Monitor and Troubleshoot Client Health

About Clients

A client is an end device (computer, phone, and so on) that is connected to a network device (access point or switch). Cisco DNA Center supports both wired and wireless clients.

Monitor and Troubleshoot the Health of All Client Devices

A client is an end device (computer, phone, and so on) that is connected to a network device (access point or switch). Cisco DNA Center supports both wired and wireless clients.

Use this procedure to get a global view of the health of all wired and wireless clients and to determine if there are potential issues that must be addressed.

Assurance uses machine learning algorithms to extract behavioral patterns in the network and predict trends. These trends are displayed as baselines in the **Client Onboarding Time** and **Client Count Per SSID** dashlets.

Note The client health data might take up to an hour to populate if an HA failover has occurred.

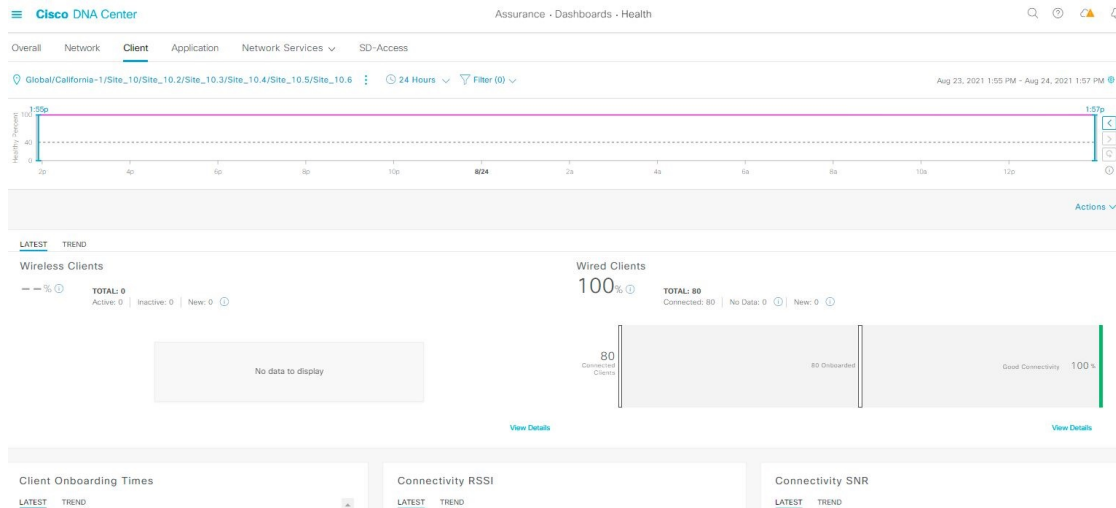**Before you begin**

Configure Assurance. See Basic Setup Workflow.

Step 1 Click the menu icon (≡) and choose **Assurance** > **Health**.

The **Overall** health dashboard appears.

Step 2 Click the **Client** tab.

The **Client** health dashboard appears.

Figure 1: Client Health Dashboard

Step 3 Use the **Client** health dashboard top menu bar for the following functionality:

Client Health Dashboard Top Menu Bar	
Item	**Description**
⊙ Global **Location** pane	Click to display the following icons: • Click ⊙ Global ⋮ to to choose area, building or floor from the left hierarchy tree pane. • Click ⋮ next to the location icon and choose **Site Details** to view the Sites table. • Click ⊘ Hide Sites to hide the Sites table. • ≡ ▥ : Click this toggle button and use the drop-down list to view the percentage of healthy clients in a table format for a site or building. Click **Apply** for a location to only display the location's client information in the **Client Health** dashboard. • ≡ ▥ : Click this toggle button to display the health of all the client sites on a geographic location-oriented client health map. By default, the client sites are color coded according to the severity of the problem. 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 the client is inactive. From the **Go to sites** column, click ⇥ for a site or building to display data only for that location on the **Client Health** dashboard.

Client Health Dashboard Top Menu Bar	
Item	**Description**
🕒 **Time Range** setting	Enables you to display data within a specified time range on the dashboard. Do the following: a. From the drop-down menu, choose the length of the range: **3 Hours**, **24 Hours**, or **7 Days**. b. Specify the **Start Date** and time; and the **End Date** and time. c. Click **Apply**.
Filter icon	Contains the **SSID** and **Band** options. Choose the SSIDs and band frequency from the drop-down list by selecting the check boxes next to them, and then click **Apply**. Depending on your selection, the information in the dashboard is refreshed. **Note** You can choose multiple SSIDs. For example, if you choose Class 1 and Class 2 SSIDs, the dashboard displays information for the clients that are connected to Class 1 SSID and Class 2 SSID.
Actions drop-down list	Enables you to export the client dashboard to PDF format. Click **Export Dashboard** to view the preview page and click **Save**. Enables you to customize the dashboard display when you choose **Edit Dashboards** from the drop-down list. See Change the Position of a Dashlet and Create a Custom Dashboard.

Step 4 Use the **Timeline Slider** to view the healthy client percentage for a more granular time range.

Hover your cursor within the timeline to view the wireless and wired client health score percentage at a specific time.

You can click and drag the timeline boundary lines to specify the time range. This sets the context for client data that is displayed in the dashboard dashlets.

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

The dotted horizontal line represents the threshold value for healthy clients, which by default is set to 40%.
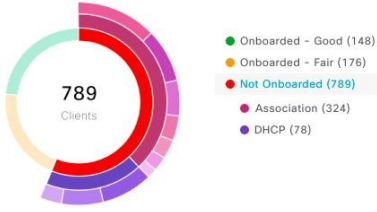
To change the threshold value:

a. Hover your cursor over the information (ⓘ) icon.

b. In the tooltip, click the edit (✏) icon.

c. In the **Client Health Threshold** slide-in pane, click and drag the blue line to set the threshold percentage value.

d. Click **Save**.

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

Step 5 Use the **Client Health Summary** dashlet for the following functionality:

Client Health Summary Dashlet	
Item	**Description**

Client Health Summary area	Includes the following tabs:
	
	• **Latest**: Displayed by default. Includes the following:
	
	    • **Wireless Clients** and **Wired Clients Health Summary Score**: The Wireless and Wired Client Summary Health score is the percentage of clients that onboarded successfully and have good connectivity. See Client Health Score, on page 19.
	
	    • **Total Devices**: Provides the total number of clients and the count of active, inactive, and new clients. Cisco DNA Center defines active, inactive, and new clients based on their activity within a 5-minute health score calculation window, as follows:
	
	        • **Active**: Clients who have successfully onboarded and are sending sufficient data to meet the data threshold, clients who have successfully onboarded and then disconnected, clients attempting to onboard and fail, and clients attempting to onboard but were excluded.
	
	        • **Inactive**: Clients who don't send sufficient data to meet the data threshold. After a user-idle timeout period expires, the wireless controller deauthenticates inactive clients.
	
	        • **New**: Clients who are in the process of onboarding. The health score for these clients is included in the next 5-minute calculation window.
	
	    • **Charts**: This snapshot-view chart provides the distribution of clients that passed or failed to onboard within the last 5 minutes. Then, from the number of clients that onboarded successfully (passed), the chart provides the percentage of clients that have good or fair connectivity.
	
	• **Trend**: Displays a trend chart that shows the health of clients over a time period.
	
	For the clients that failed to onboard, the reason for the onboarding failure is provided. Examples include AAA, DHCP, and Other.
	
	The color in the charts represents the health of the client devices:
	
	🔴: Poor client devices. Health score range is 1 to 3.
	🟠: Fair client devices. Health score range is 4 to 7.
	🟢: Good client devices. Health score range is 8 to 10.
	⚪: Inactive client devices. Health score is 0.

Client Health Summary Dashlet	
Item	**Description**
View Details	Click **View Details** to open a slide-in pane with additional details.
	The radial bar chart provides the distribution of clients that failed to onboard, and the reason for the onboarding failure. You can click each segment to view the failure reasons.
	• Data type categories by client count for that segment.
	• A table with detailed data of the clients in that segment.

Step 6 Use the KPI dashlets to view specific KPIs and metrics for the clients in your network. The following tables describe the KPI dashlets.

Note The chart data is updated every 5 minutes.

Client Onboarding Times Dashlet	
Item	**Description**
Client Onboarding Times chart	Distribution of all clients' attempts to onboard, in all the sites or a selected site, over time. This dashlet provides the percentage of clients that took less than 10 seconds to successfully onboard. Client onboarding covers Association, Authentication, Addressing, WebAuth, and DNS phases.
	There are two types of charts:
	• **Latest**: Displayed by default. This snapshot-view chart provides the distribution of clients that passed or failed to onboard within the last 5 minutes. Then, from the number of clients that onboarded successfully (passed), the chart provides the percentage of clients that have good or fair connectivity.
	• **Trend**: Contains the **Client Count** and **Baseline** tabs. Click the **Baseline** tab to display the onboarding time baseline chart, which is generated through machine learning.
	Note The **Baseline** tab will be deprecated in the near future. For AI Network Analytics features, you must enable AI Network Analytics. See Configure Cisco AI Network Analytics Data Collection and Cisco AI Network Analytics Overview.
	Important To view the baseline chart, you must choose a site and SSID from the **Filter** options.
	The chart details for the baseline charts are represented by different colors.
	• **Green band**: Predicted baseline value.
	• **Solid blue line**: Actual value.
	For the clients that failed to onboard, the reason for the onboarding failure is provided. Examples include AAA, DHCP, and Other.

Client Onboarding Times Dashlet	
Item	**Description**

View Details	Click **View Details** to open a slide-in pane with additional details:
	
	• The left pane contains the **Overall**, **Association**, **Authentication** and **DHCP** tabs. Click the tabs to populate the charts in the right pane.
	
	• The right pane contains **Charts** that have the following tabs:
	
	  • **Latest**: Contains the overall average onboarding time.
	
	  For Authentication and DHCP, the Latest tab contains a drop-down list to filter the data based on the Avg Latency Time, Avg Authentication Time for Authentication, and Avg DHCP Time for DHCP.
	
	  • **Trend**: Contains the **Baseline** tab, which allows you to view machine learning baseline charts.
	
	  Depending on the tab you choose in the left pane, additional tabs display under **Trend** > **Baseline**. For example, the **Client Count**, **Time Baseline**, or **Failure Baseline** tabs appear for Association, Authentication, or DHCP data.
	
	    Note **Failure Baseline** data is available only for the Global site.
	
	    Note The **Baseline**, **Time Baseline**, and **Failure Baseline** tabs will be deprecated in the near future. For AI Network Analytics features, you must enable AI Network Analytics. See Configure Cisco AI Network Analytics Data Collection and Cisco AI Network Analytics Overview.
	
	• Hover and move your cursor over the charts to view synchronized tooltips that display information at a selected point in time.
	
	• Click a color segment in the chart to view the following:
	
	  • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top SSIDs**, **Top Bands**, and **Top Host Operating Systems**.
	
	  • A table with detailed data of the clients in that segment.

Connectivity RSSI Dashlet	
Item	**Description**
Connectivity RSSI chart	Received Signal Strength Indication (RSSI) distribution for all clients, in all sites or a selected site. This dashlet provides the percentage of RSSI measurements for all clients whose RSSI measurement is higher than the threshold value of -72 dBm.
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 view: • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top SSIDs**, **Top Bands**, and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Connectivity SNR Dashlet	
Item	**Description**
Connectivity SNR chart	Signal-to-Noise ratio (SNR) distribution of all clients, in all sites or a selected site. This dashlet provides the percentage of SNR measurements for all clients whose SNR measurement is higher than the threshold value of 10 dB.
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 view: • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top SSIDs**, **Top Bands**, and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Client Roaming Times Dashlet	
Item	**Description**
Client Roaming Times chart	Distribution of the clients by roaming times and failures. This dashlet provides the percentage of clients with roaming times less than 3000 ms.
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 view: • Data type categories by client count: **Top Access Points**, **Top SSIDs**, **Top Host Device Types**, **Top Bands**, **Top Locations**, and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Client Count per SSID Dashlet	
Item	**Description**

Client Count per SSID chart	Distribution of the number of clients per SSID, in all sites or a selected site, over time.
	
	There are two types of charts:
	
	• **Latest**: Displayed by default. This snapshot-view chart provides the distribution of clients per SSID or selected site.
	
	• **Trend**: Contains **Client Count** and **Baseline** tabs. Click the **Baseline** tab to display the SSID baseline chart, which is generated through machine learning.
	
	Note The **Baseline** tab will be deprecated in the near future. For AI Network Analytics features, you must enable AI Network Analytics. See Configure Cisco AI Network Analytics Data Collection and Cisco AI Network Analytics Overview.
	
	Important To view the SSID machine learning baseline chart, you must choose a site and SSID from the **Filter** options.
	
	• The chart details for the baseline charts are represented by different colors.
	
	    • **Green band**: Predicted baseline value.
	
	    • **Solid blue line**: Actual value.

View Details	Click **View Details** to open a slide-in pane with additional details. Contains two types of charts: • **Latest** • **Trend**: Contains the **Baseline** tab, which allows you to view machine learning baseline charts. **Note** The **Baseline** tab will be deprecated in the near future. For AI Network Analytics features, you must enable AI Network Analytics. See Configure Cisco AI Network Analytics Data Collection and Cisco AI Network Analytics Overview. Hover and move your cursor over the charts to view synchronized tooltips that display information at a selected point in time. Click a color segment in the chart to view the following: • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top Bands**, and **Top Host Operating Systems**. • A table with detailed data of the wireless clients in that segment.

Connectivity Physical Link Dashlet	
Item	**Description**
Connectivity Physical Link chart	Distribution of wired client device link state—the number of client devices that had their physical links up, down, and had errors.

| Connectivity Physical Link Dashlet	
Item	**Description**
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 view: • Data type categories by client count: **Top Locations**, **Top Switches**, **Top Host Device Types**, and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Client Count per Band Dashlet	
Item	**Description**
Client Count per Band chart	Distribution of wireless clients connected to the 2.4-GHz band or 5-GHz band. Hover your cursor over a segment to view the percentage and number of clients connected to a specific band.
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 view: • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top SSIDs** and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Client Data Rate Dashlet	
Item	**Description**
Client Data Rate chart	Distribution of a client's data rates. Use the **Client Protocol** drop-down list to filter clients based on the client protocol they are using. Options are **802.11n/ac/ax** and **802.11a/b/g**.
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 view: • Data type categories by client count: **Top Locations**, **Top Access Points**, **Top Host Device Types**, **Top SSIDs**, **Top Bands**, and **Top Host Operating Systems**. • A table with detailed data of the clients in that segment.

Step 7 Use the **Client Devices** dashlet to view detailed information about the clients in your network. This dashlet provides the following functionality:

Client Devices Dashlet	
Item	**Description**
Type	Filter the table based on client type. Options are **Wired** and **Wireless** clients.

Client Devices Dashlet	
Item	**Description**
Health	Filter the table based on the client health with the following options: • **All** • **Inactive**: Client devices with a health score of 0. • **Poor**: Client devices with a health score range from 1 to 3. • **Fair**: Client devices with a health score range from 4 to 7. • **Good**: Client devices with a health score range from 8 to 10. • **No Data**: Client devices with no data.
Data	Filter the table based on data type with the following options: • **Onboarding Time >= 10 s**: Onboarding time is greater than or equal to the 10-second threshold value. • **Association >= 5 s**: Association time is greater than or equal to the 5-second threshold value. • **DHCP >= 5 s**: DHCP time is greater than or equal to the 5-second threshold value. • **Authentication >= 5 s**: Authentication time is greater or equal to 5 seconds. • **RSSI <= -72 dBm**: RSSI is less than or equal to the -72-dBm threshold value. • **SNR <= 9 dB**: SNR is less than or equal to the 9-dB threshold value.

Client Devices Dashlet	
Item	**Description**

Client Device table	View detailed client device information in a table format. The client device table displays the following information by default:
	
	• **Identifier**: Displays the client's user ID, hostname, or MAC address based on availability, in that order. For example, if the user ID is not available, the hostname is displayed. If the user ID and hostname are not available, the MAC address is displayed.
	
	The **Identifier** column also has specific icons that allow you to determine if the client device is wired or wireless.
	
	• **MAC Address**: Displays the MAC address, which includes Device MAC and Randomized and Changing MAC Address (RCM). The Private MAC ⚇ icon appears in front of the RCM. You can filter the table based on the type of MAC address, such as All, Device MAC, and RCM.
	
	• **IPv4 Address**: Displays the client's IPv4 address based on availability.
	
	    Note You can display the client's IPv6 address by checking the **IPv6 Address** check box in the ⋮ menu.
	
	• **Device Type**: Displays the device type.
	
	• **Health**: Displays the average of the onboarding and connected scores. The Client Health score is calculated every 5 minutes.
	
	    Note A score of -- indicates that the client has recently onboarded (new). New clients are clients that attempted to onboard after the 5-minute health score calculation window started. The health score for these new clients is included in the next 5-minute calculation window.
	
	• **Tracked**: Displays client tracking status.
	
	• **Last Seen**
	
	• **AP Name** (for wireless clients only): Displays the name of the access point.
	
	• **Switch** (for wired clients only)
	
	• **Port** (for wired clients only)
	
	• **Location**: Displays the assigned location of the client.
	
	• **Link Speed** (for wired clients only): Indicates the speed capacity of the interface or physical port. If the port has negotiated to a certain speed, the negotiated speed is displayed.
	
	    Note You can display the link speed by checking the **Link Speed** check box in the ⋮ menu.

Tracked Clients	Click **Tracked Clients** to view the slide-in pane that displays a table contains MAC Address, Last detected, Tracking Duration, Description and Randomized MACs.

Client Devices Dashlet	
Item	**Description**
View **Client 360** for a client	Display a 360° view of a client by clicking the MAC address or identifier of a client device.
	Client 360 provides detailed information for troubleshooting client connectivity issues.
⋮	Customize the data you want displayed in the table:
	a. Click ⋮ .
	b. Check the check boxes for the data you want displayed in the table.
	c. Click **Apply**.
Export	Click **Export** to export the table data to a CSV file.
	Note The data from all available columns is included even if the column was not selected for the table. Filters applied to the client table are applied to the exported data.

Monitor and Troubleshoot the Health of a Client Device

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

Note The client health data might take up to an hour to populate if an HA failover has occurred.

Step 1 Click the menu icon (≡) and choose **Assurance** > **Health**.

The **Overall** health dashboard appears.

Step 2 Click the **Client** tab.

The **Client** health dashboard appears.

Step 3 Do one of the following:

- In the **Client Devices** table, click the hyperlinked Identifier or the MAC address of the device.
- In the **Search** field (located on the top-right corner), enter one of the following: user ID (authenticated through Cisco ISE), IP address, or MAC address.

The **Client 360** window displays a 360° view of the client device.

Figure 2: Client 360 Window
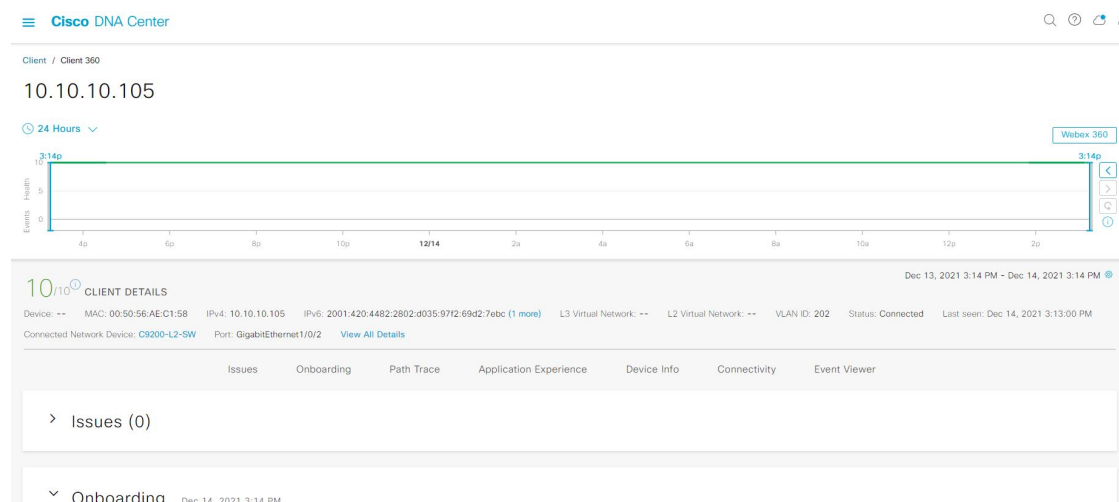
Step 4   Click the time range setting (🕐) at the top-left corner to specify the time range of the data that you want displayed on the window:

a) From the drop-down menu, choose a 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 5   Click **Intelligent Capture** at the top-right corner of the window to view, monitor, and troubleshoot captured onboarding and data packets for a specific client device to determine if there are potential issues that must be addressed. See Enable a Live Capture Session for a Client Device.

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

Step 6   Click **Webex 360** at the top-right corner above the timeline slider to view, monitor the client Webex meetings. The search meeting pop-up window is displayed.

To configure Webex integration, see *Configure Webex Integration* in the Cisco DNA Center Administrator Guide.

a) Enter the email associated with the client's Webex meeting.

b) Click **Search Meetings**. The Application Experience for Webex slide-in pane is displayed.

c) Use the Application Experience slide-in pane for the following functionality:

- **Search bar**: You can search for meetings in the table displayed.

- **Time Range filter**: Click time filter to specify time range for the data you want to displayed in the table.

- Client Meetings table is displayed, which contains meeting number, meeting name, application, network duration, start time, end time, and status.

  You can select the meeting to view the meeting quality KPI data displayed below the table as horizontal bars showing Audio quality, Video Quality and Share Quality based on application (data retrieved using Webex API) and network (data retrieved using NetFlow) latencies. You can use the drop-down list to filter the data based on Transmitting and Receiving options to display the application and network latency graphs related metrics such as packet loss, jitter and so on.

Step 7 Use the timeline slider to view the health and events information about the client device over a period of time. The timeline slider has the following functionality:

- **Health**: You can hover your cursor over the timeline slider to view the client's health score and KPIs for a 5-minute window. The KPIs with a colored circle contribute to the individual client health score.

  Note For the **Speed** KPI, the speed capacity of the interface or physical port is displayed. If the port has negotiated to a certain speed then that negotiated speed is displayed.

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

  Note If you want to display information for longer than 1 hour, manually move the timeline slider to the desired time range.

- **Onboarding**: You can hover your cursor over the timeline slider to view the client's onboarding times, including Association, Authentication, and DHCP.

- **Events**: Event data is displayed as color coded vertical bars on the graph. Green vertical bars indicate successful events and red vertical bars indicate events that failed.

  Each vertical bar represents 5 minutes of time. Multiple significant events can be generated during each 5-minute window. Hover your cursor over the vertical bar to get more information about the events.

Step 8 View the individual client health score in the **Client Details** area, below the timeline.

The individual client health score is an aggregate of the client's onboarding status, RSSI, and SNR.

If you search by the user ID, the Individual Client Health score that is displayed is the minimum score of all the monitored client devices associated with that user. For more information, see Individual Client Health Score, on page 20.

If you search by MAC address or IP address, the Individual Client Health score is the health score for that client device.

The color of the health score represents its severity. The health is measured on a scale of 1 to 10, with 10 being the best score, and a score of 0 for inactive client devices, where the health data is not applicable:

- ●: Poor client devices. Health score range is 1 to 3.
- ●: Fair client devices. Health score range is 4 to 7.
- ●: Good client devices. Health score range is 8 to 10.
- ●: Inactive client devices. Health score is 0.

Note For clients that are disconnected from the network, the score is represented as a - -.

Step 9 Use the **Client Details** area, below the timeline, to view the following information:

- For wireless clients, this area provides information about the client device such as its OS version, MAC address includes Device MAC and RCM, IPv4 and IPv6 address, connected VLAN ID, connection status, last seen timestamp, connected network device, SSID, and last known location.

- For wired clients, this area provides information about the client device such as its MAC address, IPv4 and IPv6 address, connected VLAN ID, connection status, last seen timestamp, connected network device, port, and last known location.

- For PoE-capable devices, the following elements are also displayed in the client details area: **IEEE Class**, **Negotiated Power Level**, and **PoE Status**.

Step 10 In the **Client Details** area, click **View All Details** to open a slide-in pane with additional details about the client device.

Step 11 Use the collapsible categories to view information about issues, onboarding, event viewer, path trace, application experience, and details:

Issues Category

Displays any issues that must be addressed. Issues are listed based on the timestamp. The most recent issue is listed first.

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 the following:

- To resolve an issue:

  a. From the drop-down list, choose **Resolve**.

  b. To view the list of issues that have been resolved, click **Resolved Issues**.

- To ignore an issue:

  a. From the drop-down list, choose **Ignore**.

  b. Set the number of hours to ignore the issue on the slider.

  c. Click **Confirm**.

  d. To view the list of issues that have been ignored, click **Ignored Issues**.

For information about the types of issues, see View and Manage Issues.

Onboarding Category

Topology of how a client got on the network, including information about the following services: AAA and DHCP.

Example of wired client topology: Client > Switch > Router

Example of wireless client topology: Client > SSID > Access Point > Wireless Controller

In the topology, you can do the following:

- Click a node to display a slide-in window that displays information about the node.

- Hover your cursor over the link ends (dots) to see the status and port details of the link.

- Hover your cursor over a group of devices and click **View Devices List** from the pop-up to view the list of devices and their details.

- In the Search field in the top-right corner of the **Onboarding** area, you can search for a specific device. The specific node is selected, and the corresponding information about the device is displayed.

Event View Category
For Wireless Clients: Lists scenarios and the sequence of subevents that led to each scenario. This allows you to pinpoint during which subevent an issue occurred. The following scenarios are provided for wireless clients: • **Re-Authentication** • **Broadcast Rekey**: Process of changing the session key—the encryption key of an ongoing communication—to limit the amount of data encrypted with the same key. • **Onboarding** • **DHCP** • **Delete** • **INTRA-Roaming** • **INTER-Roaming** • **ASSOC** • **AUTH** • **EAP** • **DISASSOC** • **DEAUTH** • **11r Failure** • **OKC Failure** • **EAP Failure** When an issue occurs, that event is marked red; otherwise, it is green. The Event Viewer table provides information about the failure, such as the error message, the AP and wireless controller to which the client device is connected, and the timestamp when the event occurred. Click an event to view details about that event in the right pane. **For Wired Clients**: Lists ISE server events, switch system level syslogs, switch port or interface specific events, and client specific events. For the list of messages under each event category, see Messages Displayed in the Event Viewer for Wired Clients, on page 18. Successful events are displayed as green; failure events that impact the health score are displayed as red. The Event Viewer table provides information about the failure, such as the type of message, the device information to which the wired client device is connected, and the timestamp when the event occurred. Click an event to view details about that event in the right pane.

Path Trace Category
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 Perform a Path Trace.

Application Experience Category
Applications running on a client device with their qualitative and quantitative metrics.
To view the metrics in a chart format, click the radio button next to an application in the table. A slide-in pane opens with the relevant information.
See About Application Experience and Application Visibility and View Application Experience of a Host.

Detail Information Category
Click one of the following tabs to display the corresponding information:
• **Device Info**: Displays basic information about the device. For Samsung devices, this tab displays additional information, such as build number, origin, country code, device type (mobile, tablet, and so on), and host operating system. **Station Information** details such as HW model, SW version, AC/DC Voltage, and so on, is displayed only for Intel devices. • **RF**: Only available for wireless devices. • **User Defined Network**: Only available for UDN-enabled network devices. This tab displays the Registered UDN, Connected UDN details, device MAC address, device owner, device name, device type and current status. • **Connectivity**: Displays the new connection KPI named Retries. The connection retries for radios are displayed in the retries chart. • **PoE**: This tab is available for PoE-capable clients. • **iOS Analytics**: Only available for Apple devices. • **Intel Connectivity Analytics**: Only available for devices supported by Intel wireless adapters. Displays the Roam Events, Reported Errors, Temporary Disconnection Reports and Low RSSI Reports reported by the supported client.

Messages Displayed in the Event Viewer for Wired Clients

The following tables provide the list of messages that are displayed in the **Event Viewer** for wired clients in the **Client 360** window:

ISE Server Event
`Client AUTH FAILURE`
`Client AUTH SUCCESS`

Switch System Level Syslogs
`RADIUS-3-ALLDEADSERVER`
• `Device UnReachable` • `Device Reachable`

Switch Port or Interface Specific Events
| ```
TRAP EVENTS

  • Link DOWN

  • Link UP

PM-4-ERR_DISABLE

ILPOWER-5-POWER_GRANTED

ILPOWER-5-IEEE_DISCONNECT

ILPOWER-5-INVALID_IEEE_CLASS

ILPOWER-4-LOG_OVERDRAWN

ILPOWER-3-SHUT_OVERDRAWN
``` |

Client Specific Events
| ```
DOT1X-5-FAIL

MAB-5-FAIL
``` |

Understand Client Health Score and KPI Metrics

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

Client Health Score

The Client Health score (Wireless or Wired) is the percentage of the number of healthy client devices (a health score from 8 to 10) in a target category, divided by the total number of client devices in that category. The score is calculated every 5 minutes.

For example: 90% (health score) = 90 (client devices in a target category with health score from 8 to 10) ÷ 100 (total number of client devices in that category)

The Individual Client Health score is the sum of the Client Onboarding score and the Client Connectivity score. The client health score ranges from 1 to 10, with a score of 0 for inactive clients. It is calculated as follows:

Wired Client: Link to first switch is up, authentication and authorization is successful and IP address is received. Client score is 10.

Wireless Client: Client joined the network and has good connection in terms of the RSSI and SNR KPIs.

Client Onboarding Score

The Client Onboarding score indicates the experience of a client device *while* connecting to the network.

• If a client connects to the network successfully, the score is 4.

• If a client failed to connect to the network, the score is 1.

• If a client is idle, the score is 0.

The Client Onboarding score is calculated as follows:

Wired Client: Link to the first switch is up, authentication and authorization is successful, and IP address is received.

Wireless Client: Client Onboarding score range is from 1 to 4. When the client connects to the network successfully, the score is 4. If the client failed to connect to the network, the score is 1.

Client Connectivity Score

The Client Connectivity score indicates the experience of the client device *after* the device is connected to the network. The score is calculated as follows:

Wired Client: Connectivity score can be 2 or 6. Link errors determine the Connectivity score and the resulting Overall Health score, as shown below:

- If a client onboards successfully but has link errors, the Connectivity score is 2 and the Overall Health score is 6.

- If the client onboards successfully and there are no link errors between the client and the first-hop switch, the Connectivity score is 6 and the Overall Health score is 10.

Wireless Client: Connectivity score can be 0, 4, or 10. The RSSI and SNR range determines the Connectivity score and the resulting Overall Health score is calculated as the weighted average of the RSSI-driven Connectivity score and the SNR-driven Connectivity score.

RSSI-Driven Connectivity Score	
Client's RSSI	**RSSI-Driven Connectivity Score**
If RSSI is less than or equal -72 dBm.	The client receives a RSSI-driven connectivity score of 4 and is considered to be in fair health.
If RSSI is greater to -72 dBm.	The client receives a RSSI-driven connectivity score of 10 and is considered to be in good health.

SNR-Driven Connectivity Score	
Client's SNR	**SNR-Driven Connectivity Score**
If SNR is less than or equal to 9.	The client receives a SNR-driven connectivity score of 4 and is considered to be in fair health.
If SNR is greater than 9.	The client receives a SNR-driven connectivity score of 10 and is considered to be in good health.

Individual Client Health Score

The Individual Client Health score is the sum of the Client Onboarding score and the Client Connectivity score. The client health score ranges from 1 to 10, with a score of 0 for inactive clients. It is calculated as follows:

Wired Client: Link to first switch is up, authentication and authorization is successful, and IP address is received. Client score is 10.

Wireless Client: Client joined the network and has good connection in terms of RSSI and SNR KPIs.

Client's Onboarding and Connectivity	Resulting Client Health Score
If the client failed onboarding.	The client receives a health score of 1 and is considered to be in poor health.
If the client's RSSI and SNR are below threshold.	The client receives a health score of 4 and is considered to be in fair health.
If either the client's RSSI or SNR is below threshold.	The client receives a health score of 7 and is considered to be in fair health.
If the client's RSSI and SNR is above threshold.	The client receives a health score of 10 and is considered to be in good health.

Individual Client Health Score