



Manage Intelligent Capture

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About Intelligent Capture

For Cisco DNA Center, all information about device and client health is typically available from Cisco wireless controllers. Intelligent Capture provides support for a direct communication link between Cisco DNA Center and access points (APs), so each of the APs can communicate with Cisco DNA Center directly. Using this channel, Cisco DNA Center can receive packet capture data, AP and client statistics, and spectrum data. With the direct communication link between Cisco DNA Center and APs, Intelligent Capture allows you to access data from APs that is not available from wireless controllers.



Note

- Intelligent Capture is only supported for APs in either local or FlexConnect mode.
- Intelligent Capture is not supported in SDA deployments.

Supported Devices for Intelligent Capture

The following table lists the Cisco Wireless Controllers that support Intelligent Capture:

Supported Cisco Wireless Controllers	
Device	Minimum Supported Software Version
Cisco 3504 Wireless Controller	AireOS 8.8.125.0
Cisco 5520 Wireless Controller	AireOS 8.8.125.0

Supported Cisco Wireless Controllers	
Device	Minimum Supported Software Version
Cisco 8540 Wireless Controller	AireOS 8.8.125.0

The following table lists the Cisco Catalyst Wireless Controllers that support Intelligent Capture:

Supported Cisco Catalyst Wireless Controllers	
Device	Minimum Supported Software Version
Cisco Catalyst 9800 Series Wireless Controllers	IOS-XE Gibraltar 16.12.1.s

The following table lists the Cisco APs that support Intelligent Capture:

Supported Cisco APs		
Device	Minimum Supported AireOS Software Version	Minimum Supported IOS-XE Software Version
Aironet 1540 APs ¹	8.10.105.0	16.12.1.s
Aironet 1560 APs	8.10.105.0	16.12.1s
Aironet 1815 APs ¹	8.10.105.0	16.12.1s
Aironet 1830 APs ¹	8.10.105.0	16.12.1s
Aironet 1840 APs ¹	8.10.105.0	16.12.1s
Aironet 1850 APs ¹	8.10.105.0	16.12.1s
Aironet 2800 Series AP	8.8.125.0 or 8.10	16.12.1s
Aironet 3800 Series APs	8.8.125.0 or 8.10	16.12.1s
Aironet 4800 Series APs ²	8.8.125.0 or 8.10	16.12.1s
Catalyst 9105 AP ¹	8.10 MR3	17.3.1
Catalyst 9115 AP ¹	8.10.105.0	16.12.1s
Catalyst 9120 AP	8.10.105.0 8.10.112.0 (for Spectrum Analysis)	16.12.1s 17.2.1 (for Spectrum Analysis)
Catalyst 9130 AP ²	8.10 MR3	17.3.1
Catalyst IW6300 Heavy Duty Series APs	8.10.105.0	17.1.1s
Catalyst ESW6300 Embedded Services APs	8.10.105.0	17.1.1s

¹ Spectrum Analysis is *not supported* on the following APs: Aironet 1540 AP, Aironet 1800 Series APs, Catalyst 9105 AP, and Catalyst 9115 AP.

² Data Packet Capture is only supported on Aironet 4800 APs and Catalyst 9130 AP.

Intelligent Capture Best Practices

The following are best practices to ensure Intelligent Capture functions optimally in Cisco DNA Center:

- After a new wireless controller device is added to Cisco DNA Center, disable any Intelligent Capture global settings, and then re-enable those settings so that they will be configured on the new wireless controller.
- Before deleting a wireless controller device from Cisco DNA Center, disable all Intelligent Capture settings.
- Before upgrading any of managed wireless controllers or reimaging Cisco DNA Center, disable all Intelligent Capture settings, and then re-enable them after completing the upgrade.

Live and Scheduled Capture Sessions for a Client Device

About Capture Session for a Client Device

You can run the following types of capture sessions for a client device:

Onboarding Packet Capture session captures packets that the client device uses to join a wireless network, such as 802.11 management frames, DHCP, and EAP packets, and collects the client's RF statistics (5-second samples). The data is displayed in Client 360 > Intelligent Capture page. The session can be started immediately (Run Now) or scheduled to run later. The default duration of the session is 30 minutes and set up to eight hours. By default, capture is enabled on the last client connected wireless controller. You can select up to three wireless controllers to cover client roaming scenario.

Onboarding Capture Session Limitations

Onboarding capture sessions have the following limitations:

- There are a total of 16 time slots allocated for capture sessions (live and scheduled), where each client in a session uses one time slot.

The maximum number of live capture sessions is 16, so if 16 live capture sessions are running at the same time, no slots are available for scheduled capture sessions.

The maximum number of concurrent scheduled capture sessions is 12, which always leaves four (16 minus 12) available slots for live capture sessions.

If these maximum values are exceeded, for example, you try to start a seventeenth live capture session, the following error message is displayed. Click **Yes** in the error message dialog box, and then select a capture session for which you want to end the live capture.



Note The 16-time-slot limit is enforced by the wireless controller.

When capture sessions are configured on Cisco DNA Center, any live or scheduled capture sessions that Cisco DNA Center is not aware of (such as partial packet capture sessions that were directly configured on the wireless controller) are removed.

- A maximum of 100 packets involved in onboarding events can be captured during the time period surrounding the event.
- There is a 3.5-GB limit on the total size of all scheduled onboarding packet files that reside on Cisco DNA Center. If the limit is exceeded, packet files are removed, starting with the oldest, until the total size falls below the 3.5-GB limit.

About Client Statistics

Onboarding Packet Capture sessions are global settings that enable supported APs to collect client statistics over 5-second intervals.

Client statistics are also collected over 30-second intervals when AP stats are enabled for the AP to which the client is connected.

When client statistics are collected, they are displayed on the four RF statistic charts on the **Client 360** > **Intelligent Capture** window.

Enable a Live Capture Session for a Client Device

Use this procedure to enable a live capture session for a specific client device and view data packets for the onboarding events and RF statistics.

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

The **Overall** health dashboard is displayed.

Step 2 Click the **Client Health** tab.

The **Client Health** window appears.

Step 3 Open the **Client 360** window of a specific client by doing 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.

A 360° view of the client device appears.

Step 4 In the **Client 360** window, click **Intelligent Capture**.

The **Intelligent Capture: Client Device** window appears with the following information:

Attention

If a  icon with the message **GRPC link is not ready (CONNECTING)** appears next to the client name, see [Client or Access Point Unable to Send Intelligent Capture Data to Cisco DNA Center](#), on page 20 for more details.

Figure 1: Intelligent Capture Window of a Client

**Step 5**

Use the timeline slider for the following functionality:

Timeline Slider	
Item	Description
1 hour drop-down list	Click the drop-down list and select a duration to set the range of the timeline. Options are 1 hour , 3 hours , and 5 hours . Default is 1 hour .
Timeline Slider	<p>The timeline slider determines the time window of all data displayed. A line chart of onboarding events is displayed for the results of a live capture. Green indicates onboarding events and red indicates anomaly events.</p> <p>To adjust the timeline to a different time window, click the < and > buttons to the desired time window.</p> <p>Note The timeline can display data from up to two weeks in the past.</p> <p>For more customization of the timeline range, click and drag the boundary lines.</p>

Step 6

To perform a live capture session, do the following:

- Click **Start Live Capture** at the top-right corner to start a live capture session.

During a live capture session, data packets for the **Onboarding Events** and **RF Statistics** dashlets are collected.

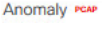
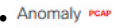




- Click **Stop Capturing** to stop the live capture session.


Note Live capture sessions run for three hours. After three hours, a dialog box for extending the session appears.

c) View the running live capture sessions in the **Intelligent Capture Settings** window for clients.

Step 7

Use the **Onboarding Events** dashlet to view events that are associated with establishing a network connection:

Onboarding Events Dashlet	
Item	Description
All and  filter	<p>Allows you to filter the onboarding events. Options are:</p> <ul style="list-style-type: none"> • All: Displays all events. This is the default. • : Filter for only anomaly events. <p>Note If the client has issues joining the network, the word "PCAP" is displayed in red beside the specific event.</p> <p>If the client has no issues joining the network, the word "PCAP" is displayed in gray beside the specific event.</p>
Export PCAP	<p>You can download the packets for a range of specified events:</p> <ol style="list-style-type: none"> Click Export PCAP. Specify the first and last events that you want to include in the PCAP. Click Download PCAP to start the download. <p>Note Since heuristics are used to determine which packets belong to an event, packets from one minute before the first event and one minute after the last event will be included in the download. This ensures that all relevant packets are in the downloaded PCAP.</p> <p>Each export is limited to the first 2000 packets, starting from the oldest timestamp.</p>
List of Onboarding, Incomplete, and Anomaly Events	<p>View the list onboarding, incomplete, and anomaly events in chronological order. Events are color-coded to indicate the following:</p> <ul style="list-style-type: none"> : Successful onboarding event. : Incomplete event. : Anomaly event. <p>Note Events with a  icon indicates that data packets for this event have been captured for download or analysis.</p> <p>You can click the parent event group to expand it and view the individual events for that group.</p>

Onboarding Events Dashlet	
Item	Description
Event Details	<p>You can click an event group or individual event to view the following sections with further details:</p> <p>Client Location: Displays the map of the client location and the client's movement during the event.</p> <p>Auto Packet Analyzer: This section appears if a live capture, scheduled capture, or anomaly capture session has captured packets for the event. The  icon that appears next to the event indicates that the event has captured packets.</p> <p>The Auto Packet Analyzer section displays a graph with the following information:</p> <ul style="list-style-type: none"> • The packets (up to 100) surrounding the event are divided into two groups. Gray sections indicate packets that precede the start of an onboarding session. White sections indicate packets in the onboarding session. <p>Deauthentication packets and unexpected patterns of packets are represented by red triangles. These are potentially significant packets that can degrade the client's onboarding experiences.</p> <p>You can download the packets by clicking Download Packets for further analysis.</p> <ul style="list-style-type: none"> • Packet (from client or from AP) • Onboard packet stage identifier • Interpacket gap (ms) • RSSI (dBm) per packet • Associated AP <p>RF Statistics: Displays charts with the RF statistic data for the 10 minute interval surrounding the event.</p> <p>The RF statistic data is composed of RSSI and SNR measurements in decibels, Rx average data rate and Rx last data rate, Tx packets and Rx packets, and Tx packet retry.</p> <p>Note If Anomaly Capture is enabled, the packets for anomaly events are captured even if a live or scheduled capture is not running.</p>

Step 8

Use the **Client Location** dashlet to view the a floor map with the following information:

- The location of the client and APs on the floor.
- Heatmap with the color intensity representing the strength of the coverage.
- The real-time location of the client on the floor map. If the client moves to another location, its movement is displayed.
- Client trail tracking with color-coded display of connectivity using the RF statistics: RSSI, SNR, data rate, throughput, and packet drop rate.

The color on the map indicates the client's health:

●: Good ●: Fair ●: Poor

- The tracking of the client for a one-minute interval surrounding the time of a selected onboarding event.
- The replay and stop or start controls below the map can be used to control the viewing.


Note The Client Location feature requires that CMX is integrated with Cisco DNA Center. For details, see the [Integrate Cisco CMX for Wireless Maps](#) chapter.

Step 9 Use the **RF Statistics** dashlet to view detailed RF information.

There are four charts that displays the AP client statistics for the client. See [About Client Statistics, on page 4](#). The color-coded data contains the following information:

- RSSI and SNR measurements in decibels.
- Rx average data rate (from the past 5 seconds) and Rx last data rate.
- Tx packets and Rx packets.
- Tx packet retry.

You can do the following in the charts:

- Hover your cursor over the chart to see the statistics for a particular time.
- Click and drag within the chart to zoom in on a period. To change the view to the default, click the  icon.


Step 10 To run a Data Packet Capture for a client device, see [Run Data Packet Capture for a Client Device, on page 10](#).

Schedule and Manage Capture Sessions for a Client Device

Use this procedure to schedule a capture session and to stop, edit, or delete a scheduled capture session.

Client capture sessions collect the following data:

- Data packets for onboarding events and **RF Statistics** chart data (5 second samples) displayed in the **Client 360 > Intelligent Capture** window. See [Enable a Live Capture Session for a Client Device, on page 4](#).
- Data for the charts and tables displayed in the **Device 360 > Intelligent Capture** window. See [View RF Statistics and Manage Spectrum Analysis Data for an Access Point, on page 15](#).

Step 1 Click the menu icon () and choose **Assurance > Intelligent Capture Settings**.

The **Client Schedule Capture** window appears.

Step 2 To schedule a client capture session, click + **Schedule Client Capture**.

In the **Schedule Client Capture** slide-in pane, do the following:

- In the **Start Time** area, specify when you want the capture session to start. Options are **Run Now** and **Run Later**.
- Click the **Duration** drop-down list to specify the duration.

- c) Click the **Select Client Devices** drop-down list and enter a search string that returns matches for the categories: client user ID, host name, or MAC address.

Note Search returns a maximum of 10 matches for each category, so refine your search string if you do not find your entry.

Note For more details about capture sessions, see [About Capture Session for a Client Device, on page 3](#).

- d) Click **Save**.

Step 3 To stop a running capture session, do the following:

- a) Click the **In-progress Captures** tab.
- b) Select a client from the table.
- c) Click **Stop Capture**.

Step 4 To edit a capture session that has been scheduled for a future time, do the following:

- a) Click the **Scheduled Captures** tab.
- b) Select a client from the table.
- c) Click **Edit Schedule**.

Step 5 To delete a completed capture session, do the following:

- a) Click the **Completed Captures** tab.
- b) Select a client from the table.
- c) Click **Delete Schedule**.

Data Packet Capture for a Client Device

About Data Packet Capture for a Client Device

Data Packet Capture allows you to capture network data into PCAP files, which can be downloaded and viewed in Wireshark. For more information, see [Run Data Packet Capture for a Client Device, on page 10](#).

Data Packet Capture Limitations

Data Packet Capture has the following limitations:

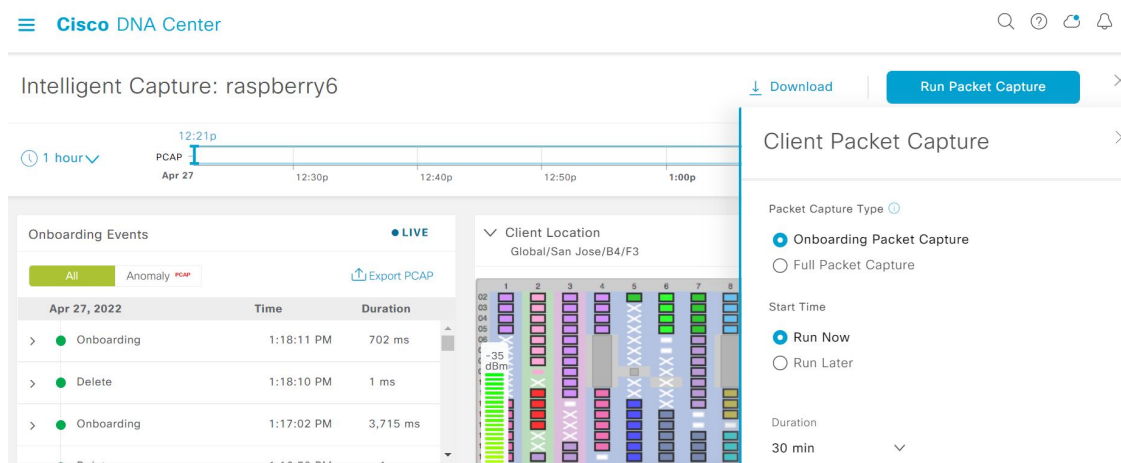
- Data Packet Capture is only supported on Cisco Aironet 4800 APs and Cisco Catalyst 9130, 9136, and 9166 APs. If Data Packet Capture is enabled and the client roams to an AP that does not support it, packet capture stops until the client reconnects to an AP that supports packet capture.
- Only one Data Packet Capture session can run at a time.
- As for all Intelligent Capture features, clocks must be synchronized between Cisco DNA Center and the Cisco Wireless Controller for Data Packet Capture to work. Ensure that the wireless controller is connected to a Network Time Protocol (NTP) server.
- Each Data Packet Capture session can capture up to 1 GB of rolling data. The 1 GB of data is broken into ten 100-MB files for faster downloads.

Run Data Packet Capture for a Client Device

Use this procedure to run a Data Packet Capture for a client device.

- Step 1** Click the menu icon (☰) and choose **Assurance > Health**.
The **Overall** health dashboard is displayed.
- Step 2** Click the **Client Health** tab.
The **Client Health** window appears.
- Step 3** Open the **Client 360** window of a specific client by doing 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.
- A 360° view of the client device appears.
- Step 4** In the **Client 360** window, click **Intelligent Capture**.
The **Intelligent Capture: Client Device** window appears with the following information:
- Attention** If a ⚠ icon with the message **GRPC link is not ready (CONNECTING)** appears next to the client name, see [Client or Access Point Unable to Send Intelligent Capture Data to Cisco DNA Center](#), on page 20.

Figure 2: Intelligent Capture Window of a Client



- Step 5** Use the timeline slider for the following functionality:

Timeline Slider	
Item	Description
1 hour drop-down list	Click the drop-down list and select a duration to set the range of the timeline. Options are 1 hour , 3 hours , and 5 hours . Default is 1 hour .

Timeline Slider	
Item	Description
Timeline Slider	<p>The timeline slider determines the time window of all data displayed.</p> <p>To adjust the timeline to a different time window, click the < and > buttons to the desired time window.</p> <p>Note The timeline can display data from up to two weeks in the past.</p> <p>For more customization of the timeline range, click and drag the boundary lines.</p>

Step 6

To run a Data Packet Capture, use the **Data Packet Capture Area** (located on the top-right corner) for the following functionality:

Data Packet Capture Area	
Item	Description
Run Packet Capture button	<p>Click Run Packet Capture, to open the Client Packet Capture slide-in pane and do the following:</p> <ol style="list-style-type: none"> Choose the Packet Capture Type, by clicking Onboarding Packet Capture or Full Packet Capture radio button. Choose the Start Time. Options are Run Now or Run Later From the Duration drop-down list, choose the time duration of the packet capture. Default is 30 minutes. Select the Wireless Controllers for which you need to enable the packet capture. You can select maximum three wireless controllers. Click Save. <p>Note All Onboarding Packet Capture sessions are displayed under Assurance > Intelligent Capture Settings > Client Schedule Capture.</p> <p>When a Data Packet Capture session is configured on Cisco DNA Center, any Data Packet Capture sessions that Cisco DNA Center is not aware of are removed (such as full packet capture sessions that were directly configured on the wireless controller).</p> <p>Note As for all Intelligent Capture features, time zones must be synchronized between Cisco DNA Center and the Cisco Wireless Controller for Data Packet Capture to work. Ensure that the wireless controller is connected to a Network Time Protocol (NTP) server.</p> <p>Note New sets of PCAP files are started each time a new capture session is started.</p>

Data Packet Capture Area	
Item	Description
Download button	<p>After full packet PCAP files have been captured from a session, click this button to download PCAP files. Click the icon in the Download column to download the data packet files. You can download files for either:</p> <ul style="list-style-type: none"> • Wireless data: 802.11 files for packets between the AP and the client. • Wired data: Ethernet files for packets between the AP and the switch or wireless controller. <p>Note A Data Packet Capture file has a limit of 100 MB. The total of all Data Packet Capture files cannot exceed 3.5 GB.</p> <p>Note Only PCAP files from the past seven days can be downloaded.</p>

View Client Data Packet Capture History

Use this procedure to view the history of the client data packet capture sessions, such as the time the first packet and the last data packet was captured, the total size of the captured data packets, and the type of packet.

Step 1 Click the menu icon (≡) and choose **Assurance > Intelligent Capture Settings**.

The **Client Schedule Capture** window appears.

Step 2 Click the **Client Data Packet Capture** tab.

The **Client Data Packet Control** window appears.

Step 3 Use the **Intelligent Capture Settings - Client Data Packet Capture** window to view the following information:

Option	Description
Identifier	Displays the client's user ID or hostname. Click the user ID or hostname to open the Intelligent Capture: Client Device window.
MAC Address	Displays the MAC address of the client device.
First Packet Time	Displays the time the first data packet was captured.
Last Packet Time	Displays the time the last data packet was captured.
Total Size	Displays the total size of the captured data.
Currently Running	Displays whether the data packet capture is currently running.
Type of Packet	Displays the type of packet, for example, Wired or Wireless .

Intelligent Capture for Access Points

About Intelligent Capture for Access Points

The AP Intelligent Capture feature allows you to enable one or more APs to capture the following data:

- **AP Stats Capture**, which includes:
 - AP radio and WLAN statistics that are displayed in the **RF Statistics** tab of the **Device 360 > Intelligent Capture** window.
 - AP Client statistics (30-second samples) that are displayed in the **RF Statistics** area of the **Client 360 > Intelligent Capture** window for all clients associated with the selected APs.
- **Anomaly Capture** for anomaly onboarding events for all clients that are associated with one or more selected APs. Enabling Anomaly Capture ensures that all anomaly onboarding events (global or for all clients associated with the selected APs) are captured for download and display.

AP Capture Limitation

There is a 1.05-GB limit on the total size of all anomaly triggered packet files that reside on Cisco DNA Center. If the limit is exceeded, then packet files are removed, starting with the oldest, until the total size falls below the 1.05-GB limit.

Enable and Manage Intelligent Capture for an Access Point

Use this procedure to enable one or more access points (APs) to capture the following data:

- **AP Statistics**: Includes AP radio statistics, WLAN statistics, and AP Client statistics. Cisco DNA Center can support up to 1000 APs for AP Stats Capture.
- **Anomaly Capture**: For anomaly onboarding events of all clients that are associated with one or more selected APs. Enabling Anomaly Capture ensures that all anomaly onboarding events (global or for all clients associated with the selected APs) are captured for download and display.

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- Step 1** Click the menu icon (☰) and choose **Assurance > Intelligent Capture Settings**.
The **Client Schedule Capture** window appears.
- Step 2** Click the **Access Point** tab.
The **Access Point** window appears.
- Step 3** To enable or disable AP Stats Capture, do one of the following:
- If there are no enabled APs, the **Configure AP Enablement** area is displayed. Choose either the **Specific** or **Global** option, and then click **Get Started**.
 - If there is at least one AP enabled, the **AP Stats Capture** window appears. From the **AP Stats Capture** window, choose one of the following options:

Option	Description
None - disable all APs	The None - disable all APs appears when at least one AP is enabled. Allows you to disable AP Stats Capture on all of the APs in which it is currently enabled.
Specific - select specific APs and enable	Allows you to enable AP Stats Capture for selected APs. Do the following: <ol style="list-style-type: none"> Click the Specific - select specific APs and enable radio button. In the left pane, expand Global, and drill down to the site > building > floor. The right pane displays the list of APs on that floor and contains three tabs: Enabled APs, Disabled APs, and Not-Ready APs. To enable AP Stats Capture for selected APs, do the following: <ul style="list-style-type: none"> Click the Disabled APs tab. A list of APs that have AP Stats Capture currently disabled, is displayed. Check the check boxes adjacent to the APs for which you want to enable AP Stats Capture, and then click Enable. To view incompatible APs, click the Not-Ready APs tab. <p>Note Incompatible APs have the following conditions:</p> <ul style="list-style-type: none"> The operation mode is not set to <code>local</code> or <code>FlexConnect</code>. The OS release that is installed on the AP is not compatible. The OS release must be MR1 or later.
Global - enable all capable APs	Allows you to enable the AP Stats Capture for all capable APs.

Step 4 To enable or disable Anomaly Capture, click the **Anomaly Capture** tab, and then do one of the following:

- If no APs are enabled, the **Configure AP Enablement** area displays, choose one of the following options, and then click **Get Started**.
- If at least one AP is enabled, the **Anomaly Capture** window appears. From the **Anomaly Capture** window, choose one of the following options:

Option	Description
None - disable all APs	The None - disable all APs appears when at least one AP is enabled. Allows you to disable Anomaly Capture on all of the APs in which it is currently enabled.

Option	Description
Specific - select specific APs and enable or disable	<p>Allows you to enable or disable Anomaly Capture for selected APs. Do the following:</p> <ol style="list-style-type: none"> Click the Specific - select specific APs and enable or disable radio button. In the left pane, expand Global, and drill down to the site > building > floor. The right pane displays the list of APs on that floor and contains three tabs: Enabled APs, Disabled APs, and Not-Ready APs. To enable Anomaly Capture for selected APs, do the following: <ul style="list-style-type: none"> Click the Disabled APs tab. A list of APs that have Anomaly Capture currently disabled, is displayed. Note If a previous attempt to enable the AP failed, an error message is displayed in the Config Status column. Check the check boxes adjacent to the APs for which you want to enable Anomaly Capture, and then click Enable. To disable Anomaly Capture for selected APs, do the following: <ul style="list-style-type: none"> Click the Enabled APs tab. A list of APs that have Anomaly Capture currently enabled, is displayed. Check the check boxes adjacent to the APs for which you want to disable Anomaly Capture, and then click Disable. To view incompatible APs, click the Not-Ready APs tab. <ul style="list-style-type: none"> Note Incompatible APs have the following conditions: <ul style="list-style-type: none"> The operation mode is not set to <code>local</code> or <code>FlexConnect</code>. The OS release that is installed on the AP is not compatible. The OS release must be MR1 or later. To display the list of APs that support Intelligent Capture, click the information (i) icon next to the Not-Ready APs tab.
Global - enable all capable APs	Allows you to enable the Anomaly Capture for all capable APs.

View RF Statistics and Manage Spectrum Analysis Data for an Access Point

Use this procedure to view RF statistics and start and manage Spectrum Analysis data for a specific access point.

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

The **Overall** health dashboard is displayed.

Step 2 Click the **Network Health** tab.

The **Network Health** window appears.

Step 3 Do one of the following:

- From the **Network Devices** dashlet, click the device name (hyperlinked identifier) for the AP to view the details for the AP.
- In the **Search** field (located at the top-right corner), enter the device name, IP address, or MAC address.

A 360° view of the AP appears.

Step 4 In the **Device 360** window, click **Intelligent Capture** at the top-right corner.

The **Intelligent Capture: AP Name** window appears.

Attention If a  icon with the message **GRPC link is not ready (CONNECTING)** appears next to the AP name, see [Client or Access Point Unable to Send Intelligent Capture Data to Cisco DNA Center, on page 20](#) for more details.

Step 5 Click the **RF Statistics** tab to view details about RF statistics.

Note If **AP Stats Capture** has not been enabled, enable it. See [Enable and Manage Intelligent Capture for an Access Point, on page 13](#).


Step 6 In the **RF Statistics** tab you can do the following:

- a) Use the timeline to view the RF statistics for a given time and specify the scope of the data:

Timeline Slider	
Item	Description
1 hour drop-down list	Click the drop-down list and select a duration to set the range of the timeline. Options are 1 hour , 3 hours , and 5 hours . Default is 1 hour .
Timeline Slider	<p>The timeline slider determines the time window of all data displayed. The timeline slider is color-coded to display the health of the AP. You can hover your cursor at a specific time to see details such as the device health score, system resources, and data plane.</p> <p>To adjust the timeline to a different time window, click the < and > buttons to the desired time window.</p> <p>For more customization of the timeline range, click and drag the boundary lines.</p>

- b) Use the radio frequency selector under the timeline to filter the data that appears in the dashlets based on the frequency bands. Click the drop-down list and select **Radio 0 (2.4 GHz or 5 GHz)**, **Radio 1 (5 GHz)**, or **Radio 2 (6 GHz)** (depending on the number of radios supported).
- c) Use the dashlets to view the RF statistics details:

Note You can do the following in the charts that are displayed in the dashlets:

- Hover your cursor over the charts to view details.
- Click and drag within the chart to zoom in on a period. To change the view to the default, click .
- Click the color-coded data types below the chart to disable or enable the data type that is displayed in the chart.

Dashlets	Description
Clients dashlet	Displays the number of clients using the AP. The data source is from the AP WLAN statistics.
Top Clients with Tx Failed Packets by SSID dashlet	Displays the list of SSIDs in the table. The data source for the table is from the AP WLAN statistics. The data source for the bar chart is from AP client statistics. Select an SSID to see the top clients with transmit failed packets for that SSID.
Channel Utilization dashlet	Displays the channel utilization percentage used by the AP and other wireless and non-wireless devices. The data source for the bar chart is from AP Radio Statistics.
Channel Utilization by this Radio dashlet	Displays the current channel utilization percentage used by the AP and a list of SSIDs, the number of clients connected to it, and the number of packets sent or received over the last 15 minutes for its clients. The data source for the table is from the AP WLAN statistics. The data source for the circle chart is from AP radio statistics.
Frame Count dashlet	Displays the number of management and data frames. The data source is from the AP radio statistics.
Frame Errors dashlet	Displays the number of transmit and receive errors. The data source is from the AP radio statistics.
Tx Power and Noise Floor dashlet	Displays the transmit power and noise floor. The data source is from the AP radio statistics.
Multicast/Broadcast Counter dashlet	Displays the multicast and broadcast counts for each SSID. The data source is from the AP WLAN statistics.

Step 7 Click the **Spectrum Analysis** tab.

Step 8 Click **Start Spectrum Analysis** to start a spectrum analysis session.

- Note**
- The spectrum analysis duration is 10 minutes.
 - The maximum number of concurrent spectrum analysis sessions is 20.

Step 9 In the **Spectrum Analysis** tab you can do the following:

- Use the timeline to view the spectrum analysis data for a given time and specify the scope of the data to display:

Timeline Slider	
Item	Description
1 hour drop-down list	Click the drop-down list and select a duration to set the range of the timeline. Options are 1 hour , 3 hours , and 5 hours . Default is 1 hour .
Timeline Slider	<p>The timeline slider determines the time window of data that is displayed. The timeline slider is color-coded to display the health of the AP. You can hover your cursor at a specific time to see the details, such as the device health score, system resources, and data plane.</p> <p>For Spectrum Analysis, the time range is set to a 5-minute window.</p> <p>To adjust the timeline to a different time window, click the < and > buttons to the desired time window.</p> <p>Note The timeline can display data from up to two weeks in the past.</p> <p>Click and drag the boundary lines to view data for a specific time.</p>

- b) Use the radio frequency selector under the timeline to filter the data that appears in the charts based on the frequency bands. Click **2.4 GHz**, **5 GHz**, or **6 GHz**.

Note If **Radio Mode** and **Channel** (above the **Spectrum Analysis** charts) do not display any data, this indicates that the AP has no radios operating on the selected band. This occurs when an AP has both the client serving radios operating on **5 GHz**, while the radio frequency selector is set to **2.4 GHz**.

For more details, see [About Cisco AP Functionality During Spectrum Analysis, on page 20](#).

- c) Use the **Spectrum Analysis** charts for the following functionality:

Spectrum Analysis Charts	
Item	Description
Top chart (Persistence)	<p>This chart provides in real time the amplitude (power) and the channel frequency for each heard signal in the RF environment. The X axis represents the amplitude and the Y axis represents the channel frequency.</p> <p>The colors in the chart represent how many signals are heard at the same amplitude and channel frequency within the selected 5-minute time period:</p> <ul style="list-style-type: none"> • Blue indicates a low number of overlapping signals (or signals heard at the same amplitude and frequency). • Red indicates a high number of overlapping signals. <p>The intensity of the color increases (from blue > green > yellow > orange > red) as more signals are heard. As the lines in the chart overlap and intersect, they change color.</p> <p>The transparency of the colors represents the age of the signal data, with older data being more transparent.</p> <p>To view the RF environment in real time, click Realtime FFT (Fast Fourier Transform) to enable it. Enabling Realtime FFT limits the persistence chart to display "one" most recent data stream, rather than a collection of data streams from a 5-minute time period.</p> <p>To zoom in and view data for a specific range of channels, click and drag your mouse to select the range. The chart refreshes and displays data for the specific channels that you selected.</p> <p>To zoom out and view the entire chart, click the magnifying glass on the top-right corner.</p>
Bottom chart (Waterfall)	<p>This chart provides a time-wise interpretation of data. The chart provides the same information as the Persistence chart but in a different format. The X axis shows the time and the Y axis shows the channel frequency. The lines in the chart represent the exact order in which the events have occurred, which can enable you to troubleshoot the root cause if a problem occurs.</p> <p>The colors in the chart represent the amplitude. Blue indicates a low value (-100 dBm) and red indicates a high value (-20 dBm).</p>

d) Use the **Interference and Duty Cycle** chart to view the following:

- Detected interference and its severity:
 - Interference is plotted as a circle where the radius represents the bandwidth of the interference. The X axis represents the frequency in which the interference was heard on and the Y axis represent the severity.
 - Severity measures the impact of the interference and the range. Range is from 0, which indicates no impact, to 100, which indicates a huge impact.
 - The interference type is determined by its RF signature, which is identified by Cisco CleanAir Technology.
- The duty cycle of each channel.

About Cisco AP Functionality During Spectrum Analysis

The Cisco Aironet 2800 Series, 3800 Series, and 4800 Series Access Points (APs) have dual band radios with flexible radio assignment (FRA) in slot 0. This FRA radio operates on 2.4 GHz, but can be assigned to operate on 5 GHz. Its mode can be changed to differ from the AP's operational mode. When you configure the AP's FRA radio to operate in 5 GHz, no client radios can operate in 2.4 GHz band.



Note Spectrum Analysis is *not supported* on the Aironet 1540 AP, Aironet 1800 Series APs, and Catalyst 9115 AP.



Note Verify that the APs have the correct software version installed. See the **Supported Cisco APs** table in the [Supported Devices for Intelligent Capture, on page 1](#) topic.

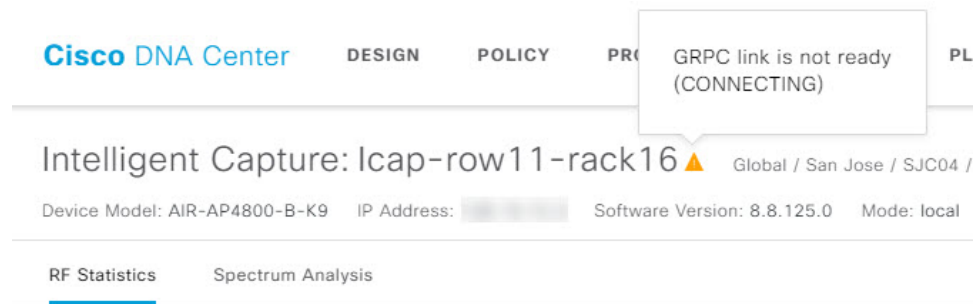
Radio slot assignments for spectrum analysis are as follows:

Device Model	Spectrum Analysis Radio Slot Assignment
Aironet 2800 Series APs Aironet 3800 Series APs Aironet 1560 APs Catalyst IW6300 Heavy Duty Series APs Catalyst IW6300 Heavy Duty Series APs	Radio slots 0 and 1 are enabled.
Aironet 4800 Series APs Catalyst 9120 AP Catalyst 9130 APs	<p>These APs have three radio slots.</p> <p>If data packet capture is running, radio slots 0 and 1 are enabled.</p> <p>If data packet capture is not running, radio slot 2 is enabled.</p> <p>Note AP spectrum analysis data is not displayed for the 2.4 GHz channel band. Also, if there is no AP radio serving the 2.4 GHz band, the Radio Mode and Channel fields are empty. This occurs if the FRA radio is set to operate in 5 GHz and packet capture is enabled.</p>

Troubleshoot Intelligent Capture

Client or Access Point Unable to Send Intelligent Capture Data to Cisco DNA Center

Problem: Client or access point is unable to send Intelligent Capture data to Cisco DNA Center. The warning (🚩) icon appears with the message **GRPC link is not ready (CONNECTING)**:



Background: In order for APs to send Intelligent Capture data to Cisco DNA Center, the Intelligent Capture port number on the Cisco Catalyst 9800 Series Wireless Controller or Cisco Wireless Controller must be set to 32626. Typically, when the Catalyst 9800 Series Wireless Controller or wireless controller is discovered by Cisco DNA Center, the port number is automatically set to 32626.

However, there are some upgrade paths for Cisco DNA Center that can cause the port number from being properly set.

Solution: To resolve this issue, do the following:

1. Check that the Catalyst 9800 Series Wireless Controller or wireless controller has the Intelligent Capture server port number is set to 32626.
2. If the port number is not set to 32626, manually set it.

