Spectrum Analysis

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Spectrum analysis

A spectrum analysis chart is a graphical visualization tool that

- Cisco Catalyst Center receives and displays real-time spectrogram streams from APs
- aggregates spectrum data into distinct chart types for network administrators, and
- helps identify and analyze RF violations using color-coded, interactive visual outputs.

To analyze a violation, you should select the corresponding AP and analyze the spectrogram stream.

Each AP uses a specific channel to communicate with clients, depending on whether the setting is global or specific to a channel.

When many clients join the same AP, frames are more likely to be dropped. If clients disconnect quickly or cannot join, perform spectrum analysis to check if the channels are congested.

You can enable spectrum analysis on each AP listed in the web UI and view graphs for the selected AP. When spectrum analysis is enabled, APs send spectrum data to Cisco Catalyst Center, which aggregates it into three distinct charts.

You can view these charts while performing a spectrum analysis:

- Persistence charts plot the amplitude-to-power ratio of each signal at each channel for five minutes. The chart uses blue to represent one signal and red to represent many signals. It also uses opacity to show the age of signal data within the five-minute interval; older data appears more transparent.
- Waterfall charts plot all signals analyzed in the channel for five minutes, with intensity on the X-axis and time on the Y-axis. The chart uses blue for low values and red for high values.
- Interference and Duty charts plot the severity of detected interference for each channel band and list the interference type. Interference appears as a circle; the center indicates severity and the radius shows the affected section of the channel band. The impact is measured by severity values, ranging from 0 to 100. Cisco Catalyst Center determines the interference type from the RF signature using Cisco CleanAir technology.

Live spectrum analysis

A live spectrum analysis is a radio monitoring feature that

- enables real-time inspection of the spectrum of frequencies generated by AP radios
- displays consolidated interference views across both the 2.4 GHz and 5 GHz ranges when using radio 2, and
- allows users to select an AP radio in the web UI and view its associated live spectrum for a configurable duration for 10 minutes.

You can perform a live spectrum analysis of the AP radios using the web UI, which allows you to monitor the spectrum of frequencies generated by the associated AP radios. The live spectrum capture uses radio 2 if it is available. Otherwise, both radio 0 and radio 1 are used. However, if the feature is enabled on radio 0 or radio 1, you can view only the part of the spectrum associated with those radios.

Perform AP spectrum analysis (GUI)

Identify radio frequency interference and optimize wireless network performance using AP spectrum analysis using the GUI.

Before you begin

Use the Cisco Catalyst Center discovery functionality to locate an AP to perform a spectrum analysis.

Procedure

Step 1 Choose **Provision** > **Inventory**.

The **Inventory** window is displayed.

Step 2 Click **AP Name**.

The **360 degree Device** window is displayed.

Step 3 Click **Intelligent Capture**.

Step 4 Click **Spectrum Analysis** to view the graphs.

Step 5 From the **Radio** drop-down list, select a radio.

Step 6 Click **Start Spectrum Analysis**.

The graphs are displayed on the Web UI for you to analyze.

To stop the analysis, click **Stop Spectrum Analysis**.

Configure spectrum analysis (CLI)

Enable spectrum analysis to monitor and troubleshoot RF interference on wireless APs using commands.

Procedure

Step 1 Enter the global configuration mode.

Example:

```
Device# configure terminal
```

Step 2 Configure spectrum analysis on the AP.

Example:

```
Device# icap subscription ap rf spectrum enable
```

Step 3 Select a radio slot to enable spectrum analysis.

Example:

```
Device# icap subscription ap rf spectrum slot number
```

Verify spectrum analysis

This is a sample output of the command that verifies spectrum analysis on a selected AP:

```
Device# show ap icap subscription name
Subscription list
-----------------
Full Pkt Capture : Disabled
Partial Pkt Capture : Enabled
Anomaly Event : Enabled
Debug : Disabled
Stats : Disabled
Ap Operational Data : Disabled
Sensor Message : Enabled
RRM Operational Data : Disabled
Client Events : Disabled
aWIPS Forensic Pkts: Disabled
MAC and Filters subscription list
---------------------------------
Full-packet-trace: None
Partial-packet-trace: None
Filters: None
Anomaly Detection: None
Client Stats
------------
None
RF Spectrum
-----------
Radio Slot(s): 1
```