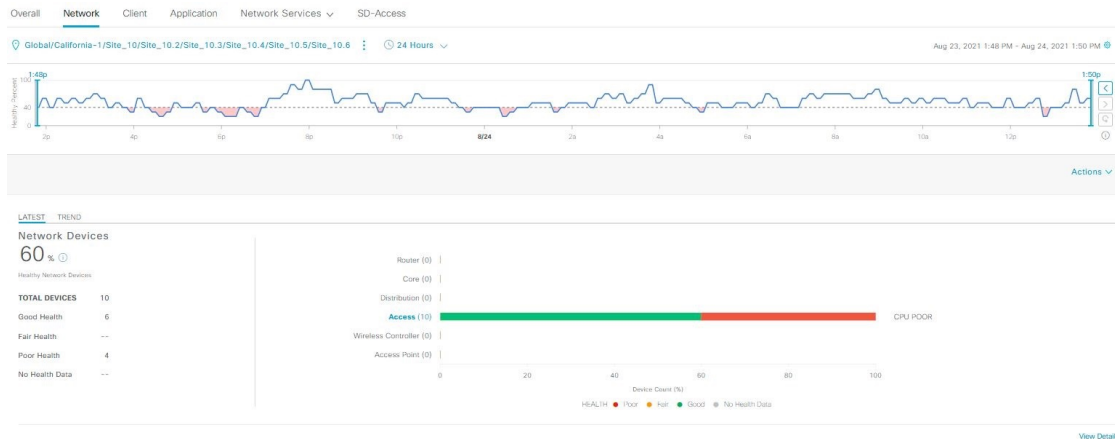



Note The network health score exists only in the context of a location. If the location of a device is not available, it is not counted in the network health score.


Procedure

- Step 1** From the main menu, choose **Assurance > Health**.
The **Overall** health dashboard appears.
- Step 2** Click the **Network** tab.
The **Network** health dashboard appears.

Figure 1: Network health dashboard









Step 3 Click the location option ( Global) in the top menu bar to select the site, building, or floor from the Site hierarchy.

Step 4 Click  next to the location icon and to switch between:

- **Site Map**: Provides a geographical view of your network hierarchy.
- **Site Table**: Provides a list-based view of all sites, including their health scores and device counts.

The location pane has this 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 these options: <ul style="list-style-type: none"> • Hierarchical Site View: Sorts the list at a site level. From the Go to sites column, click  for a site or building to display data only for that location on the Network dashboard. • Building/Outdoor Area view : Sorts the list at a building level. From the Go to sites column, click  for a site or building to display data only for that location on the Network dashboard.
 Export	Click Export to export the device information to a CSV file.

Location option	
Item	Description
 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 are color coded according to the severity of the problem.
	Click this close icon to hide the map or table view.

Step 5 Click the time range setting (**24 Hours** ▾) in the top menu bar to specify the time range of data that appears on the dashboard.

- From the drop-down menu, select the time range: **3 Hours**, **24 Hours**, or **7 Days**.
- Specify the **Start Date** and time, and the **End Date** and time.
- Click **Apply**.

Step 6 Click the **Actions** drop-down list in the top menu bar for this functionality:

- **Export Dashboard:** Enables you to export the network 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 7 Use the **Network Health** timeline for this functionality.



You can specify a more granular time range. You can click and drag the timeline boundary lines to specify the time range. This sets the context for the custom charts on the dashboard.

You can use the arrow buttons on the right of the timeline to view data for up to 30 days.

Hover your cursor within the timeline chart to view the network device health score percentage at a specific time.

The dotted horizontal line represents the threshold for a healthy network, which by default is set to 40%.

To change the threshold value:

- Hover your cursor over the information () icon.
 - In the tooltip, click the edit () icon.
 - In the **Network Health Threshold** slide-in pane, click and drag the blue line to set the threshold percentage value.
 - Click **Save**.
- Check the **Telemetry Status** check box below the timeline to view the horizontal bar in the timeline. To view the telemetry status:
 - Hover your cursor over the horizontal bar to view the network device telemetry status such as Good, Fair, or Poor in the tool tip
 - Click the **Telemetry Status** in the tool tip to open a slide-in pane to view the summary of the telemetry status.

Note

Changing the custom threshold affects when the Network Device Summary Health Score is displayed as red. The custom threshold does not change the number of healthy or unhealthy devices.

Note

Gaps in the timeline indicate that no health data was retrieved from the device. This situation can occur when a device is in maintenance mode.

Step 8

Use the **Network Devices Health Summary** dashlet for this functionality:

Network Devices health summary dashlet	
Item	Description
Network Devices Health Summary area	<p>Includes these tabs:</p> <ul style="list-style-type: none"> • Latest: Displayed by default. The left pane provides the network health summary score and the total number of devices. The right pane displays charts. <ul style="list-style-type: none"> • Network Health Summary Score: The Network Health Summary score is the percentage of healthy (good) devices in your overall network or selected site. See Network Health score, on page 27. • Total Devices: Provides the total number of network devices and the count of devices that have Good Health, Fair Health, Poor Health, and No Health Data. • Charts: This color-coded snapshot-view chart shows the performance of each device category (Access, Core, Distribution, Router, Wireless Controller, and Access Points) over the last 5 minutes. <p>Hover your cursor over a color to display the health score and the number of devices associated with that color.</p> <p>If the chart shows a low health score (red or orange), the KPIs that contributed to the low health score are shown next to the bar. Examples include link errors, high CPU, high memory, high noise, and low air quality.</p> <p>You can also click a hyperlinked device category (Access, Core (including third party devices), Distribution, Router, Wireless Controller, and Access Point) to open a slide-in pane with additional details.</p> • Trend: Click the Trend tab to display a trend chart. This color-coded trend chart shows the performance of devices over a time range. Hover your cursor over the chart to display the total number of devices and their health over time. <p>The color in the charts represent the health of the network devices:</p> <ul style="list-style-type: none"> ●: Poor network devices. Health score range is 1 to 3. ●: Fair network devices. Health score range is 4 to 7. ●: Good network devices. Health score range is 8 to 10. ●: No Health data (includes third party devices and devices in maintenance mode). Health score is 0.
View Details	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 to refresh the data in the table that is displayed below the chart.

Step 9 Use the AP dashlets to view this information:

Total APs up/down dashlet

Color-coded chart that provides this AP status information: number of APs that are connected to the network and the number of APs that are not connected to the network.

The **Latest** tab provides a 5-minute snapshot view.

The **Trend** tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.

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 to refresh the data in the table that is displayed below the chart.

Top N APs by Client Count Dashlet

Chart that provides information about the APs that have the highest number of clients.

The **Latest** tab provides a 5-minute snapshot view.

The **Trend** tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.

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 to refresh the data in the table that is displayed below the chart.

Top N APs by High Interference Dashlet

Information about the APs that have high interference. You can select 2.4 GHz, 5 GHz, or 6 GHz.

The **Latest** tab provides a 5-minute snapshot view.


The **Trend** tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.


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 to refresh the data in the table that is displayed below the chart.

Step 10

Use the **Network Devices** dashlet for this functionality:

Network Devices dashlet	
Item	Description
Type	Filter the table based on the device type with these options: All , Access , Core , Distribution , Router , WLC , and AP . Note When you filter the devices based on device type "Router", it displays the device(s) with device role "Border Routers".

Network Devices dashlet	
Item	Description
Overall Health	<p>Filter the table based on the overall health score of the device with these options:</p> <ul style="list-style-type: none"> • All • Poor: Devices with a health score range from 1 to 3. • Fair: Devices with a health score range from 4 to 7. • Good: Devices with a health score range from 8 to 10. • No Health: Devices with no health data.
Network Devices table	<p>View device information for all the devices in the network or for a selected site in a table format.</p> <p>Note The Overall Health Score is the minimum subscore of these KPI metric health scores: System Health, Data Plane Connectivity, and Control Plane Connectivity.</p> <p>In the Overall Health Score column, hover your cursor over a health score. The Device Health score is displayed along with the health and percentage value of all of the KPI metrics. The Device Health score is the minimum subscore of the KPI metrics, depending on the type of device. For routers and switches, these are the KPI metrics: System Resources (memory utilization and CPU utilization), Data Plane (uplink availability and link errors), and Fabric (Control Plane Reachability). The Fabric Domain Name, Fabric Name and Fabric Role columns display the fabric domain name, fabric name, and fabric role (Edge, Border, Map Server, and so on).</p> <p>Hover over your cursor on device icon against each device to view the reachability status (Reachable, Up, Unreachable, Rebooting, and so on).</p> <p>Note For third party devices, the device reachability status is either Reachable or Unreachable.</p>
Device 360	<p>Display a 360° view of a device by clicking the device name in the Device column.</p> <p>Device 360 provides detailed information for troubleshooting device issues.</p> <p>Note When a site admin discovers a device that's not assigned to a site, the Device 360 window doesn't show data for the unassigned device. However, a global admin can see data for unassigned devices in the Device 360 window.</p>
 Export	Click Export to export the device information to a CSV file.

Network Devices dashlet	
Item	Description
	<p>Customize the table display:</p> <ol style="list-style-type: none"> From the Table Appearance tab, set the table density and striping. From the Edit Table Columns tab, select the data you want displayed in the table. Click Apply.

Step 11 Use the **Network Devices Reachability** dashlet to view this information:

Network Devices Reachability Dashlet
<p>Color-coded chart shows the reachability status of routers, switches, and wireless controllers.</p> <ul style="list-style-type: none"> • Reachable • Unreachable <p>The Latest tab provides a 5-minute snapshot view.</p> <p>The Trend tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.</p> <p>Click View Details to open a slide-in pane with additional details. From the slide-in pane, you can hover your cursor over the timeline slider to view the reachability status of over a time period. The Reachability status count of top devices based on role and location is displayed below the timeline slider as horizontal bar graphs.</p> <p>You can select the data displayed as horizontal bars to filter the table based on the reachability status, device types, and location with these options: All, Access, Core, Distribution, Router, and WLC.</p>

Step 12 Use the **WAN Link Utilization** dashlet to view this information:

WAN link use dashlet
<p>The bar chart shows the status of the WAN link use percentage only for the available WAN links.</p> <p>Note For a link to be considered a WAN link, you must manually assign the system-generated WAN tag to the required port. See "Assign Tags to Ports" in the Manage Your Inventory chapter of the Catalyst Center User Guide.</p> <p>The Latest tab provides a 10-minute snapshot view of Available and Not Available WAN links.</p> <p>The Trend tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.</p> <p>Click View Details to open a slide-in pane with additional details. From the slide-in pane, you can select an element on the chart to view more detailed data.</p> <p>You can select the data displayed as horizontal bars below the timeline slider to filter the table based on top locations, device types, and location.</p>

Step 13 Use the **WAN Link Availability** dashlet to view this information:

WAN link availability dashlet

Color-coded chart displays the information on the available WAN links in your network.

The **Latest** tab provides the percentage of WAN links available.

The **Trend** tab provides a trend view for the time range that you selected in the time range settings. For example, if the time range is set to the last three hours, the trend tab displays three hours of data.

Click **View Details** to open a slide-in pane with additional details. From the slide-in pane, you can select an element on the chart to view more detailed data.

You can select the data displayed as horizontal bars below the timeline slider to filter the table based on top locations (link count) and device types (link count).

Monitor and troubleshoot the health of a device

Use this procedure to view details about a specific device and determine if there are potential issues that must be addressed.

Procedure

Step 1 From the main menu, choose **Assurance > Health**.

The **Overall** health dashboard appears.

Step 2 Click the **Network** tab.

Step 3 In the **Network** health dashboard, do one of these tasks:

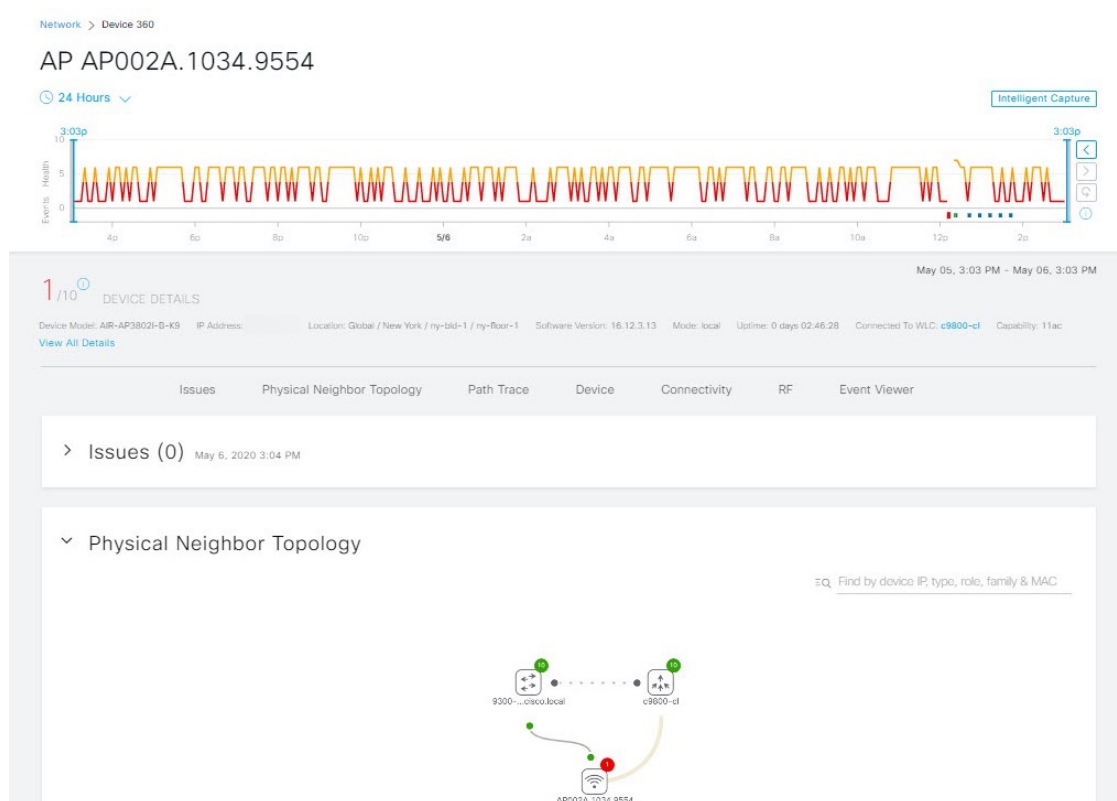
- In the **Network Devices** dashlet, click a device name in the **Device Name** column.
- In the **Search** field, enter the device name, IP address, or MAC address.

The **Device 360** window displays a 360° view of the network device.

Note

The **Map View** appears by default.

Figure 2: Device 360 window

**Note**

You can click the **View Device Details** hyperlink next to the device name to cross-launch the device inventory window.

- Step 4** Click the time range setting (🕒 24 Hours ▼) to specify the time range of data that is displayed on the window:
- From the drop-down menu, select a time range: **3 hours**, **24 hours**, or **7 days**.
 - Specify the Start date and time and the End date and time.
 - Click **Apply**.

- Step 5** Click **Intelligent Capture** to view, monitor, and troubleshoot captured onboarding and data packets for a specific network device and to determine if there are potential issues that must be addressed. See [View RF Statistics of an AP](#).

Note

Intelligent Capture is not supported for all the AP models. If **Intelligent Capture** is not displayed, verify that the AP is a supported model, and that the AP is assigned to a location on the **Network Health** dashboard.

- Step 6** Use the timeline slider to view the health and events information about the network device over a period of time.

Note

Gaps in the timeline indicate that no health data was retrieved from the device. This situation can occur when a device is in maintenance mode.

Under Maintenance banner is displayed for the access points that are under maintenance mode when you hover your cursor during a specific time period.

The timeline slider displays this information:

- **Health:** You can hover your cursor over the timeline slider to view the device health score and KPIs for a 5-minute window. The device's health score is the minimum of all KPI health scores.

When you double-click the graph, it displays the timeline slider for 1 hour.

Note

To display information for longer than 1 hour, manually move the timeline slider to the desired time range.

When you double-click the timeline, it displays the timeline slider for a 1-hour time period. The entire window is refreshed, providing updates for that hour. Note that the timestamps next to each category (**Issues**, **Connectivity**, and so on) are also refreshed.

- Check the **Telemetry Status** check box below the timeline to view the horizontal bar in the timeline. To view the telemetry status:
 - Hover your cursor over the horizontal bar to view the network device telemetry status such as Good, Fair, or Poor in the tool tip.
 - If telemetry shows in red color, it indicates full data loss.
 - If telemetry shows in yellow color, it indicates partial data loss.
 - Click the **Telemetry Status** in the tool tip to open a slide-in pane to view the summary of the telemetry status.

Step 7

You can view the device's health score in the **Device Details** area, below the timeline.

Note

Devices in maintenance mode are not included in the calculation of a device's health score.

The details for the device's health score are as follows:

- **Switch:** The health score for switches is the minimum subscore of these parameters — memory utilization, CPU utilization, link errors, link discards, uplink availability, and reachability to the control plane. In addition, for fabric devices, fabric health is also included. For more information, see [Switch Health score, on page 28](#).

Note

Switches: Uplink availability is based on infrastructure links.

Cisco StackWise Virtual: Uplink availability is based on infrastructure links, Cisco StackWise Virtual links (SVL), and Dual Active Detection (DAD) links. See [About Cisco StackWise Virtual and its limitations, on page 22](#).

Cisco StackWise: Uplink availability is based on infrastructure links and Cisco StackWise links. See [About Cisco StackWise and its limitations, on page 23](#).

- **Router:** The health score for routers is the minimum subscore of these parameters — memory utilization, CPU utilization, link errors, link discards, uplink availability, and reachability to the control plane. For more information, see [Router Health score, on page 29](#).

Note

Uplink availability is based on infrastructure links.

- **AP:** The health score for APs is the minimum subscore of these parameters — memory utilization, CPU utilization, link errors, radio utilization, interference, noise, and air quality. For more information, see [AP Health score, on page 30](#).
- **Wireless Controller:** The health score for wireless controllers is the minimum subscore of these parameters — memory utilization, free timers, free memory buffers (MBufs), work queue element (WQE) pools, packet pools,

and link errors. For fabric wireless controllers, it includes fabric health. For more information, see [Wireless Controller Health score, on page 32](#).

The color of the health score represents its severity. The health is measured on a scale of 1 to 10, where 10 is the best score. A score of 0 indicates that data could not be obtained, or that the device is in maintenance mode.

- : Critical issues. Health score range is 1 to 3.
- : Warnings. Health score range is 4 to 7.
- : No errors or warning. Health score range is 8 to 10.
- : No data available (includes devices in maintenance mode). Health score is 0.

Step 8

Use the **Device Details** area, below the timeline, to view the most current information about the device, such as the building and floor where the device is located, the device model, IP address, software version installed on the device, device role, HA status, the IP address or MAC address, and the uptime.

Note

For **Fabric Site**, elements are displayed in the device details area—**Fabric Role**, **Fabric Domain**, **System Resources**, **Data Plane**, **Virtual Network**, **Transits** and **Events**.

For **Cisco StackWise Virtual**, two additional elements are displayed—**Stack Status: StackWise Virtual** and **StackWise Virtual Domain**.

For **Cisco StackWise**, an additional **StackWise** element is displayed, along with the number of switches in the stack, such as **StackWise (2)**. A stack can contain a maximum of eight switches.

For **Mesh APs**, these details are displayed in the device details area—**Mode**, **Mesh Role** and **RAP**.

For PoE-capable devices, these elements are also displayed in the device details area—**IEEE Class**, **Negotiated Power Level**, and **PoE Status**.

Step 9



Click **View All Details** in the **Device Details** area to open a slide-in pane that displays additional attributes of a device, such as general information, network information, and rack location. Depending on the device type, additional device-specific details may be included.

Step 10

Use the **Issues** category to view issues that must be addressed.

Note

When a device is in maintenance mode, it does not trigger any issues.

Issues are listed based on the timestamp. The most recent issue is listed first. Next to the issue name is a Note icon (). If you're an admin user, you can add, edit, and delete notes. Click the Note icon () and then click **Add**. If you're any other type of user, you can only view note information.

Click an issue to open a slide-in pane to view the corresponding details, such as the description of the issue, impact, and suggested actions.

From the slide-in pane, you can do these tasks:

- To resolve an issue:
 - a. From the drop-down list, select **Resolve**.
 - b. Click **Resolved Issues** to view the issues that are resolved.
- To ignore an issue:
 - a. From the drop-down list, select **Ignore**.


- b. On the slider, set the number of hours to ignore the issue.
- c. Click **Confirm**.
- d. Click **Ignored Issues** to view the issues that have been ignored.

Step 11 Use the **Physical Neighbor Topology** category to view the topology of the device and how that device is connected to neighboring devices.

You can do these tasks:

- Click a node to display a slide-in pane that displays information about the node.
- Click a link between two devices to see the details about that specific link, such as the port/interface corresponding to the link, admin status, port mode, and so on.
- Hover your cursor over the link ends (dots) to see the status of the link.
- Hover your cursor over a group of devices and click **View Devices List** to view the list of devices and their details.
- In the Search field in the **Onboarding** area, you can search for a specific device. The specific node is selected, and the corresponding information about the device is displayed.

Note

- For AP 360, the 2-GHz and 5-GHz clients are displayed, and the dotted link lines going from these two clients are not clickable. Also, the link line between AP to wireless controller and wireless controller to AP is not clickable.
- For an SD-Access Fabric, the fabric groups are displayed with a fabric badge icon.
- The Cisco StackWise Virtual and Cisco StackWise are displayed with a stack icon ()
- Path Trace displays a switch icon if a Cisco StackWise Virtual or a Cisco StackWise is involved in that path.

Step 12 Use the **Event Viewer** category to view an audit trail of events for the device. The Event Viewer table provides information about the issue such as the reason code and the time stamp when the event occurred. Click an event to view details about that event in the right pane.

- **APs:** Lists scenarios and the sequence of subevents that led to each scenario. This allows you to pinpoint during which sub event an issue occurred. Radio resource management (RRM) events, such as Transmit Power Change, RF Channel Change, and Radio Reset, are displayed.
- **Switches and Routers:** Displays all syslogs that have a severity of Critical and above (Emergency and Alert), events for any links that are up or down, and events for devices that are reachable or unreachable. Syslogs that are less severe than Critical level (Error, Warning, Notice, and Info) are also displayed.
- **Wireless Controllers:** Lists wireless controller events. For Cisco AireOS devices, selected traps and syslogs are displayed. For Cisco IOS controllers, selected syslogs and events are displayed.

Step 13 Use the **Path Trace** category to run a path trace.

Click **Run New Path Trace** to display a network topology between a specified source device and a destination device. The topology includes the path's direction and the devices along the path, including their IP addresses. The display also shows the protocol of the devices along the path (**Switched, STP, ECMP, Routed, Trace Route**) or other source type.

See [Do a path trace](#).

Step 14 Click the **Application Experience** category to view the running applications in your network.

To view the metrics in a chart format, click the radio button next to an application. A slide-in pane opens with the relevant information.

See [About Application Experience and Application Visibility](#) and [View Application Experience of a host](#).

Note

This category is displayed only for routers.

Step 15 Use the **Detail Information** category to view the device's historical KPIs performing over a period of time.

Click these tabs to view the respective details:

Device info tab
<p>Availability section displays information about the device CPU, memory, uptime, temperature, and so on.</p> <p>HA Redundancy section displays information about the Redundancy Mode, Redundancy Unit, Local State, and Peer State for the Cisco Embedded Wireless Controllers.</p> <p>For WLC 360, STANDARD POWER SERVICE section displays information about device Connection Status, Last Successful Connection and so on.</p> <p>Note For third party devices, only the Uptime chart appears.</p> <ul style="list-style-type: none">• If there are multiple sensors for a wireless controller, the data reflects the latest maximum temperature of all sensors.• For network devices that are configured out of band, the uptime chart does not correlate correctly with the health score and other data. For example, the uptime chart for a 24-hour window shows that the device was down at 11:39 am and at 2:40 pm. Then, if you select a 3-hour window, 11:00 am – 2:00 pm (in the timeline slider), the downtime is not displayed. This issue occurs because Catalyst Center is not able to receive the sys uptime information from the device. To work around this issue, synchronize the configuration between the device and Catalyst Center.

Connectivity tab

Displays information about the health of a device's connection with the network. This tab is available for APs.

The Connectivity tab contains radio-specific KPIs, such as Radio 0, Radio 1, and Radio 2. Click the appropriate radio to view information such as Current Channel, Extended Channel(s), RF Profile, Band, Mode, and Current Channel Width. You can also view charts for Traffic, Client Count, and so on.

- **Traffic:** The traffic (in Mbps) for radios is displayed. The Rx (receiver) data packets and Tx (transmitter) data packets (in bytes) are shown as color-coded lines on the chart.
Hover your cursor over a time instance on the graph to view the amount of traffic (Rx or Tx) sent or received for a particular day and time.
- **Client Count:** The number of clients for radios is displayed. The client count is shown as color-coded lines on the chart.
Hover your cursor over a time instance on the graph to view the number of clients connected to an AP for a particular day and time.
- **Link Error:** To display information about interfaces, check the check boxes next to the interfaces on the right of the chart. Based on the interfaces you select, the error percentage for each interface is displayed as color-coded lines on the chart.
Hover your cursor over a time instance on the graph to view the error percentage for a particular day and time. You can select a maximum of five interfaces.
- **Ethernet Interface KPI:** The Ethernet interface KPIs contain interfaces such as GigabitEthernet0 and GigabitEthernet1. Click the appropriate interface to display the charts for Utilization, Error, and Rate. You can also view the total and average values for the KPIs aggregated for a time range selected on the top of AP 360.

Note

A Connected Switch banner is displayed for interfaces connected with switches.

- **Top Clients with Tx Drops per SSID:** Displays the top 5 clients with packet drop count per selected SSID. This chart is available only for clients connected to Cisco 9800 wireless controllers starting from 17.12 version.
- **Retries:** The connection retries for radios are displayed in the retries chart.

Note

Only infrastructure links are considered for link errors. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.

Fabric Site Tab

This tab is available for SD-Access fabric.

Fabric KPIs are grouped under different categories: **Fabric Site Connectivity**, **Fabric Infrastructure**, and **Fabric Control Plane**. You can filter the categories to view the respective KPIs. Based on the KPI selection, you can view the table displayed with reachability information, such as the destination, IP address, and type. Check the check box next to destination to view the control plane reachability status, LISP, and Pub/Sub session status charts.

Note

The uplink status chart shows data only if the Fabric Underlay Automation is used to provision the fabric.

Interfaces tab

Contains information about the selected interface, such as the name, description, operational status, and link speed.

Use the PORT TYPE tabs to display information about a specific port type. The tabs that are displayed depend on the type of device selected:

- **Switches and Routers:** Displays **All**, **Access**, **Auto**, **Routed**, and **Trunk** port types.
- **Cisco StackWise Virtual:** Displays **All**, **Access**, **Auto**, **Routed**, **TrunkSVL**, and **DAD** port types.
- **Cisco StackWise:** Displays **All**, **Access**, **Auto**, **Routed**, **Trunk**, and **StackWisePort** port types.
- **Wireless Controller:** Displays **All**, **Ethernet**, and **Virtual** port types.

The table contains sortable columns. However, if you try to sort a column with a new parameter, the expanded interface list collapses.

Note

For the **Link Speed** data column, the speed capacity of the interface or physical port is displayed. If the port has negotiated to a certain speed, that negotiated speed is displayed.

To display the operational status of the interfaces for a particular day and time in a chart format, check the check boxes next to the interfaces. You can select a maximum of five interfaces. The first interface in the table is selected by default.

The **Interface Availability**, **Utilization**, **Error**, and **Link Discard** charts are displayed below the table.

The **Tx Utilization** and **Rx Utilization** chart values are populated in **Percentage** and **Rate (bps)**. You can toggle between the Percentage and Rate to view the utilization values.

Note

For wireless controllers, link discard information is not provided in a separate chart. It is provided, along with other data, in a **Traffic Summary** table. Data in the **Traffic Summary** table is shown only for the physical and Ethernet interfaces of a wireless controller.

PoE tab

This tab is available for PoE-capable switches and APs.

Displays the device's Power over Ethernet (PoE) telemetry.

Switches

The **POWER SUMMARY** section displays the switch's overall PoE telemetry:


- **Power Budget:** The overall power that the switch allocates for use with PoE-capable devices.
- **Used Power:** The power being supplied by the switch to PoE-capable devices.
- **Remaining Power:** The unused power available for use by PoE-capable devices.
- **Power Usage:** The percentage of power being supplied by the switch to PoE-capable devices. This value is equal to the value of the **Used Power** divided by the value of the **Power Budget**.

The **Power Stack** section lists the power stack devices connected to PoE, such as Power Stack Name, Stack Mode, Stack Topology, Allocated Power, Consumed Power, Remaining Power, and so on.

The **Module Power Details** section lists the components in the switch that supply power for PoE.

The **PoE Interfaces** section lists the PoE-capable devices connected to the switch's interfaces. At the top of the section is a count of interfaces that are currently off.

You can customize the table by doing these tasks:

- Use the **POE CONFIG**, **ADMIN STATUS**, and **POE OPER STATUS (SIGNAL PAIR)** filters above the table to filter the interfaces.
- Use the search bar to perform searches for specific interfaces, PoE-capable devices, or any other values.
- Click  to open a menu where you can add and remove columns for specific data types.

APs

The **Detail Information** section displays the AP's PoE telemetry: IEEE PD Class, Power Level, PoE Admin Status, PoE Oper Status, PoE Policing Status, Switch Name, Interface Name, Allocated Power, Consumed Power, Max Power Drawn, PoE Priority, PoE Configuration, and Perpetual PoE.

The **Power Distribution** section displays a trend chart of the power distribution (allocated and consumed power) for the selected time range.

StackWise Tab

This tab is available for Cisco StackWise.

Displays information about the Cisco StackWise, such as the serial number, product ID, MAC address, role, state, priority, and the neighboring switch number.

StackWise Virtual Tab

This tab is available for Cisco StackWise Virtual.

Displays information about the Cisco StackWise Virtual, such as the serial number, product ID, MAC address, role, state, priority, uptime, and port numbers.

RF Tab

This tab is available for APs and wireless clients.

- The RF tab contains radio-specific KPIs, such as Radio 0, Radio 1, and Radio 2. Click the appropriate radio tab to display charts for radio channel utilization, traffic utilization, interference, noise, air quality, air-time efficiency, wireless latency by client distribution, Tx power, Top Clients with Tx drops per SSID, channel information, and so on.

- **RF Tab Limitation**

When an AP with three radios (for example, a Cisco Catalyst 9130 AP) connects to a wireless controller running 17.2 or later, the device supports all three radios, and three radios (Radio 0, Radio 1, and Radio 2) are displayed under the RF tab.

When that same AP connects to a wireless controller running version 17.1 older, the device supports two radios, and two radios (Radio 0 and Radio 1) are displayed under the RF tab.

However, if an AP moves from a wireless controller running a newer version to one running an older version (17.2+ > 17.1), the RF tab continues to display the three radios (Radio 0, Radio 1, and Radio 2) that were initially detected.

- For AP 5-GHz radios, a DFS tab provides information about Dynamic Frequency Selection (DFS) radar events.
- For **AP 360**, under **RF** tab:

Radio 2 (6GHz band), **STANDARD POWER MODE** section provides information about **Automated Frequency Coordination (AFC)** integration that includes AFC status, Last Response Time, Expiration, and AFC defined location details such as location type, lat/long, and so on.

Neighbors and Rogues section contains **Band** (2-GHz and 5-GHz radio frequencies), **Type** (All, Neighbor, Rogue), and **RSSI Range** (0 to -100 dBm) filters. Depending on the filter selection, the AP table is refreshed.

AP table includes the details, such as the Identifier, Radio, RSSI (dBm), Channel, Type, and SSID of the AP. Use the search bar to find AP devices, radios, or any other values.

Note

Catalyst Center stores only 10 neighbors with the highest RSSI for each 5-minute interval.

Click  to open a menu where you can use **Edit Table Column** to enable or disable specific columns. Click **Export** to export the table data to a CSV file.

- Click the **KPI** drop-down list and check the check boxes next to the charts that you want to display. The charts provide various information, such as Throughput, Client Count, Channel Utilization, Top SSIDs by Client/Package Count, and so on. Selected charts are displayed in the **RF** tab.
- Depending on the filter selection, the Wi-Fi analyzer graph is displayed below the table. The Wi-Fi graph summarizes the total and average values for the KPIs aggregated for a time range selected on the top of the AP 360 timeline slider.

Check the check boxes next to the APs to view the Wi-Fi analyzer graph for the specific AP. Hover your cursor over the chart to view details.

Click the **Chart Setting** icon to enable or disable the **Access Point Label**, which is shown in the graph for each AP.

Virtual Network Tab

This tab is available for SD-Access fabric.

The KPIs are grouped under the **VN Services** and **Fabric Control plane** categories. You can select the category to view the **Dynamic Default Border**, **Remote Internet Availability**, **Multicast (external RP)**, and **Pub-Sub Session Status** KPIs. You can filter the categories to display the table with reachability information, such as the destination, IP address, and type. Check the check box next to destination to view the status, such as control plane reachability status, LISP, and Pub/Sub session status charts.

Transits and Peers Network Tab

This tab is available for SD-Access fabric.

The **Transits and Peers Network** tab contains these **Transit Site Control Plane** KPIs: **BGP Session from Border to Transit Control Plane**, **LISP Session from Border to Transit Site Control Plane**, and **Pub-Sub Session from Border to Transit Site Control Plane**. Check the appropriate KPI check box to display the charts and table with reachability information, such as the destination, IP address, and type.

Mesh Tab

This tab is available for Mesh APs.

The **Mesh** tab shows a device's mesh role, mesh profile, downstream MAPs, mesh backhaul channel, hops to RAP, bridge group name, and backhaul interface.

It also provides these radio-specific KPIs: **Current Channel**, **Extended Channel(s)**, **Mode**, **RF Profile**, **Band**, **Tx Power**, **Clean Air Status**, **Admin State**, and **Current Channel Width**.

Advanced Analytics Tab

This tab is available for Cisco Catalyst 9800 Series Wireless Controllers and Wireless-enabled Catalyst Switches (eCA).

The **Advanced Analytics** tab displays detailed process-level telemetry KPIs, including:

- **Per-Process CPU Utilization (%)**: Displays the percentage of CPU resources consumed by each process running on the wireless controller over the selected time range. This KPI helps identify processes consuming excessive CPU cycles that may impact device performance and client experience.
- **Per Process Memory Utilization (%)**: Displays the percentage of memory resources consumed by each process running on the wireless controller over the selected time range. This KPI helps identify processes with abnormal memory consumption that could lead to memory exhaustion and device instability.
- **Client Delete Count**: Displays the number of client deletion events per WNCN process instance over the selected time range. A client deletion occurs when a client session is removed from the controller due to disassociation, deauthentication, session timeout, or administrative action. This KPI helps identify abnormal client churn patterns.
- **KPIs**: Click the **KPIs** drop-down to view and select from the available Advanced Analytics KPIs. Check the check boxes next to the KPIs you want to display, and click **Apply**. You can select multiple KPIs simultaneously. The available KPIs are: AP Count, Client Count, Client Count Per Band, Client State Stats, Client Association Stats, Client Mobility Stats, Client Roam Stats, Traffic, Traffic Errors, Data Plane – Punt, Data Plane – Software Drops, Data Plane – Hardware Drops, mDNS Stats, AAA Stats – Authentication, AAA Stats – Authorization, AAA Stats – Accounting, AAA Stats – Radius
- **Client Count**: Displays the total number of wireless clients currently associated with each WNCN process instance on the wireless controller over the selected time range. This KPI provides visibility into client load distribution across wncn processes and helps identify load imbalances.

When you use the time slider to display KPI data for the last 3 hours, 24 hours, or 7 days, note that:

- The 7-day time slider uses a 60-minute window. It reports data based on the start time of that 60-minute window and returns the latest data within that 60-minute interval.
- The 3-hour and 24-hour time sliders use a 10-minute window. They report data based on the start time of that 10-minute window and return the latest data within that 10-minute interval.

Step 16 To compare the health of AP radios across the floor in a building, click the toggle button in the top-right corner to switch between **Detail View** and **Map and Comparison View**.

Map and Comparison View displays a floor map with the AP radios placed on it.

Step 17 From the **View Site** drop-down list, select the floor on which you want to compare the AP radios.

Hover your cursor over the AP icon on the floor map to view the device details of an AP radio, such as **MAC Address**, **Model**, **Mode**, and **Issue Count**.

Step 18 Click **Compare AP Radios** to compare the AP radios on the floor map.

The **Map View** appears by default, showing the last 5 minutes of AP radio data.

Step 19 Click the AP icon on the floor map.

A dialog box appears to select or deselect the radios for comparison.

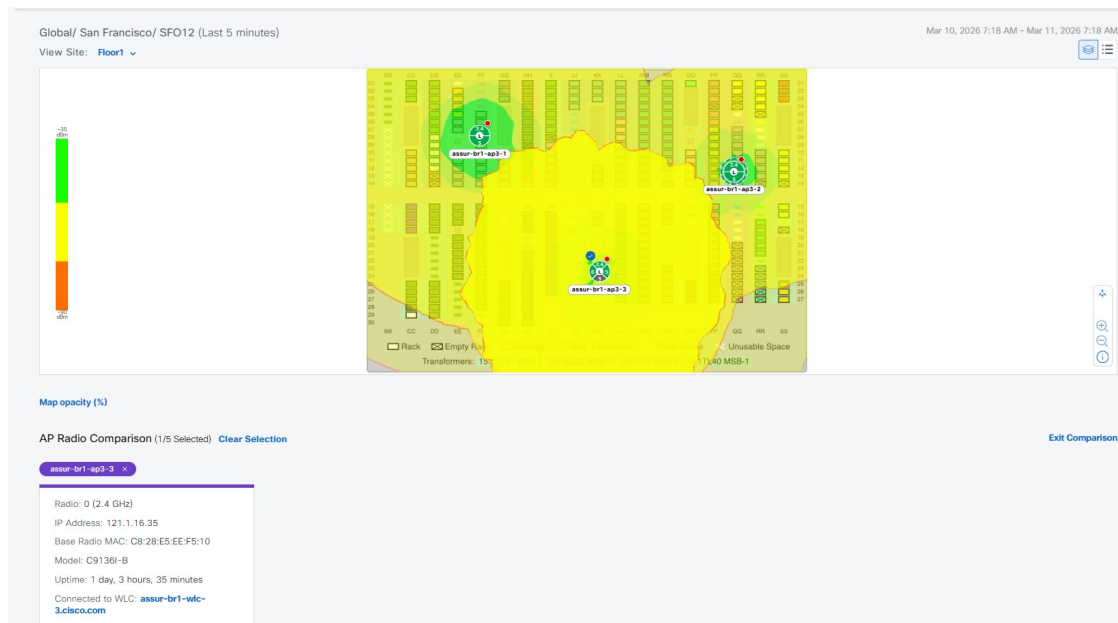
Step 20 Check the check boxes next to the list of radios that you want to compare on a floor.

Note

- By default, Catalyst Center selects the current AP for comparison only if the first radio of the respective AP is in monitor mode.
- **Local**, **Remote**, and **Hybrid** modes are the only AP radio modes enabled for comparison.
- You can select up to five AP radios at a time for comparison.

Step 21 Use **AP Radio Comparison** to view the list of AP radios selected for comparison.

Figure 3: AP Radio Comparison Map View



You can compare **Radio**, **IP Address**, **Model**, **Uptime**, **Connected to WLC**, and **Floor**.

Step 22 Use **Comparative Metrics** to view the comparative metrics for the selected KPIs.

Step 23 From the **Select KPI** drop-down list, select the KPIs for which you want to see the comparative matrices.

You can select from these KPIs:

- Channel Information
- Throughput (Rx Rate)
- Radio Retries
- Interference
- Air Quality
- Management Frames
- Tx Errors
- Tx Power
- Traffic Utilization

- Tx Traffic Utilization
- Throughput (Tx Rate)
- Connected Client Count
- Channel Utilization
- Noise
- Wireless Latency
- Data Frames
- Rx Errors
- Multicast Counter
- Rx Traffic Utilization

Step 24 Click the toggle button to switch between **Map View** and **Table View**.

The **Access Point Radios** table view lists the AP radios.

Step 25 Check the check box next to the AP radios that you want to compare on a floor map.

Step 26 To remove all radios from the comparison in the **AP Radio Comparison** area, click **Clear Selection**.

Step 27 Click **Exit Comparison** to exit.

About Cisco StackWise Virtual and its limitations

Cisco StackWise Virtual is a network system visualization technology that allows two physical switches to operate as a single logical virtual switch using a 40-G or 10-G Ethernet connection.

Supported devices for StackWise Virtual

This table lists the Cisco Catalyst switches that support StackWise Virtual:

Device	Minimum Supported IOS-XE Software Version
Cisco Catalyst 9300 Series Switches	16.11+
Cisco Catalyst 9400 Series Switches	16.11+
Cisco Catalyst 9500 Series Switches	16.11+

StackWise Virtual Limitations

Cisco StackWise Virtual has these known limitations:

- After you have configured Cisco StackWise Virtual, the second switch still appears in the inventory, and stops responding because it does not have its own IP address. As a workaround, do these steps:
 1. Delete both the switches from the inventory. See [Delete a network device](#).
 2. Configure StackWise Virtual. (Configure the two switches into one virtual switch.)

3. Discover the devices. See [Discover your network using an IP address range or CIDR](#), [Discover your network using CDP](#), or [Discover your network using LLDP](#).



Note After StackWise Virtual is discovered, one switch plays the active role, while the other a standby role. Both switches in the stack get associated with one primary management IP address.

- After you remove Cisco StackWise Virtual, the two switches are independent. They both have the same IP address and operate in Dual Active Detection (DAD) state. As a workaround, do these steps:
 1. Configure a different IP address on the second switch.
 2. Rediscover the devices. See [Discover your network using an IP address range or CIDR](#), [Discover your network using CDP](#), or [Discover your network using LLDP](#).

About Cisco StackWise and its limitations

The Cisco StackWise technology provides an innovative new method for collectively utilizing the capabilities of a stack of switches. Individual switches intelligently join to create a single switching unit with a 32-Gbps switching backplane. Configuration and routing information is shared by every switch in the stack, creating a single switching unit.

Supported devices for Cisco StackWise

These devices support Cisco StackWise:

- Cisco Catalyst 3650 Series Switches
- Cisco Catalyst 3850 Series Switches
- Cisco Catalyst 9300 Series Switches

Cisco StackWise limitations

Cisco StackWise has these known limitations:

- Ring status is not displayed in the **Device 360** header.
- Link Speed information is not provided in the **Detail Information > Interfaces** tab.

Configure health score settings for network devices

Use this procedure to configure the health score settings for network devices. You can customize the health score calculation for network devices by changing the KPI thresholds and specifying the KPIs that are included for the calculation. Health score settings is not applicable to third party devices.

Procedure

Step 1 From the main menu, choose **Assurance > Health > Health Score Settings**.

The **Health Score** window appears.

Step 2 Click the **Device Health** category to customize its health score calculation settings.

The screen displays the Key Performance Indicators (KPIs) table that includes KPI Name, KPI Health Score, Included for Health Score, Current Setting, and Last Modified.

Step 3 From the **KPI Name** column, click the KPI name link.

The slide-in pane for the KPI appears.

KPI Name	KPI Health Score	Included for Health Score	
Fabric Control Plane Reachability Device health indicated by fabric Control Plane Reachability status.	POOR Fabric is not reachable	GOOD Fabric is reachable	Yes
Free Mbuf Device health indicated by Free Memory Buffers.	POOR -> 20%	GOOD -> 20%	Yes
Free Timer Device health indicated by Free Timers.	POOR -> 20%	GOOD -> 20%	Yes
Link Error Device health indicated by Link Errors.	POOR -> 1%	GOOD -> 1%	Yes
LISP Session Status Device health indicated by LISP Session Status.	POOR LISP Session Status Down	GOOD LISP Session Status Up	Yes
Memory Utilization Device health indicated by Memory Utilization.	POOR > 95%	GOOD <= 95%	Yes
Packet Pool	POOR	GOOD	

Step 4 Configure the KPI health score settings:

- If the KPI threshold is quantitative, you can customize the threshold value for what is considered a good health score.
- To sync or unsync the common KPI threshold between the health and issues settings, use the Synced toggle button. The sync works vice versa when it is synced from health or issue settings page and it is applicable only for wireless controllers.
- To remove the KPI from the health score calculation, uncheck the **Included in Device health Score** check box.

Note: The synchronization of the common KPI threshold between the health and issues settings using the Synced toggle button applies only to the Wireless controllers device category.

Note

A network device's health score is the lowest score from all its included KPI scores.

Restriction

At least one KPI must be included for the health score calculation.

Attention

When viewing the KPI health scores for a network device, excluded KPIs display a NA instead of a health score.

d) To restore the default settings, hover your cursor over **View Default Setting** and click **Use Default**.

Step 5 Click **Apply**.

A confirmation dialog box appears.

Enable SNMP Collector metrics for fabric devices

For the health score to populate correctly for fabric devices, you must enable the SNMP Collector metrics.

Procedure

Step 1 From the main menu, choose **System > Data Platform**.

Step 2 Click **Collectors**.

A list of collectors appears.

Step 3 Click **COLLECTOR-SNMP**.

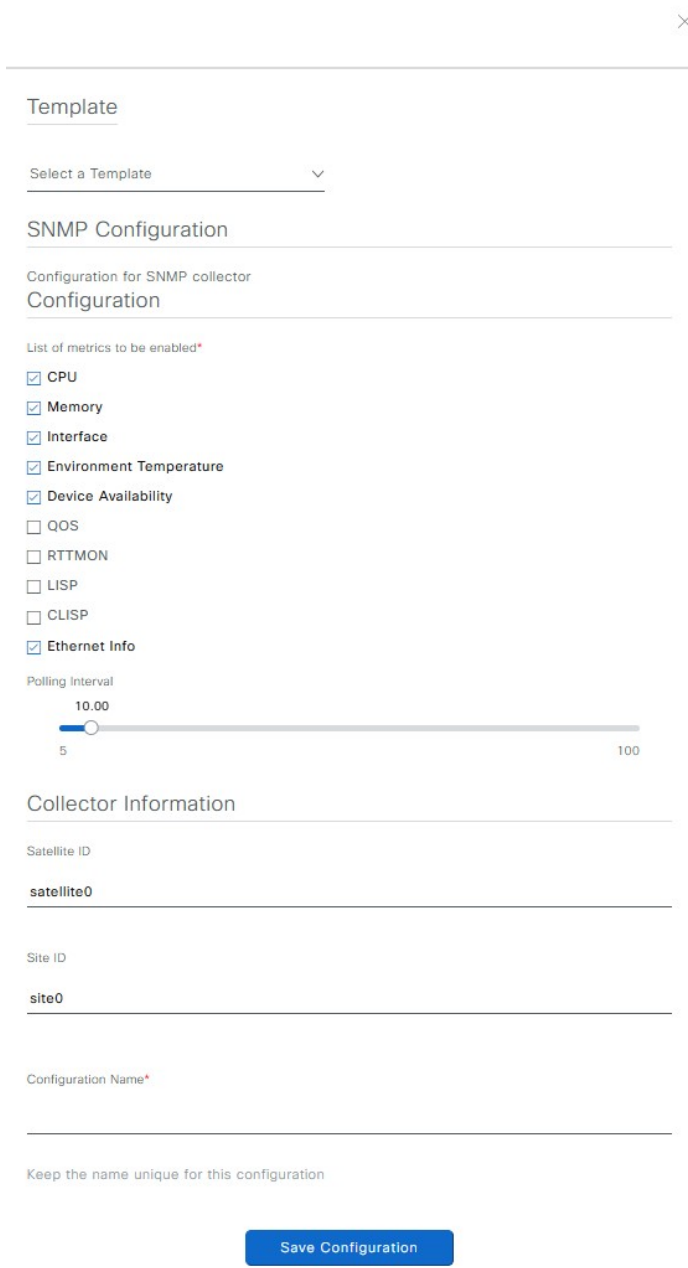
The **COLLECTOR-SNMP** window opens.

Step 4 Click **+ Add**.

The **SNMP Configuration** dialog box opens.

Step 5 Choose a template from **Select a Template** drop-down list.

Figure 4: SNMP Configuration



The image shows a configuration dialog box for SNMP. It has a close button (X) in the top right corner. The dialog is divided into several sections:

- Template:** A dropdown menu labeled "Select a Template".
- SNMP Configuration:** A section header.
- Configuration for SNMP collector Configuration:** A sub-section header.
- List of metrics to be enabled*:** A list of checkboxes for various metrics:
 - CPU
 - Memory
 - Interface
 - Environment Temperature
 - Device Availability
 - QOS
 - RTTMON
 - LISP
 - CLISP
 - Ethernet Info
- Polling Interval:** A slider control with a value of 10.00, ranging from 5 to 100.
- Collector Information:** A section with three text input fields:
 - Satellite ID: `satellite0`
 - Site ID: `site0`
 - Configuration Name*: (empty)

Below the Configuration Name field, there is a note: "Keep the name unique for this configuration". At the bottom center, there is a blue button labeled "Save Configuration".

Step 6 In the **Configuration Name** field, enter a unique name for the SNMP configuration.

Step 7 Click **Save Configuration**.

Understand network health score and KPI metrics

This section provides information about how the network health scores and KPI metrics are computed.

Network Health score

The Network Health score is a percentage of the number of healthy network devices (a health score from 8 to 10) divided by the total number of network devices (excluding devices in maintenance mode). The score is calculated every 5 minutes.

For example:

90% (health score) = 90 (network devices with health score from 8 to 10) \div 100 (total number of network devices - devices in maintenance mode)

Device Category Health score

The Device Category Health score (Access, Core, Distribution, Router, Wireless) is the percentage of the number of healthy network devices (a health score from 8 to 10) in a target category, divided by the total number of network devices in that category (excluding devices in maintenance mode). The score is calculated every 5 minutes.

For example:

90% (health score) = 90 (network devices in a target category with health score from 8 to 10) \div 100 (network devices in that category - devices in maintenance mode)

Individual Device Health score

The Individual Device Health score is the minimum score of these KPI metric health scores: System Health, Data Plane Connectivity, and Control Plane Connectivity. The KPI metric score is based on the threshold that is defined per KPI.

Device Health Score = MIN (System Health, Data Plane Connectivity, Control Plane Connectivity)

Depending on the type of device, the metrics vary.

System health	
Device type	Description
Switch (Access and Distribution)	Includes system-monitoring metrics, such as CPU utilization and memory utilization.
Wireless	Includes these system-monitoring metrics: <ul style="list-style-type: none"> • For wireless controllers, it includes memory utilization, free timers, and free Mbufs. • For APs, it includes CPU utilization and memory utilization.
Router	Includes system-monitoring metrics, such as CPU utilization and memory utilization.
Fabric	Includes system-monitoring metrics, such as CPU utilization and memory utilization.

Data plane connectivity	
Device type	Description
Switch (Access and Distribution)	Includes metrics, such as link errors and link status. For switches, the Inter-device Link Availability metric counts physical stack ports, network device-connected links, and fabric edge-facing port channels.
Wireless	Includes these metrics: <ul style="list-style-type: none"> • For wireless controllers, it includes metrics like WQE pool, packet pools, and link errors. • For AP, it includes RF metrics like interface, noise, air quality, and radio utilization.
Router	Includes metrics, such as link errors.

Control plane connectivity	
Device type	Description
Wireless	Includes these KPIs: <ul style="list-style-type: none"> • For wireless controllers, it includes connectivity to the Control Plane node servers. • For fabric devices, it includes metrics, such as connectivity to the Control Plane node.

Switch Health score

The Switch Health score is the minimum subscore of these parameters:



Note Devices in maintenance mode are not included in the calculation of a device's health score.

Parameter	Score calculation
CPU Utilization	<ul style="list-style-type: none"> • If CPU utilization is 95 percent or less, the score is 10. • If CPU utilization is more than 95 percent, the score is 1.
Memory Utilization	<ul style="list-style-type: none"> • If memory utilization is 95 percent or less, the score is 10. • If memory utilization is more than 95 percent, the score is 1.
Link Errors (Rx and Tx)	<p>Only infrastructure links are considered for link errors. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.</p> <p>If a physical infrastructure interface has errors, the score is 8. If all links are down, the score is 1. Otherwise, the score is 10.</p>

Parameter	Score calculation
Link Discards	<p>Only infrastructure links are considered for link discards. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.</p> <p>If a physical infra link has packet drops (discards), the score is 8. If all links encounter discards, the score is 1. Otherwise, the score is 10.</p>
Link Status	<p>Only infrastructure links are considered for link status UP/DOWN. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.</p> <p>If a physical infrastructure interface is down, the score is 8. If all interfaces are down, the score is 1. Otherwise, the score is 10.</p>
Inter-device Link Availability	<p>The Inter-device Link Availability KPI monitors the connectivity status between your network devices</p> <ul style="list-style-type: none"> • GOOD: This status is triggered when all inter-device links are up • POOR: This status is triggered when all inter-device links are down.
Reachability to Control Plane Node—Fabric Devices Only (Edge and Border)	<ul style="list-style-type: none"> • If the Control Plane node is reachable, the score is 10. • If the Control Plane node is unreachable, the score is 1. <p>Note</p> <ul style="list-style-type: none"> • If there is more than one Control Plane node in a fabric network, and all the Control Plane nodes are reachable, the score is 10; otherwise, the score is 1. • In the case of a collocated Edge or Border with Control Plane, Reachability to Control Plane is not considered. • For the health score to populate correctly for fabric devices, enable SNMP Collector metrics. See Enable SNMP Collector metrics for fabric devices, on page 25.

Router Health score

The Router Health score is the minimum subscore of these parameters:



Note Devices in maintenance mode are not included in the calculation of a device's health score.

Parameter	Score calculation
CPU Utilization	<ul style="list-style-type: none"> • If CPU utilization is 95 percent or less, the score is 10. • If CPU utilization is more than 95 percent, the score is 1.

Parameter	Score calculation
Memory Utilization	<ul style="list-style-type: none"> • If memory utilization is 95 percent or less, the score is 10. • If memory utilization is more than 95 percent, the score is 1.
WAN Connectivity	<ul style="list-style-type: none"> • If the WAN connectivity is down, the score is 1. • If the WAN connectivity is up, the score is 10.
Link Errors	<p>Only infrastructure links are considered for link errors. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.</p> <p>If a physical infrastructure interface has errors, the score is 8. If all links are down, the score is 1. Otherwise, the score is 10.</p>
Link Discards	<p>Only infrastructure links are considered for link discards. Infrastructure links are topological links connecting Catalyst Center-managed network devices, such as switches, routers, wireless controllers, and APs.</p> <p>If a physical infra link has packet drops (discards), the score is 8. If all links encounter discards, the score is 1. Otherwise, the score is 10.</p>
Inter-device Link Availability	<p>The Inter-device Link Availability KPI monitors the connectivity status between your network devices</p> <ul style="list-style-type: none"> • GOOD: This status is triggered when all inter-device links are up • POOR: This status is triggered when all inter-device links are down.
Reachability to Control Plane Node—Fabric Devices Only (Edge and Border)	<ul style="list-style-type: none"> • If the Control Plane node is reachable, the score is 10. • If the Control Plane node is unreachable, the score is 1. <p>Note</p> <ul style="list-style-type: none"> • If there is more than one Control Plane node in a fabric network, and all the Control Plane nodes are reachable, the score is 10; otherwise, the score is 1. • In the case of a collocated Edge or Border with Control Plane, Reachability to Control Plane is not considered. • For the health score to populate correctly for fabric devices, enable SNMP Collector metrics. See Enable SNMP Collector metrics for fabric devices, on page 25.

AP Health score

The AP Health score is the minimum subscore of these parameters:



Note Devices in maintenance mode are not included in the calculation of a device's health score.

Parameter	Score calculation
CPU Utilization	<ul style="list-style-type: none"> • If CPU utilization is 90 percent or less, the score is 10. • If CPU utilization is more than 90 percent, the score is 1.
Memory Utilization	<ul style="list-style-type: none"> • If memory utilization is less than 90 percent, the score is 10. • If available memory is 90 percent or more, the score is 1.
Radio Utilization Score	<p>The score is calculated individually for each radio, and then averaged across all radios to obtain the overall utilization score.</p> <ul style="list-style-type: none"> • If radio utilization is less than 70 percent, the score is 10. • If radio utilization is 70 percent or more, the score is 1.
Interference Score	<p>The score is calculated individually for each radio, and then averaged across all radios to obtain the overall interference score.</p> <p>For 2.4-GHz radio:</p> <ul style="list-style-type: none"> • If interference is less than or equal to 50 percent, the score is 10. • If interference is more than 50 percent, the score is 1. <p>For 5-GHz radio or 6-GHz radio:</p> <ul style="list-style-type: none"> • If interference is less than or equal to 20 percent, the score 10. • If interference is more than 20 percent, the score is 1.
RF Noise Score	<p>The score is calculated individually for each radio, and then the averaged across all radios to obtain the overall noise score.</p> <p>For 2.4-GHz radio:</p> <ul style="list-style-type: none"> • If RF noise is less than -81 dBm, the score is 10. • If RF noise is -81 dBm or more, the score is 1. <p>For 5-GHz radio or 6-GHz radio:</p> <ul style="list-style-type: none"> • If RF noise is less than -83 dBm, the score is 10. • If RF noise is -83 dBm or more, the score is 1.

Parameter	Score calculation
Air Quality Score	<p>The score is calculated individually for each radio, and then averaged across all radios to obtain the overall air quality score.</p> <p>For 2.4-GHz radio:</p> <ul style="list-style-type: none"> • If air quality is 60 percent or more, the score is 10. • If air quality is less than 60 percent, the score is 1. <p>For 5-GHz radio or 6-GHz radio:</p> <ul style="list-style-type: none"> • If air quality is 75 percent or more, the score is 10. • If air quality is less than 75 percent, the score is 1.
Link Error Score	<p>The score is calculated individually for each Ethernet interface and then averaged across all Ethernet interfaces to obtain the overall link error score.</p> <ul style="list-style-type: none"> • If link errors are less than 1 percent, the score is 10. • If link errors are 1 percent or more, the score is 1.

Wireless Controller Health score

The Wireless Controller Health score is the minimum subscore of these parameters:



Note Devices in maintenance mode are not included in the calculation of a device's health score.

Parameter	Score calculation
Memory Utilization	<ul style="list-style-type: none"> • If memory utilization is less than 90 percent, the score is 10. • If the available memory is 90 percent or more, the score is 1.
Free Timer Score	<ul style="list-style-type: none"> • If the number of free timers is 20 percent or more, the score is 10. • If the number of free timers is 20 percent or less, the score is 1.
Free Memory Buffers (MBufs)	<ul style="list-style-type: none"> • If the number of free memory buffer is 20 percent or more, the score is 10. • If the number of free memory buffer is less than 20 percent, the score is 1.
Work Queue Element (WQE) Pool Score	<ul style="list-style-type: none"> • If the wqe pool is greater than wqe pool threshold, the score is 10. • If the wqe pool is at the same level as or lower than the wqe pool threshold, the score is 1.

Parameter	Score calculation
Packet Pools	<ul style="list-style-type: none"> • If the packet pool is greater than the packet pool threshold, the score is 10. • If the packet pool is at the same level as or lower than the packet pool threshold, the score is 1.
Link Errors	<ul style="list-style-type: none"> • If link errors are less than 1 percent, the score is 10. • If link errors are 1 percent or more, the score is 1.
Connection to Control Plane Node—Fabric Wireless Controllers Only	<ul style="list-style-type: none"> • If the Control Plane node is reachable, the score is good. • If the Control Plane node is unreachable, the score is poor. <p>Note If there is more than 1 Control Plane node in a fabric network, and all the Control Plane nodes are reachable, the score is 10; otherwise, the score is 1.</p>

Effects of maintenance mode on network health scores and KPI metrics

When a network device (router, switch, wireless controller, or access point) is placed in maintenance mode, its clients are also placed in maintenance mode. For example, when you place a Cisco Wireless Controller in maintenance mode, any APs associated with the wireless controller are also placed in maintenance mode. Catalyst Center treats all devices in maintenance mode the same, regardless of whether a device was placed in maintenance mode as an administrative action or as a result of its association with a device.

Network health scores and KPI metrics do not include devices that are in maintenance mode, as metrics from such devices may be unreliable or unavailable during this period.

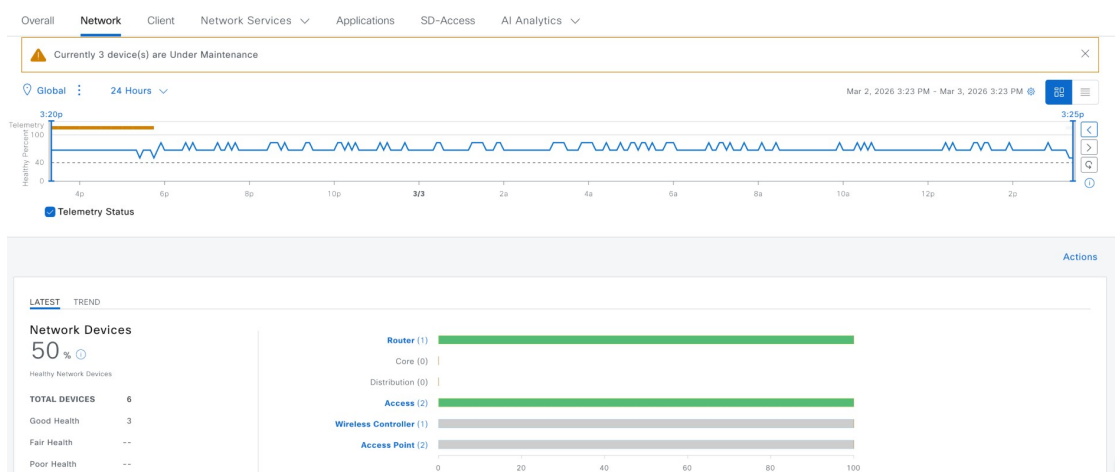
When a device is in maintenance mode, Catalyst Center does not:

- Collect health data
- Gather interface statistics
- Report issues for the device

Health and KPI calculations skip maintenance data. However, reports that show the total number of devices still include those in maintenance mode

When you access network health scores and KPI metrics while a device is in maintenance mode on the **Assurance > Health > Network** window, Catalyst Center displays a banner indicating that a device is in maintenance mode. In addition, start and end times of the maintenance window are indicated in the device 360 windows and logged as events in the system status log. The dashboards allow you to filter by devices that are in maintenance mode.

Figure 5: Device 360 with maintenance banner



Catalyst Center continues to do these tasks for a device that is in maintenance mode:

- Relevant events are still generated and can be displayed in the event viewer during maintenance mode.
- Maintenance-related operations, such as image upgraded, bulk provisioning, and so on still trigger events.
- The availability report in Assurance is not impacted.
- Topology is not impacted.

Understand RF calculations

Channel utilization, also known as *radio utilization*, is the total channel usage that Catalyst Center detects across Wi-Fi and non-Wi-Fi.

Catalyst Center derives the AP radio interference from this formula:

$$\text{Interference \%} = \text{Channel Utilization \%} - \text{Rx Traffic \%} - \text{Tx Traffic \%}$$

This definition of AP interference includes interference caused by rogue traffic, neighbor traffic, and non-Wi-Fi traffic.

Non-Wi-Fi interference, also known as *noise*, can be measured in % and dBm.

This diagram shows the relationship between the various parameters for the AP radio.

Figure 6: RF parameters in Catalyst Center

