



Simplifying Network Troubleshooting Using Catalyst Center Assurance

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Session ID – BRKOPS-2121



#CiscoLiveAPJC

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- 4 Enter messages/questions in the Webex space

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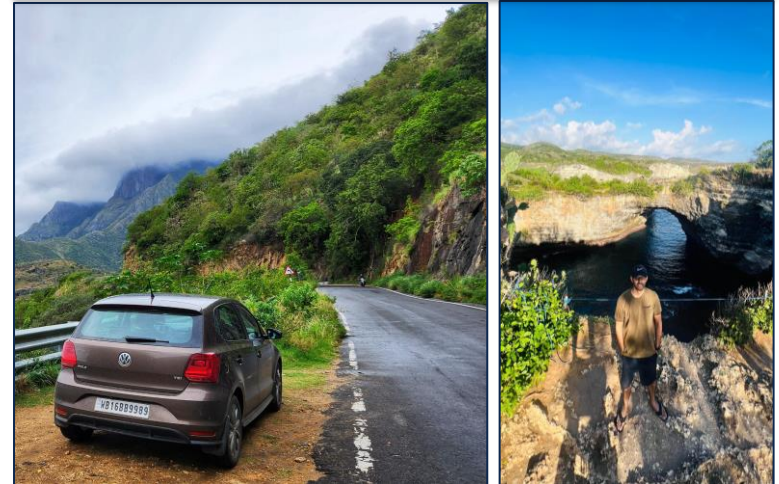
About Vasant...

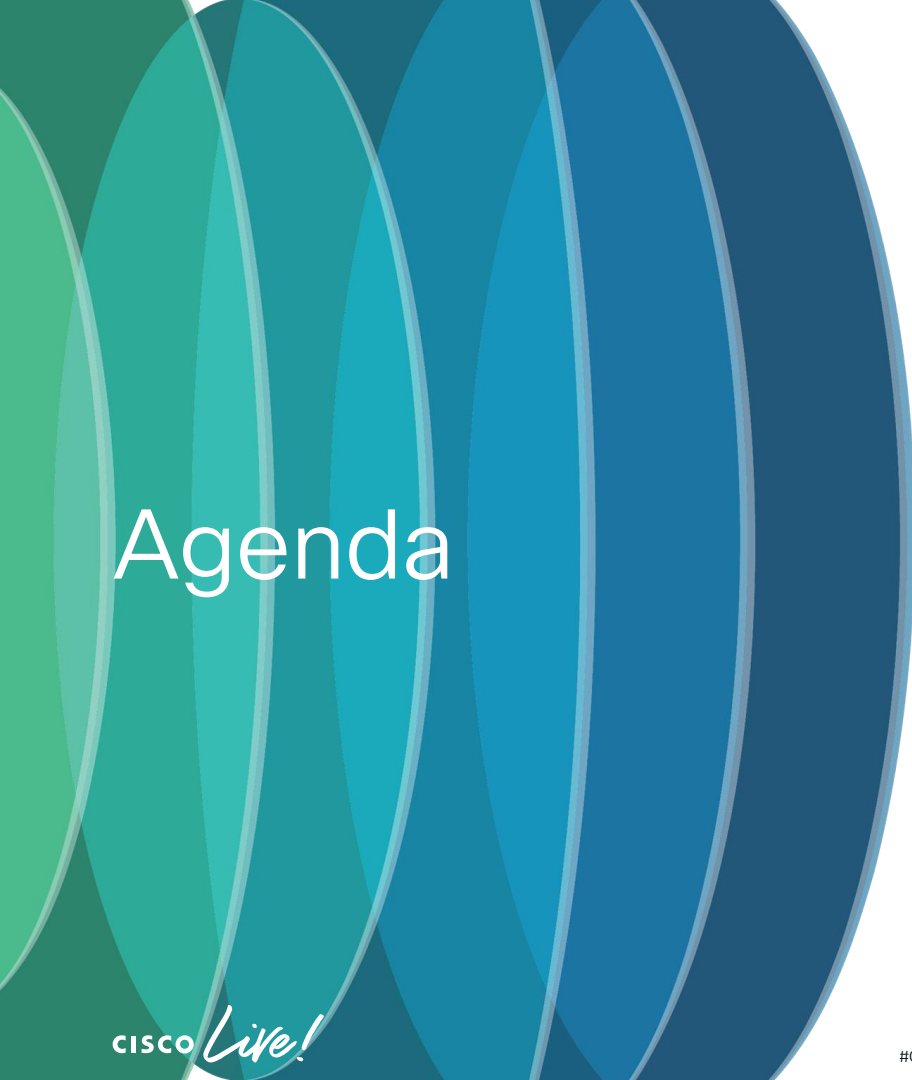
9+ Years with Cisco

- TAC – Wireless
- Network Consultant – Wireless
- Catalyst Center TME

- Travelling
- Temple Architecture
- History

cisco *Live!*





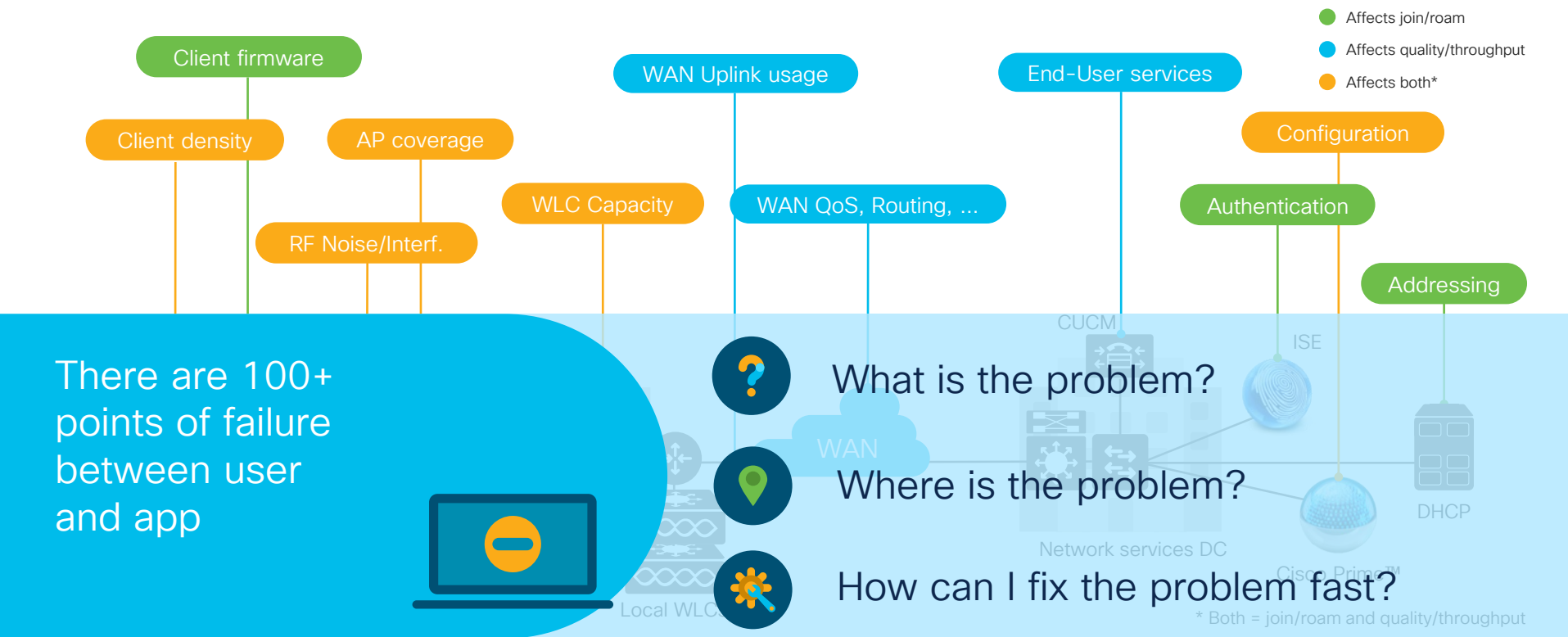
Agenda

- Introducing Catalyst Center Assurance
- Key use cases for network troubleshooting
 - Health of the network
 - Health of the clients
 - Network issues
 - Reactive troubleshooting of wireless client onboarding issues
 - Proactive troubleshooting of network issues
 - RF optimization for different kinds of deployments

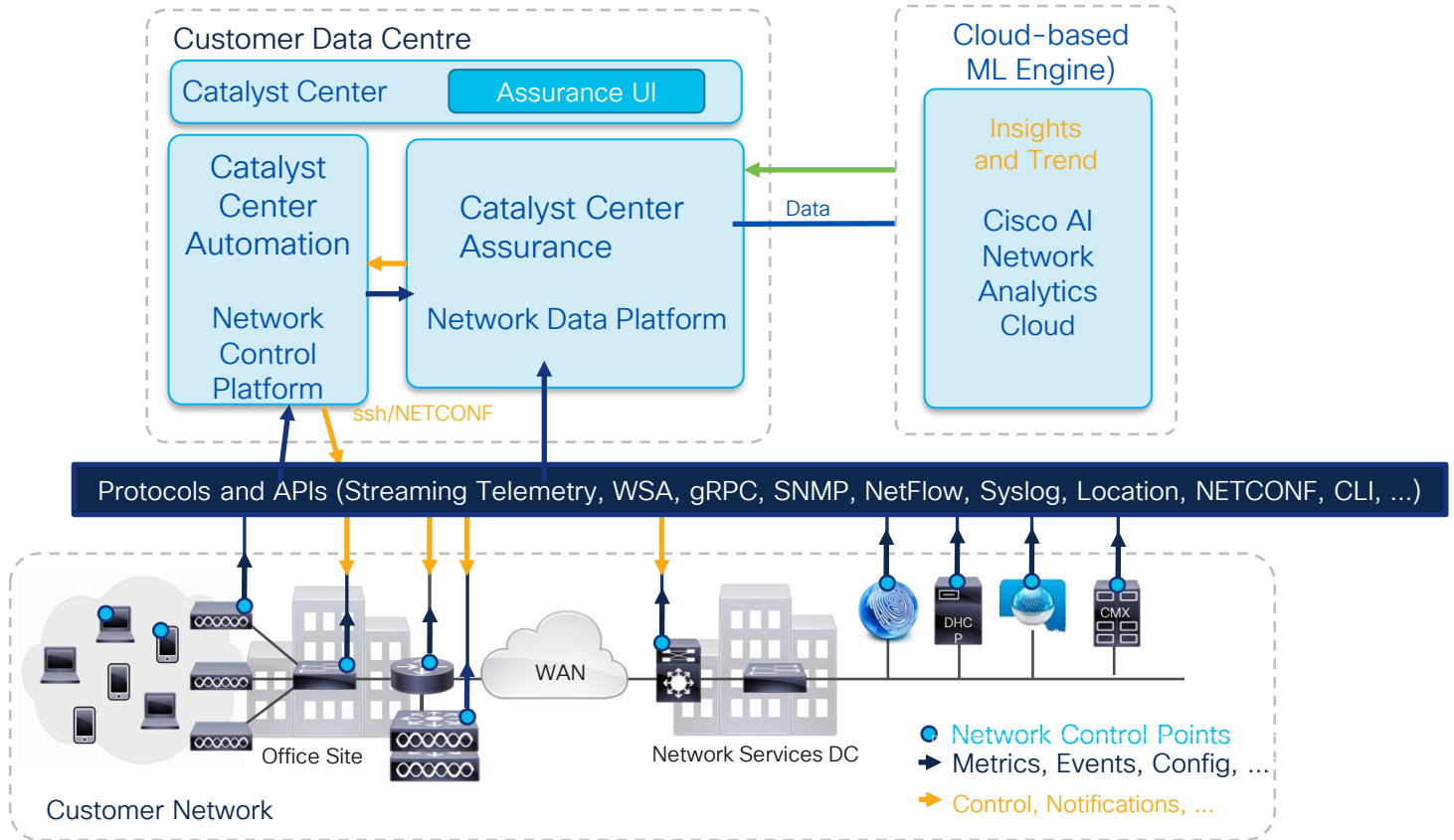
Introducing Catalyst Center Assurance



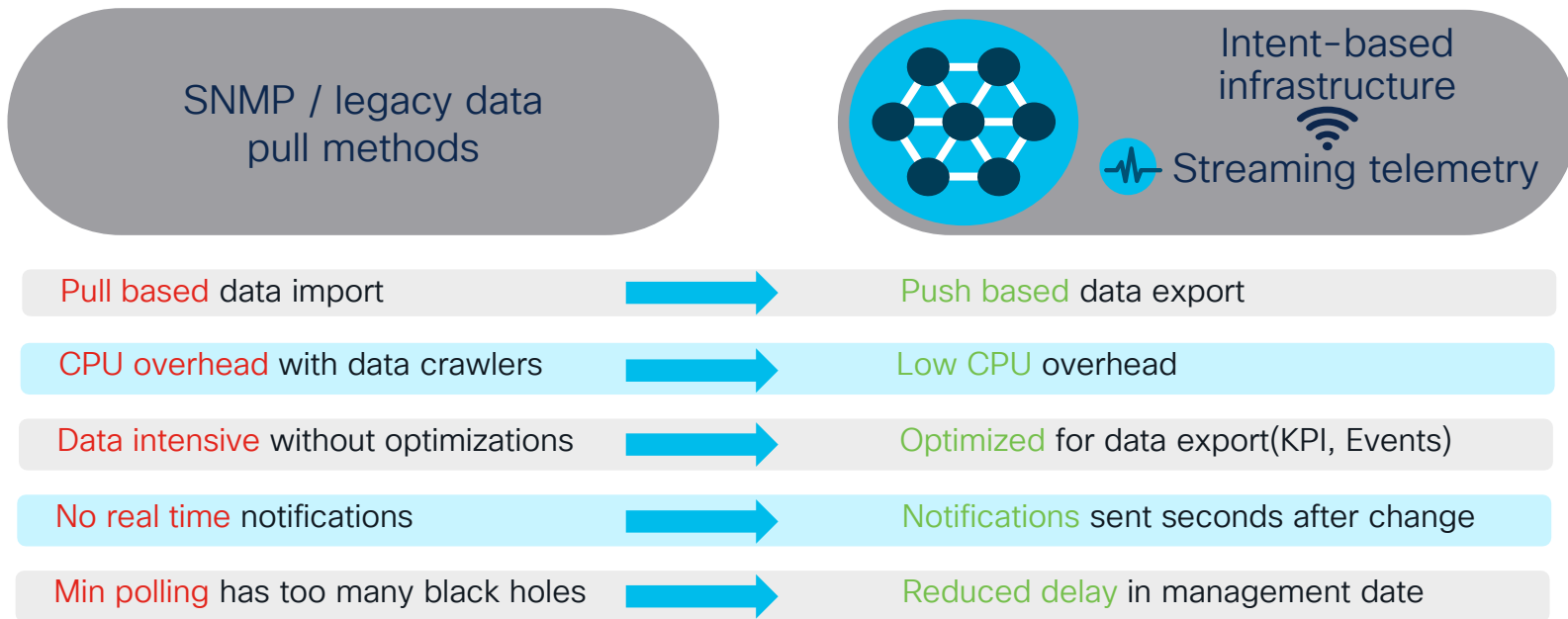
Network assurance is a complex, end-to-end problem



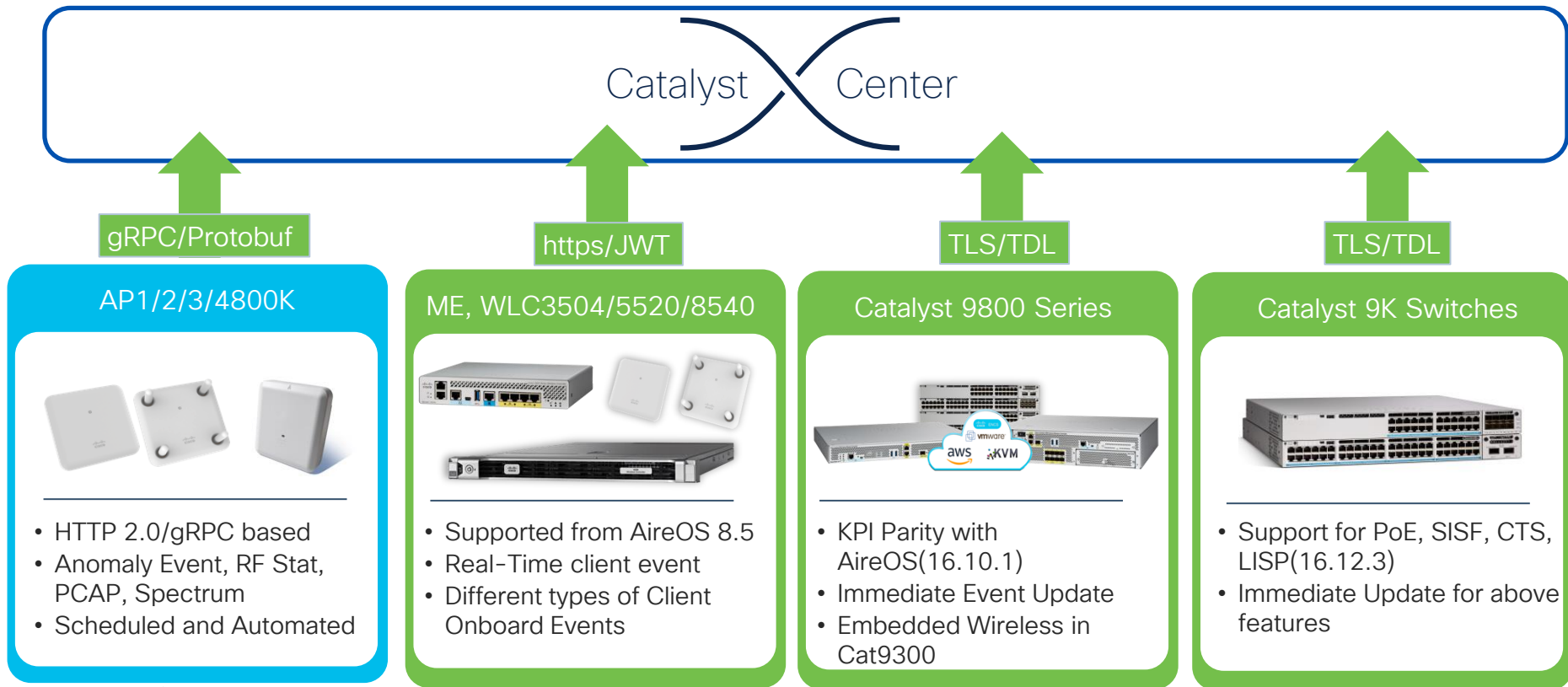
Catalyst Center Assurance Architecture



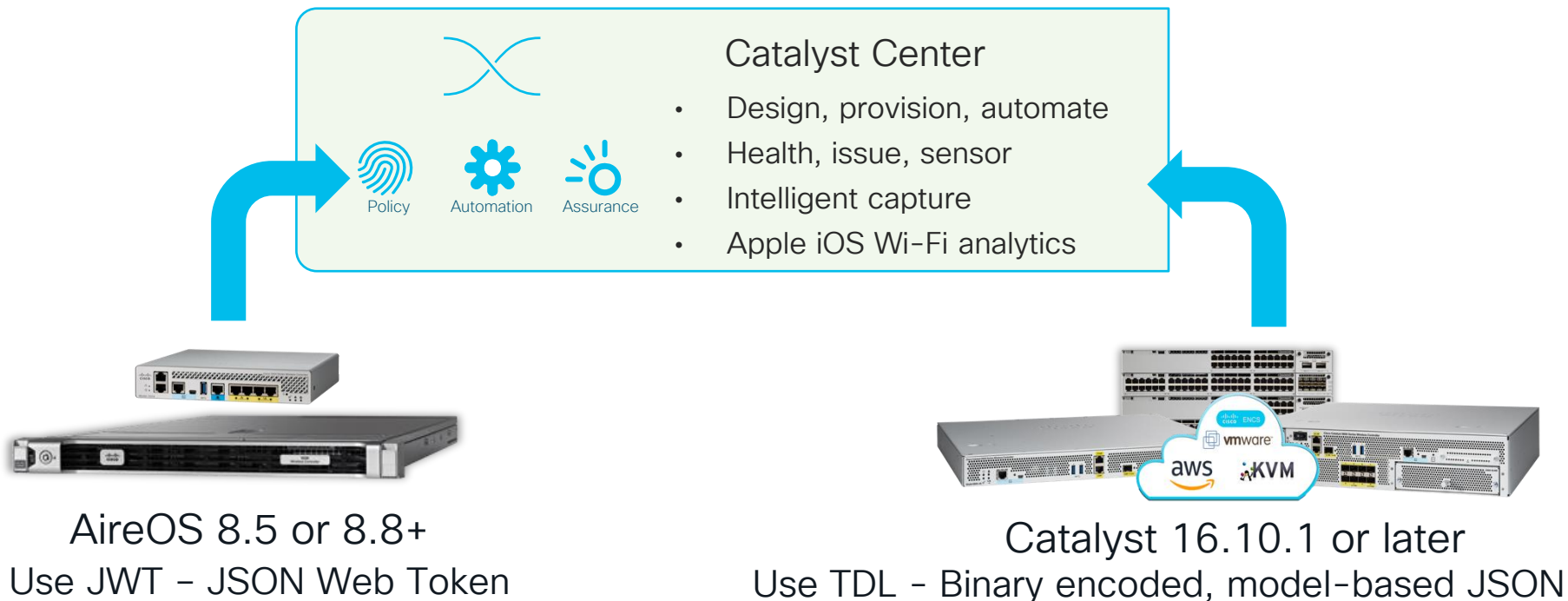
Streaming telemetry provides right data at the right time with the right context



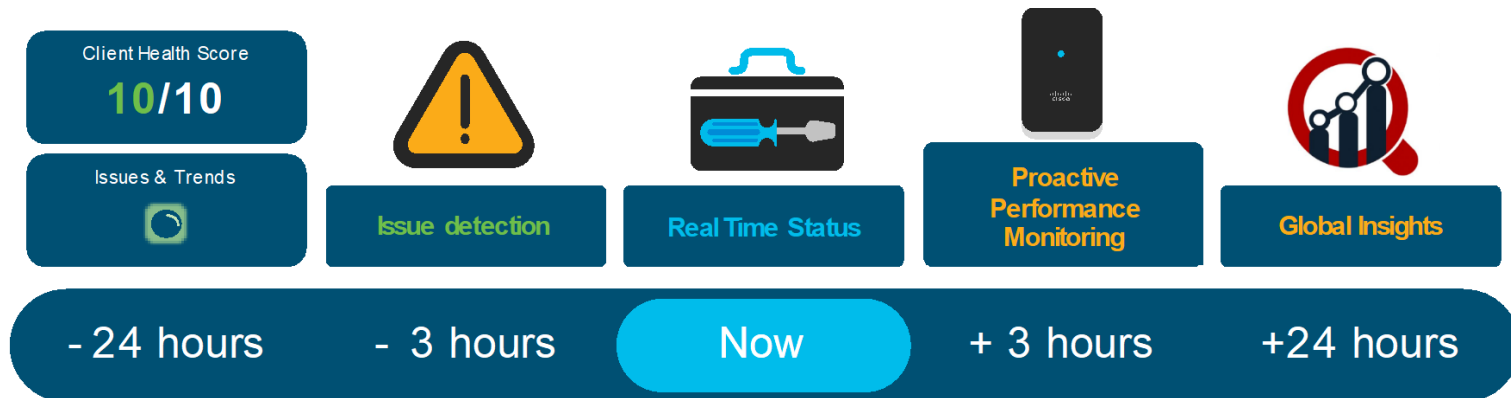
Purpose-built for Catalyst Center Assurance Streaming Telemetry Architecture



Wireless assurance provide feature parity between AireOS and IOS-XE based controller



Network Time Travel



Unique temporal graph technology captures network state information



Full contextual state stored for 30 days to allow time travel and recreate problem in data

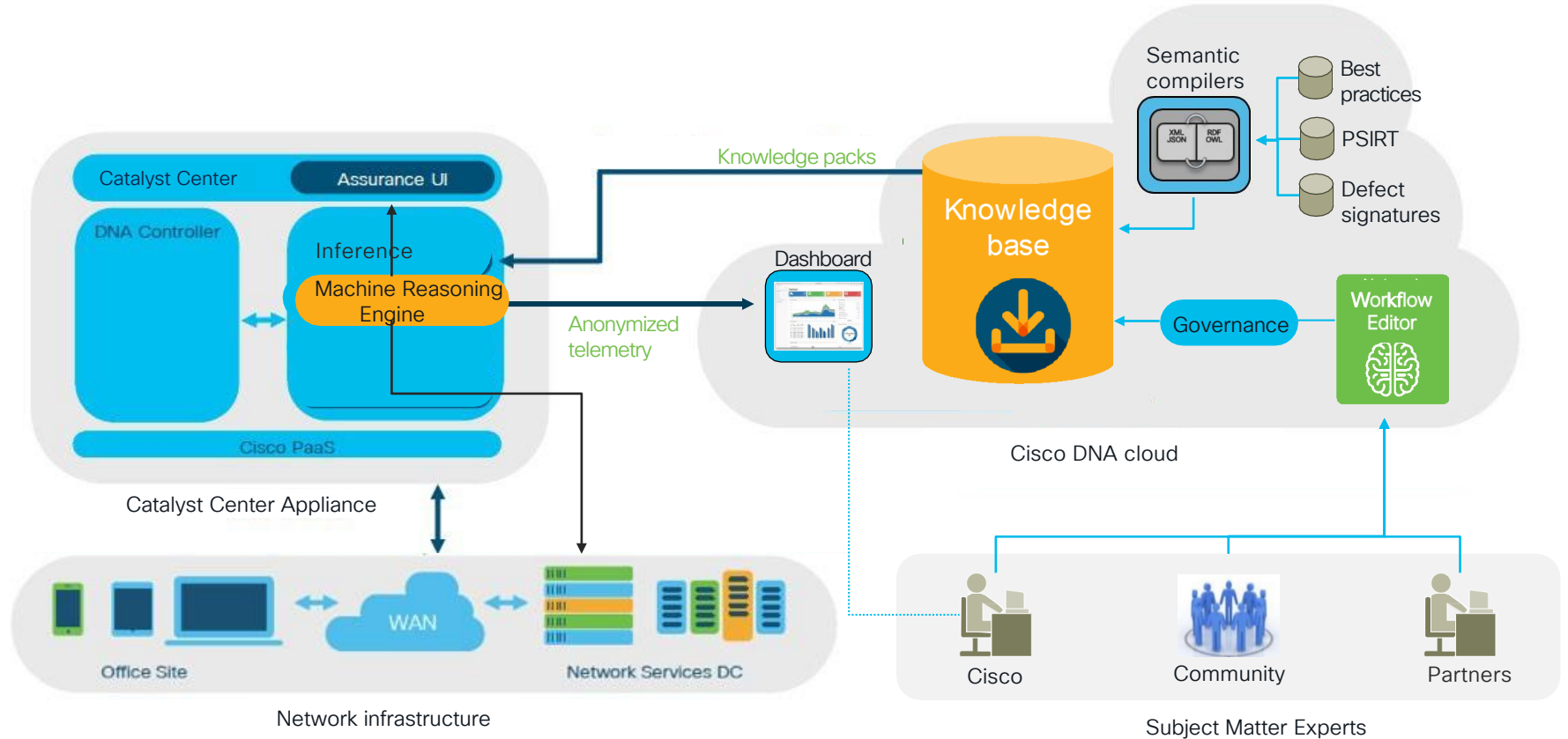


Billions of context aware search graph entries created every 24 hours



Lowens mean time to resolution and improves end user experience

Machine Reasoning Engine Architecture

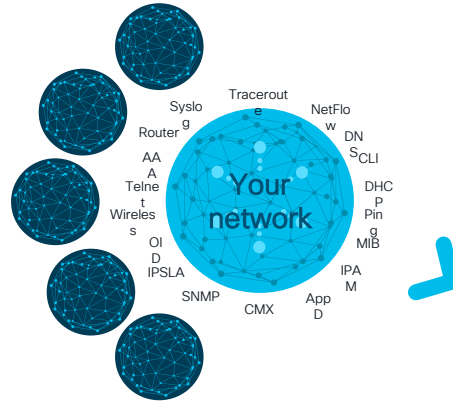
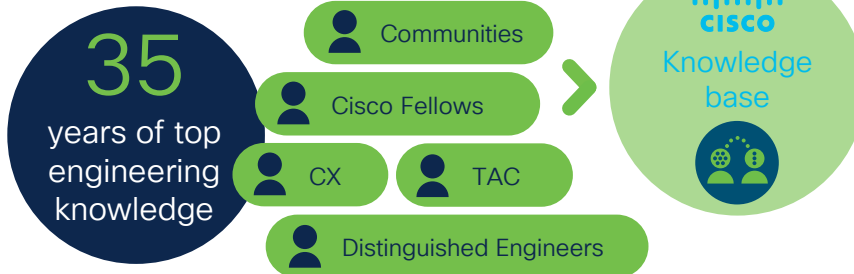


Machine Reasoning Engine – Supported Features

Diverse data:
network,
application, security

Diverse networks:
Local and global

Streaming telemetry:
Cloud connected



High CPU utilization
Power supply failures
Interface down
STP loop detection
Wired client auth failures
DHCP reachability failures
SDA readiness
Security vulnerabilities
Software defect notifications
Sticky clients
PoE failures
Wireless client / AP data collection

Catalyst Center Assurance Features – No AI Cloud Tethering

Visibility

- 360 Views
- Health Dashboard
- Maps
- Rogue and aWIPS Dashboard
- Wi-Fi 6 Dashboard
- Wi-Fi analytics (Apple, Samsung, and Intel)
- DHCP, DNS Dashboards

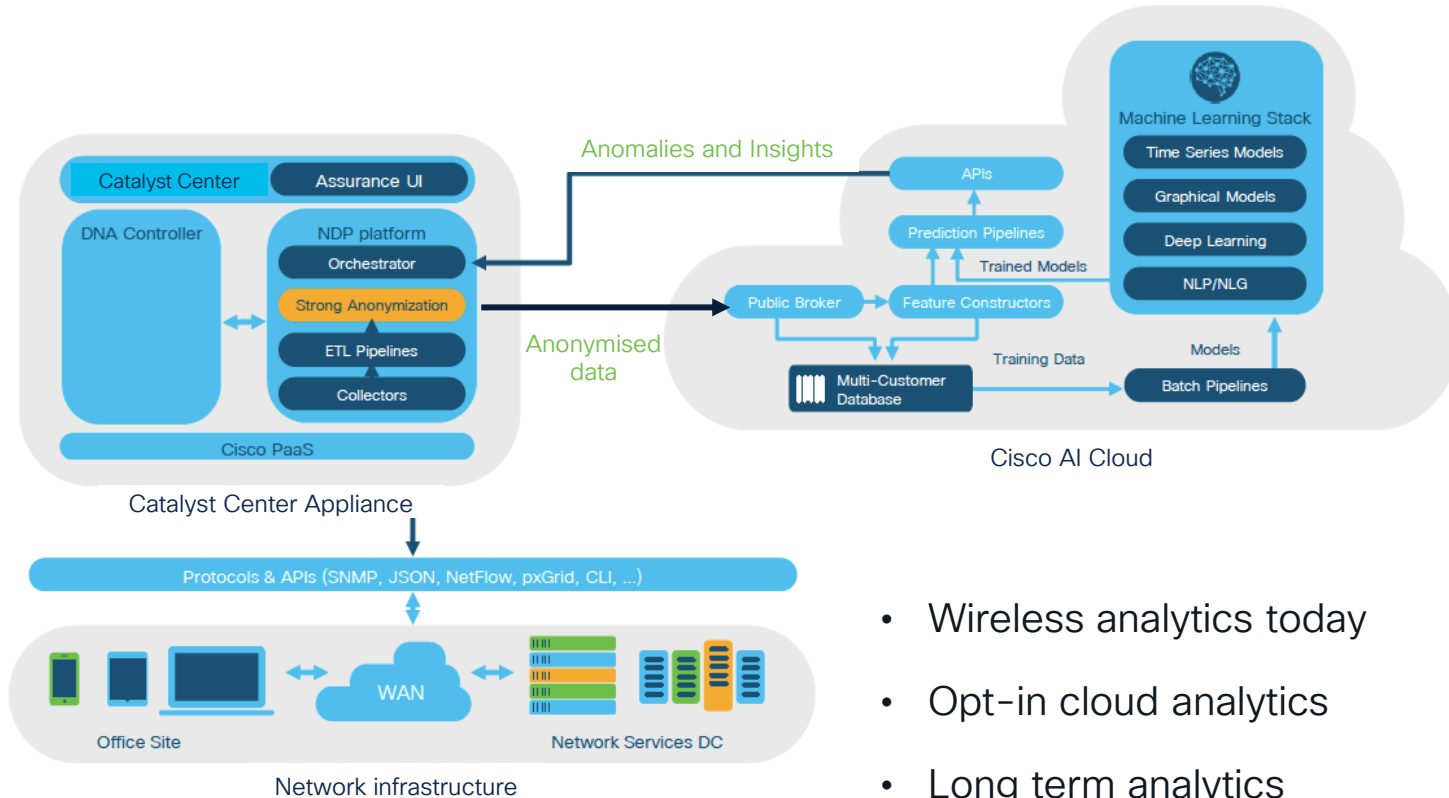
Observability

- Application Experience
- ThousandEyes Integration
- MS Teams, WebEx Integration
- Network Services
- Location Services
- PoE analytics
- Reports
- Spectrum Analyzer

Insights & Action

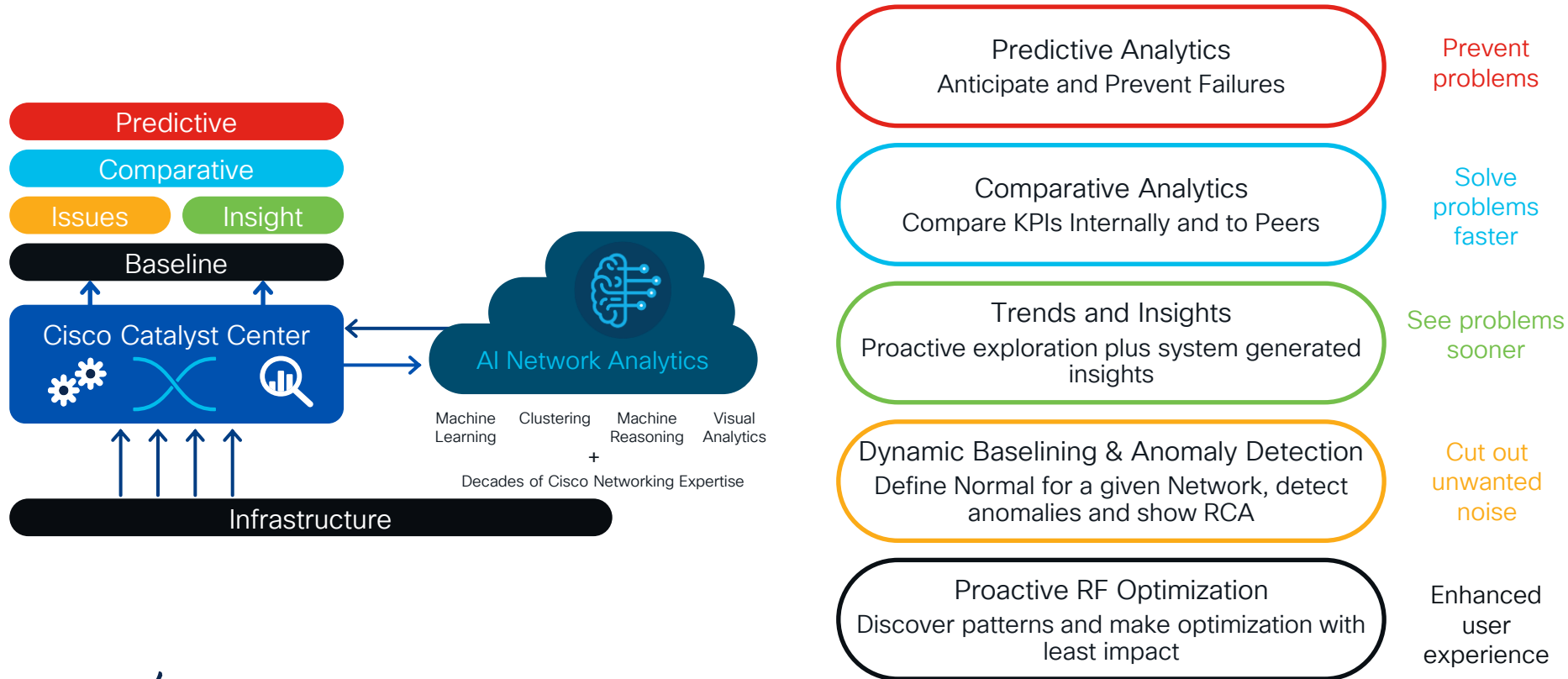
- Intelligent Capture
- Network Reasoner
- Issues/events Dashboard
- Issues Auto Resolution
- Reports

Cisco AI Network Analytics



- Wireless analytics today
- Opt-in cloud analytics
- Long term analytics

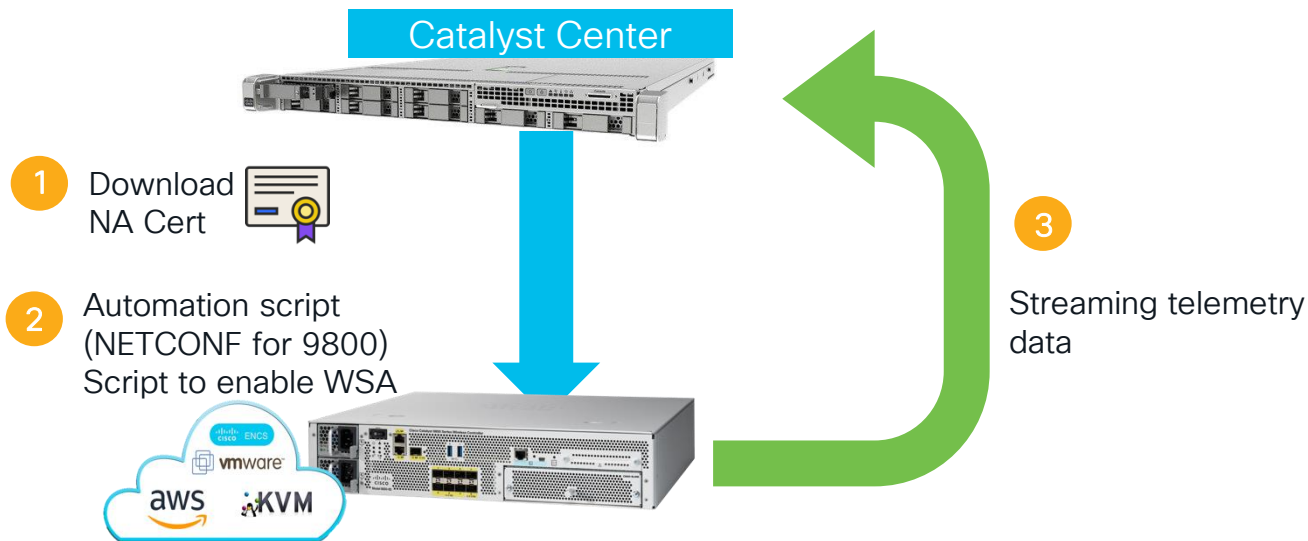
Cisco AI Network Analytics – Solution Overview



How do I start using these features?

Add the devices to Catalyst Center inventory, assign them to a site and enable AI Network Analytics

- Catalyst Center pushes automated scripts to enable telemetry
 1. Prerequisite – Enable Netconf-yang from Device CLI
 2. Install Catalyst Center Certificate for https setup with Catalyst Center
 3. Configure and Enable streaming telemetry

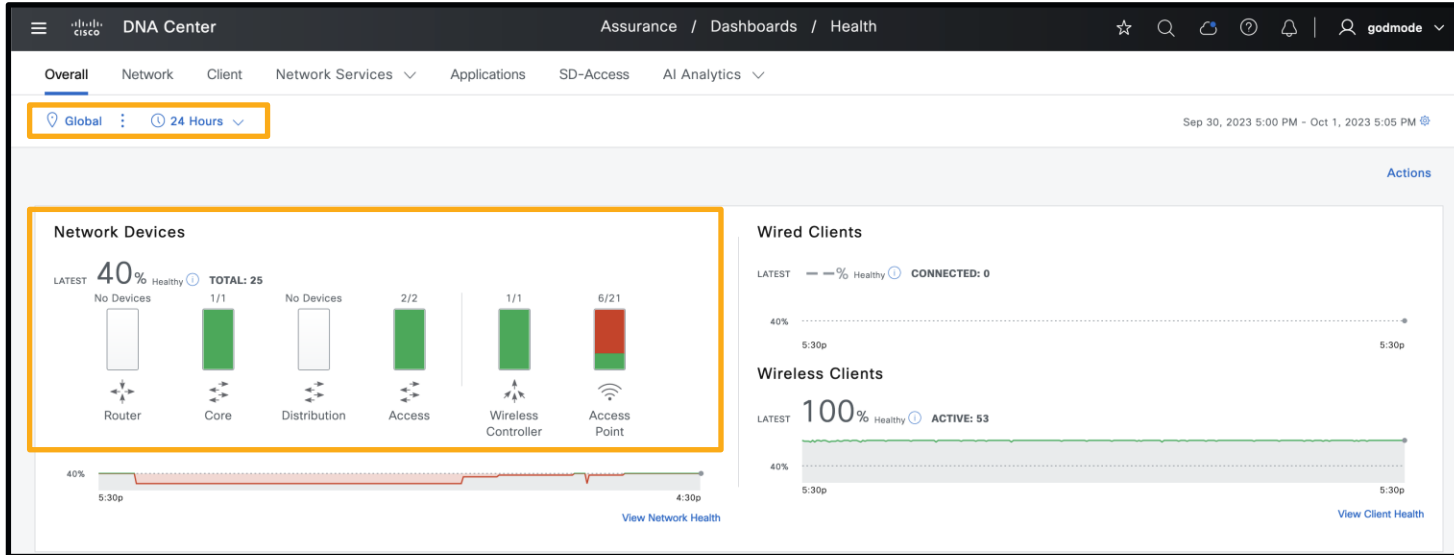


Key Use Cases For Network Troubleshooting

Use Case 1: Health of the Network

How is my network doing?

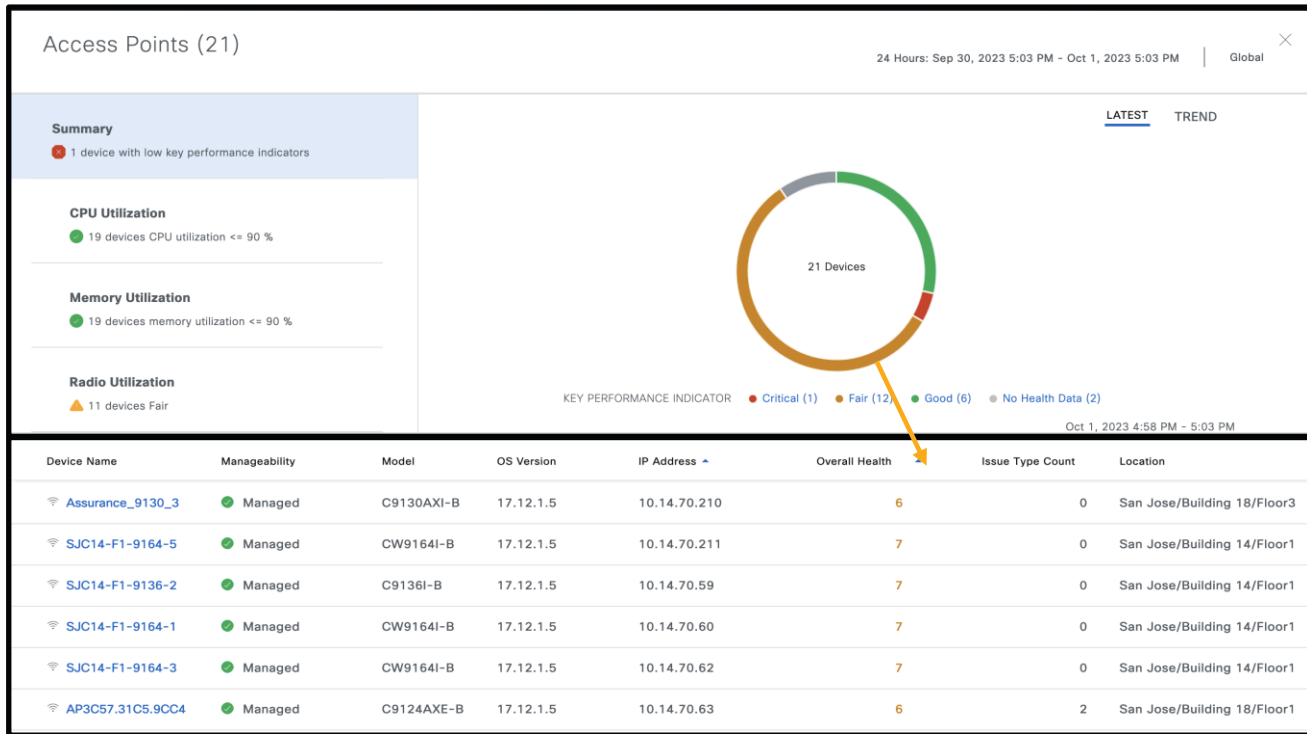
Overall network health



- Overall and site-specific health of my network devices
- Is the health over a period improving or going down?

Which WLC or AP is reducing the health of my network?

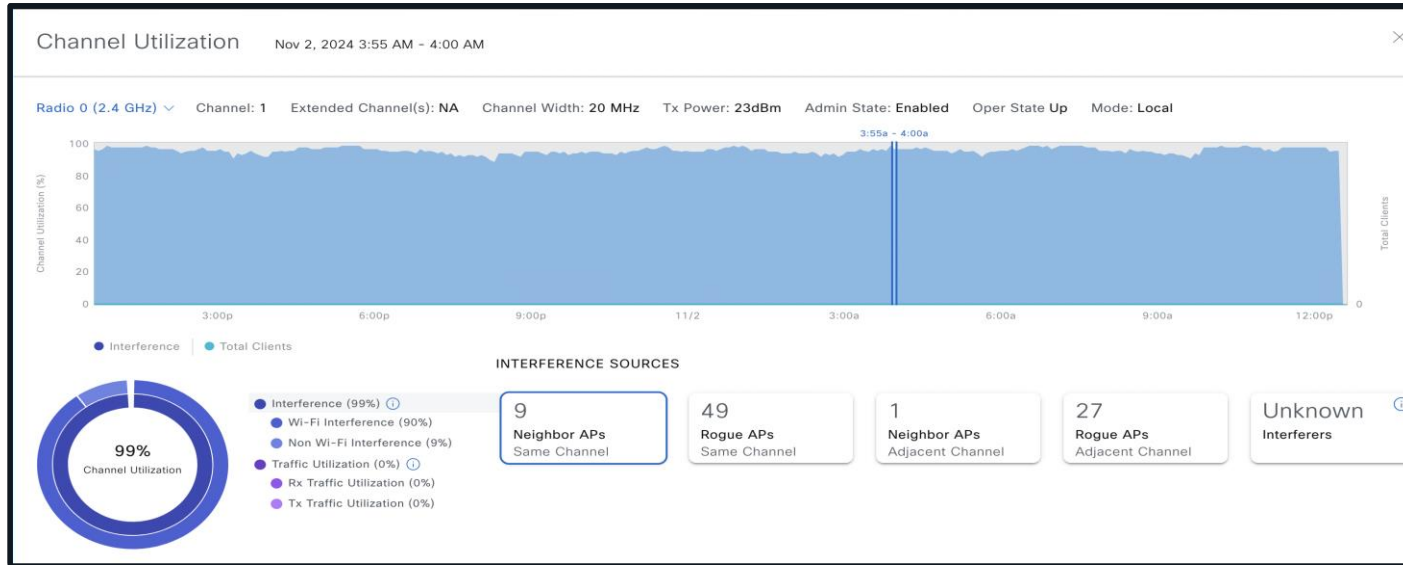
Network device health



- Summary of the KPIs contributing to the health score
- List of APs for the corresponding health scores
- Similar list of WLC, if you have multiple WLCs

Why is my WLC or AP health score so low?

Device 360



- Device 360 view shows exactly which KPI is contributing to poor health score
- Go back in time till 30 days to see historical data

Can I modify the health score KPI thresholds as per my network?

Health score settings

Device Health

Application Health

Health Score

The health score can be customized based on device type. The network device's health score is the lowest score of all included KPIs. To disable a KPI from impacting the overall device health, you can exclude it from the health score calculation.

Note: Health score setting is not applicable for Third Party Devices.

Router

Core, Distribution & Access

Wireless Controller

Access Point

Wireless Client

Wired Client

Q Search Table

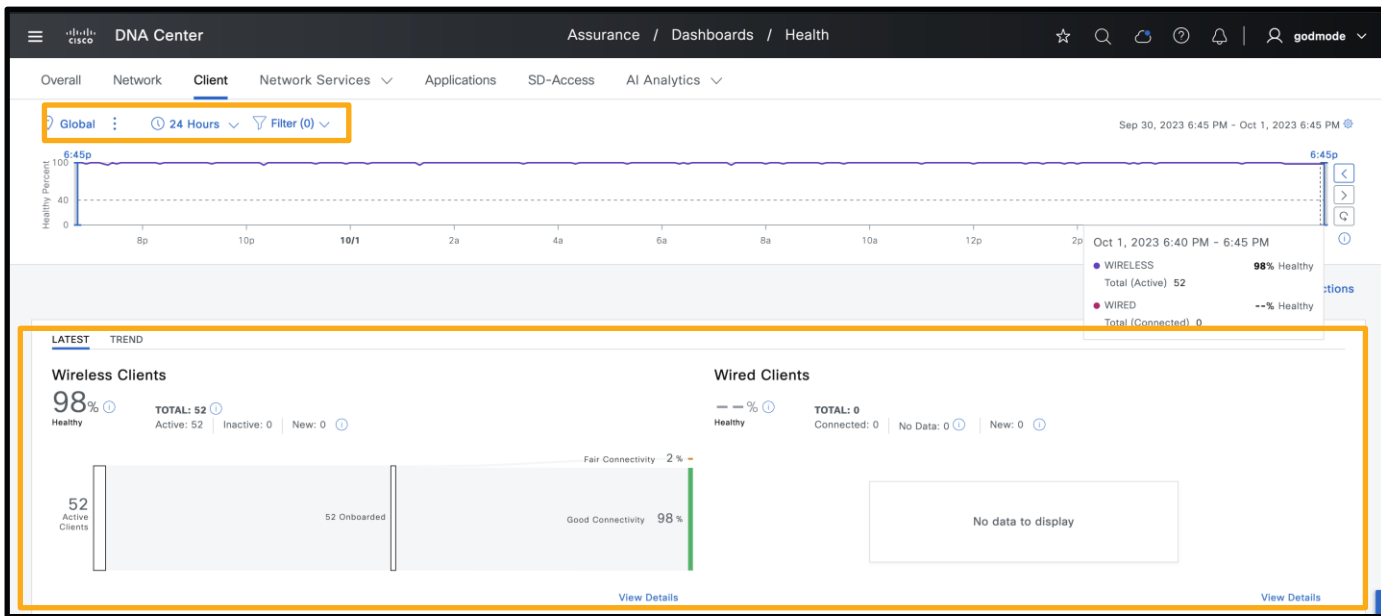
KPI Name	KPI Health Score		Included for Health Score	Current Setting	Last Modified
Air Quality 2.4 GHz AP health indicated by Air Quality of 2.4 GHz band.	POOR < 60%	GOOD ≥ 60%	✔ Yes	Default	--
Air Quality 5 GHz AP health indicated by Air Quality of 5 GHz band.	POOR < 75%	GOOD ≥ 75%	✔ Yes	Default	--
Air Quality 6 GHz AP health indicated by Air Quality of 6 GHz band.	POOR < 75%	GOOD ≥ 75%	✔ Yes	Default	--
CPU Utilization Device health indicated by CPU Utilization.	POOR > 90%	GOOD ≤ 90%	✔ Yes	Default	--
Interference 2.4 GHz AP health indicated by Radio frequency Interference in 2.4 GHz band.	POOR > 50%	GOOD ≤ 50%	✘ No	Custom	Sep 19, 2021 12:10 PM
Interference 5 GHz AP health indicated by Radio frequency Interference in 5 GHz band.	POOR > 20%	GOOD ≤ 20%	✔ Yes	Default	--

Threshold for the KPIs are configurable and can be included/excluded for health score calculation

Use Case 2: Health of the Clients

How are my clients doing?

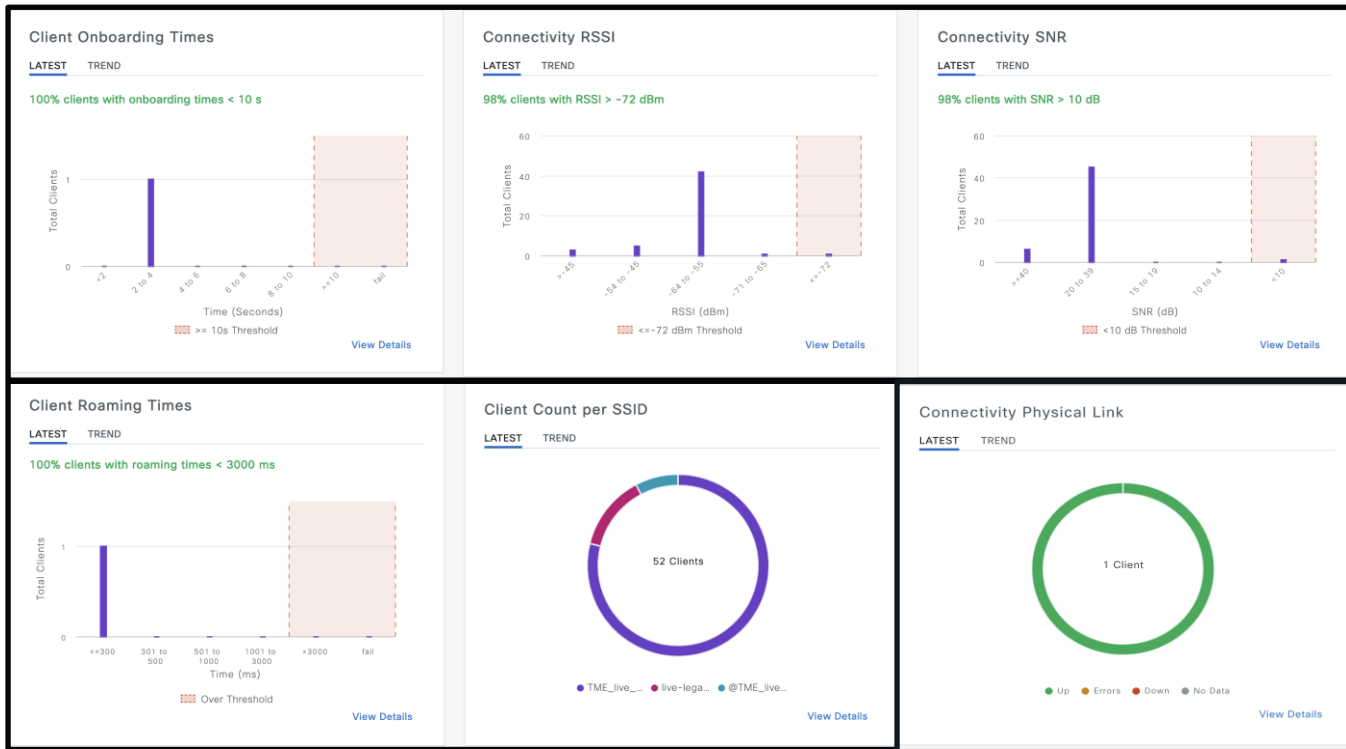
Overall client health



- Overall and site-specific health of the clients
- Filter with SSID and bands for wireless clients
- View details on clients with poor connectivity and reason and on client 360

How are my clients doing?

Overall client health

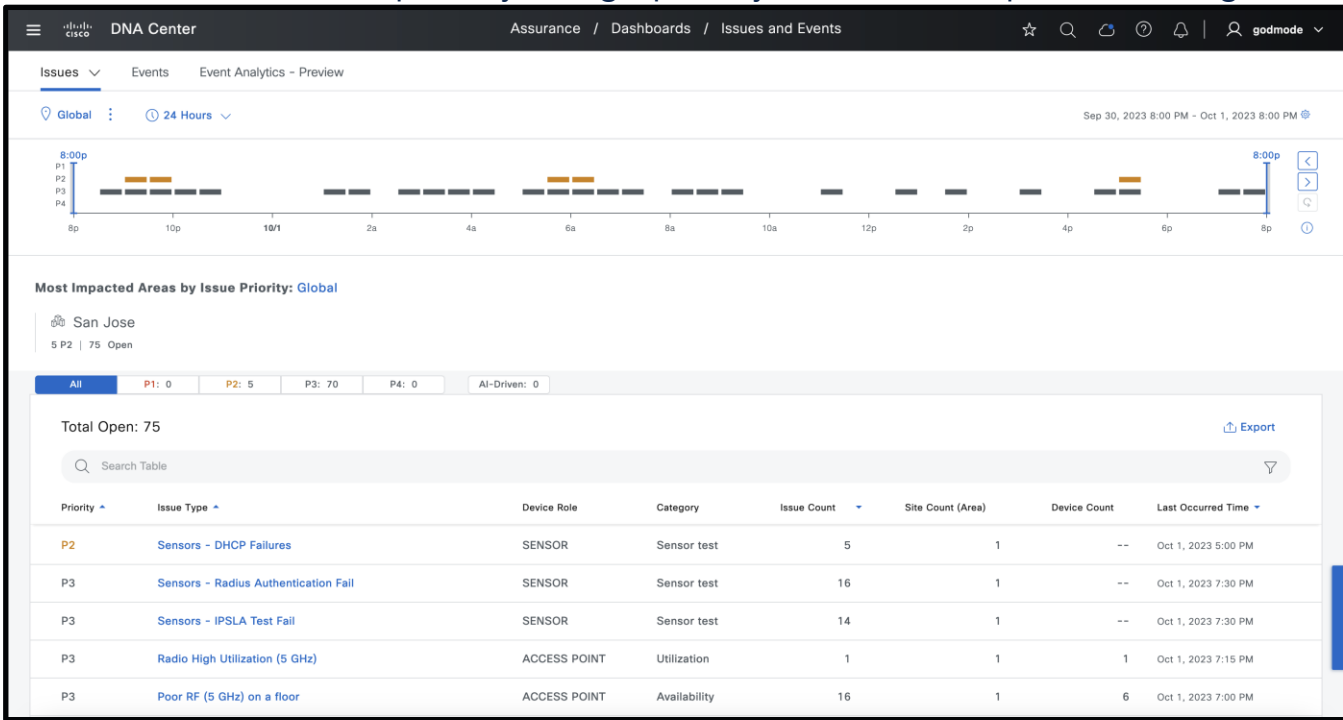


- Executive summary of different wireless/wired client KPIs
- Filter with SSID and bands
- Latest data and the trend over a period of 24 hours can be viewed

Use Case 3: Network Issues

How do I get visibility into issues impacting my network?

Issue dashboard to help analyse high priority issues and top sites having issues



- What are the top sites and issues that need attention?
- When did the issue happen?
- Different channels like email, pagerduty, rest API, webex, syslog can be used to get notifications on these issues

Layer 2 loop issue

Issues ▾ Events Event Analytics - Preview

All P1: 4 P2: 6 P3: 7 P4: 7 ☐ AI-Driven: 5

Total Open: 24 [Export](#)

Search Table

Priority ▴	Issue Type	Device Role	Category	Issue Count	Site Count (Area)	Device Count	Last Occurred Time
P1	Interface Connecting Network Devices is Down	DISTRIBUTION	Connectivity	0	1	1	Oct 8, 2024 10:59 AM
P1	Layer 2 loop symptoms	DISTRIBUTION	Connectivity	2	1	2	Oct 8, 2024 10:44 AM
P1	Switch unreachable	BORDER ROUTER	Availability	1	1	1	Oct 8, 2024 7:29 AM
P1	Fabric Devices Connectivity - DHCP Underlay	BORDER ROUTER	Connected	1	1	1	Oct 8, 2024 7:14 AM
P2	Excessive failures to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Oct 8, 2024 10:29 AM
P2	Excessive time to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Oct 8, 2024 10:14 AM
P2	Excessive time to get an IP Address - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Oct 8, 2024 9:59 AM
P2	Drop in radio throughput for Cloud Applications	ACCESS POINT	Application	1	1	1	Oct 8, 2024 9:44 AM
P2	Drop in total radio throughput	ACCESS POINT	Application	1	1	1	Oct 8, 2024 9:29 AM
P2	Switch power failure	ACCESS	Device	1	1	1	Oct 8, 2024 9:14 AM

16 Record(s) Show Records: 10 < 1 2 >

How do I get visibility into issues impacting my Wireless Network?

Troubleshooting High Radio Utilization issue

(P3)Radio

1 Open Issue

0 Selected

Issue

The 5

1 Record(s)

Radio High Utilization (5 GHz)

P3 The 5 GHz

Status: Open

Description

The 5 G

utilizati

Time

Oct 1, 2

Location

Global/Sa

Problem Details

Impact Details

Troubleshooting

Suggested Actions

Radio High Utilization (5 GHz)

P3 The 5 GHz

Status: Open

Description

The 5 GHz

utilization.

Time

Oct 1, 202

Location

Global/Sa

Problem Details

Impact Details

Troubleshooting

Suggested Actions

Radio High Utilization (5 GHz) / Issue Instance

P3 The 5 GHz radio 1 on AP "SJC14-F1-9136-1" is experiencing high utilization.

Status: Open

Description

The 5 GHz radio "1" on the AP "SJC14-F1-9136-1" has exceeded the 70% threshold and is currently experiencing 82% utilization.

Time

Oct 1, 2023 9:15 PM

Location

Global/San Jose/Building 14/Floor1

Problem Details

Impact Details

Troubleshooting

Suggested Actions

IMPACT SUMMARY

0 Client(s) Affected

Suggested Actions (5)

1 Consider adding more APs with 5 GHz radios to this location.

2 Check the neighbor APs on the same channel. High traffic on their clients will cause higher interference.

3 Check for the presence of rogue APs and rogue clients on these APs channels.

4 Use the show 802.11a cleanair device ap SJC14-F1-9136-1 command to check the CleanAir Interference Severity Index (ISI) on this AP, and the RSSI from other APs.

5 Consider enabling Optimized Roaming on the WLC using - https://www.cisco.com/c/en/us/td/docs/wireless/controller/9800/17-3/config-guide/b_wl_17_3_cg/m_smart_roam.html

Preview All

Run

Run



Can I create custom issues?

The screenshot illustrates the process of creating a custom issue from a syslog event in the Cisco DNA Center Assurance / Dashboards / Issues and Events page.

Left Panel (Events): Shows a list of events. The event 'LINEPROTO:UPDOWN' is highlighted, and a green callout 'Syslog Event' points to it.

Main Panel (Event Details): Displays details for the selected event. The 'Event Type' is 'Syslog'. The message text is '2743165: 2743158: *Oct 2 06:21:32.786: Line protocol on Interface GigabitEthernet1/0/25, changed state to up'. The device name is 'B18-live-C9200-wireless-tme.com'. The device IP is '10.14.70.3'. The location is 'Global/San Jose/Building 18/Floor1'. The mnemonic is 'UPDOWN'. The facility is 'LINEPROTO'. A green callout 'Create Issue' points to the 'Create an Issue' link.

Right Panel (Create an Issue Modal): A modal window titled 'Create an Issue' with the following fields:

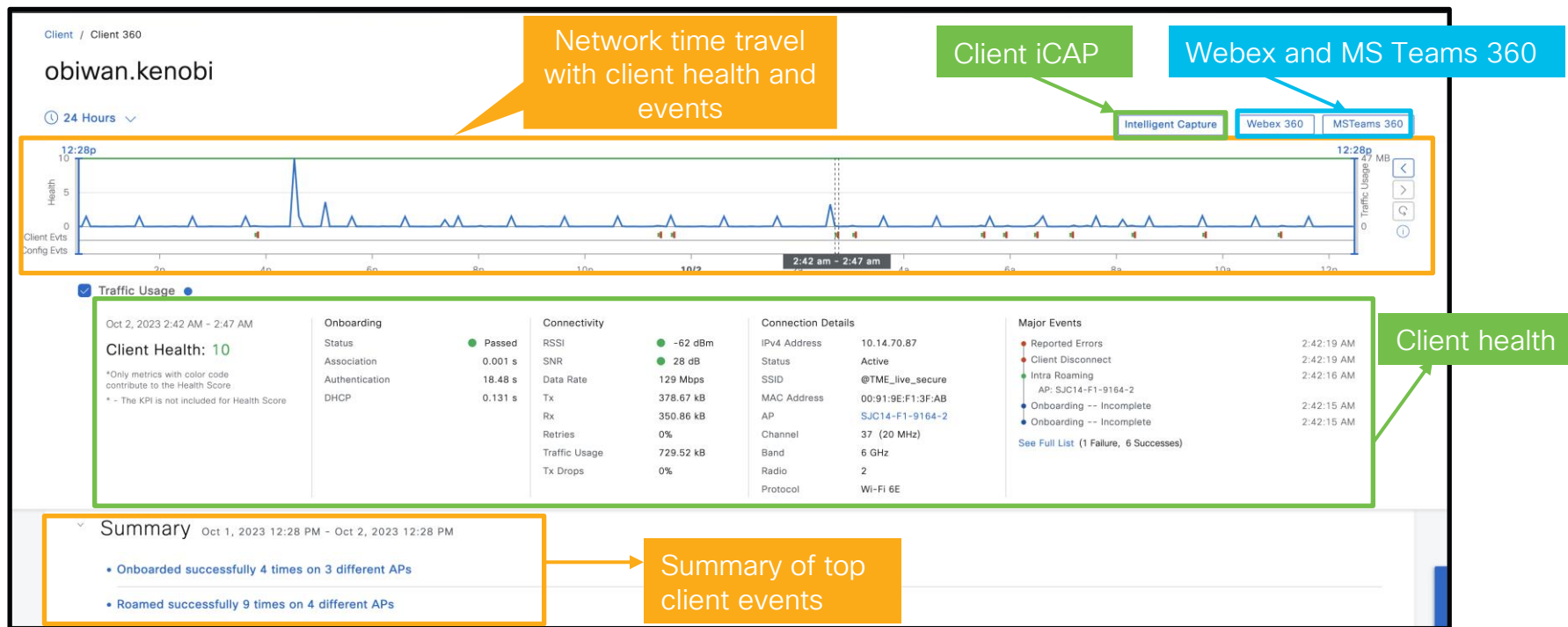
- Issue Name***: Create an Issue Name
- Description***: Add description here
- Syslog Detail**:
 - Severity***: 5 - Notice
 - Facility***: LINEPROTO
 - Mnemonic***: UPDOWN

Buttons at the bottom: Cancel, Next.

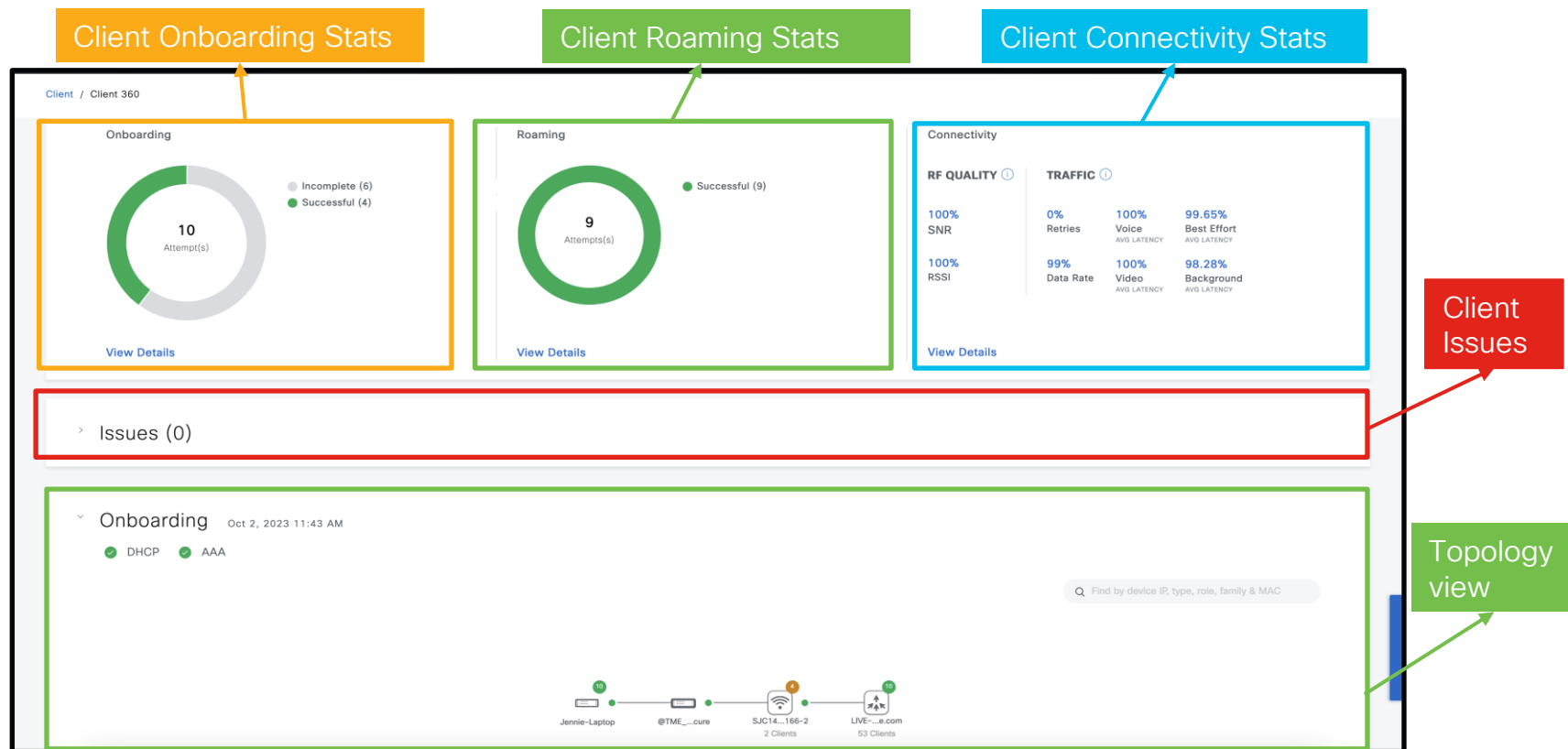
- Create user defined issues from syslogs
- Define the severity for occurrence of the issue

Use Case 4: Reactive Troubleshooting of Wireless Client Onboarding Issues

Client 360 view



Client 360 view



Client 360 view

Event Viewer

[Go to Global Event Viewer](#) [Export](#) [Full Screen](#)

Search Table

Event	Time	Details
Oct 2, 2023		
> ● Authenticating (1)	1:36:55.910 PM	AP:SJC14-F1-9166-2 WLAN:@TME_live_secure
> ● Authenticating (1)	1:06:53.568 PM	AP:SJC14-F1-9166-2 WLAN:@TME_live_secure
> ● Authenticating (1)	12:36:51.454 PM	AP:SJC14-F1-9166-2 WLAN:@TME_live_secure
> ● Authenticating (1)	12:06:49.325 PM	AP:SJC14-F1-9166-2 WLAN:@TME_live_secure

112 records Show Records: 100 1 - 100 < 1 2 >

Authenticating Oct 2, 2023 1:36:55 PM

Detailed Information

Status:
● Success

Details:

AUTH Server	10.10.105.35
WLC Name	LIVE-C9800-40-SSO.wireless-tme.com
Frequency(GHz)	6.0
Mac Address	00:91:9E:F1:3F:AB
WLAN	@TME_live_secure
AP Mac	10:F9:20:FD:65:A0
AD Name	SJC14-F1-9166-2

Tools

[Client Data Collection](#) [Launch](#)

[Path Trace](#) [Run New Path Trace](#)

Application Experience As of Oct 2, 2023 2:00 PM [Refresh](#)

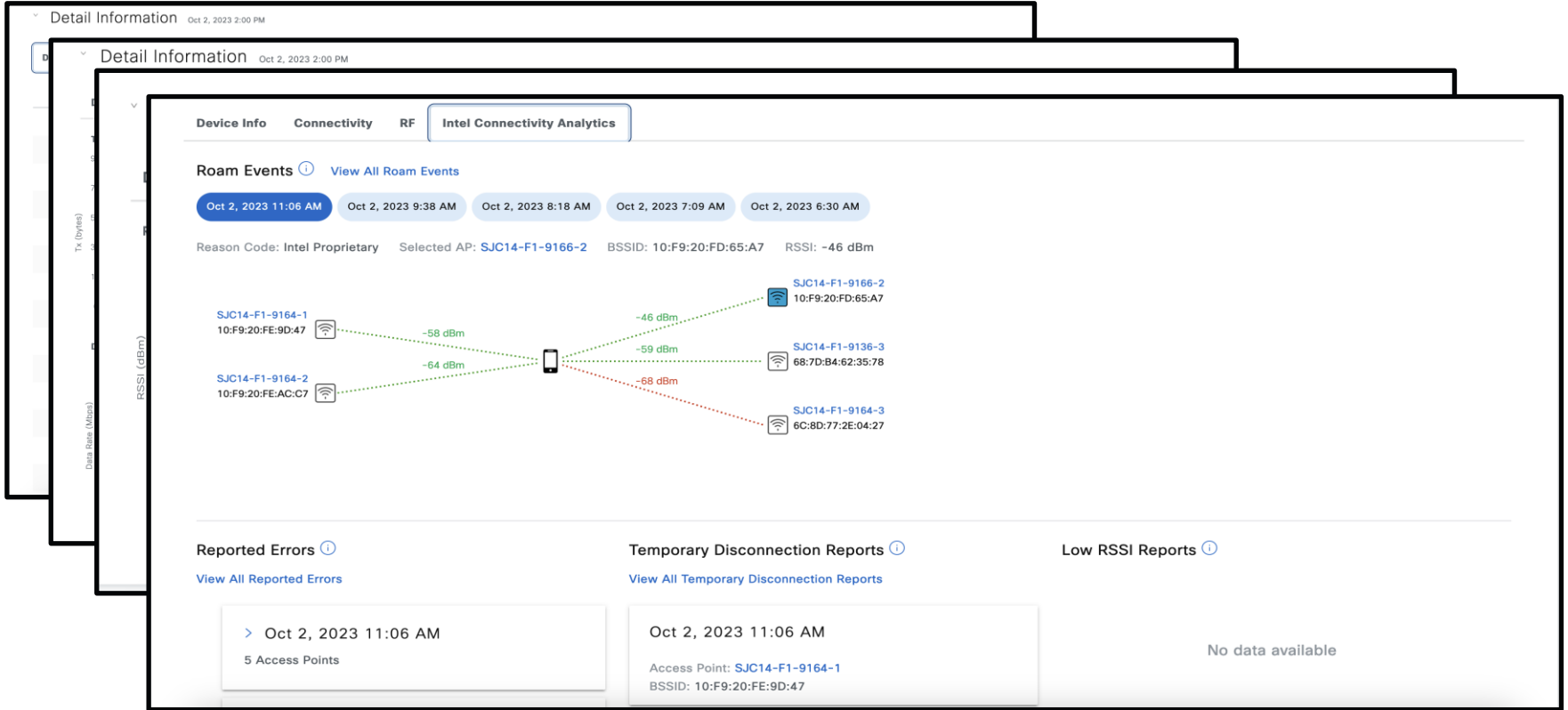
Client event viewer

Collect client logs, show outputs, PCAPs

Client tools

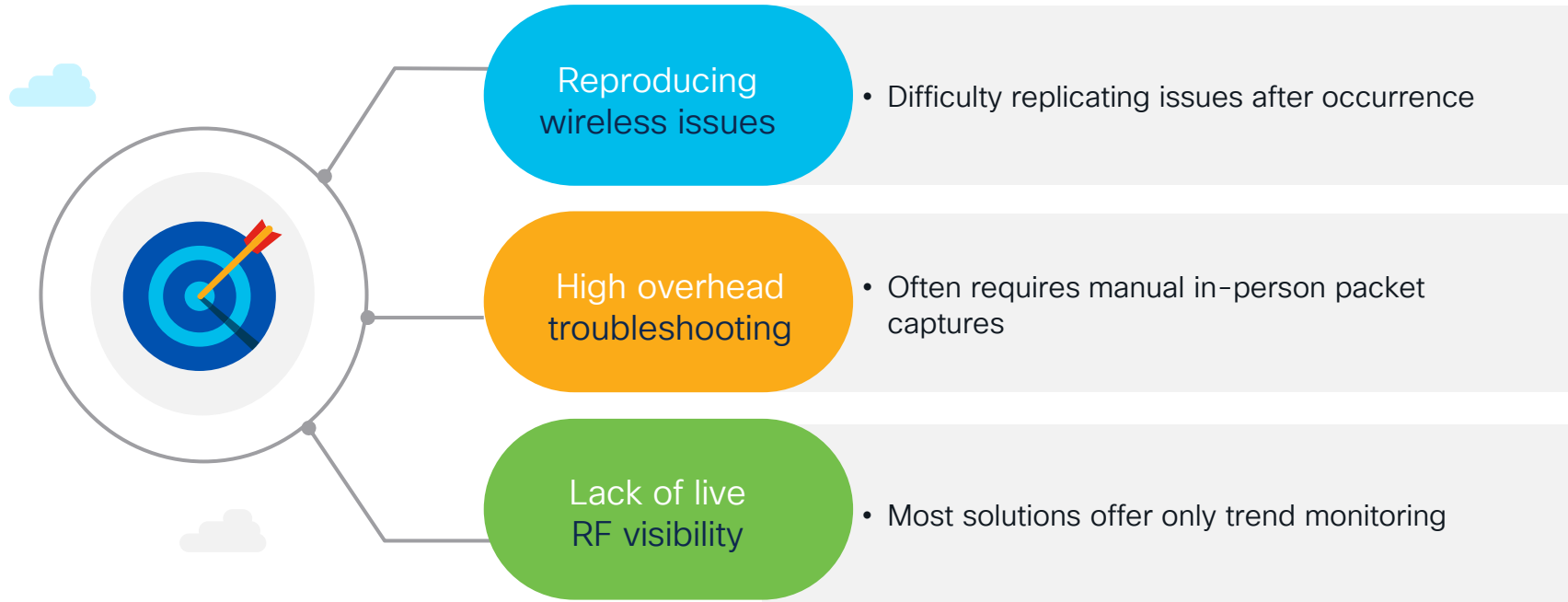
Client application experience

Client 360 view



Intelligent Capture

Why?



Intelligent capture

Client and AP use cases



Passive and on-demand packet capture

Real-time client and AP statistics

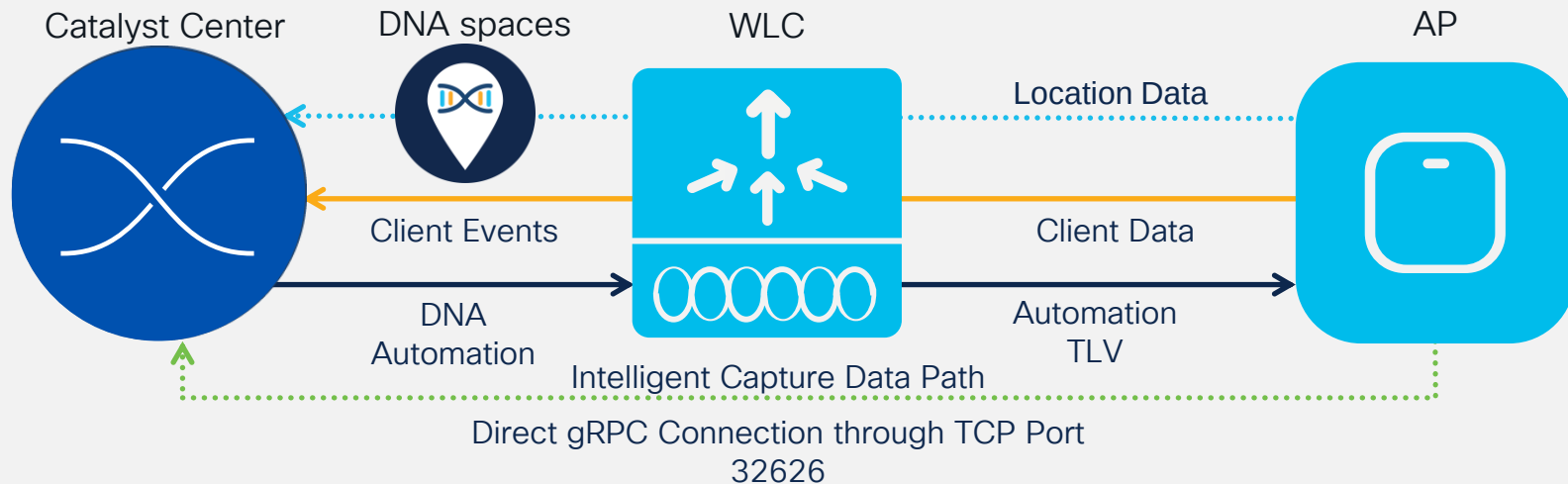
Anomaly capture

On-demand spectrum analysis

Over the air capture(OTA)

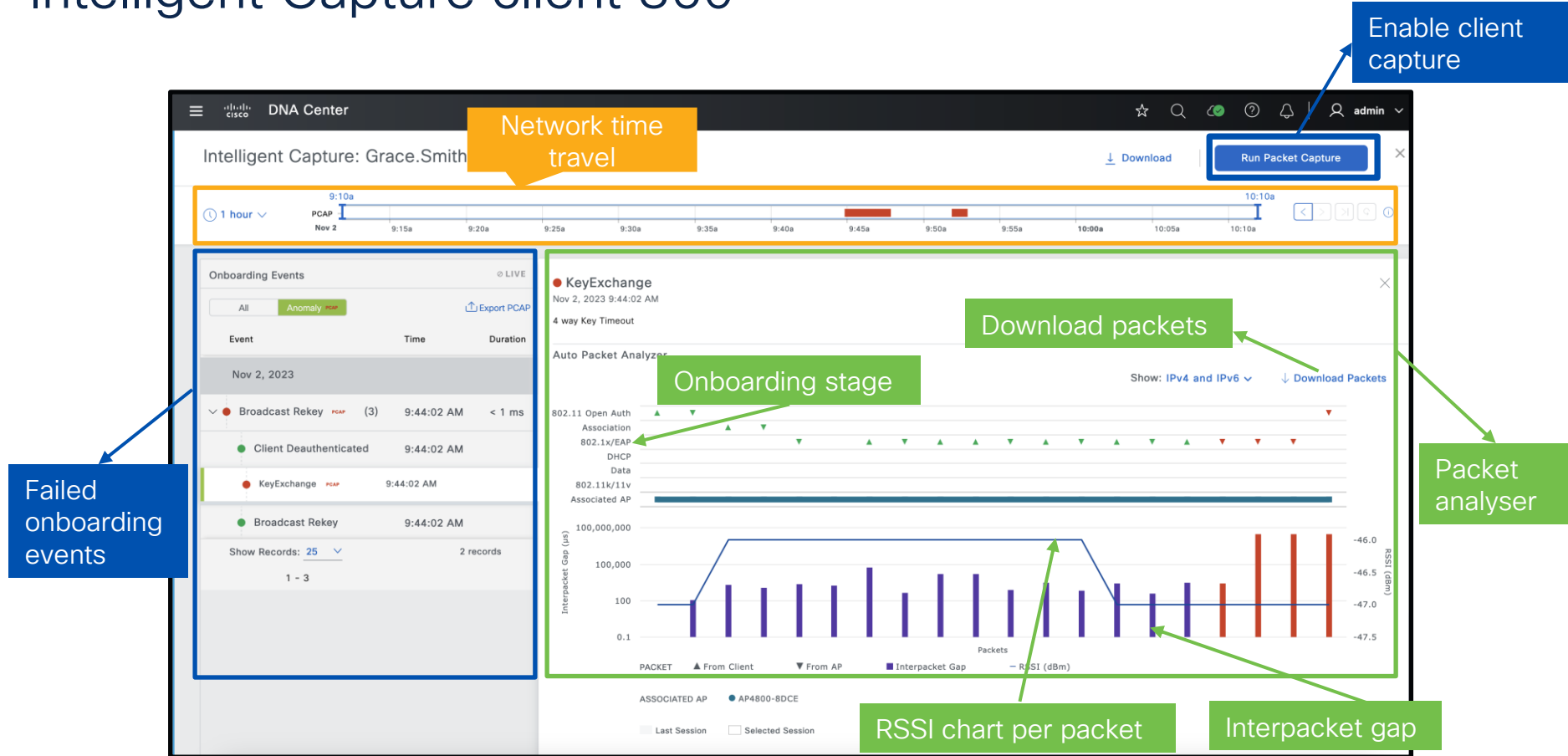
Intelligent Capture topology

Packet capture, statistics and location

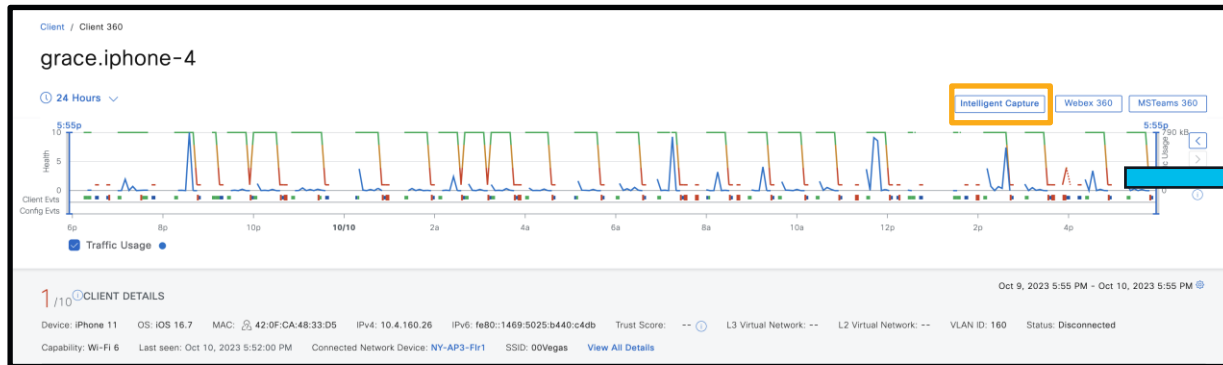


Cisco DNA Spaces is recommended for Location Services; however, CMX can also be used.

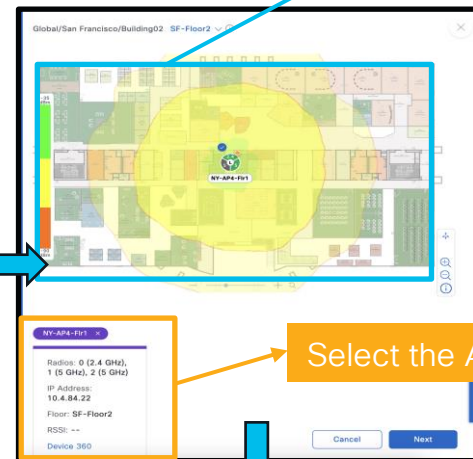
Intelligent Capture client 360



Intelligent Capture client 360 (OTA sniffer)



AP floor map view



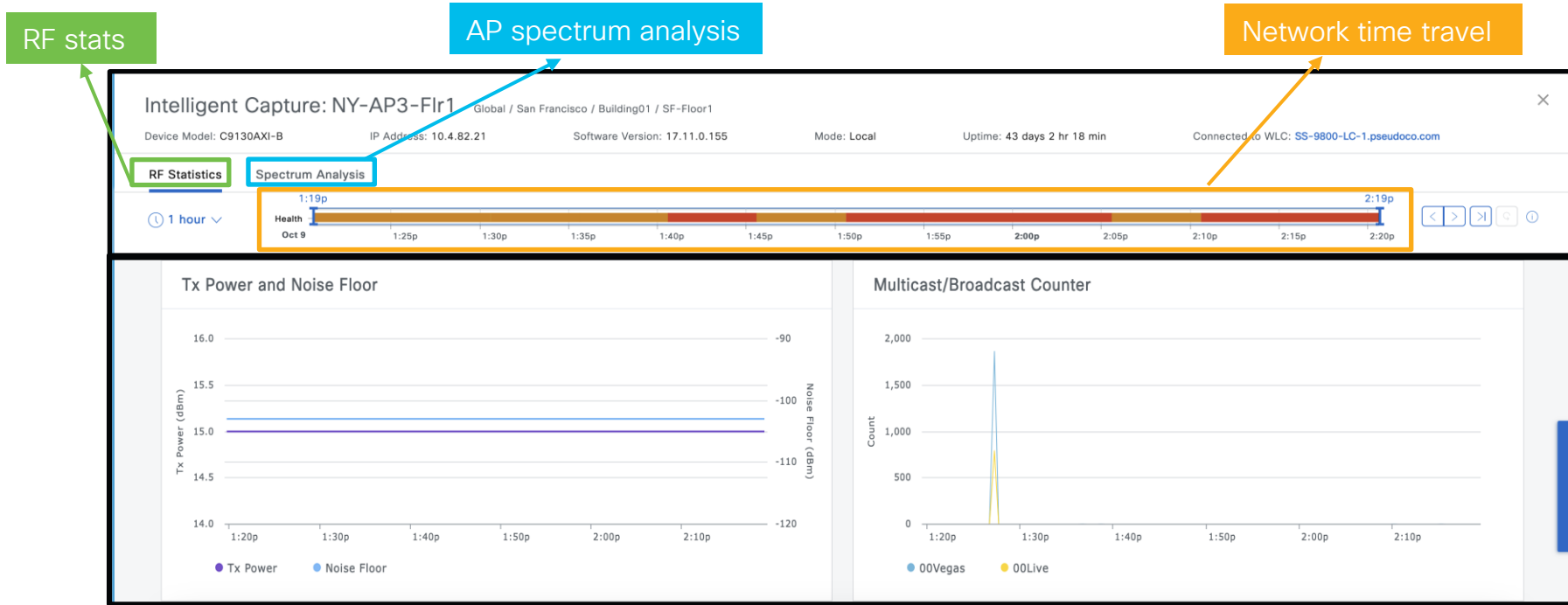
Select the AP

- Can select up to 2 access points
- Map view makes it easy to get neighbor AP details

Select AP radio parameters

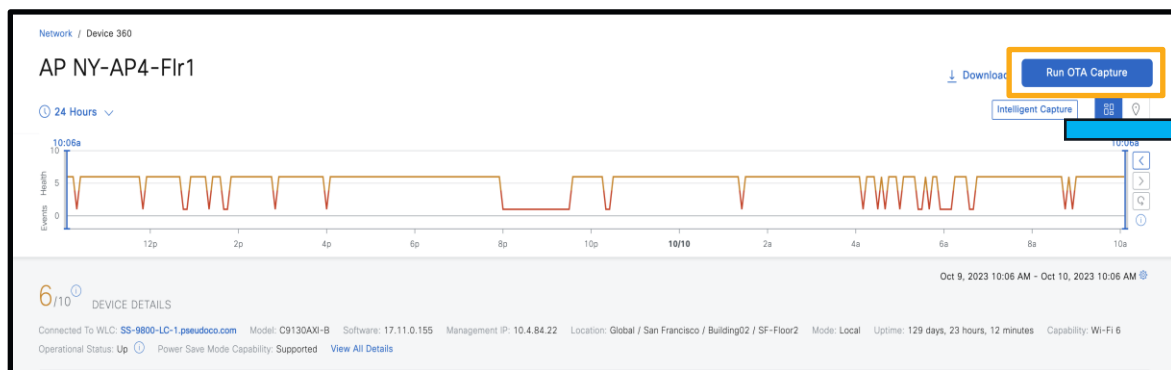
The screenshot shows the 'Run OTA Capture' configuration screen. It prompts the user to 'Select OTA Sniffer Band, Radio, Channel Width & Channel'. The selected AP is 'NY-AP4-Fir1' with MAC address '2C:57:41:86:AE:E0'. A red box highlights the configuration options for the selected AP, which include: 'Select Band' (5), 'Select Radio' (1 (Client Count: 2)), 'Select Channel Width' (20), and 'Select Channel' (32). A red arrow points from the 'Select AP radio parameters' text to this red box.

Intelligent Capture AP 360



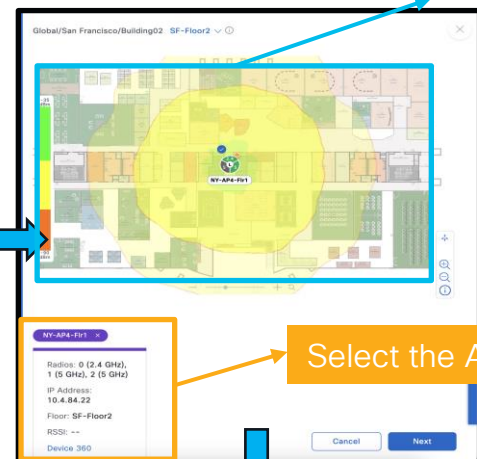
- Complete AP RF Stats which can filtered on radio and SSID basis
- Spectrum analysis provides users with insight into the spectrum activities around their AP

Intelligent Capture AP 360 (OTA sniffer)



- Steps are exactly the same as from Client 360
- Can select up to 2 Access Points
- Map view makes it easy to get neighbour AP details

AP floor map view



Select AP radio parameters

Run OTA Capture

Select OTA Sniffer Band, Radio, Channel Width & Channel

NY-AP4-Fir1

MAC Address: 2C:57:41:86:AE:E0

AP NY-AP4-Fir1 supports capturing packets at the radio level.

Select Band: 5

Select Radio: 1 (Client Count: 2)

Select Channel Width: 20

Select Channel: 32

Intel Analytics Overview

Background:

- Intel Wi-Fi chipsets make up 90% of enterprise laptops.
- Intel Analytics enables these clients to provide enhanced visibility for faster troubleshooting.

Key Benefits:



Provides Intel client model, driver version, coverage hole reporting, roaming, power type, etc.

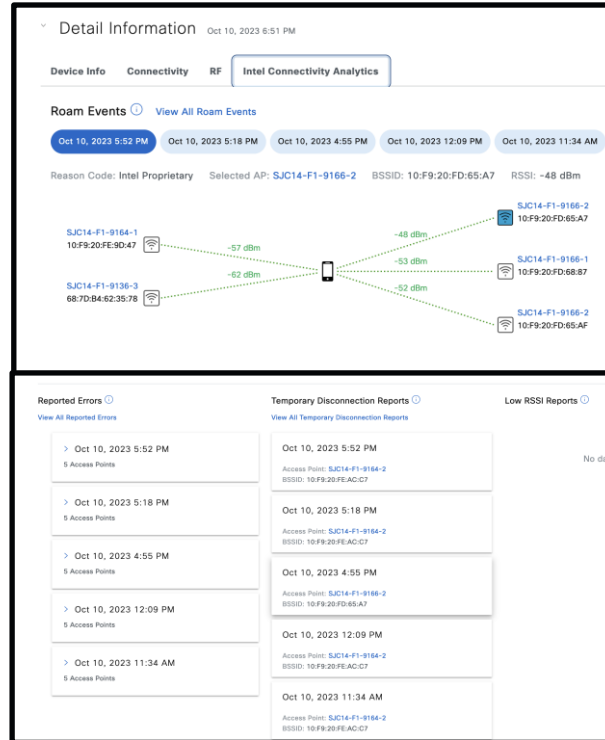


No need for client-side agent to provide data.



Integration with Catalyst Center's client 360.

CISCO *Live!*



Use Cases

1. Identifying bad drivers
2. Validating new drivers
3. Identifying bad hardware
4. Troubleshooting roaming
5. Identifying poor connectivity
6. Identify misbehaving APs

Station Information

HW Model	AX210 160MHz
SW Version	22.200.02.01
AC/DC Voltage	AC
System Manufacturer	Intel
System Model	Latitude 5520

Supported software and hardware matrix

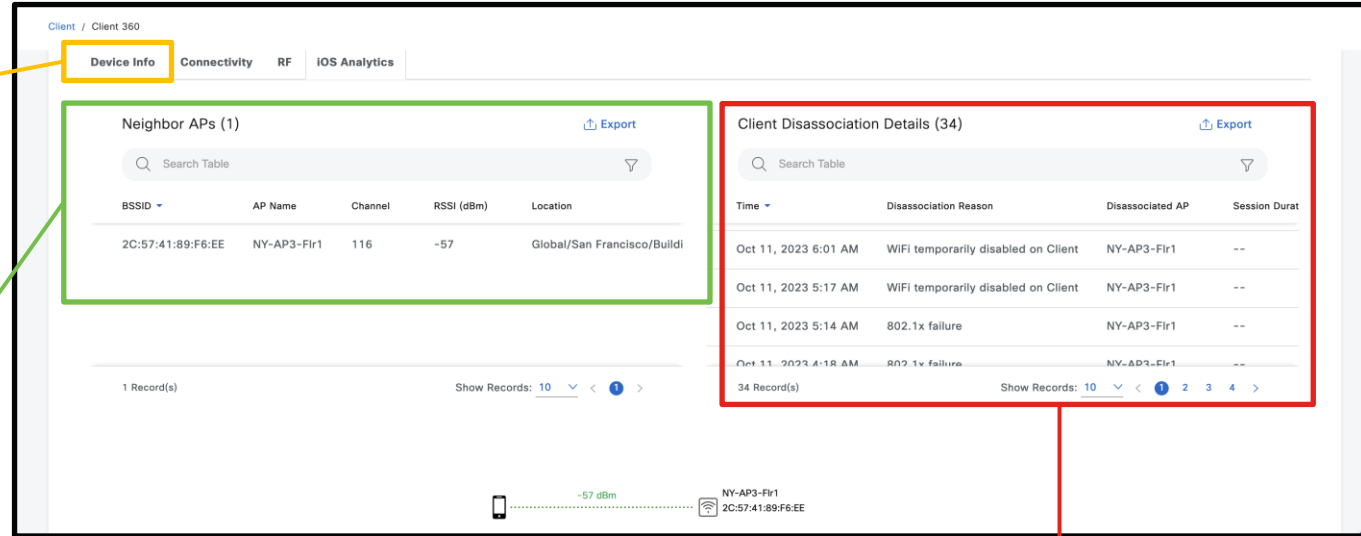
Cisco and Intel chipset devices

Cisco Access Point Hardware		Intel Chipset
All Wave 2 and Catalyst 11ax APs		AC8561, AC9560, AX200, AX201, AX210, AX1650, AX1675
Cisco IOS XE WLC Software	Cisco AireOS WLC Software	Intel Driver Software
17.6.1	N/A	22.50.1
Cisco IOS XE WLC Hardware		
Embedded Wireless Controller on the AP and Switch		
C9800-CL		
C9800-L		
C9800-40		
C9800-80		

Apple iOS analytics

Detailed client device profile information – device model, OS details

Insights into the clients view of the neighbouring access points with RSSI information



Provide clarity into the reliability of connectivity – client disassociation details

iOS device support for Cisco Apple analytics

Device Type	iPhone	iPad
Device Hardware	iPhone 7 Internal Name: iPhone9,1 and iPhone9,3	iPad (9.7-inch) 6 th Gen or later Internal Name: iPad7,5 and iPad7,6
	iPhone 7 Plus Internal Name: iPhone9,2 and iPhone9,4	iPad (9.7-inch) 5 th Gen Internal Name: iPad6,11 and iPad6,12
	Or Newer	iPad Pro (12.9-inch, 2 nd gen) Internal Name: iPad7,1 and iPad7,2
		iPad Pro (10.5-inch) Internal Name: iPad7,3 and iPad7,4
Apple iOS Software	11.0 and higher	11.0 and higher
Cisco AireOS Software	8.5+	8.5+
Cisco IOS XE Software	16.12.3+	16.12.3+

1st Gen, iPad Pro 2015/2016 model (iPad6,3/6,4/6,7/6,8) is not supported

MS Teams integration

Application Experience for MS Teams: 10.10.10.105

Meetings (73)

Search Table

From May 15, 2022 to May 16, 2022

Meeting Name

MS Teams Score

cisco lightt2 participated in a peer-to-peer call

cisco lightt2 participated in a peer-to-peer call

73 Records

Meeting Name	MS Teams Score	Network APM Score	Duration	Start Time	End Time	Status	Meeting Type	Participants (#)
cisco lightt2 participated in a peer-to-peer call	7/10	6/10	00:05 h	May 16, 2022 9:10 AM	May 16, 2022 9:15 AM	Ended	Peer To Peer	2
cisco lightt2 participated in a peer-to-peer call	7/10	6/10	00:05 h	May 16, 2022 9:03 AM	May 16, 2022 9:08 AM	Ended	Peer To Peer	2
cisco lightt2 participated in a peer-to-peer call	7/10	6/10	00:05 h	May 16, 2022 8:49 AM	May 16, 2022 8:54 AM	Ended	Peer To Peer	2

73 Records

Show Records: 10 11 - 20

CISCO LIGHTT2 PARTICIPATED IN A PEER-TO-PEER CALL

Audio Quality Video Quality Share Quality

7/10 MS Teams Score 6/10 Network APM Score

ASR1K_Site2.cisco.com , ISR4K_Site3.cisco.com Exporters

Packet Loss

MS Teams Telemetry

Transmitting 3.9% Receiving

Network APM Telemetry

Transmitting Receiving Threshold: 0.7 %

Jitter

MS Teams Telemetry

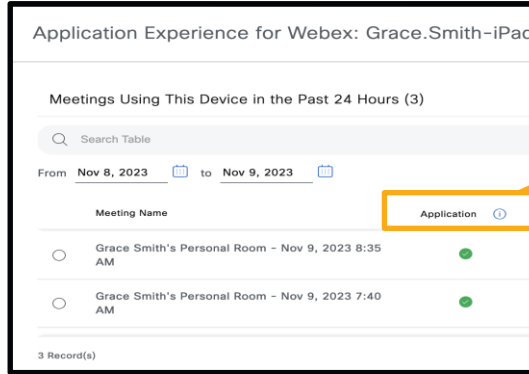
Transmitting 0ms Receiving

Network APM Telemetry

Transmitting Receiving Threshold: 1 ms

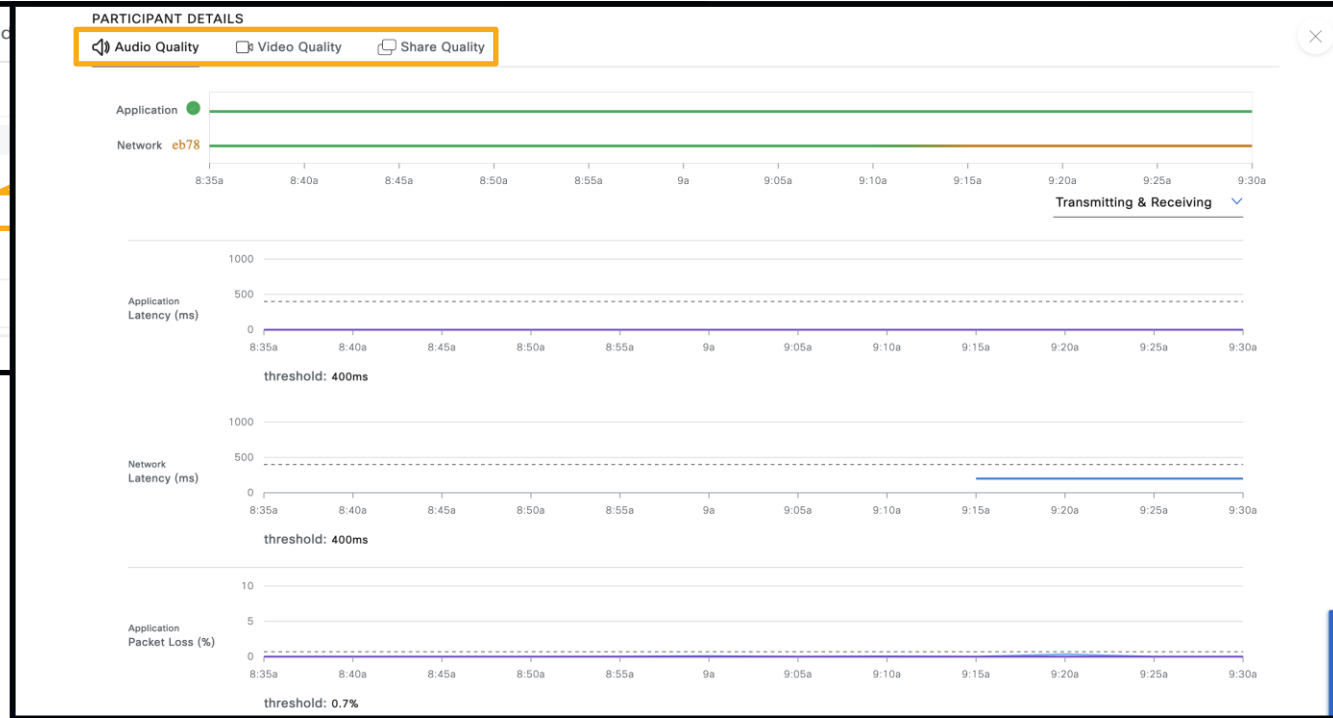
- Displays the meeting for client with MS Teams and network APM score
- View quality details from MS Teams and network side by side

Webex Teams integration

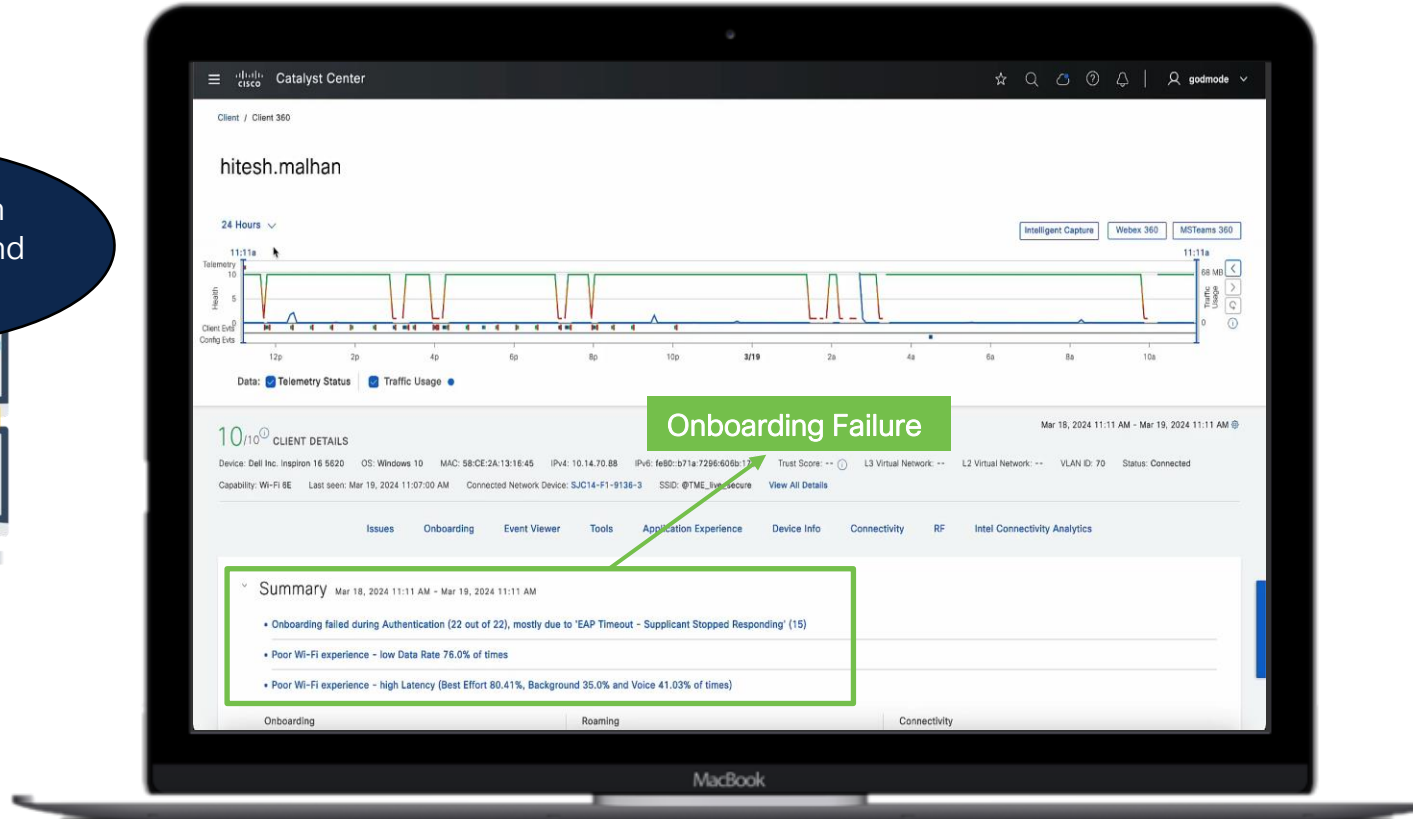


- Displays the meeting for client with Webex Teams and network APM score
- View quality details from Webex Teams Control Hub and network side by side

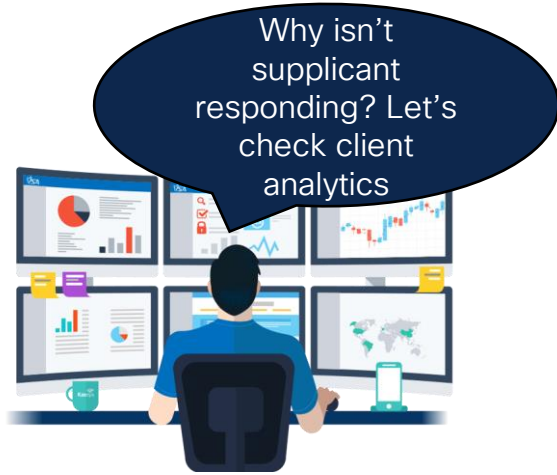
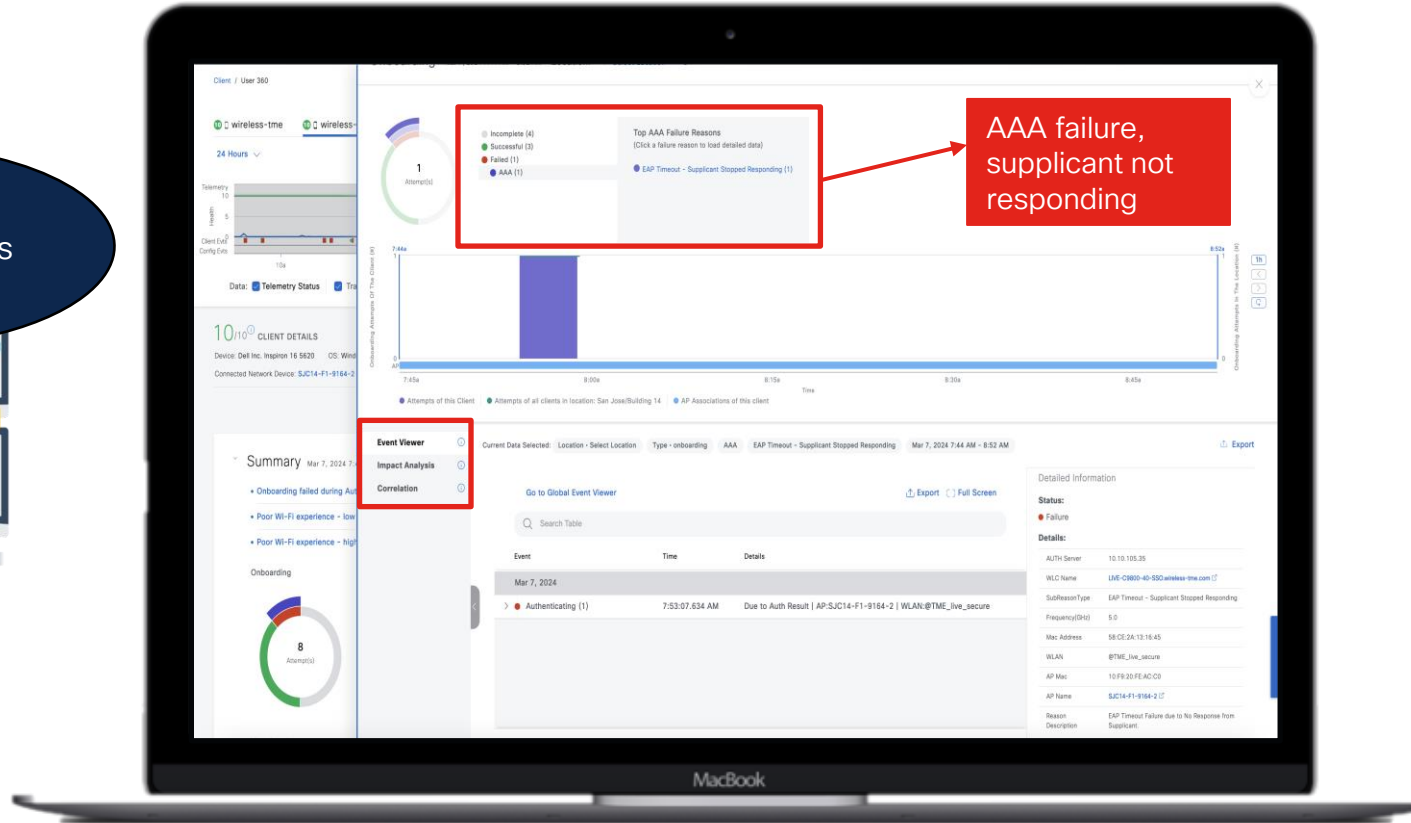
cisco Live!



Client 360 with Catalyst Center



Client 360 with Catalyst Center



Client 360 with Catalyst Center



Client / User 360

Event Viewer

Go to Global Event Viewer Export Full Screen

Search Table

Event	Time	Details
Intel Roam Report (1)	8:21:37.226 AM	RSSI: -57 dBm AP: SJC14-F1-9164-2 Reason Code: Intel Proprietary Type: Device Analytics - Intel
Intel Reported Errors (1)	8:21:37.226 AM	Type: Device Analytics - Intel
Intel Reported Errors	8:21:37.226 AM	Type: Device Analytics - Intel
DHCP (1)	8:21:34.337 AM	AP:SJC14-F1-9164-2 WLAN:@TME_live_secure
Onboarding (9)	8:21:33.900 AM - 8:21:34.230 AM	AP:SJC14-F1-9164-2 WLAN:@TME_live_secure
INTRA-WLC Roaming -- Incomplete (5)	8:21:32.792 AM - 8:21:33.734 AM	Due to Max Security Association Queries AP:SJC14-F1-9136-3 WLAN:@TME_live_secure
Onboarding -- Incomplete (1)	8:21:32.734 AM	AP:SJC14-F1-9164-2 WLAN:@TME_live_secure

19 records Show Records: 25 1 - 21

Tools

Client Data Collection Launch

Path Trace Run New Path Trace

Application Experience

APs (Invalid E)

Device Analytics

Access Point: F2:9C:3E:ED:77:40
BSSID: F2:9C:3E:ED:77:40
Frame Type: Beacon
Error: Invalid E (48)

Access Point: F2:9C:3E:ED:77:40
BSSID: F2:9C:3E:ED:77:40
Frame Type: Beacon
Error: Invalid E (48)

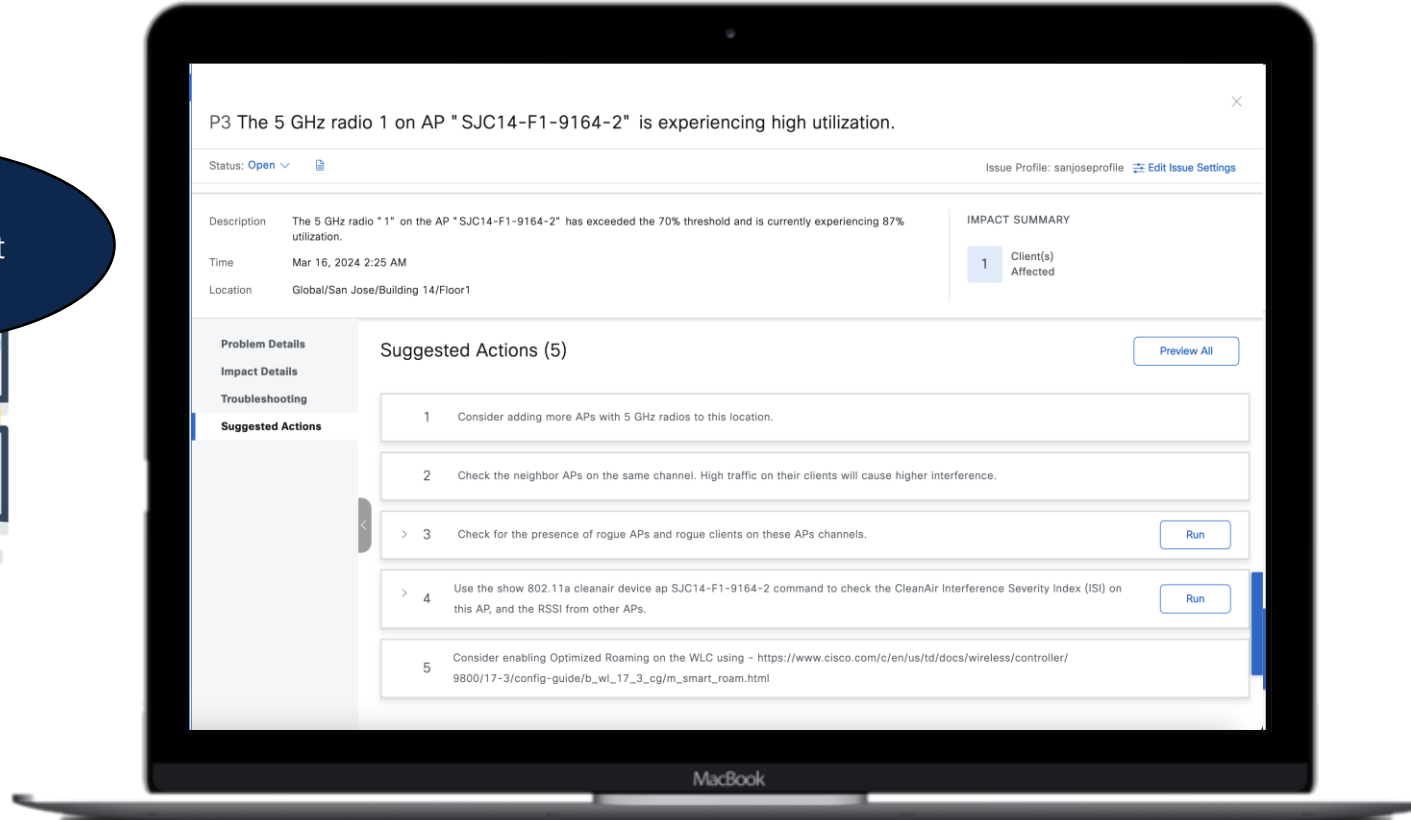
Access Point: F2:9C:3E:ED:77:40
BSSID: F2:9C:3E:ED:77:40
Frame Type: Beacon
Error: Invalid E (48)

APs (Missing Response)

Access Point: SJC14-F1-9136-3
BSSID: 68:7D:84:62:35:7F
Frame Type: Authentication Response
Error: Missing Response

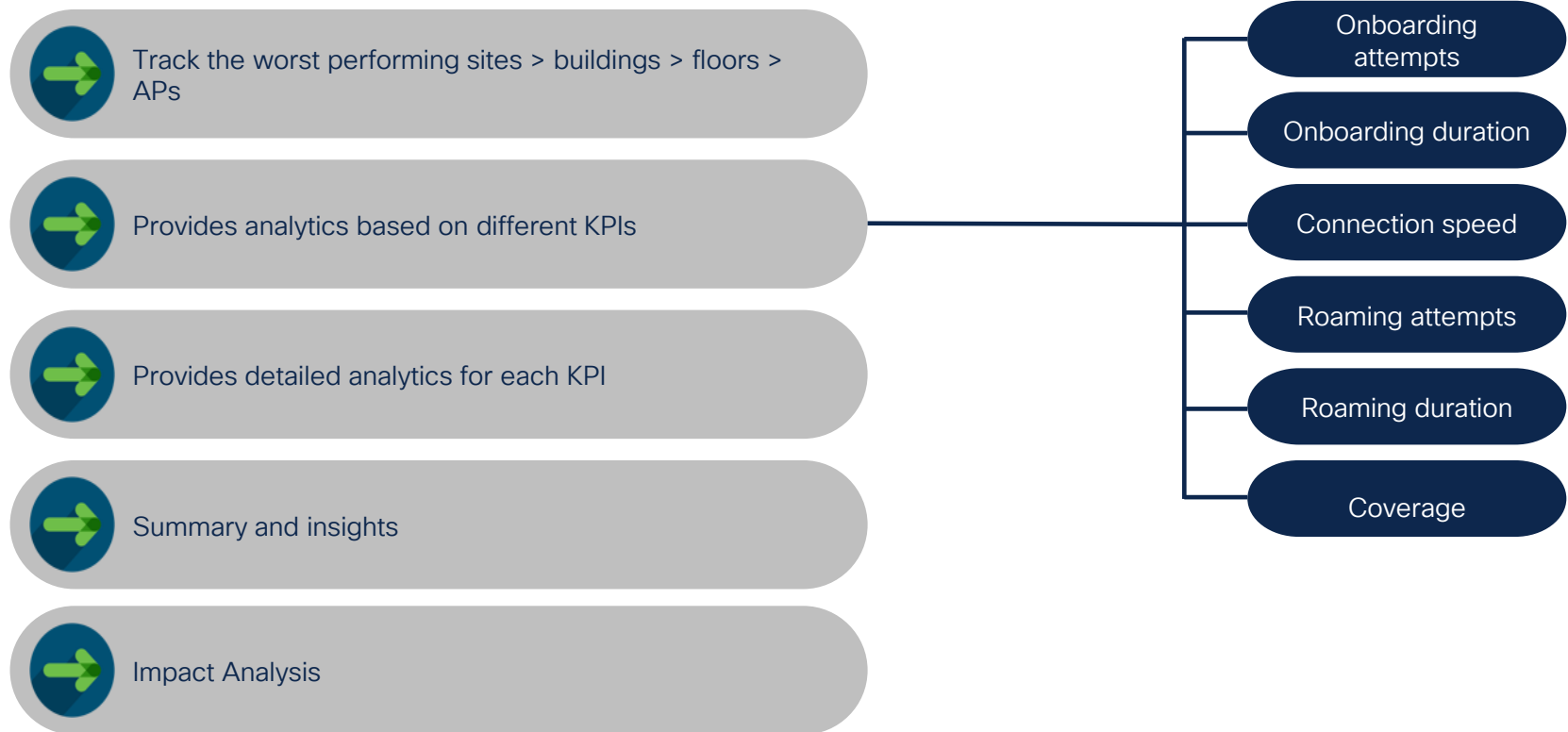
APs missing response

AP 360 with Catalyst Center

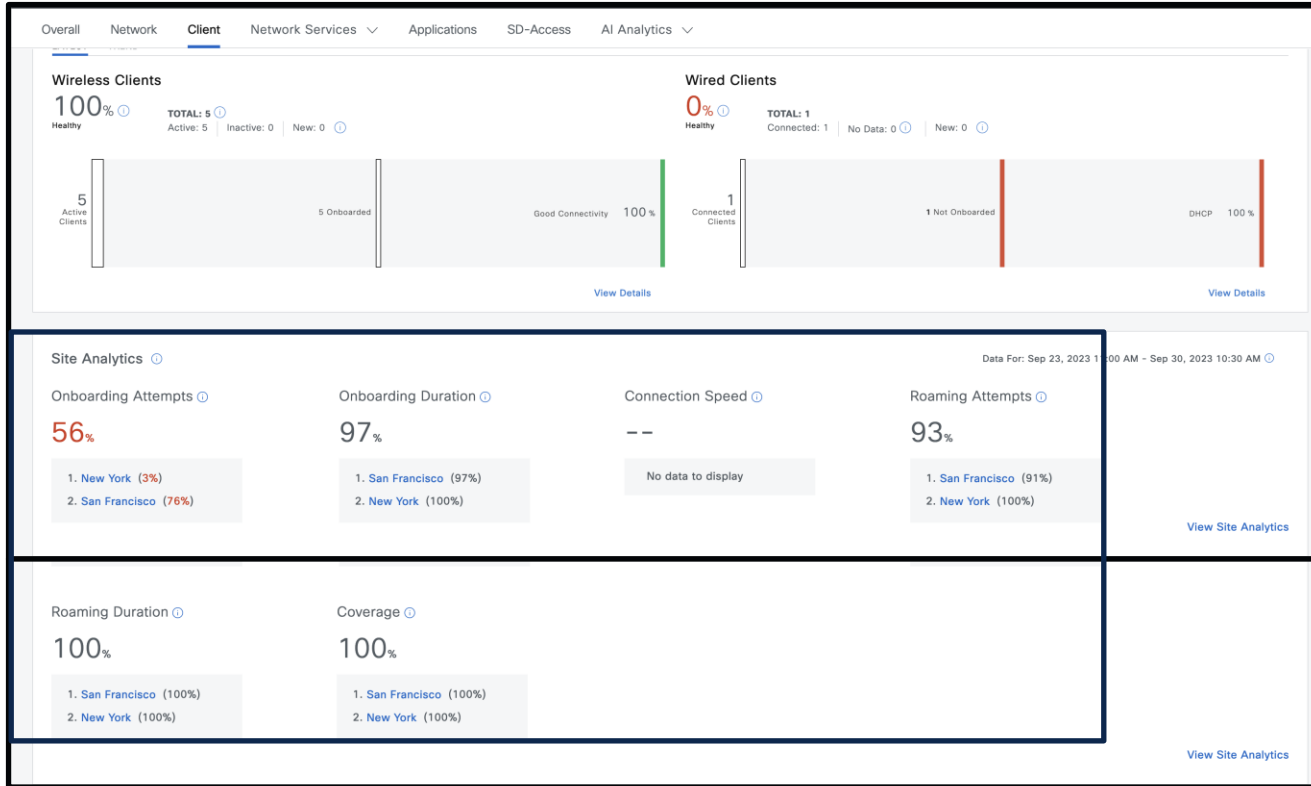


Use Case 5: Proactive Troubleshooting of Network Issues

Site analytics

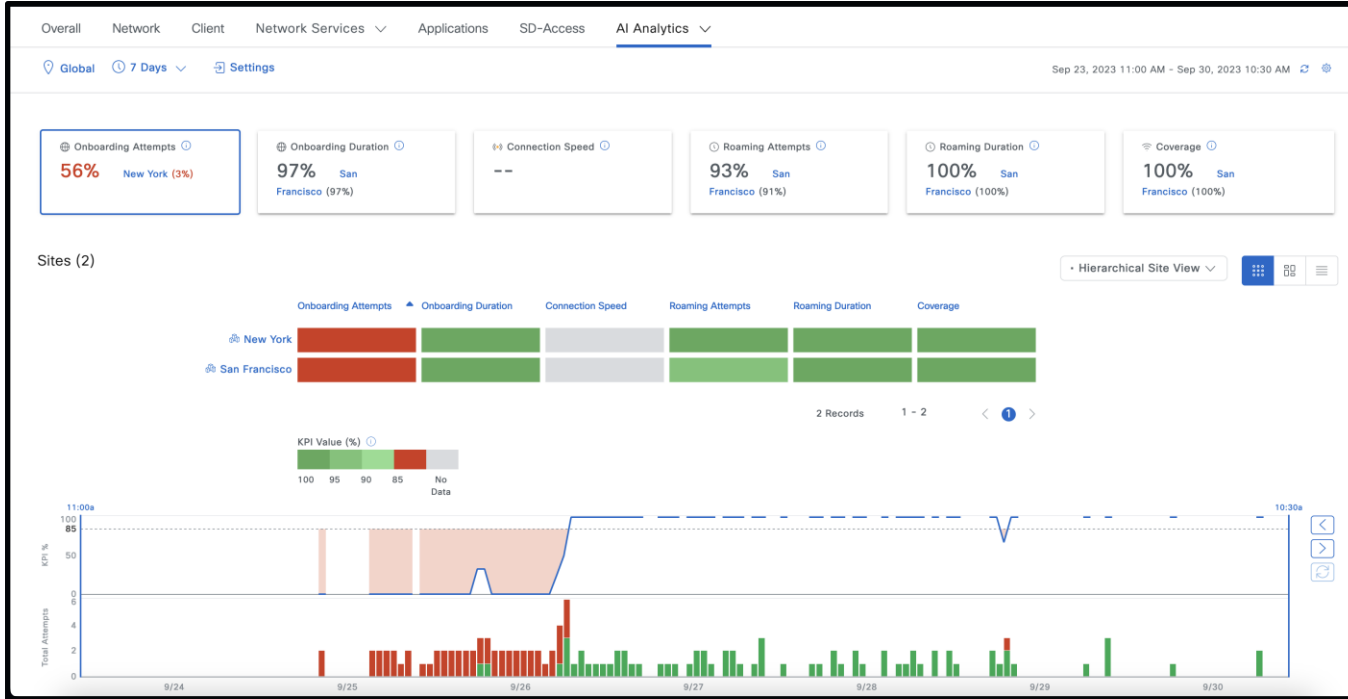


Site analytics – client health dashboard



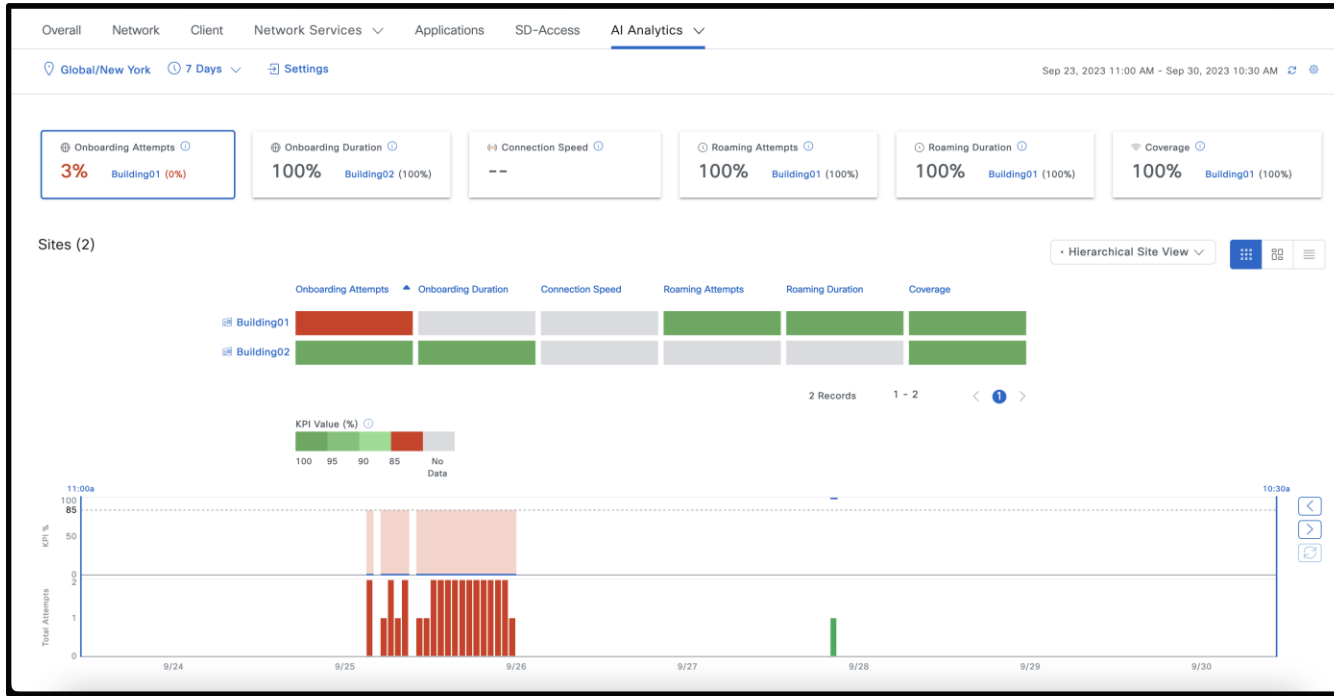
- Overview of how the sites are doing
- Which are my worst performing sites?
- Which site do we need to investigate proactively?

Site analytics dashboard - area



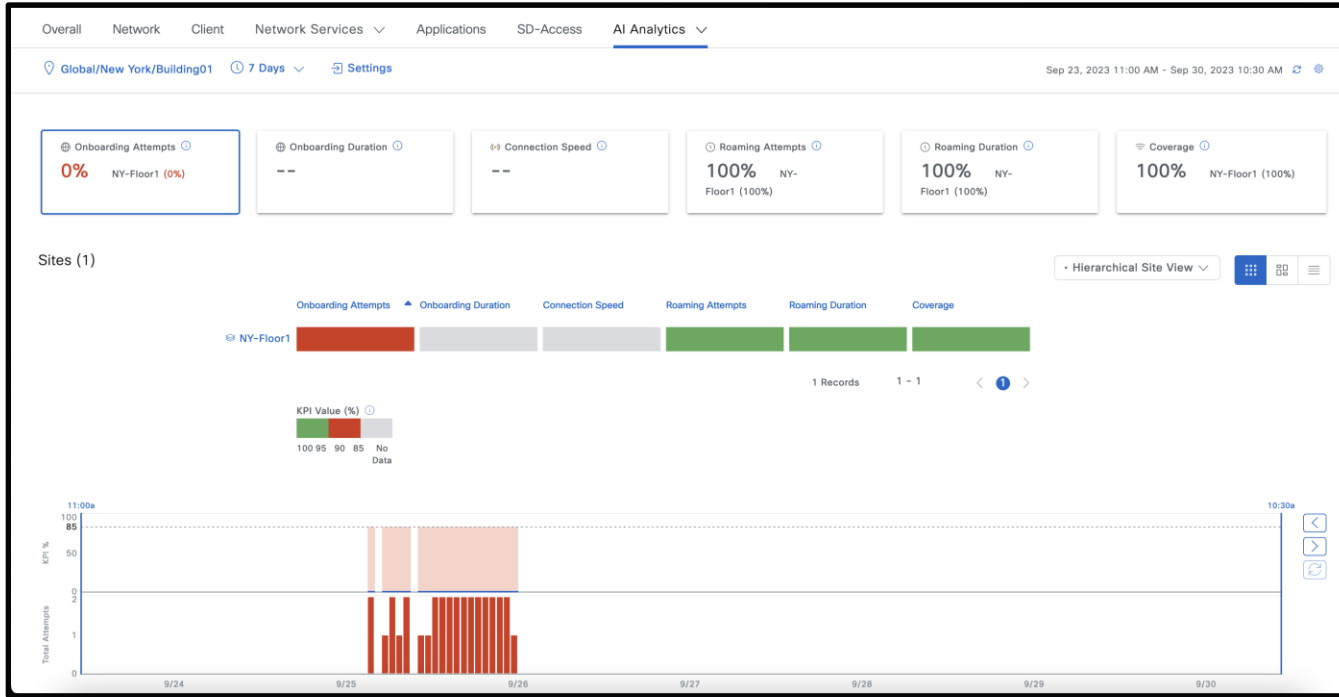
- Each KPI can be tracked till floor level to understand which building/floor is contributing to poor performance
- Granular view into the exact time when the issue was seen

Site analytics dashboard - building



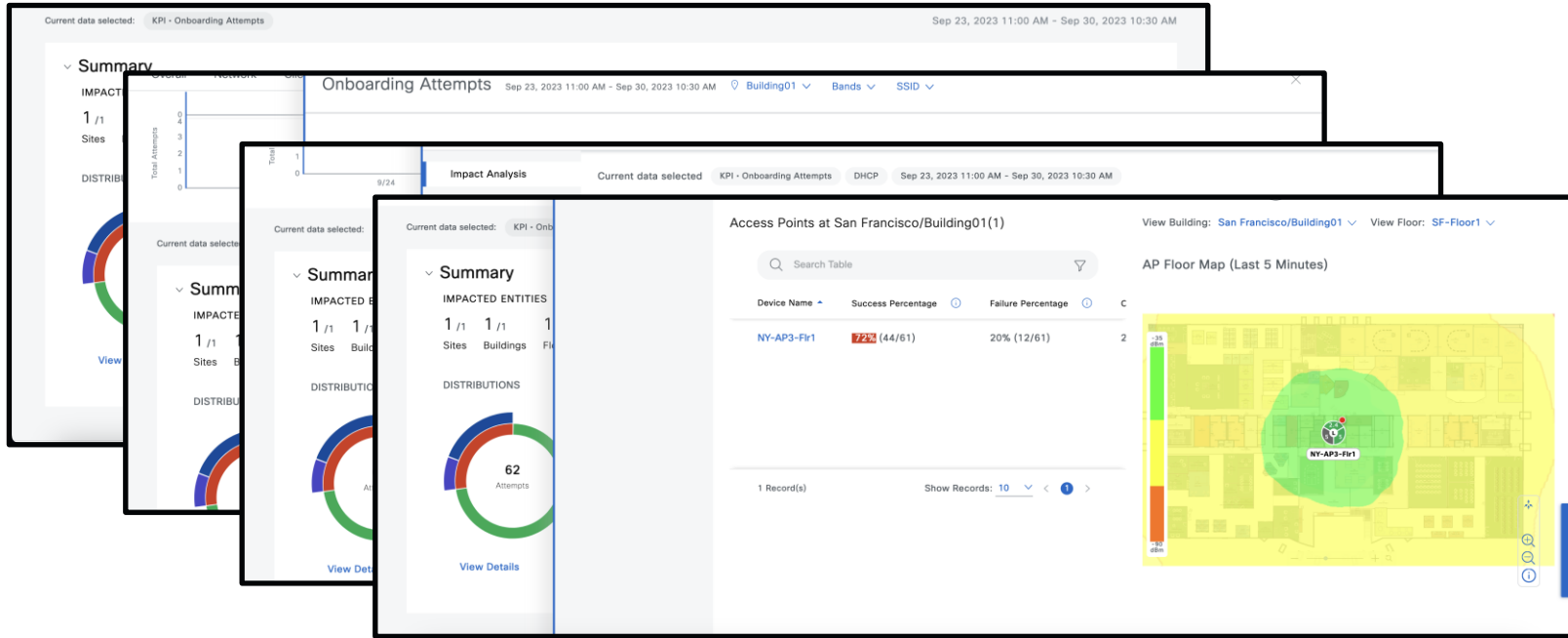
- Each KPI can be tracked till floor level to understand which building/floor is contributing to poor performance
- Granular view into the exact time when the issue was seen

Site analytics dashboard - floor



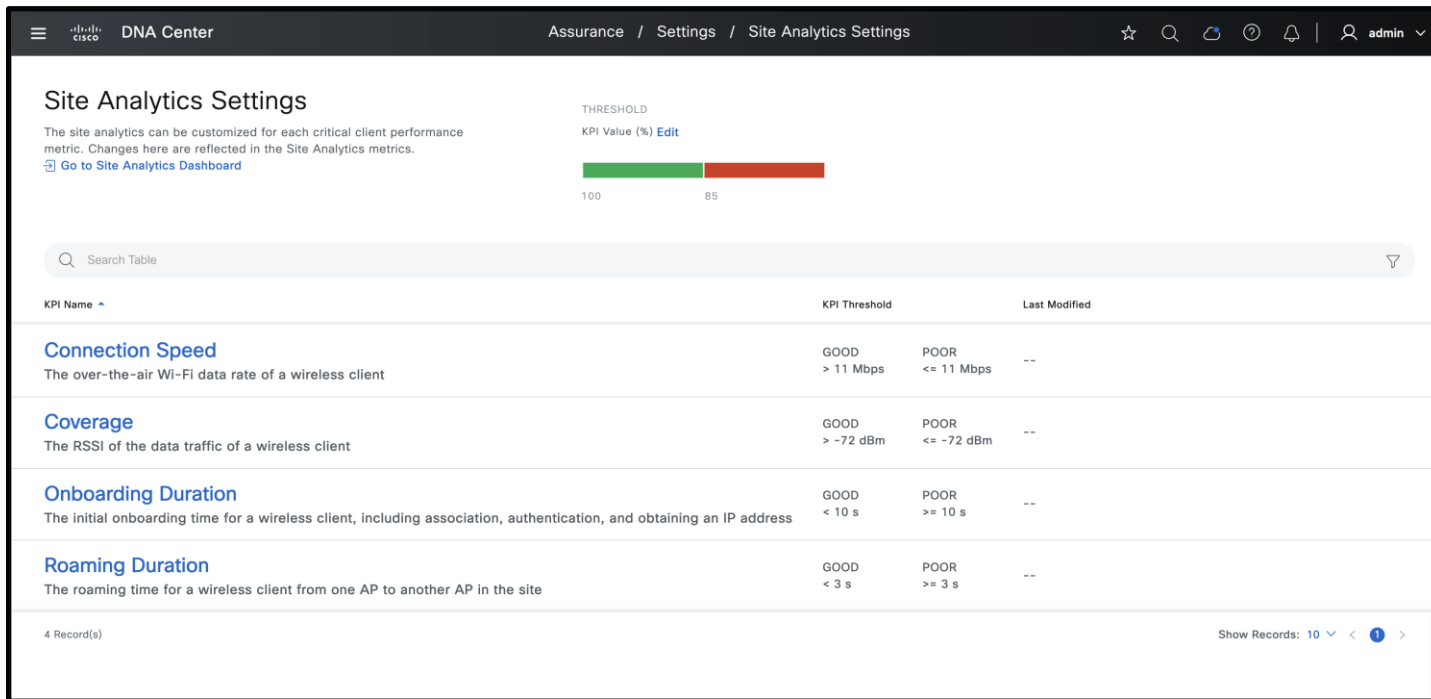
- Each KPI can be tracked till floor level to understand which building/floor is contributing to poor performance
- Granular view into the exact time when the issue was seen

Site analytics dashboard – summary and insights



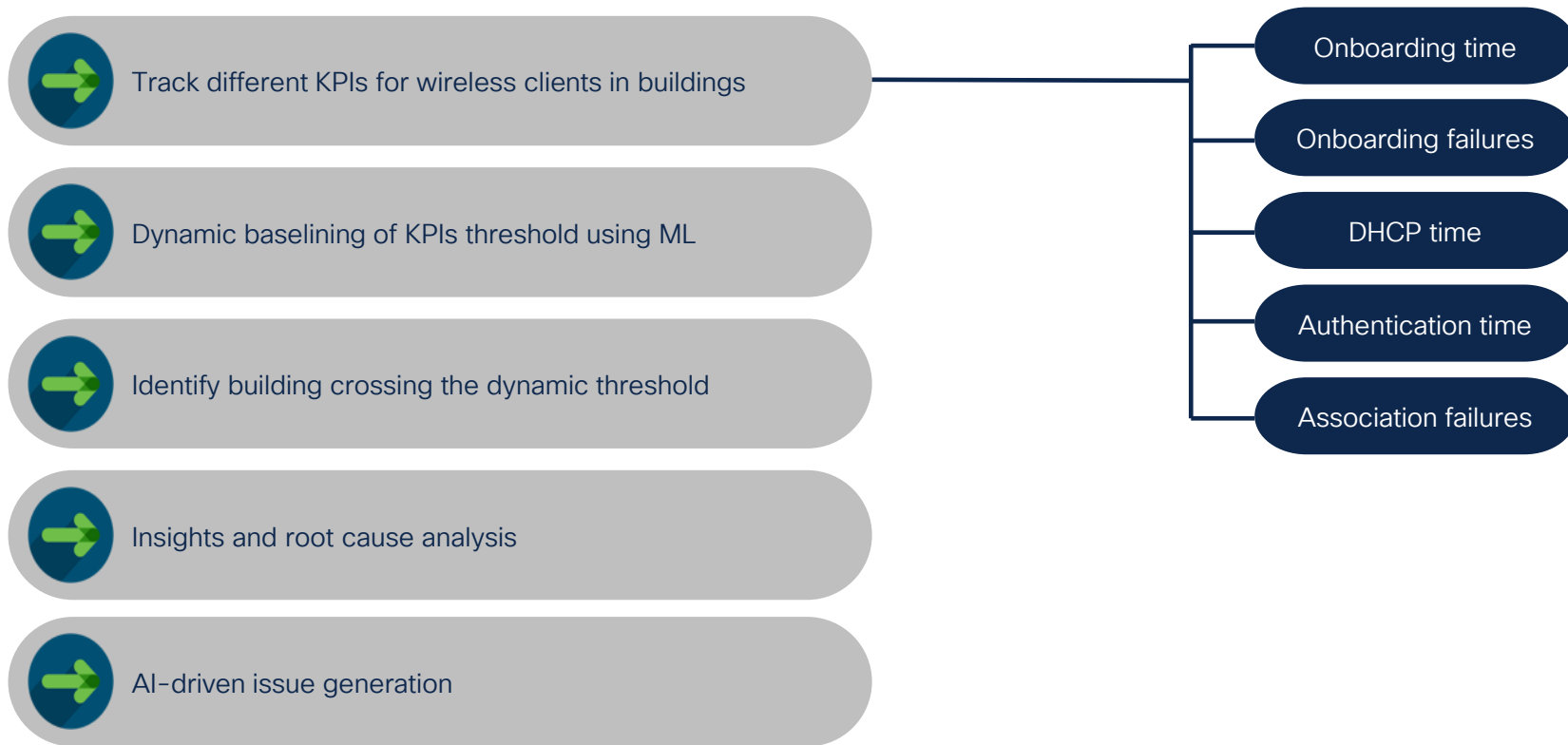
- Summary and Insights about the exact reason for failure
- Drill down from site to AP level to understand which AP is seeing the worst behaviour

Site analytics - settings

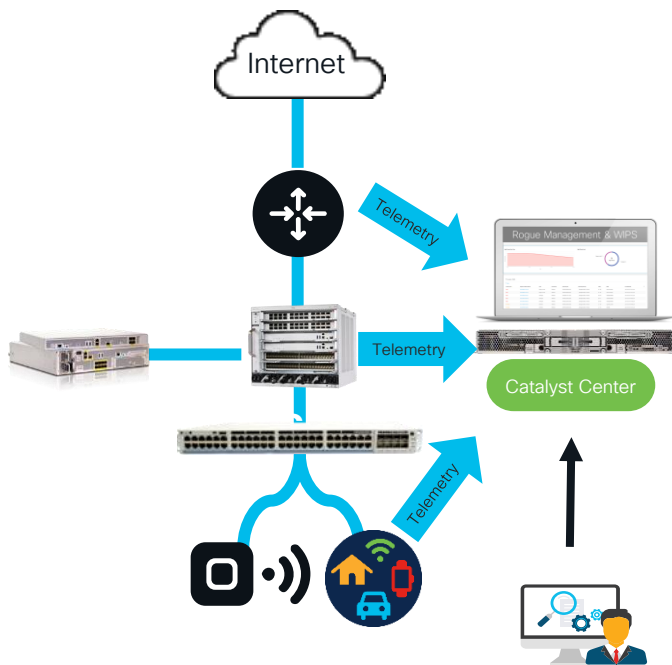
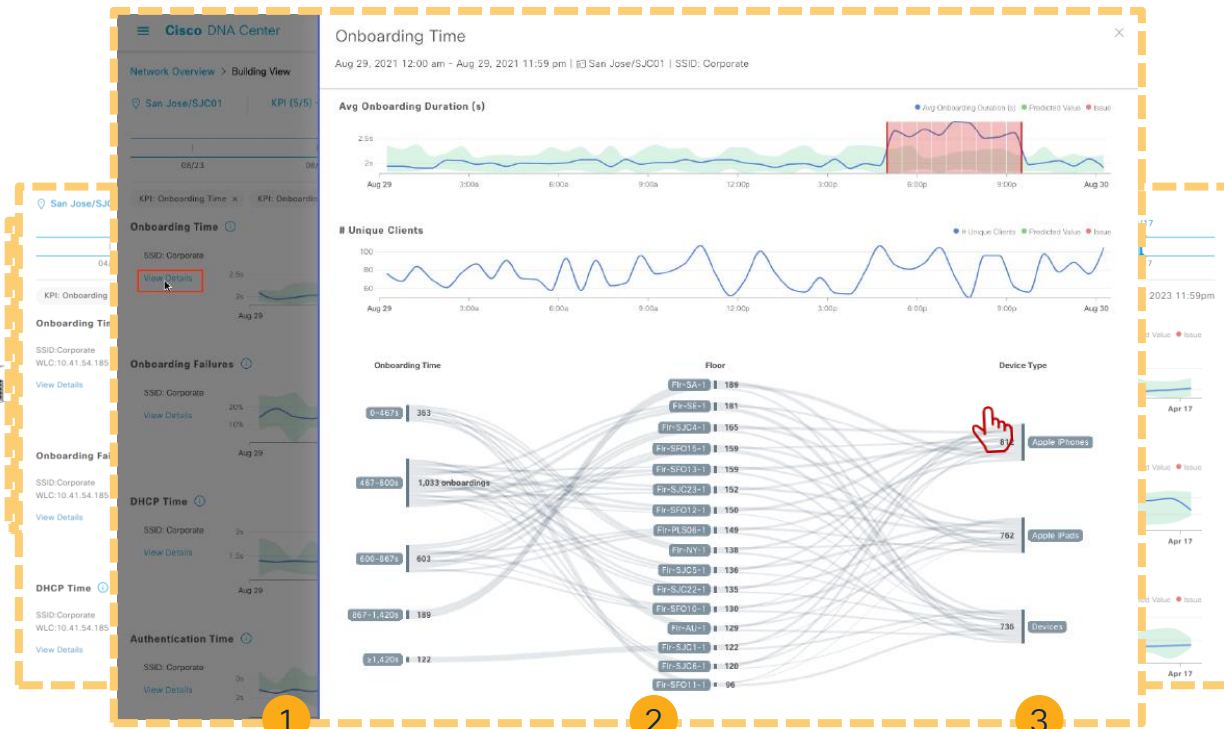


- All the KPIs are customizable based on the expected values for a customer network

Baselines



Behind the scenes: baselines (beeswarm chart)



Beeswarm chart
This provides the insights about the performance of the client devices with respect to KPIs

Colour-coded charts
Shows issues triggered based on the deviations from the predicted baseline.

Sankey charts
These charts emphasize the major flow between floors and device type (client devices).

AI-driven issues

Most Impacted Areas by Issue Priority: Global

San Jose 0 P1 | 12 Open San Francisco 2 P1 | 3 Open

All P1: 0 P2: 5 P3: 0 P4: 0 **AI-Driven: 5**

Total Open: 5 [Export](#)

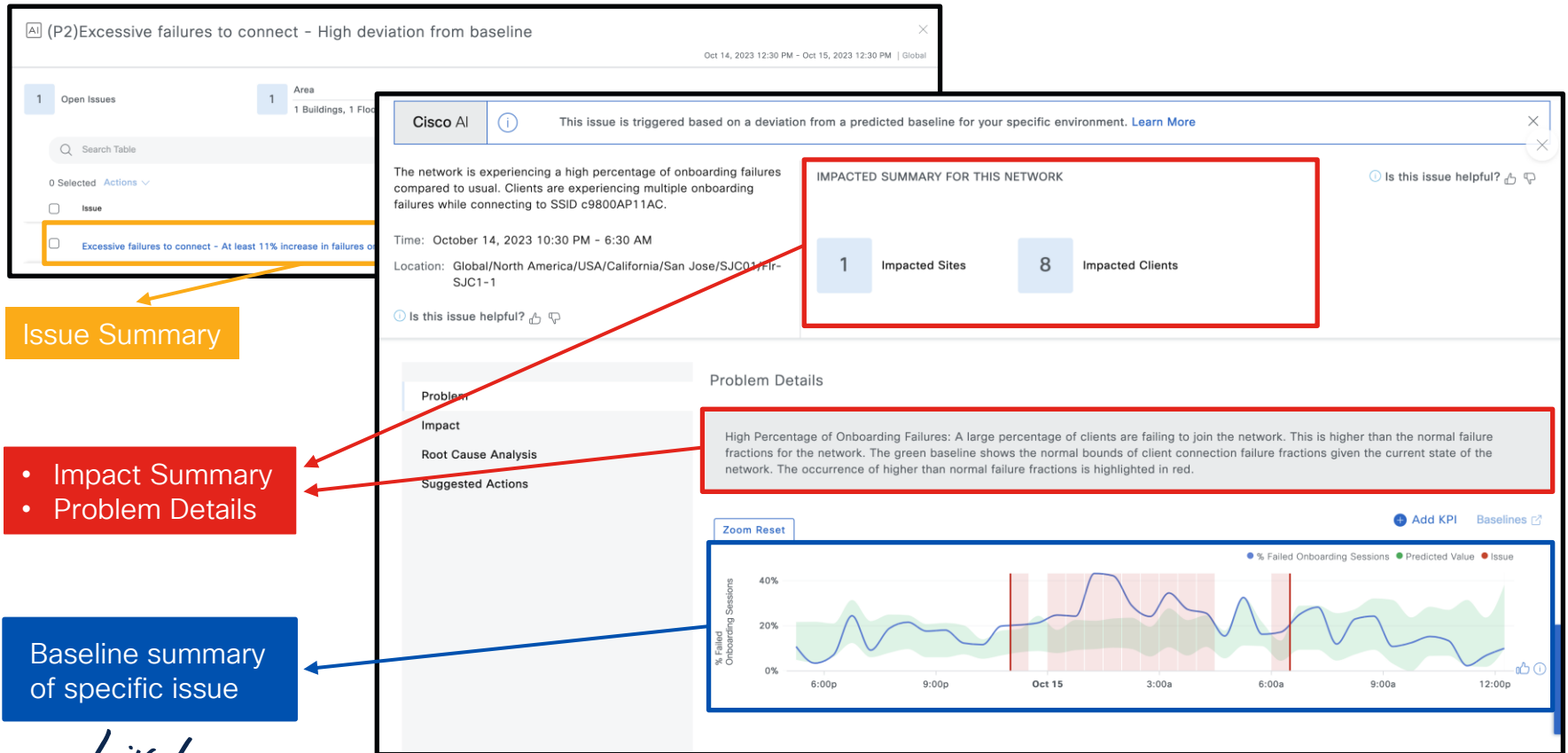
Search Table

Priority	Issue Type	Device Role	Category	Issue Count	Site Count (Area)	Device Count	Last Occurred Time
P2	Excessive failures to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Apr 10, 2023 2:20 PM
P2	Excessive time to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Apr 10, 2023 2:18 PM
P2	Excessive time to get an IP Address - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Apr 10, 2023 2:16 PM
P2	Drop in radio throughput for Cloud Applications	ACCESS POINT	Application	1	1	1	Apr 10, 2023 2:06 PM
P2	Drop in total radio throughput	ACCESS POINT	Application	1	1	1	Apr 10, 2023 2:04 PM

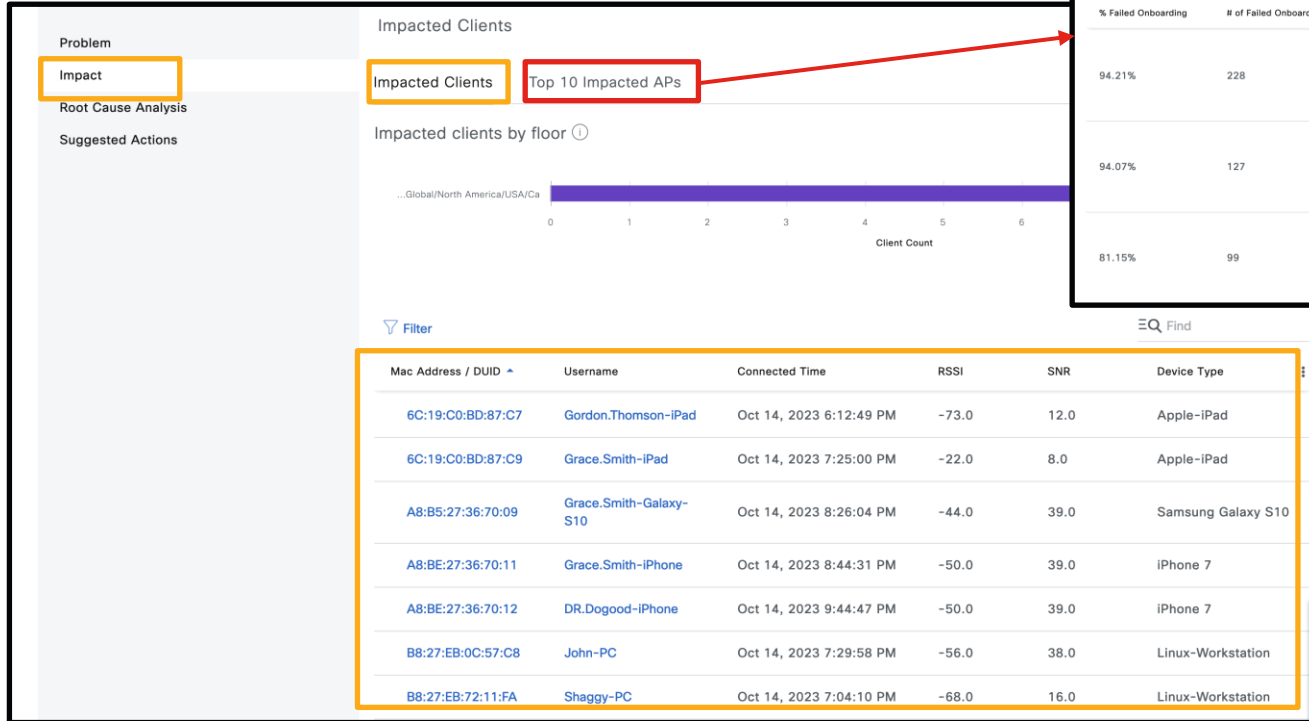
5 Record(s) Show Records: 10 < 1 >

- Dynamic baseline / threshold
- Suppress global issues to reduce noise
- Onboarding, throughput issues for wireless clients

AI-driven issues – drill down



AI-driven issues - impact

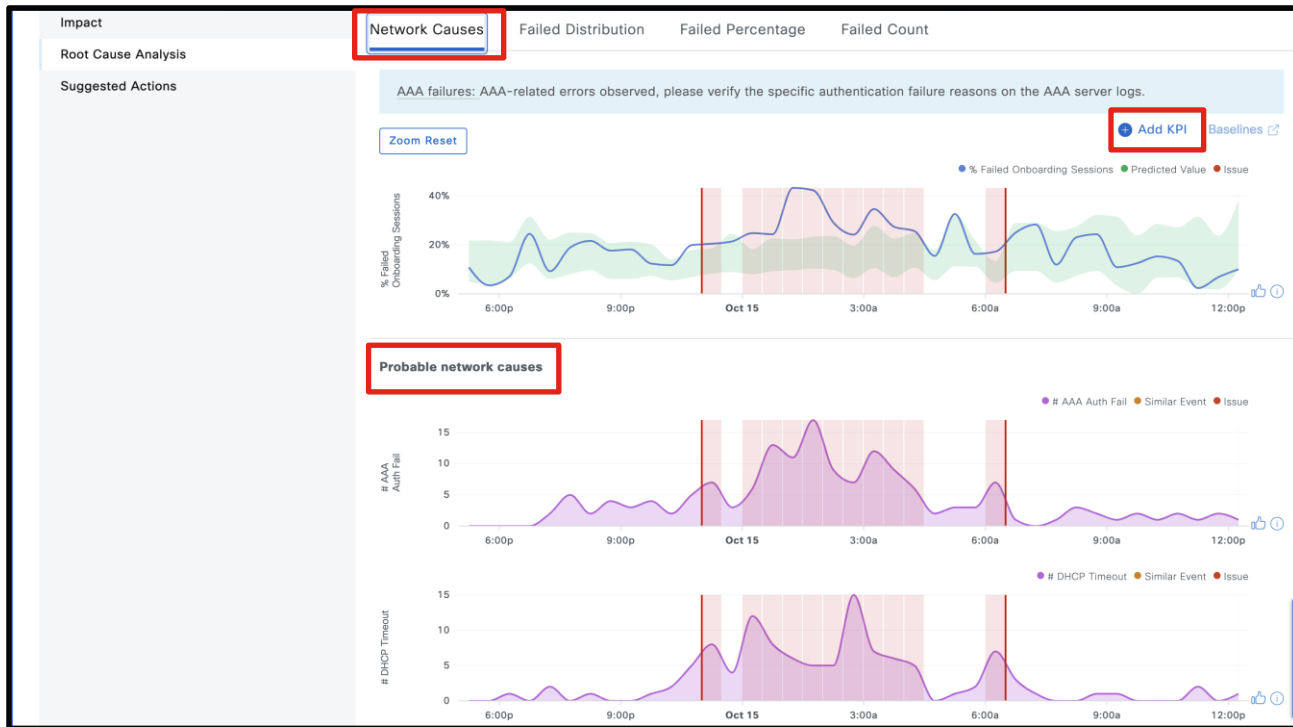


Impacted Clients						
Top 10 Impacted APs						
Filter						
% Failed Onboarding	# of Failed Onboarding	# of Clients	Name	Band	Slot	Location
94.21%	228	31	SJC01_9136_12	5 GHz	1	Global/North America/USA /California/San Jose/SJC01 /FIR-SJC1-1
94.07%	127	21	SJC01_9136_14	5 GHz	1	Global/North America/USA /California/San Jose/SJC01 /FIR-SJC1-1
81.15%	99	37	SJC01_9136_11	5 GHz	1	Global/North America/USA /California/San Jose/SJC01 /FIR-SJC1-1

Details on impacted clients by floor with redirect link to client 360

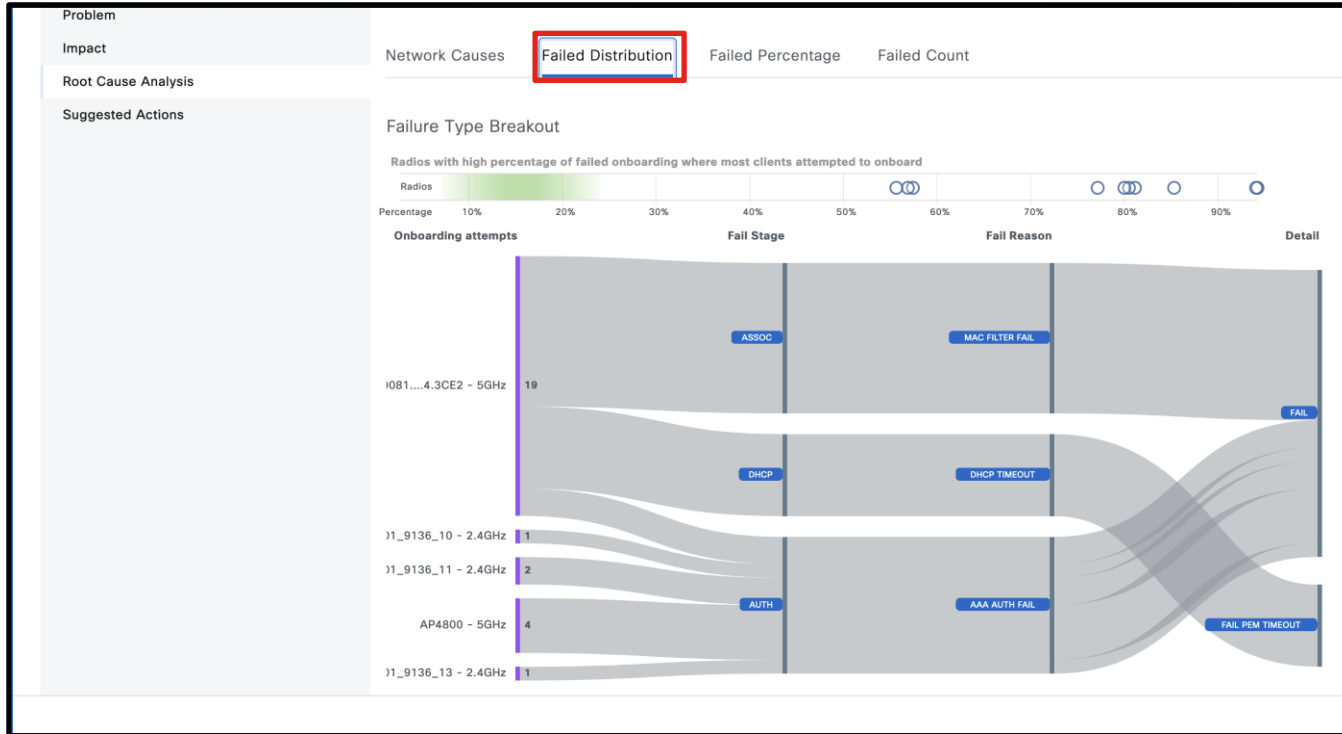
Top 10 impacted aps for selected issue type

AI-driven issues – root cause analysis



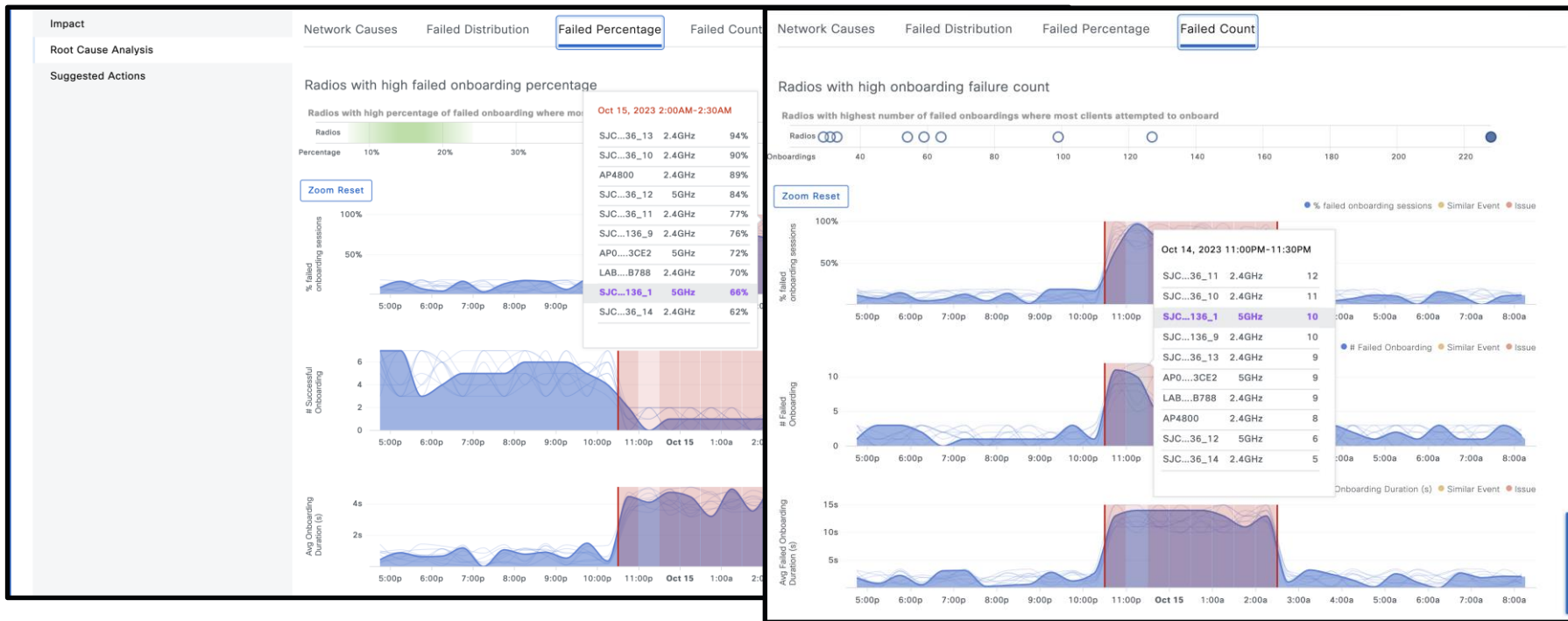
- Probable network Caused for the issue like AAA auth fail
- Correlation of KPIs during the time of issue to get insights
- Ability to add various KPIs

AI-driven issues – root cause analysis



- Radios with high percentage of failed onboarding
- View of the fail stage, fail reason and detail

AI-driven issues – root cause analysis



- Shows radios with highest failed onboarding % and failed client count

AI-driven issues – suggested actions

The screenshot displays the Cisco AI-driven issues interface. On the left, a sidebar shows 'Most Impacted Areas by Location' for San Jose (0 P1 | 12 Open) and a table of open issues with columns for Priority and Issue Type. The main content area features a 'Cisco AI' header with a notification: 'This issue is triggered based on a deviation from a predicted baseline for your specific environment. [Learn More](#)'. Below this, a detailed problem description states: 'The network is experiencing a high percentage of onboarding failures compared to usual. Clients are experiencing multiple onboarding failures while connecting to SSID c9800AP11AC.' It also provides the time (October 14, 2023 10:30 PM - 6:30 AM) and location (Global/North America/USA/California/San Jose/SJC01/Fir-SJC1-1). An 'IMPACTED SUMMARY FOR THIS NETWORK' shows 1 Impacted Site and 8 Impacted Clients. A 'Suggested Actions' section lists several categories: AAA failures, DHCP Verification (with sub-actions: Verify that DHCP server is responsive, Verify that DHCP clients are responsive), AAA Verification (with sub-action: Verify the load on AAA server), CPU and Memory Usage (with sub-action: Verify the CPU and memory load on the WLC), and RF Conditions (with sub-action: Verify the RF conditions at clients location).

Issues ▾ Events EV

Cisco AI ⓘ This issue is triggered based on a deviation from a predicted baseline for your specific environment. [Learn More](#) ✕

The network is experiencing a high percentage of onboarding failures compared to usual. Clients are experiencing multiple onboarding failures while connecting to SSID c9800AP11AC.

Time: October 14, 2023 10:30 PM - 6:30 AM

Location: Global/North America/USA/California/San Jose/SJC01/Fir-SJC1-1

Is this issue helpful? ⓘ

IMPACTED SUMMARY FOR THIS NETWORK

1 Impacted Sites 8 Impacted Clients

Is this issue helpful? ⓘ

Problem

Impact

Root Cause Analysis

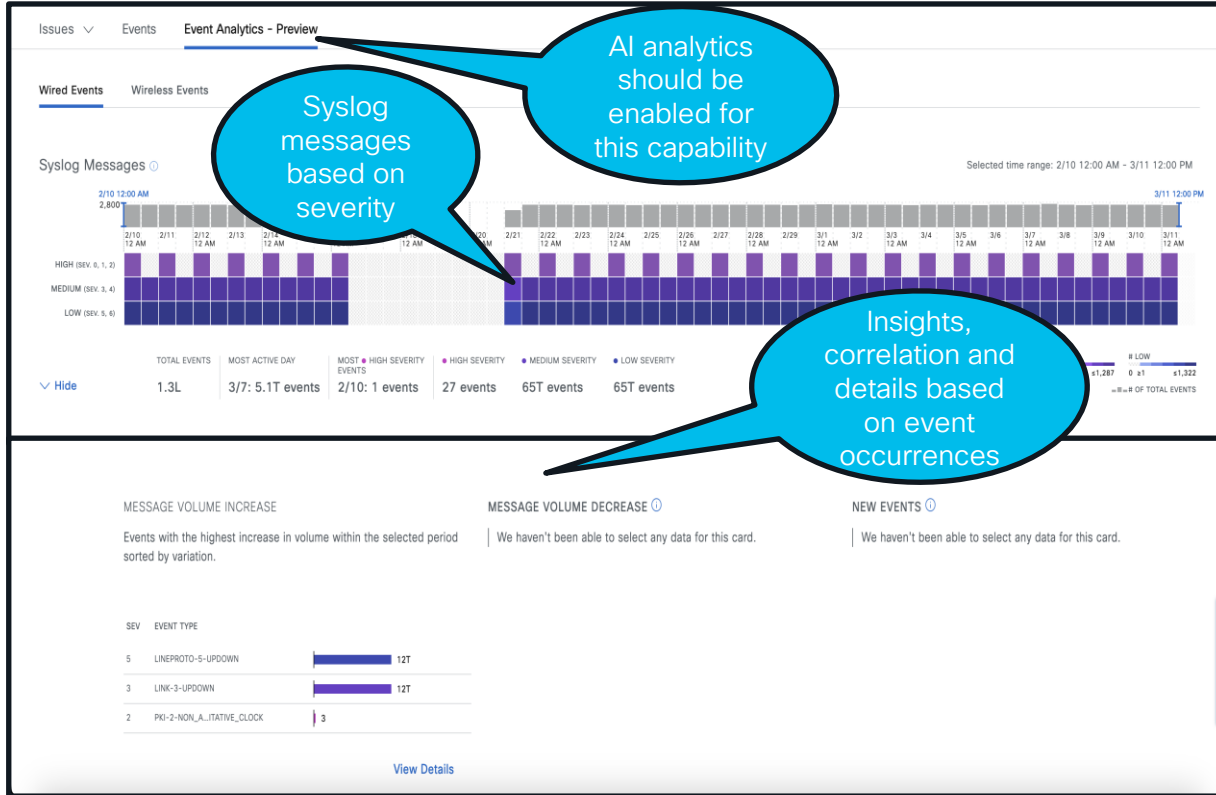
Suggested Actions

Suggested Actions

- AAA failures
- ✓ DHCP Verification
 - Verify that DHCP server is responsive
 - Verify that DHCP clients are responsive
- ✓ AAA Verification
 - Verify the load on AAA server
- ✓ CPU and Memory Usage
 - Verify the CPU and memory load on the WLC
- ✓ RF Conditions
 - Verify the RF conditions at clients location

- Areas to investigate for remediating the issue

Event analytics



- Support for wired and wireless events
- Syslog and reachability events
- Radio and client onboarding events for wireless

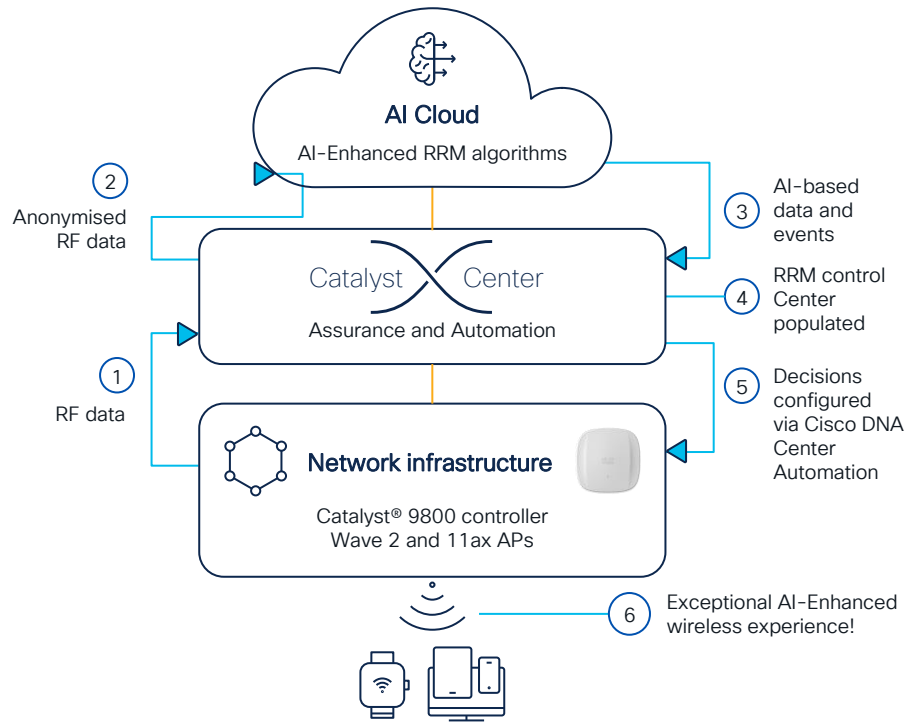
Use Case 6: RF Optimization for Different Kinds of Deployments

AI-enhanced RRM architecture and data flow

AI-Enhanced RRM is built into Cisco's AI Cloud.

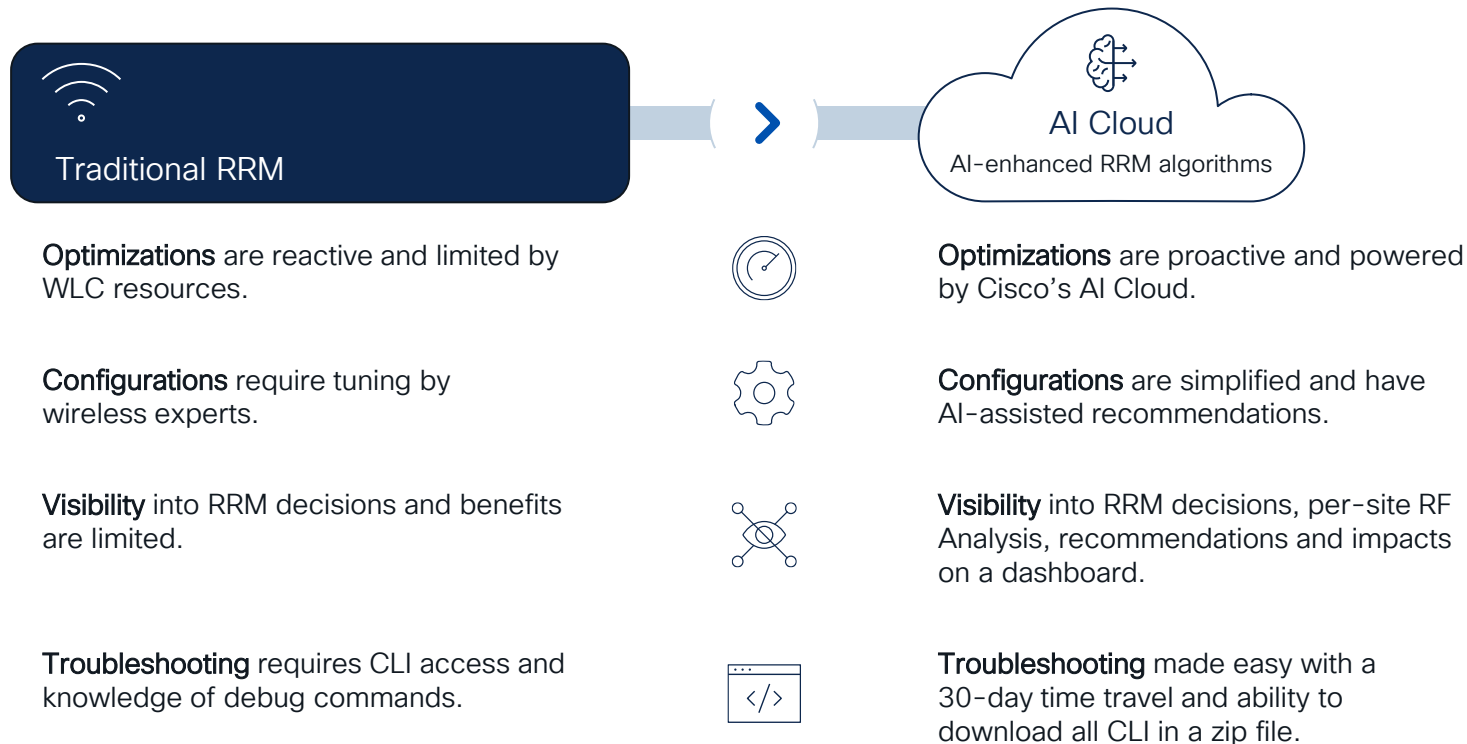
AI processes 2 weeks of RF data to discover patterns.

Proactive optimisations make Wi-Fi exceptional.



AI-enhanced RRM is much better than traditional RRM

Easy configuration, complete visibility, improved serviceability



Single pane for all RRM configurations

Basic settings Band, busy hour, and RRM services

Basic Settings

Radio Frequency Settings

☒ 2.4 GHz ☒ 5 GHz ☒ 6 GHz ⓘ

Busy Hours ⓘ

Start Time: 9:00 End Time: 17:00

Busy Hour Sensitivity ⓘ

☐ Low ☒ Medium ☐ High

Enable RF Settings

	2.4 GHz	5 GHz	6 GHz
Flexible Radio Assignment ⓘ	☒	☒	☐
Dynamic Channel Assignment ⓘ	☒	☒	☒
Dynamic Bandwidth Selection ⓘ		☒	☒
Transmit Power Control ⓘ	☒	☒	☒

Define how often RRM optimises Wi-Fi during period

Advanced settings Channel width, available channels, data rates, etc.

Advanced

Display Tuning Controls for: 2.4 GHz 5 GHz 6 GHz

Channel Width: Best

DBS WIDTH

20 40 80 160

20MHz 40MHz 80MHz 160MHz

160 MHz 80 MHz 40 MHz 20 MHz

1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97 101 105 109 113 117 121 125 129 133 137 141 145 149 153 157 161 165 169 173 177 181 185 189 193 197 201 205 209 213 217 221 225 229 233

UNII 5 (1-93) UNII 6 (97-113) UNII 7 (117-185) UNII 8 (189-233)

DCA CHANNEL

Enable PSC Enforcing ⓘ ☐

Select All

☐ UNII-5 1-93 ☒ UNII-6 97-113 ☐ UNII-7 117-185

☐ 1	☐ 5	☐ 9	☐ 13	☒ 97	☒ 101	☒ 105	☒ 109	☐ 117	☐ 121	☐ 125	☐ 129
☐ 17	☐ 21	☐ 25	☐ 29	☒ 113				☐ 133	☐ 137	☐ 141	☐ 145
☐ 33	☐ 37	☐ 41	☐ 45					☐ 149	☐ 153	☐ 157	☐ 161
☐ 49	☐ 53	☐ 57	☐ 61					☐ 165	☐ 169	☐ 173	☐ 177

Easy 3-step deployment workflow

1

Give AI-Enhanced RRM cloud access in Settings

The screenshot shows the 'Cisco AI Analytics' settings page in the DNA Center. It includes sections for 'AI Network Analytics', 'AI-Enhanced RRM', and 'EVENTS ANALYTICS'. The 'AI-Enhanced RRM' section is highlighted, showing options to 'Enable AI-Enhanced RRM' and 'Enable log export'.

2

Create an AI RF profile

The screenshot shows the 'Edit AI Radio Frequency Profile' page. It includes a 'Basic Settings' section with 'Radio Frequency Settings' (2.4 GHz, 5 GHz, 6 GHz) and 'Busy Hours' (Start Time: 9:00, End Time: 17:00, Busy Hour Sensitivity: High). There are also sections for 'Enable RF Settings', 'Flexible Radio Assignment', 'Dynamic Channel Assignment', 'Dynamic Bandwidth Selection', and 'Transmit Power Control'.

3

Assign AI RF profile to a building, and provision your Catalyst® 9800 and APs

The screenshot shows the 'Assign Locations to AI RF-Profile' dialog box. It includes a 'Site selection summary' table with columns for 'Selected Location' and 'Impacted Location'. The table shows 'Building 14' as the selected location and 'No impacted locations available' as the impacted location. There are 'Cancel' and 'Assign' buttons at the bottom.

Demo



Welcome to Catalyst Center!


Explore


There is a new Catalyst Center system update available. [Learn more](#)



Some of your license compliance requirements have not been met. [Learn more](#).

Cisco DNA Center is becoming Catalyst Center

As part of our vision to converge our products around an integrated platform, we are changing the name of Cisco DNA Center to Catalyst Center in the next release. The capability and functionality of Catalyst Center remains the same as Cisco DNA Center.



Assurance Summary

Health

Healthy as of Apr 7, 2024 10:53 AM

36%

Network Devices

83%

Wireless Clients

--%

Wired Clients

[View Details](#)

Critical Issues

Last 24 Hours

1

P1

30

P2

[View Details](#)

Trends and Insights

Last 30 Days

0

AP Performance Advisories

0

Trend Deviations

[View Details](#)

Network Snapshot

Sites	Network Devices	Application QoS Policies
-------	-----------------	--------------------------

Software and hardware support matrix

Cisco IOS® XE WLC software

17.7.1 and later

Catalyst Center software and licensing

2.3.3.6 and later
with Cisco DNA Advantage license

Cisco® access point hardware

All Wave 2 and Catalyst® 11ax and 6E access points

Cisco IOS XE WLC hardware

Catalyst 9800-CL

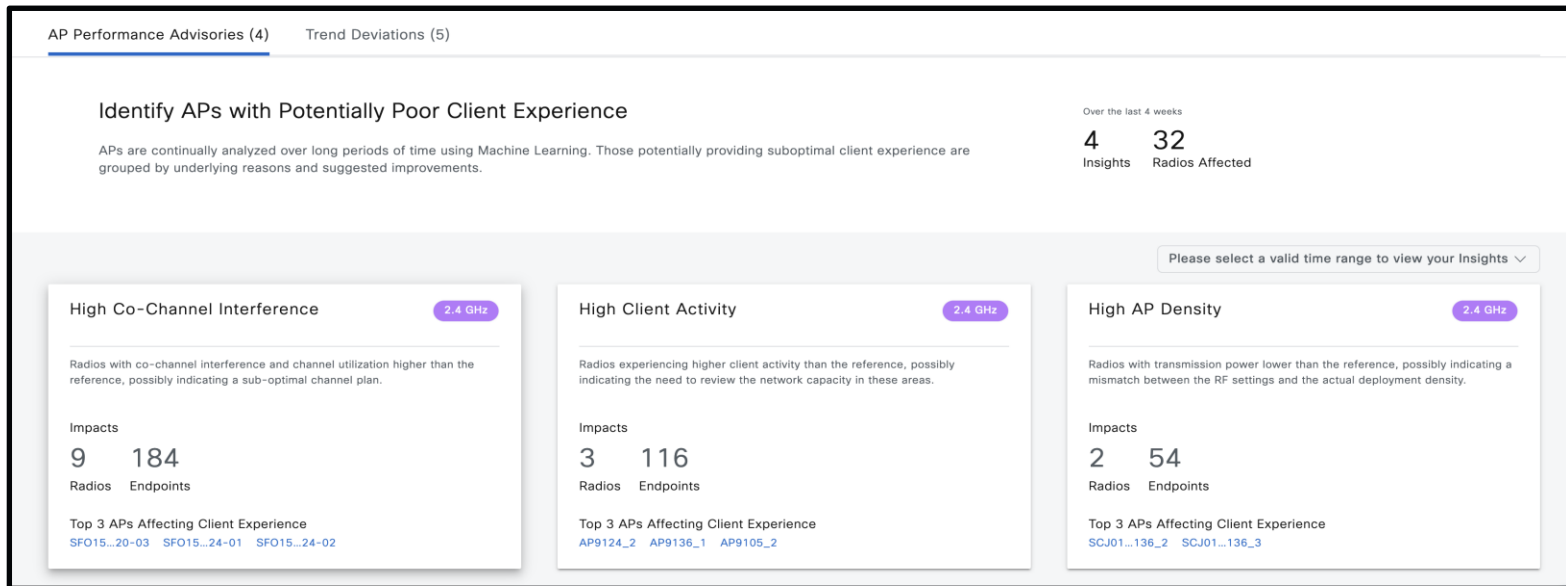
Catalyst 9800-L

Catalyst 9800-40

Catalyst 9800-80

Refer to the [Cisco AI-Enhanced RRM Deployment Guide](#) for detailed instructions.

AP performance advisories



- Identify APs giving a poor client experience using ML
- Pinpoint the KPI (ex. High AP Density) causing the poor experience along with root cause
- ML system that measures and benchmarks client experience parameters across AP's (RSSI, SNR, interference) to identify poor performing APs in a 4-week time window.

AP Performance Advisories – Low AP Density 5 GHz

Trends and Insights / Low AP Density at 5 GHz

Low AP Density At 5 GHz

Radios with transmission power higher than the reference, possibly indicating a lower than optimal deployment density. ⓘ

ⓘ Is this insight helpful? 🗨️

18
Radios

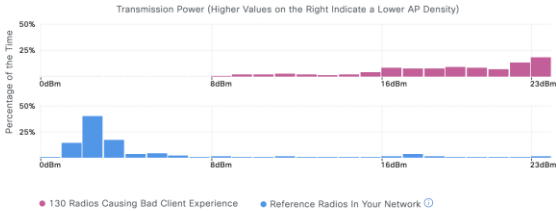
9
Buildings

TOP 1 RADIOS AFFECTING CLIENT EXPERIENCE

AP912...105_2

Power Distribution

Radios in this group have high transmission power more often than the [Reference radios](#).



Transmission power optimization is handled by the RRM (Radio Resource Management) algorithm, however, if radios need to constantly use high power it may indicate a low radio density or an RF profile not optimized for the actual RF deployment.

Radios Impacting Client Experience (18)

Export

Search Table

Insights Details	Impact	AP Model	Location	# of Clients Affected	KPIs Impacting Client Experience
AP4800	Low	AIR-AP4800-B-K9	Global / North America / USA / California / San Jose / SJC01 / Fir-SJC1-1	20	RSSI Distribution, Speed Distribution
PLS06-AP3800-01	Low	AIR-AP3802I-B-K9	Global / North America / USA / California / Pleasanton / PLS06 / Fir-PLS06-1	19	RSSI Distribution, Speed Distribution
SFO10-AP3800-02	Low	AIR-AP3802I-B-K9	Global / North America / USA / California / San Francisco / SFO10 / Fir-SFO10-1	17	RSSI Distribution, Speed Distribution
SJC01_9136_11	Low	C9136I-B	Global / North America / USA / California / San Jose / SJC01 / Fir-SJC1-1	16	RSSI Distribution, Speed Distribution
AP70B3.1733.D6D4	Low	AIR-AP4800-A-K9	Global / North America / USA / California / San Jose / SJC22 / Fir-SJC22-1	14	RSSI Distribution, Speed Distribution
AP0081.C424.3CE2	Low	AIR-AP1852I-B-K9	Global / North America / USA / California / San Jose / SJC01 / Fir-SJC1-1	12	RSSI Distribution, Speed Distribution

18 Record(s)

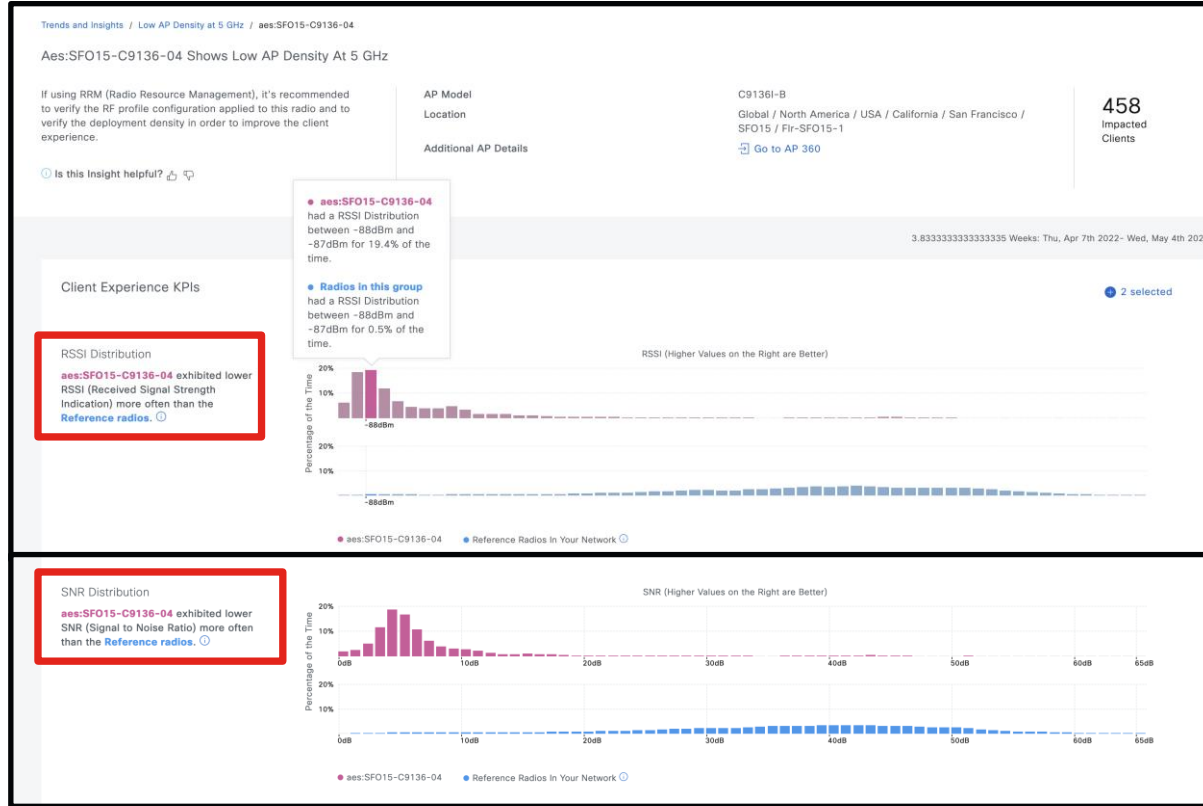
Show Records: ▾

1 - 6

- Low Density APs is identified because it has higher Transmit Power than reference Radios
- Reference Radios are determined by analyzing 4-week data using ML
- Impacting Radios Identified

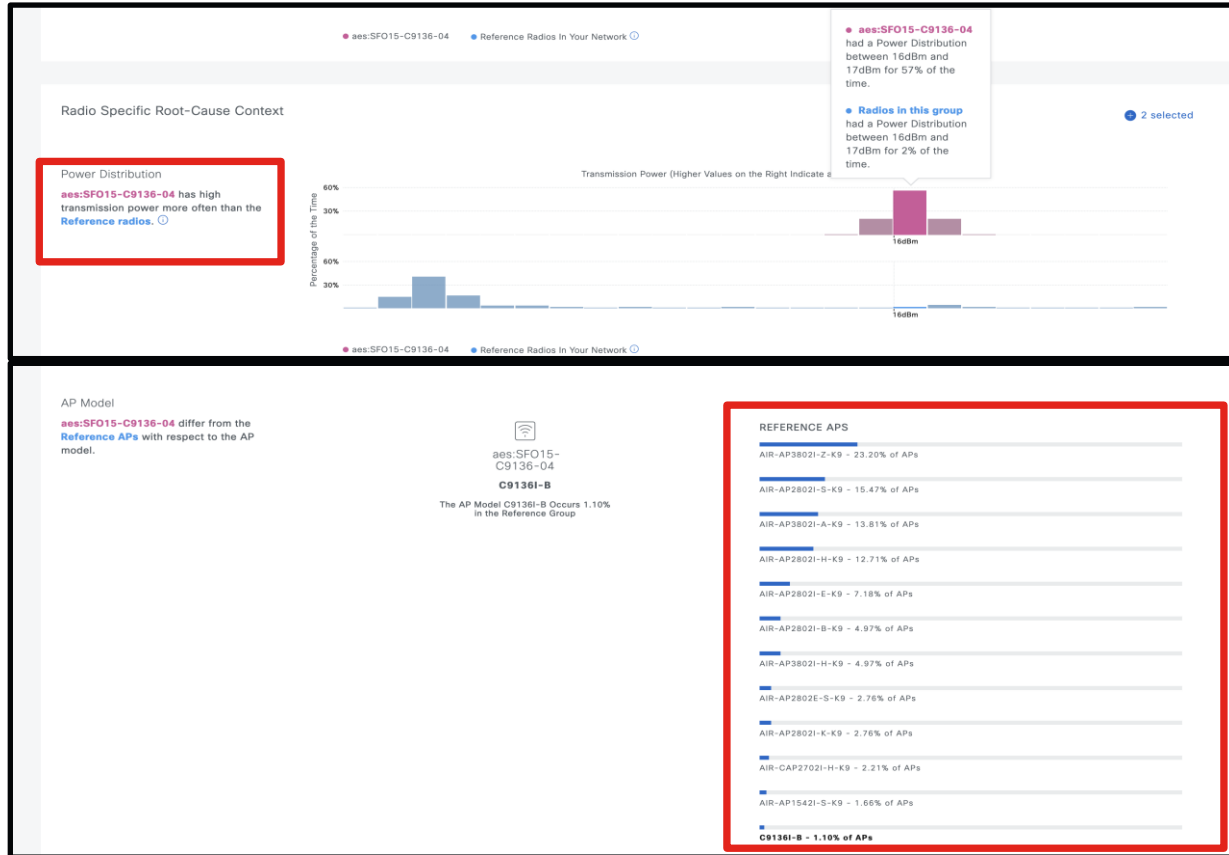
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AP Performance Advisories – Low AP Density 5 GHz



- Client Experience KPIs per AP – Identify impact on the client end on per AP level
- Low RSSI and SNR as compared to the reference Radios

AP Performance Advisories – Low AP Density 5 GHz



- Radio Specific Root-Cause Context – Problem AP showing high power level as compared to reference Radios

Summary

Assurance data collection using telemetry

Health of the network and clients

Network issues and troubleshooting – reactive and proactive

RF optimization using AI-enhanced RRM

Complete Your Session Evaluations



Complete a minimum of 4 session surveys and the Overall Event Survey to claim a **Cisco Live T-Shirt**.



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- Book your one-on-one Meet the Expert meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at www.CiscoLive.com/on-demand



Thank you

CISCO *Live!*

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CISCO *Live!*

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