

The background features a vibrant, abstract design. On the left, there are horizontal, wavy bands of color in shades of red, orange, yellow, and green. On the right, a bright white light source emits a series of colorful rays in shades of blue, cyan, and yellow, creating a sunburst effect.

CISCO *Live!*

Let's go

#CiscoLiveAPJC



The bridge to possible

Wireless Network Insights and Troubleshooting using Catalyst Center Assurance

Vasant Nagarajan – Technical Marketing Engineer
BRKEWN-1267

cisco *Live!*

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Cisco Webex App

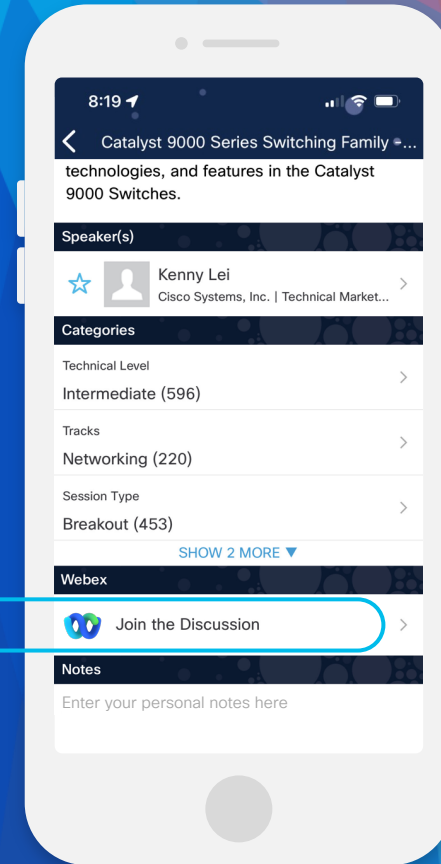
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until December 22, 2023.



<https://cicolive.ciscoevents.com/cicolivebot/#BRKEWN-1267>

About Me...

Vasant Nagarajan – Technical Marketing Engineer

Bengaluru, India

Joined Cisco in 2015

Loves to travel and explore different cuisines



Session Abstract

In this session you will get see various capabilities of Catalyst Center Assurance from a Wireless Use-cases perspective. It will cover all the necessary steps to collect and correlate your wireless network and convert the hurricane of data in your network into meaningful information

This session focuses on

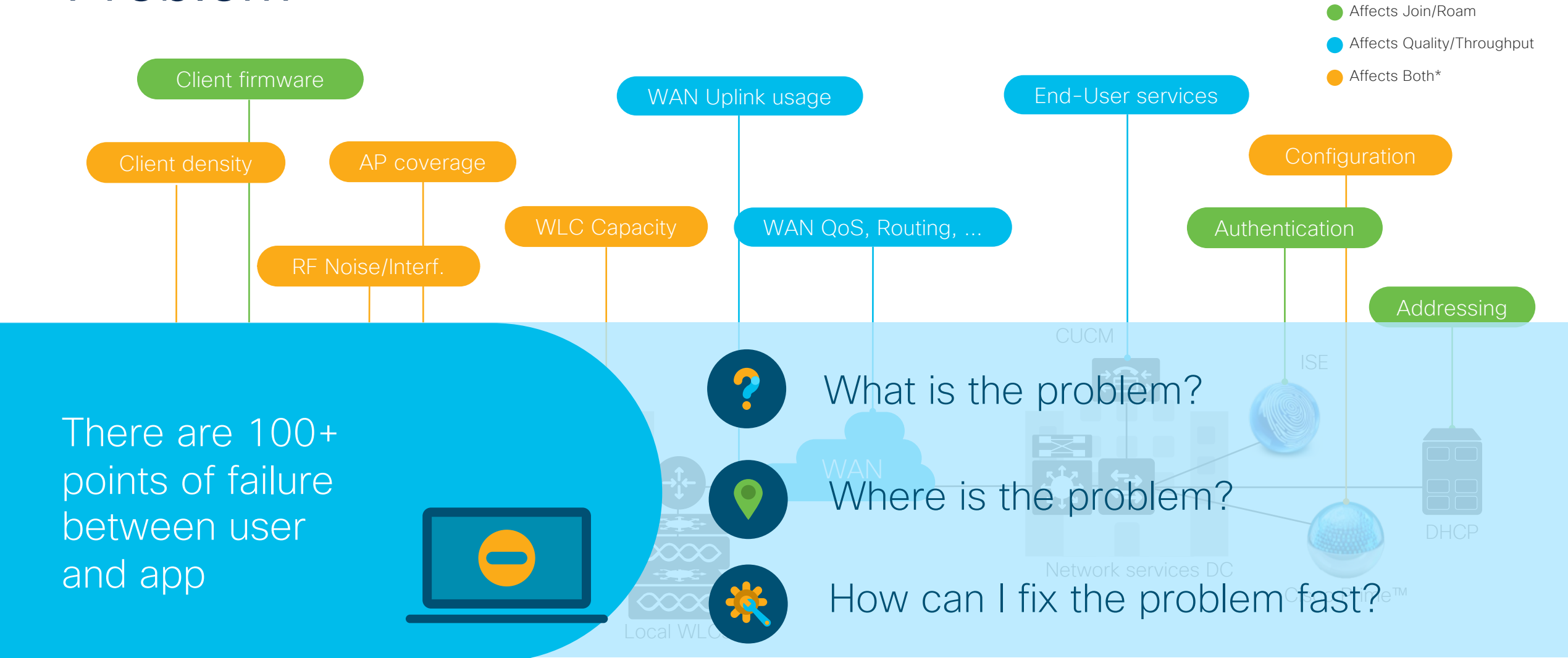
- Wireless Network SLA Management using Health Dashboards
- Wireless Client Troubleshooting
- Wireless Anomaly detection, Root cause and Trend Analysis
- Network Device remediation

Agenda

- Introducing Catalyst Center Assurance
- Key Use Cases for Troubleshooting Wireless Networks
 - Health of the Wireless Network
 - Health of the Wireless Clients
 - Wireless Network Issues
 - Reactive Troubleshooting of Wireless Client Onboarding Issues
 - Proactive Troubleshooting of Wireless Client Onboarding Issues
 - Proactive Identification of APs with Poor Client Experience
 - RF Optimization for Different kinds of deployment

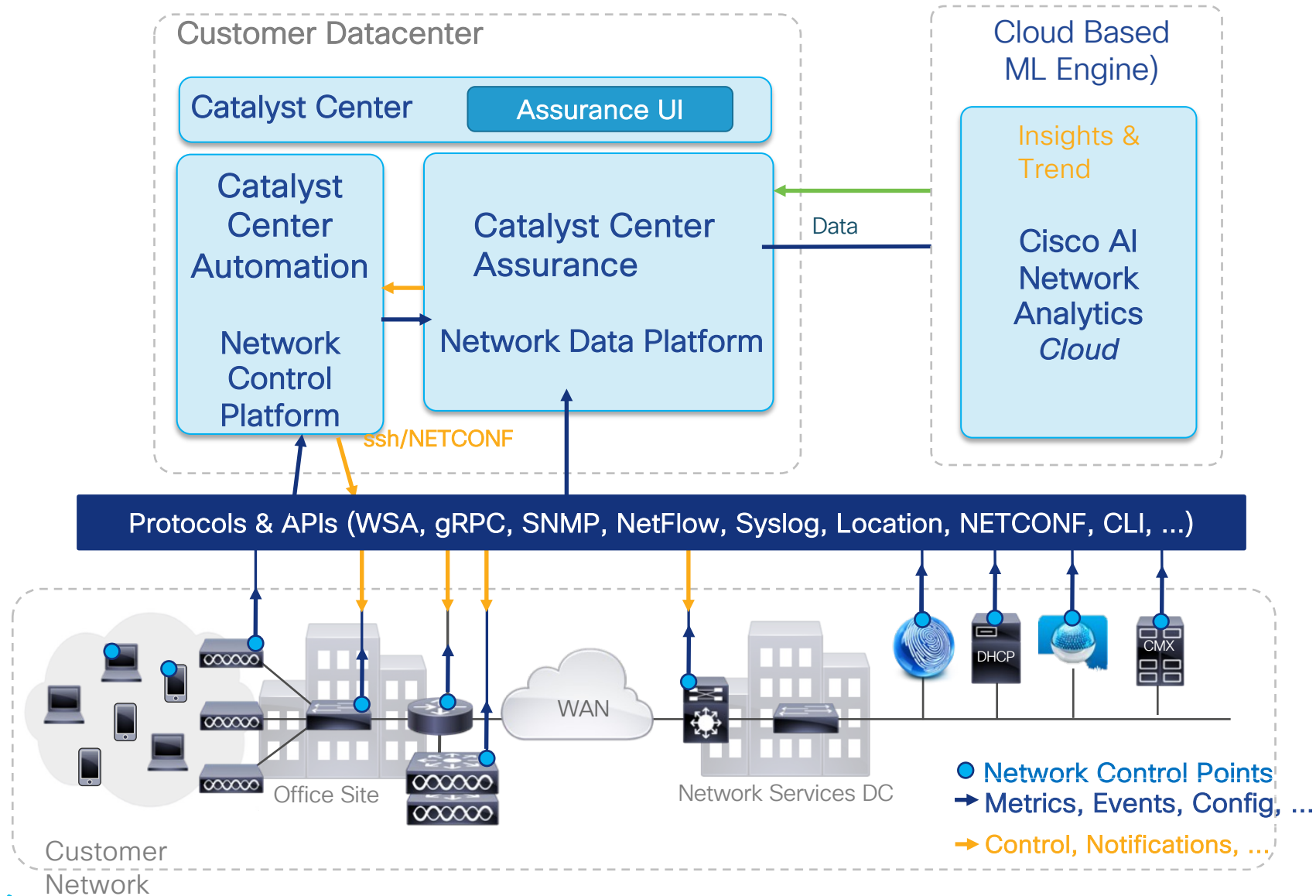
Introducing Catalyst Center Assurance

Network Assurance is a Complex, End-to-End Problem



* Both = Join/roam and quality/throughput

Catalyst Center Assurance Architecture

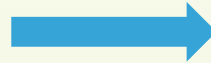


Streaming Telemetry provides right data at the right time with the right context

SNMP / Legacy data
pull methods

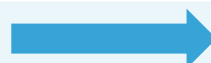


Pull based data import



Push based data export

CPU Overhead with data crawlers



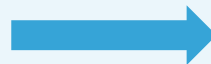
Low CPU overhead

Data intensive without optimizations



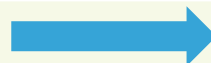
Optimized for data export(KPI, Events)

No real time notifications



Notifications sent seconds after change

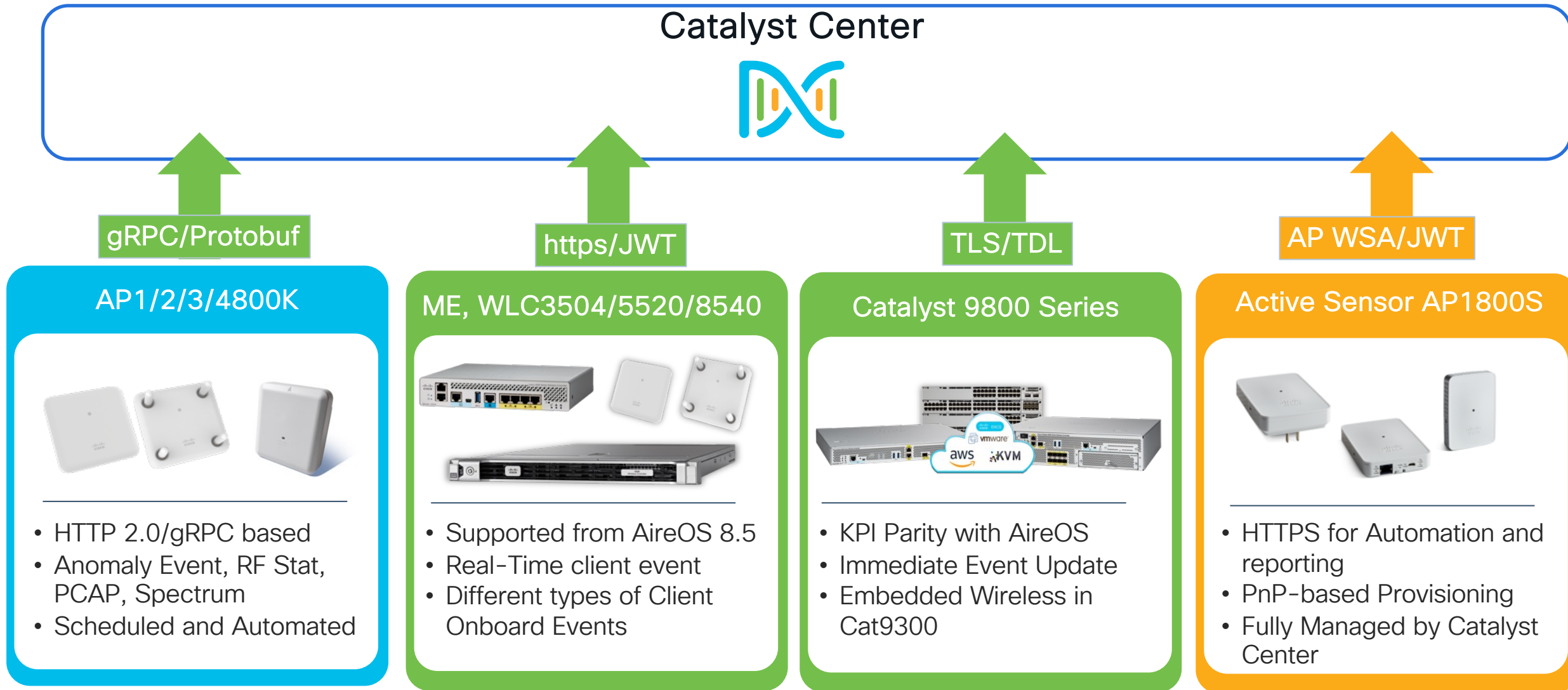
Min Polling has too many black holes



Reduced delay in management data

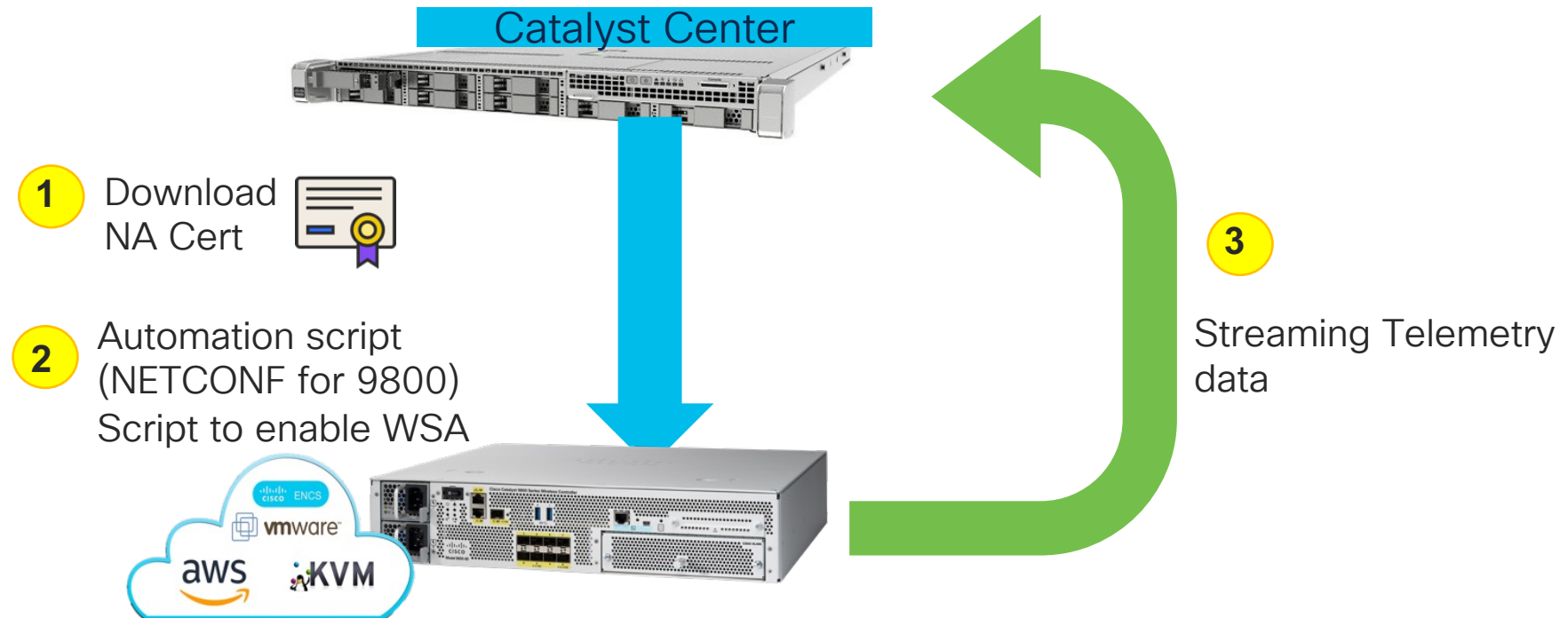
Purpose-Built for Catalyst Center Assurance Wireless Streaming Telemetry Architecture

*Available with 16.10.1s
and Catalyst Center 1.2.8 or later

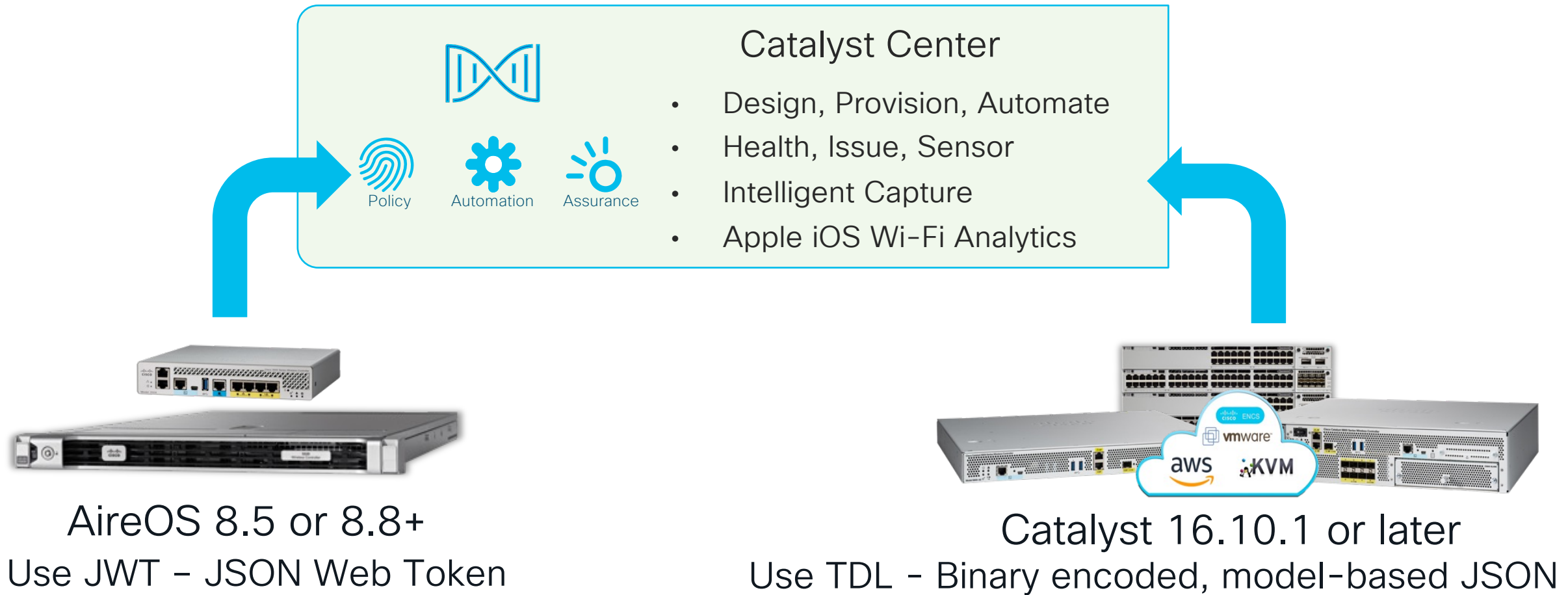


Streaming Telemetry is automatically enabled once WLC is added to Catalyst Center inventory and assigned to a site

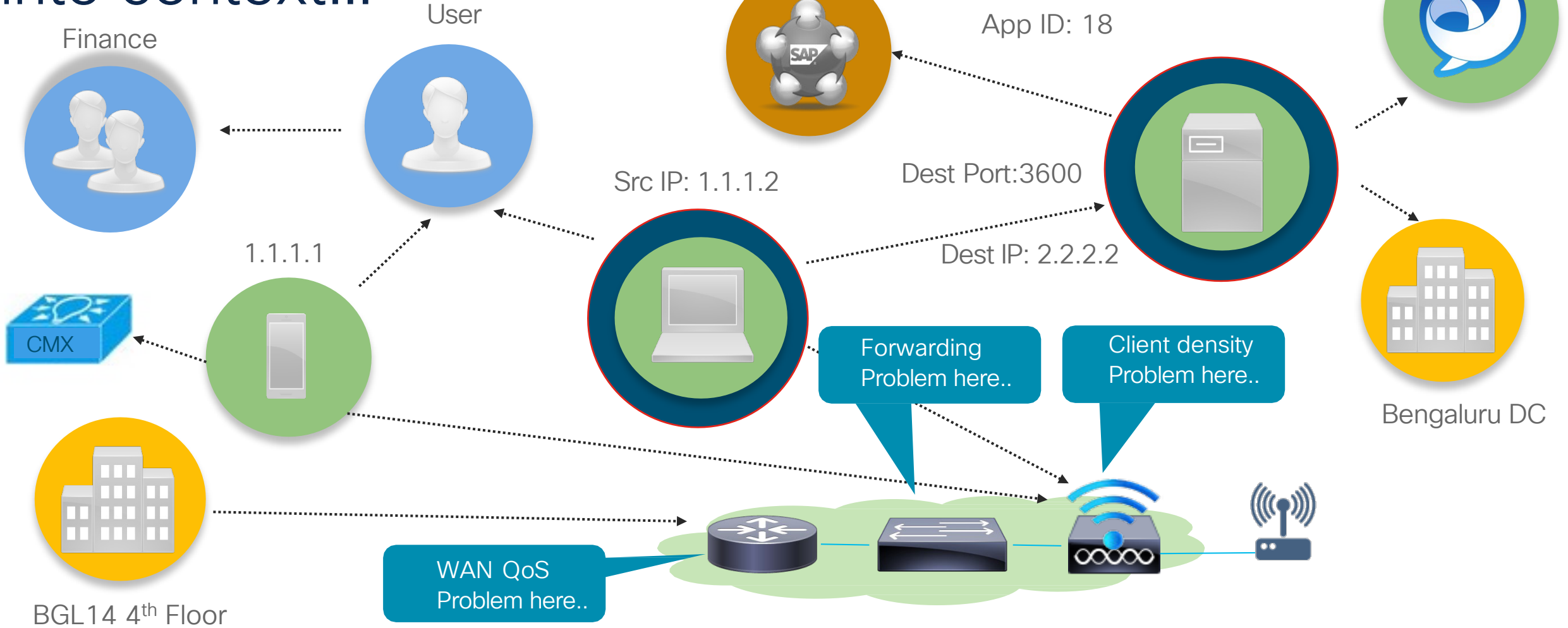
- Catalyst Center pushes automated scripts to enable telemetry
 1. Prerequisite – Enable Netconf-yang from Cat9800 CLI (only for 9800 WLC)
 2. Install Catalyst Center Certificate for https setup with Catalyst Center
 3. Configure and Enable streaming telemetry



Wireless Assurance provide feature Parity between AireOS and IOS-XE based Controller

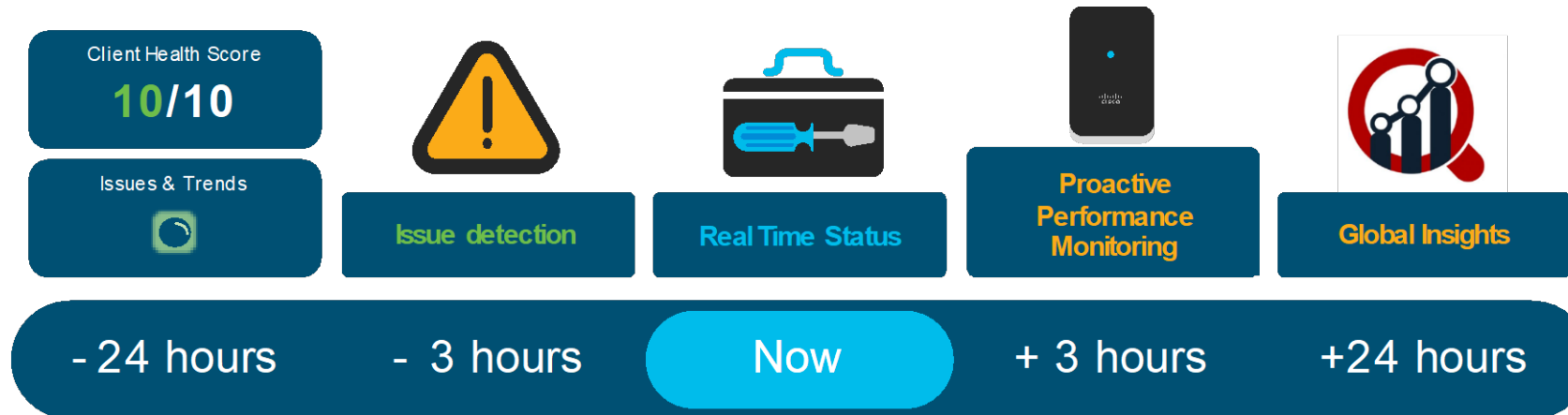


Putting all this data into context...



CISCO *Live!*

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

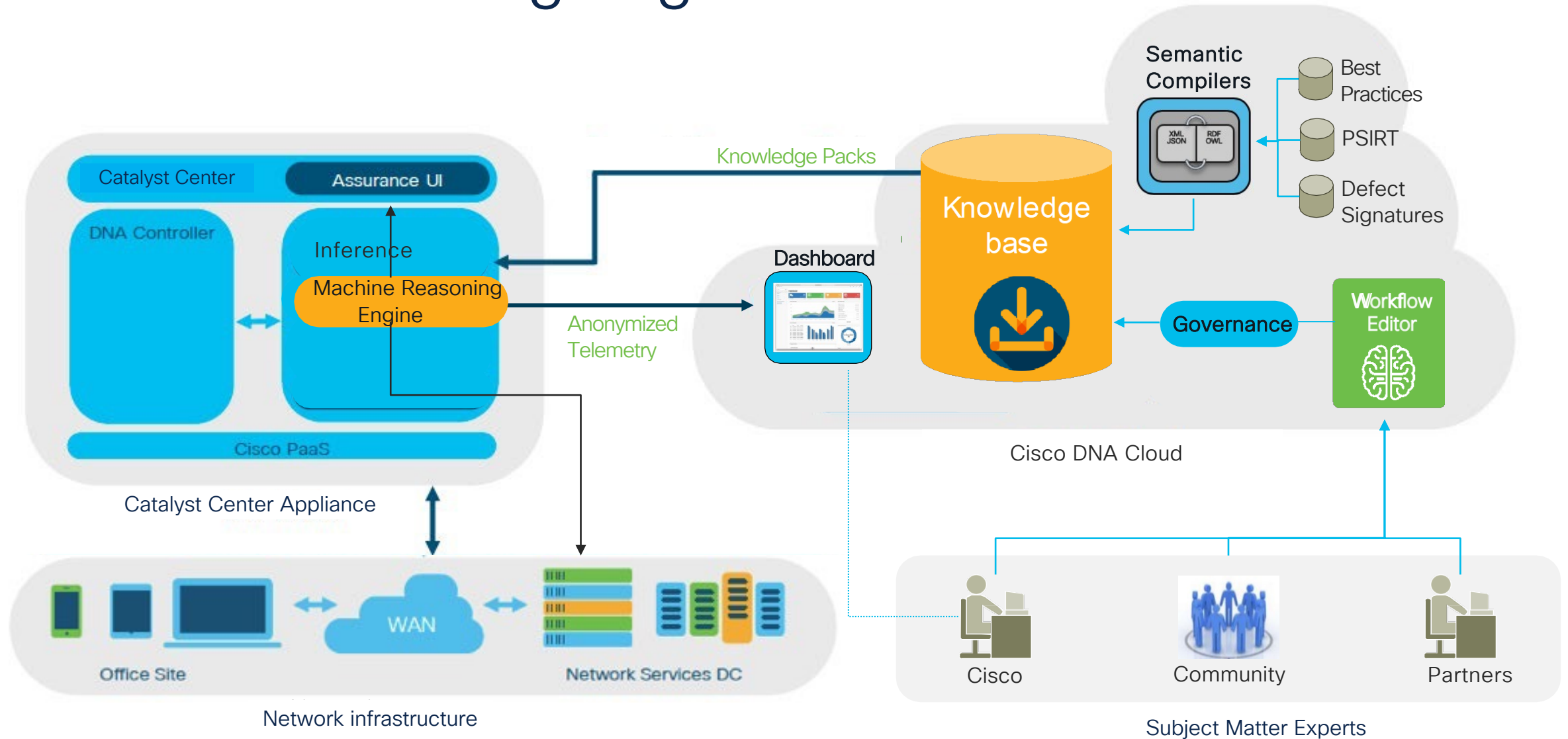


Billions of context aware search graph entries created every 24 hours

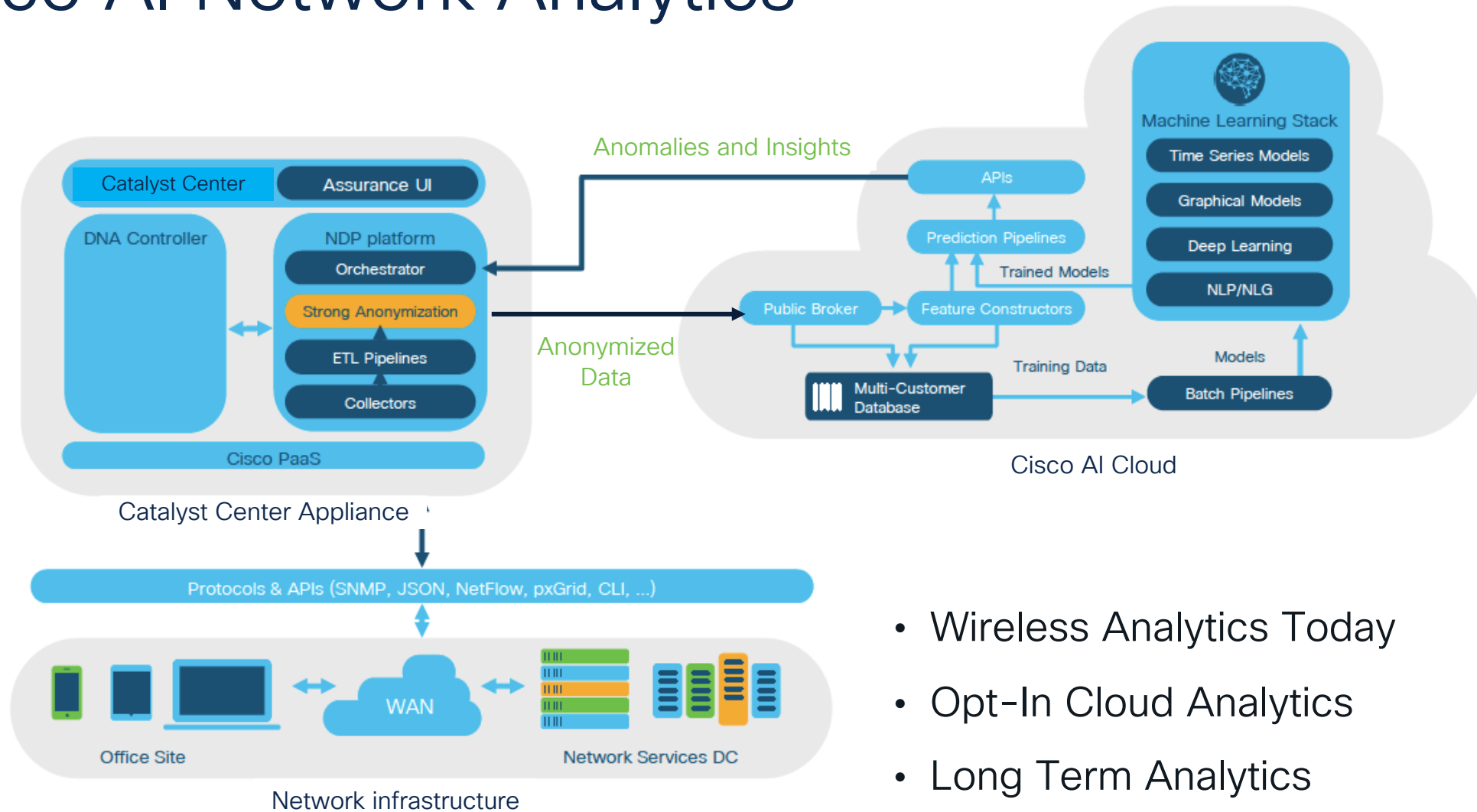


Lowers Mean Time To Resolution and improves end user experience

Machine Reasoning Engine Architecture

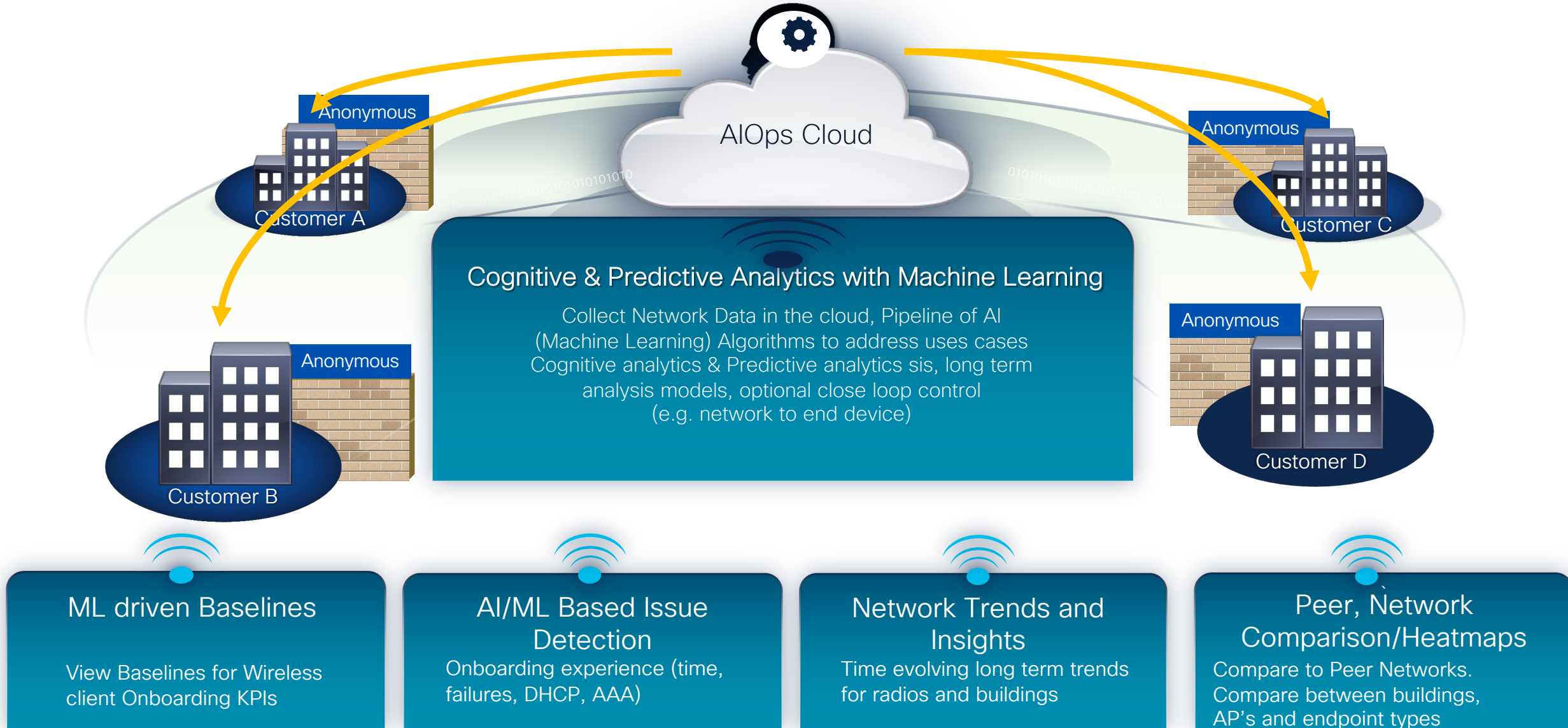


Cisco AI Network Analytics

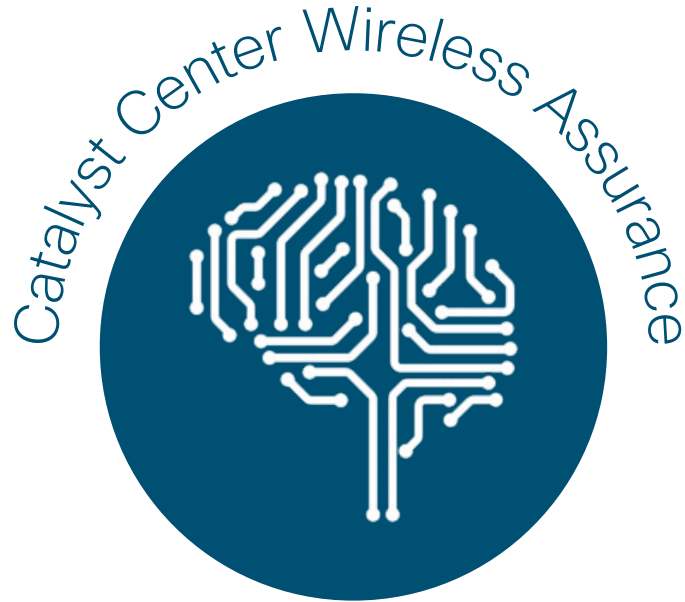


- Wireless Analytics Today
- Opt-In Cloud Analytics
- Long Term Analytics

Cisco AI Network Analytics – Solution Overview



Catalyst Center Assurance – Tool-kits



Streaming
Telemetry



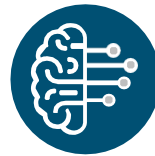
Intelligent Capture
Auto PCAPs



Intel/iOS/Samsung
Analytics



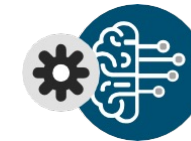
Client/AP 360



ML Baseline



Comparison



Trends and Insights



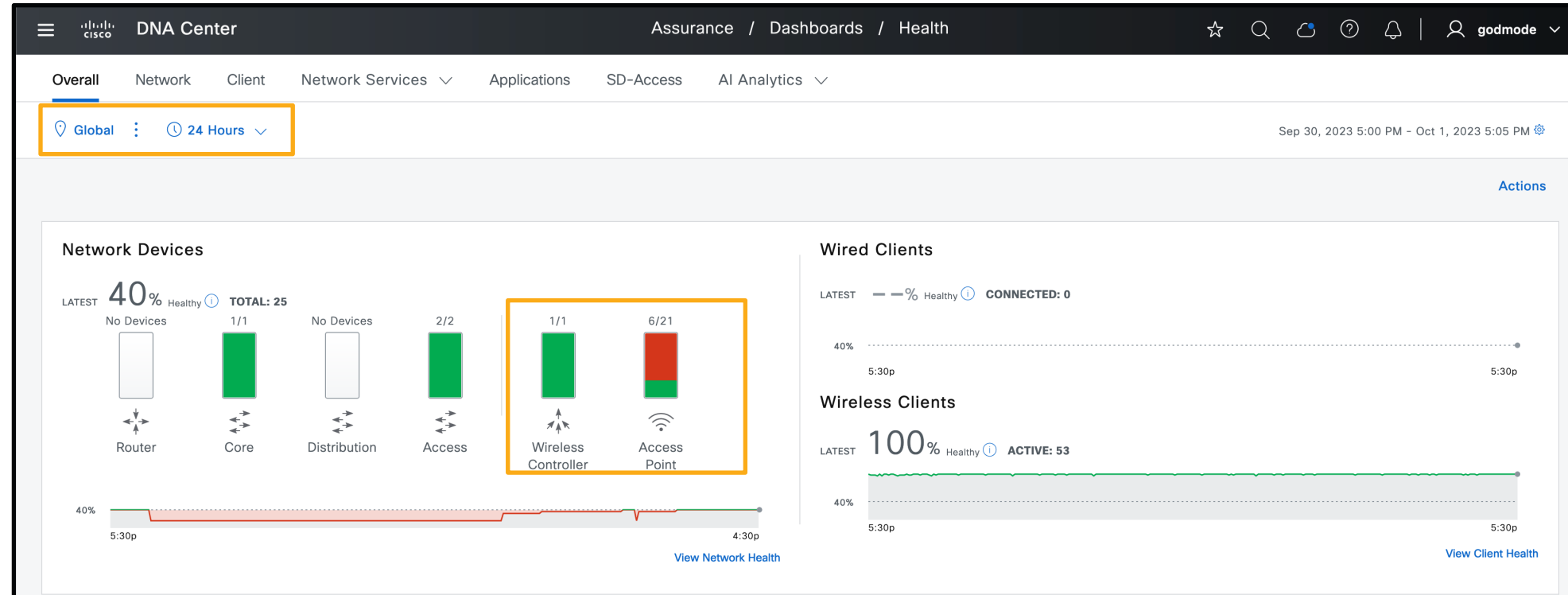
AI-RRM

Key Use Cases for Troubleshooting Wireless Networks

Use Case 1: Health of the Wireless Network

How is my Wireless Network Doing?

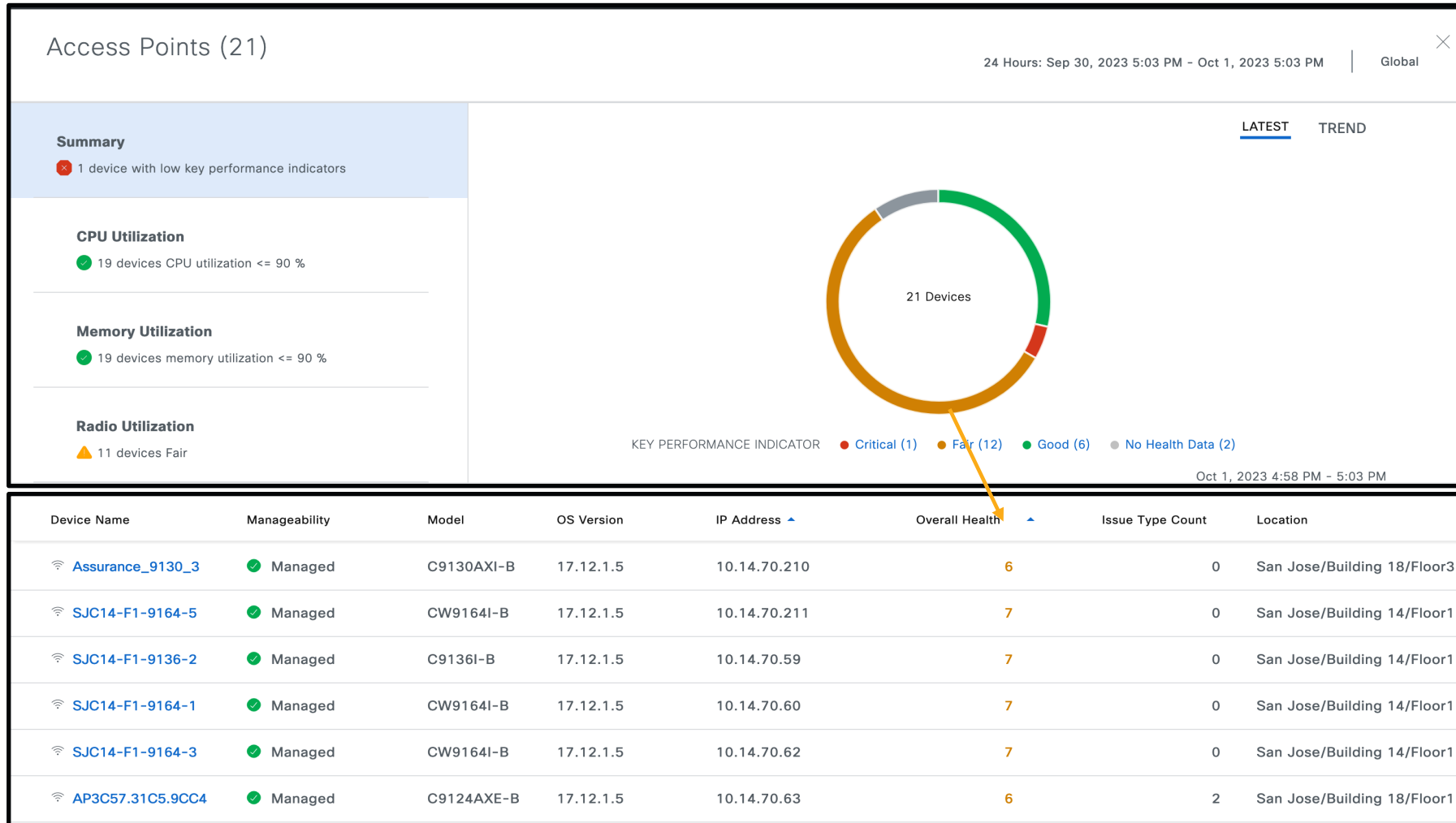
Overall Network Health



- ❖ Overall and site-specific health of my wireless 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



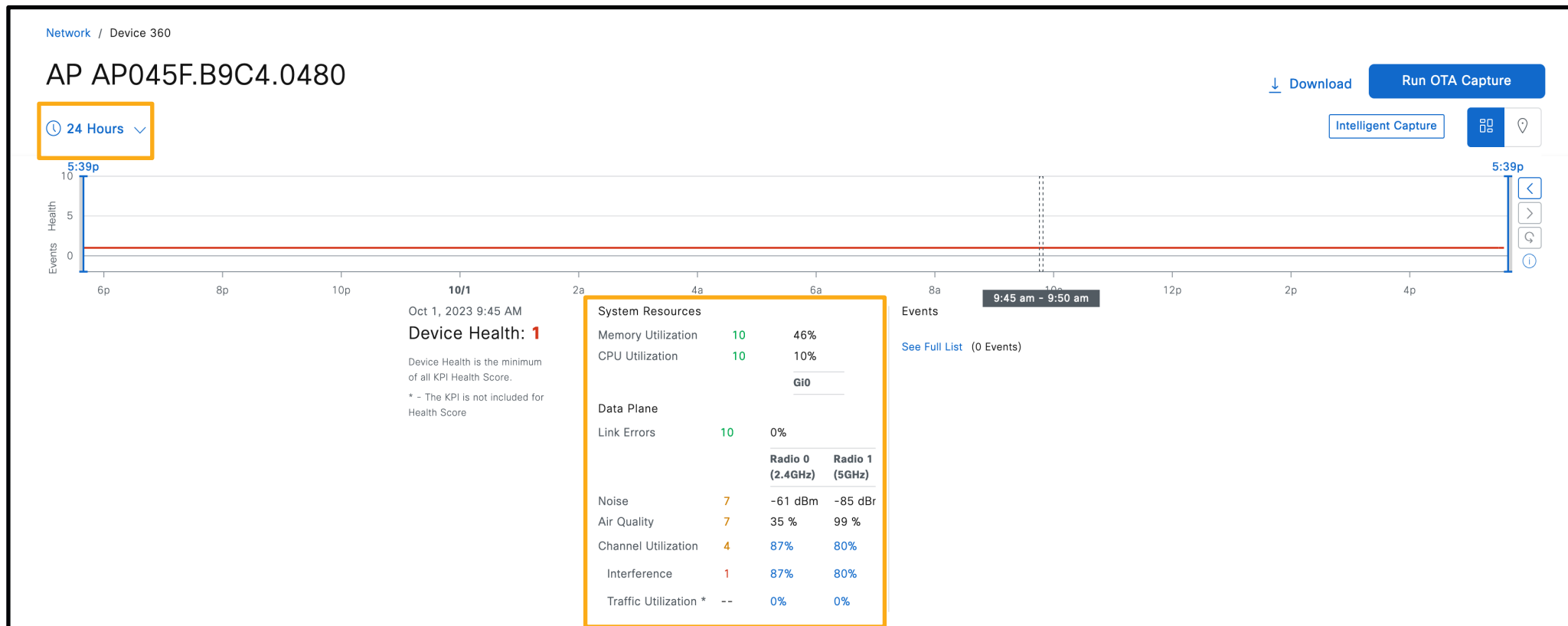
❖ Summary of the KPIs contributing to the health score

❖ 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

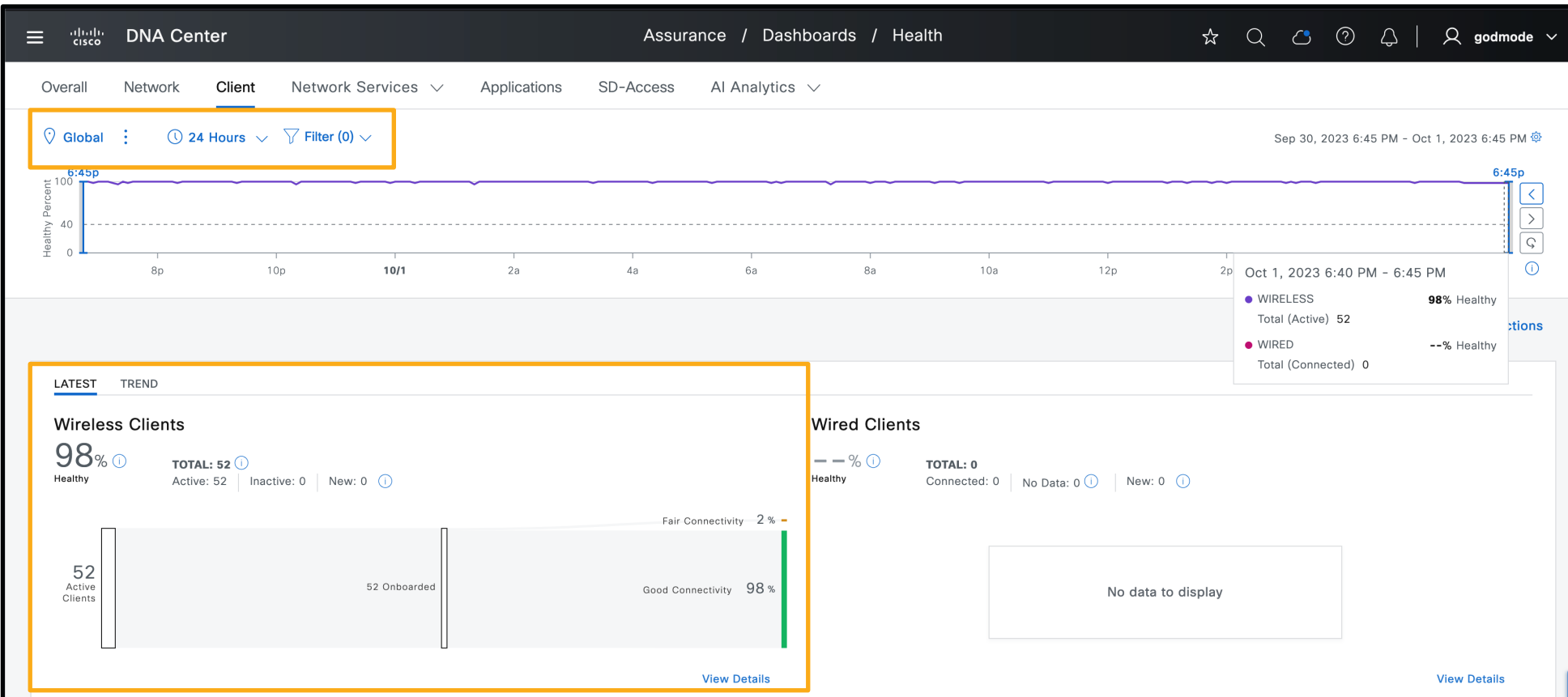
Device Health Application Health					
Health Score					
The health score can be customized based on device type. The network device's health score is the lowest score of all included KPIs. To disable a KPI from impacting the overall device health, you can exclude it from the health score calculation.					
Note: Health score setting is not applicable for Third Party Devices.					
Router Core, Distribution & Access Wireless Controller <u>Access Point</u> Wireless Client Wired Client					
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 Wireless Clients

How are my Wireless Clients Doing?

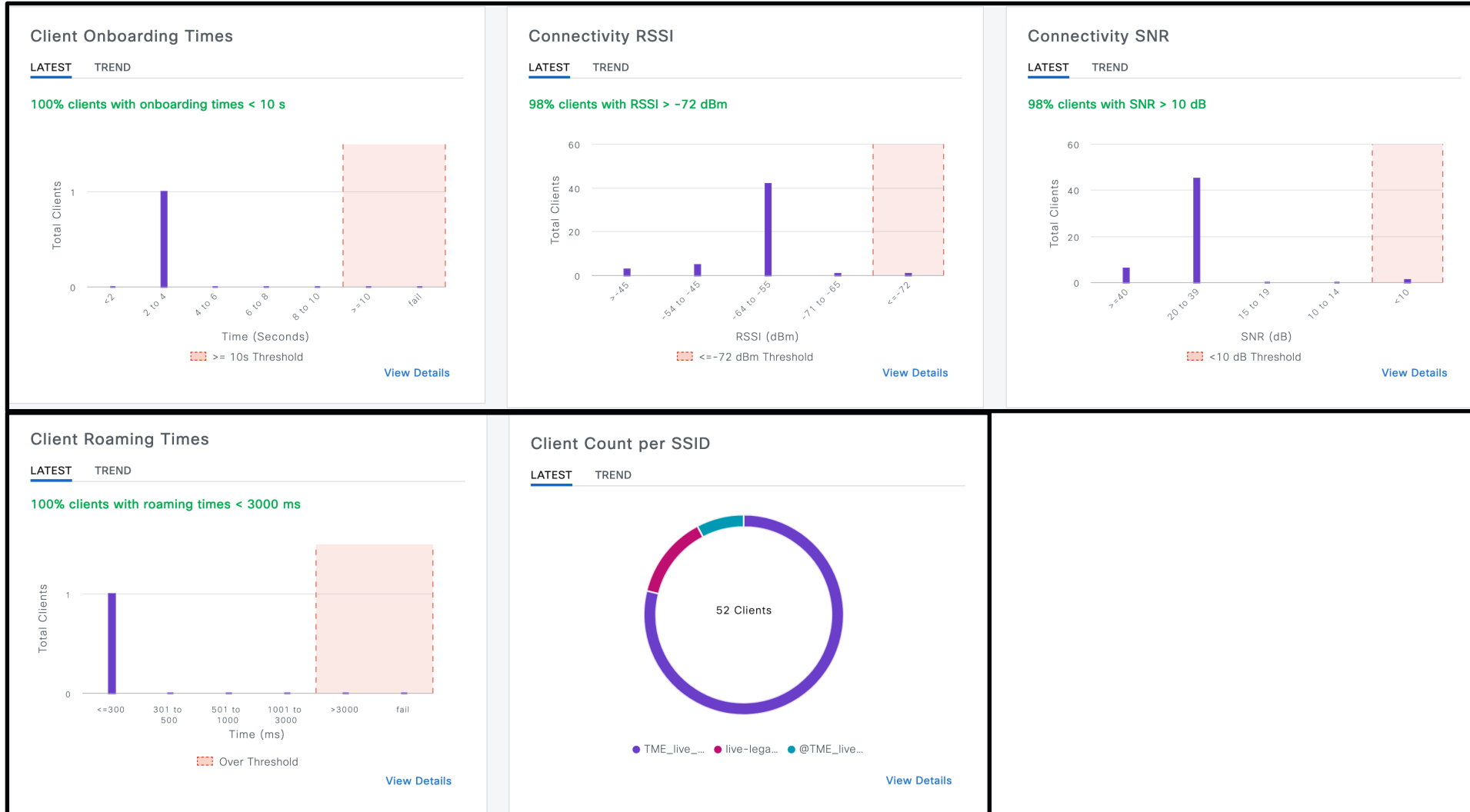
Overall Client Health



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

How are my Wireless Clients Doing?

Overall Client Health



❖ Executive summary of different wireless client KPIs

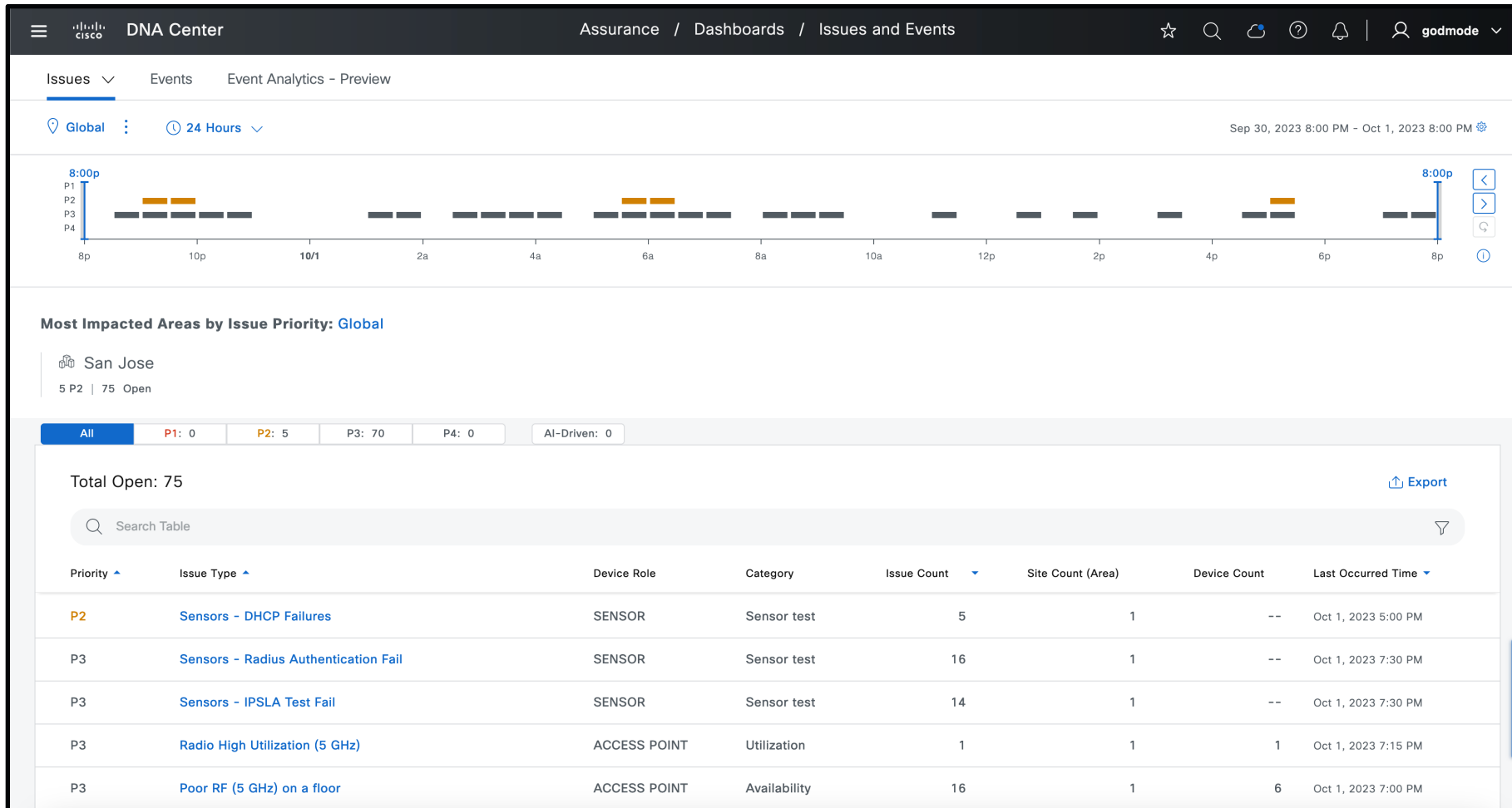
❖ Filter with SSID and bands

❖ Latest data and the trend over a period of 24 hours can be viewed

Use Case 3: Wireless Network Issues

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

Issue Dashboard to help analyze 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

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

Troubleshooting High Radio Utilization issue

The screenshots illustrate the following interface elements:

- Issue Title:** P3 The 5 GHz radio 1 on AP "SJC14-F1-9136-1" is experiencing high utilization.
- Status:** Open
- Issue Profile:** sanjoseprofile
- Impact Summary:** 0 Client(s) Affected
- 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
- Suggested Actions (5):**
 - Consider adding more APs with 5 GHz radios to this location.
 - Check the neighbor APs on the same channel. High traffic on their clients will cause higher interference.
 - Check for the presence of rogue APs and rogue clients on these APs channels. [Run](#)
 - 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. [Run](#)
 - 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

Can I create custom issues?

The screenshot shows the Cisco DNA Center interface. On the left, under 'Events (8223)', a list of events is shown. One event, 'LINEPROTO:UPDOWN', is highlighted with a green callout bubble labeled 'Syslog Event'. The main panel displays details for this event, including 'Event Type: Syslog' (highlighted with an orange box), 'Message Text', 'Device Name', 'Device IP', 'Location', 'Mnemonic', and 'Facility'. A blue callout bubble labeled 'Create Issue' points to the 'Create an Issue' link in the top right of the event details panel.

Create an Issue

Create an user defined issue based of syslog details.

Issue Name*
Create an Issue Name

Description*
Add description here

Syslog Detail

Severity*
5 - Notice

Facility*
LINEPROTO

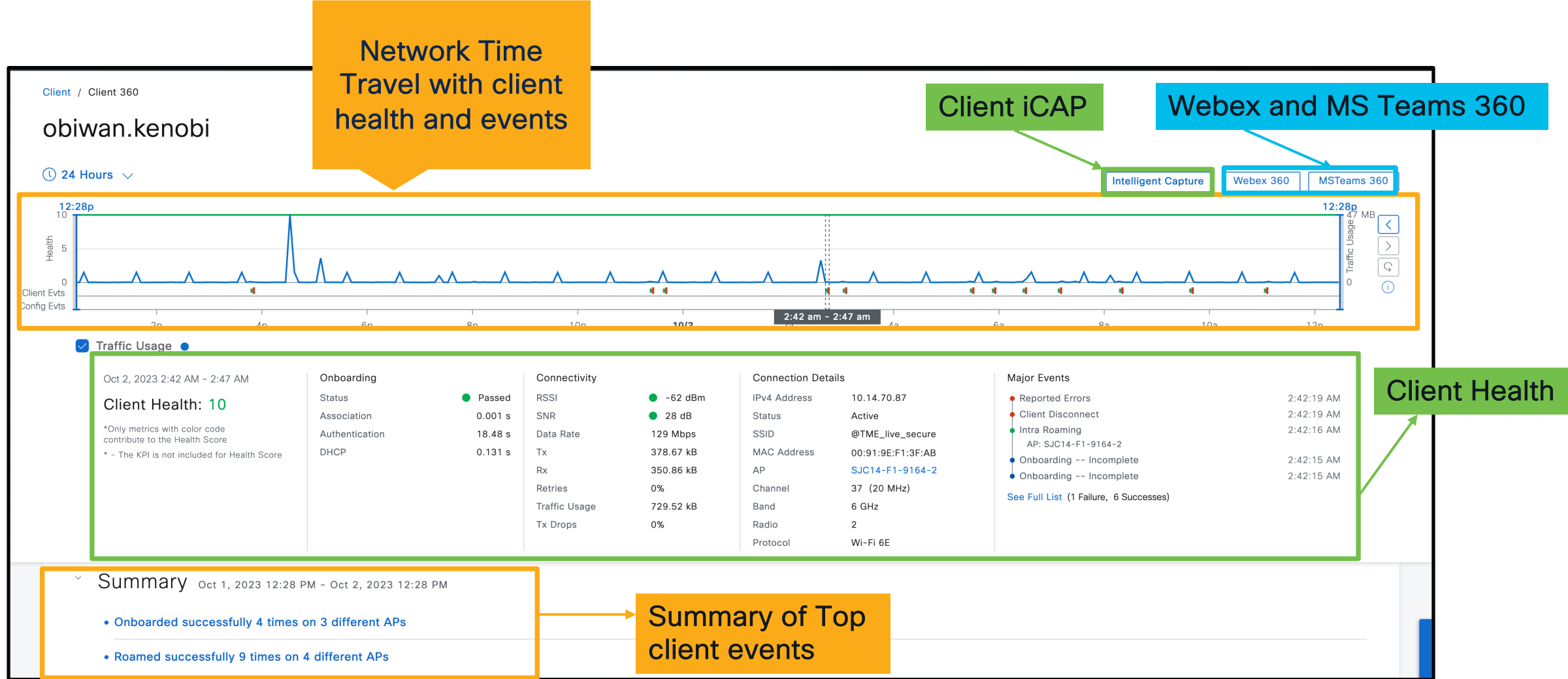
Mnemonic*
UPDOWN

Cancel Next

- ❖ Create User Defined Issues from Syslog's
- ❖ Define the Severity for occurrence of the issue

Use Case 4: Reactive Troubleshooting of Wireless Client Onboarding Issues

Client 360 view

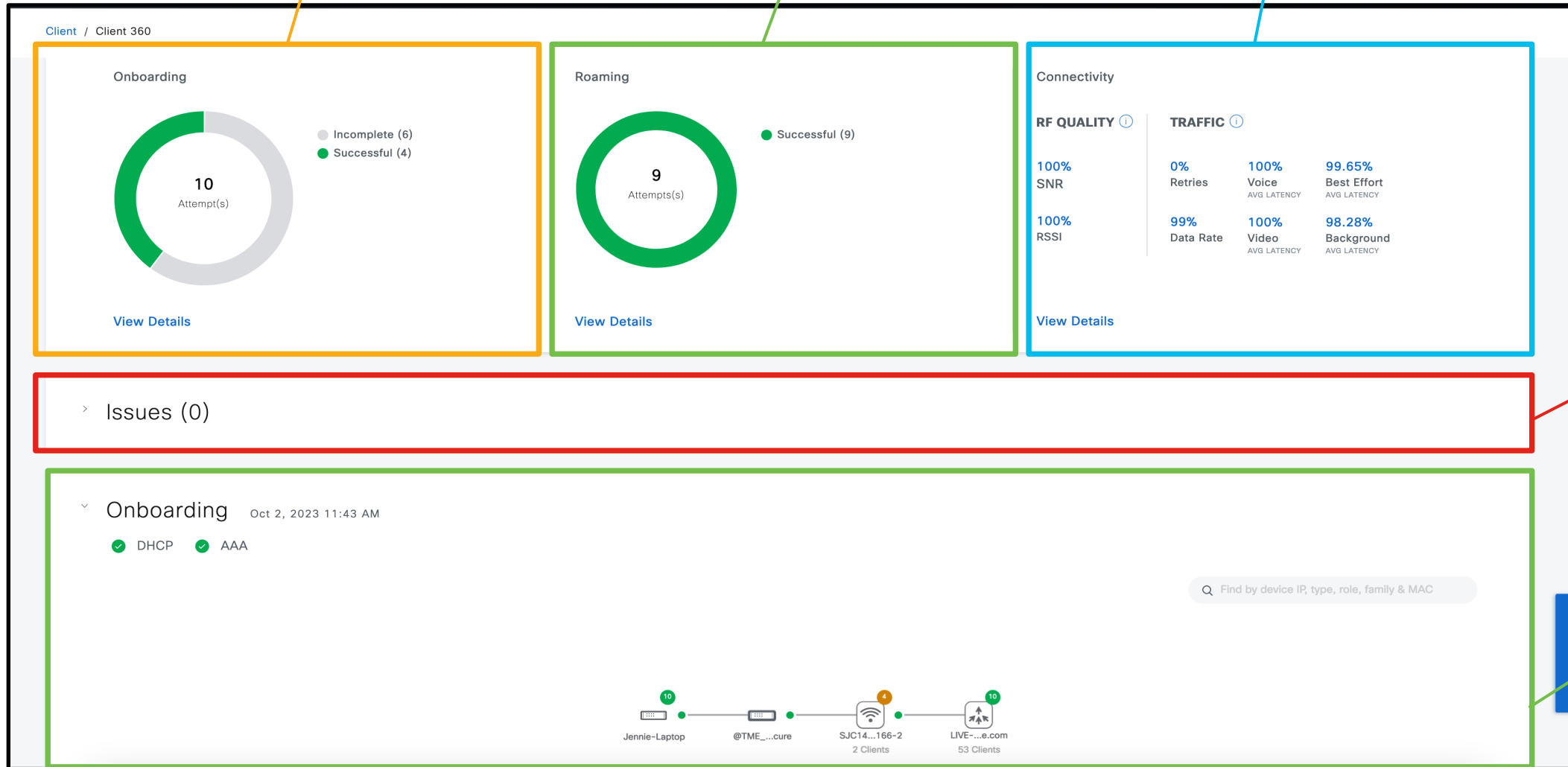


Client 360 view

Client Onboarding Stats

Client Roaming Stats

Client Connectivity Stats



Client Issues

Topology view

Client 360 view

Event Viewer

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

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

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

AP 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

CISCO *Live!*

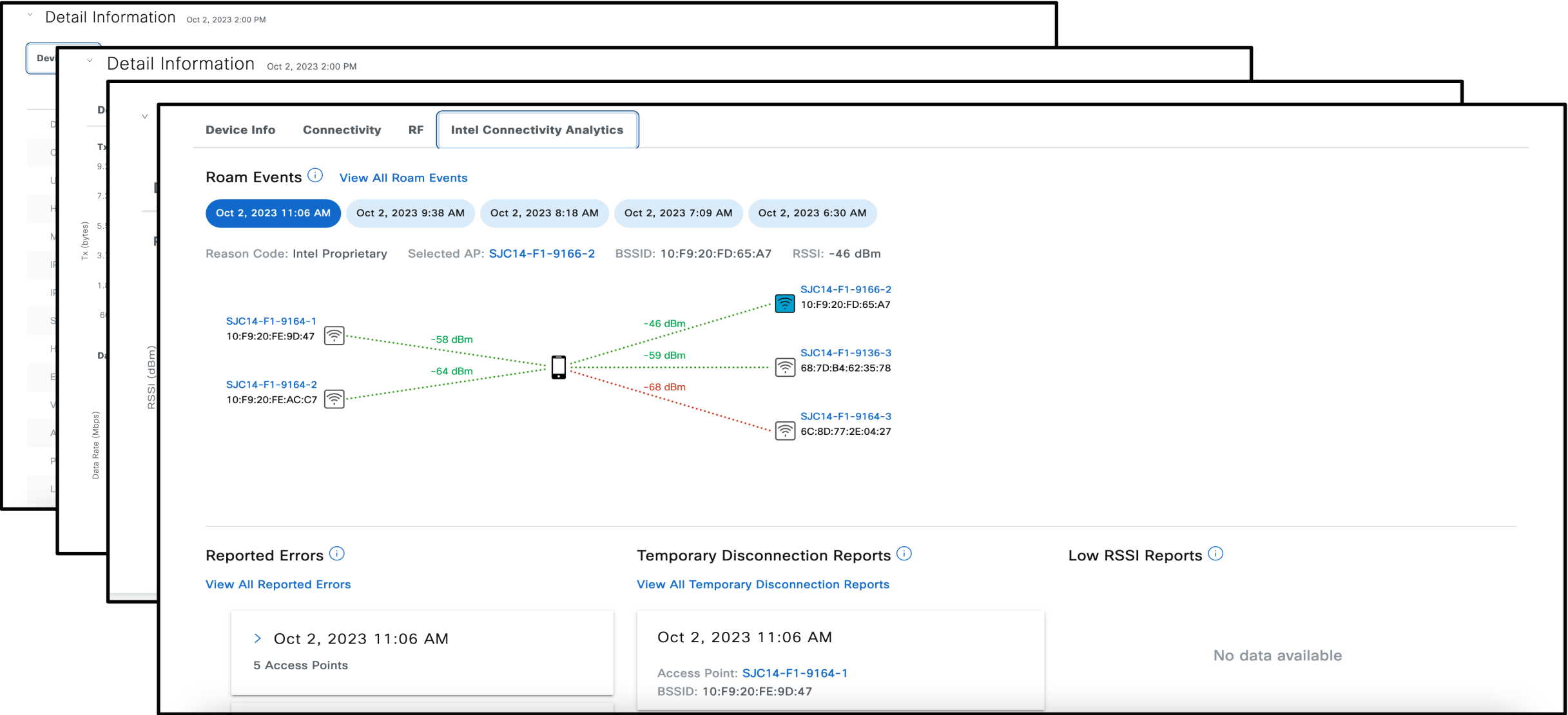
#CiscoLiveAPJC

BRKEWN-1267

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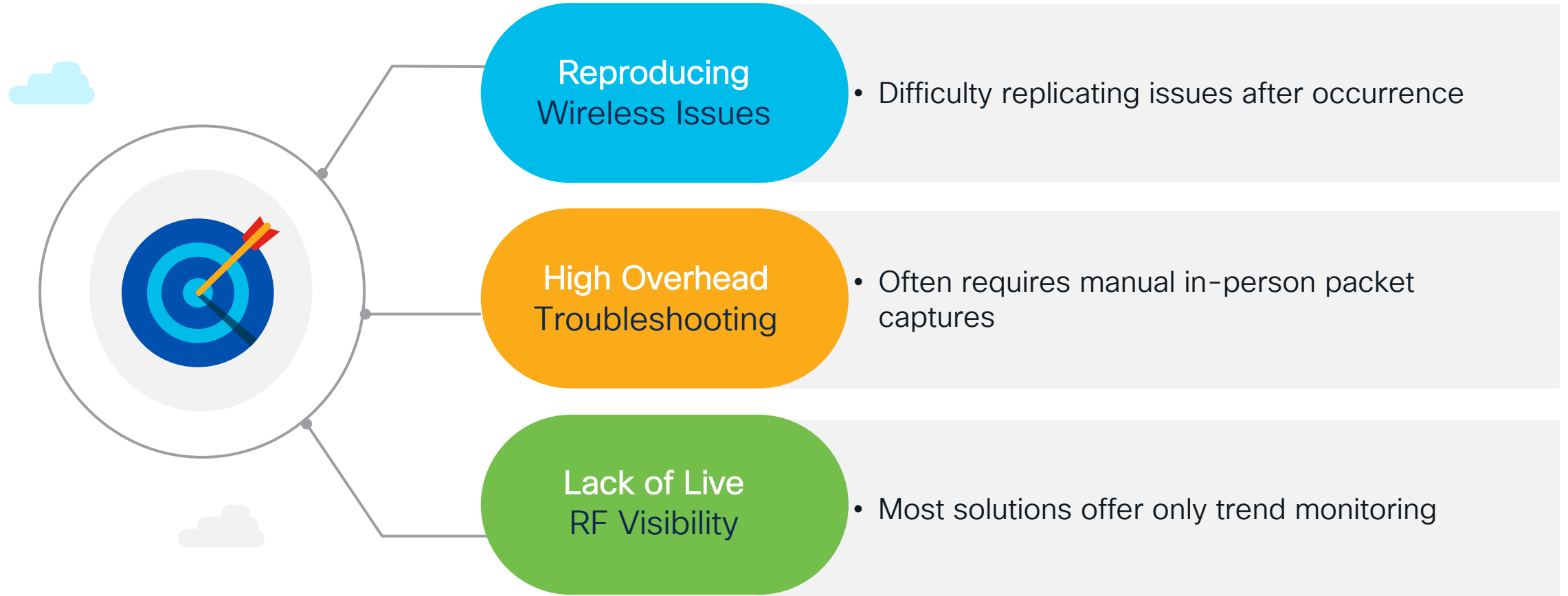
38

Client 360 view



Intelligent Capture

Why?



Intelligent Capture

Client and AP Use Cases



Passive & On-demand
Packet Capture

Real-Time
Client & AP Statistics

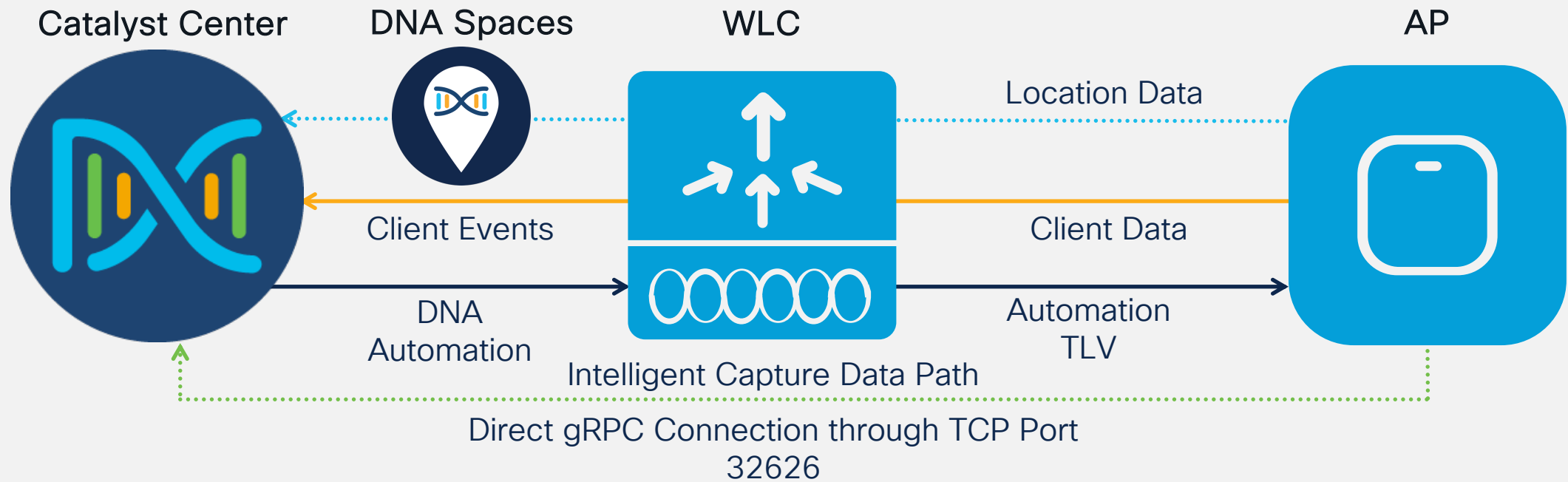
Anomaly Capture

On-Demand
Spectrum Analysis

Over the Air Capture(OTA)

Intelligent Capture Topology

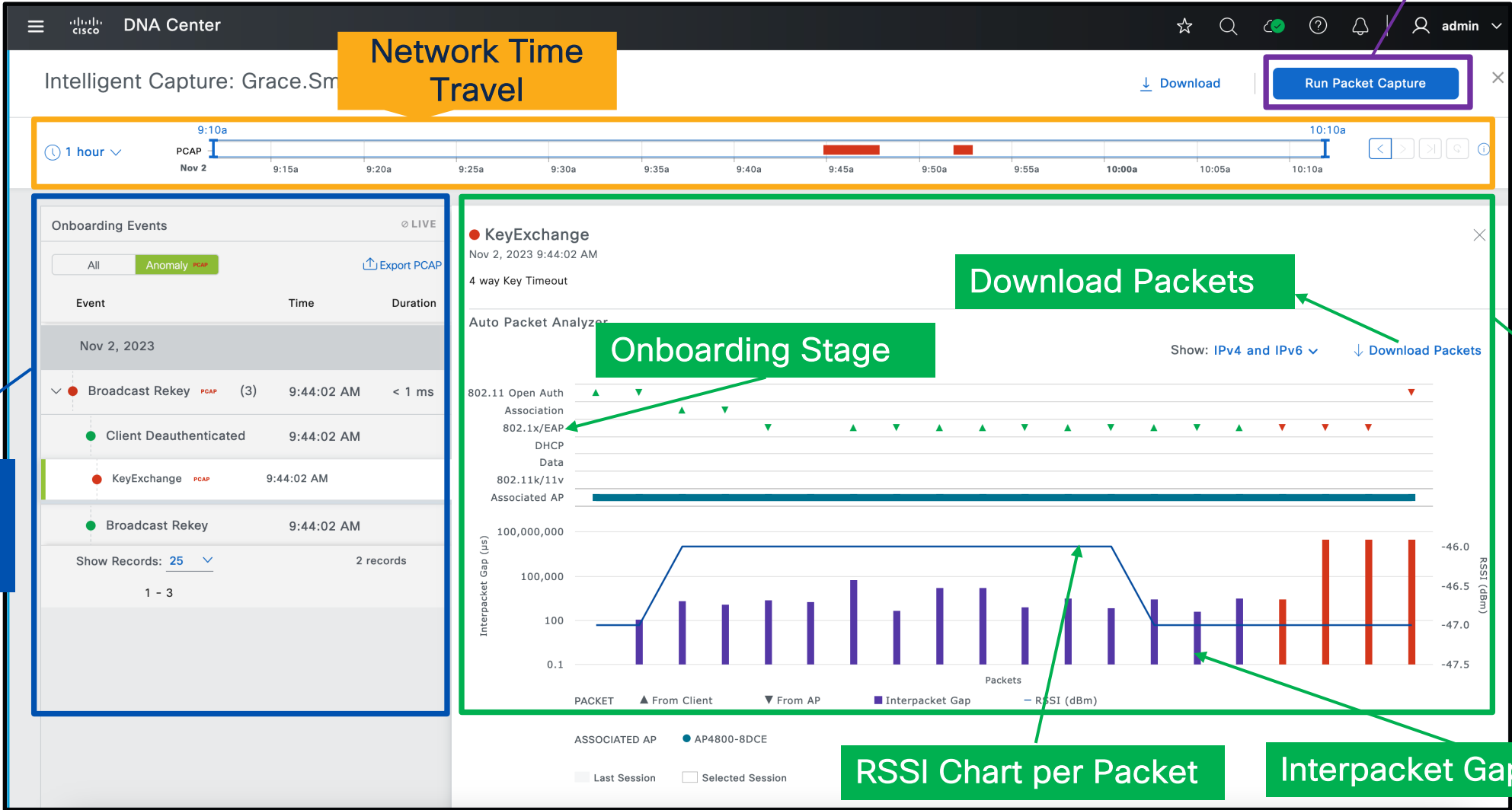
Packet Capture, Statistics and Location



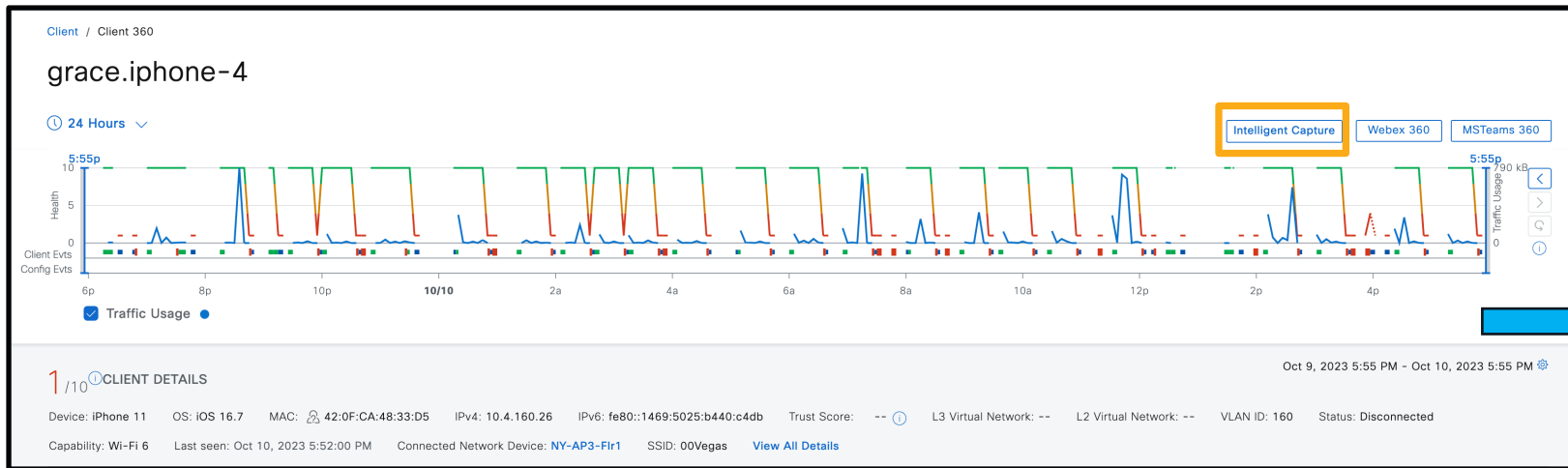
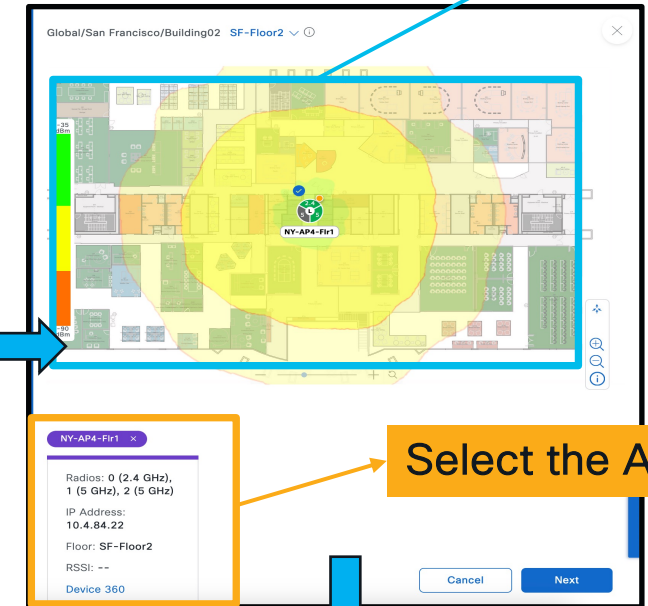
Cisco DNA Spaces is recommended for Location Services; however, CMX can also be used.

Intelligent Capture Client 360

Enable Client Capture



Intelligent Capture Client 360 (OTA Sniffer) AP Floor Map view



- ❖ Can select up to 2 Access Points
- ❖ Map view makes it easy to get neighbor AP details

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

Intelligent Capture AP 360

RF Stats

AP Spectrum Analysis

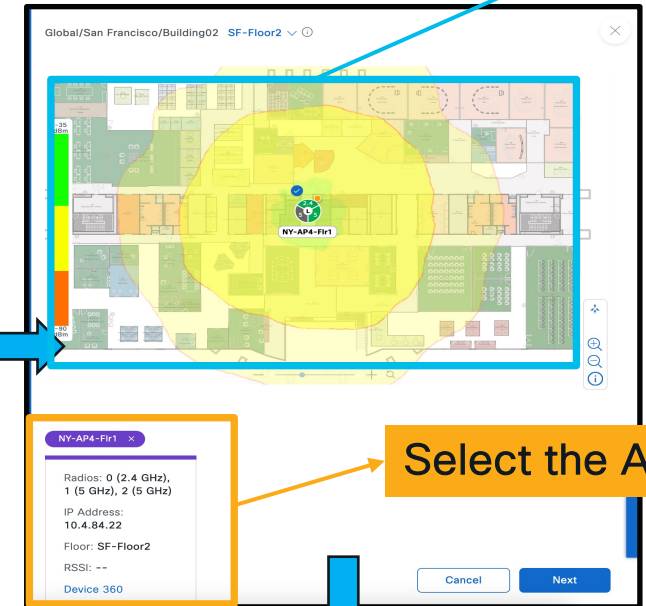
Network
Time Travel



- ❖ Complete AP RF Stats which can be 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)

AP Floor Map view



Select the AP

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

Select AP Radio Parameters

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

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:



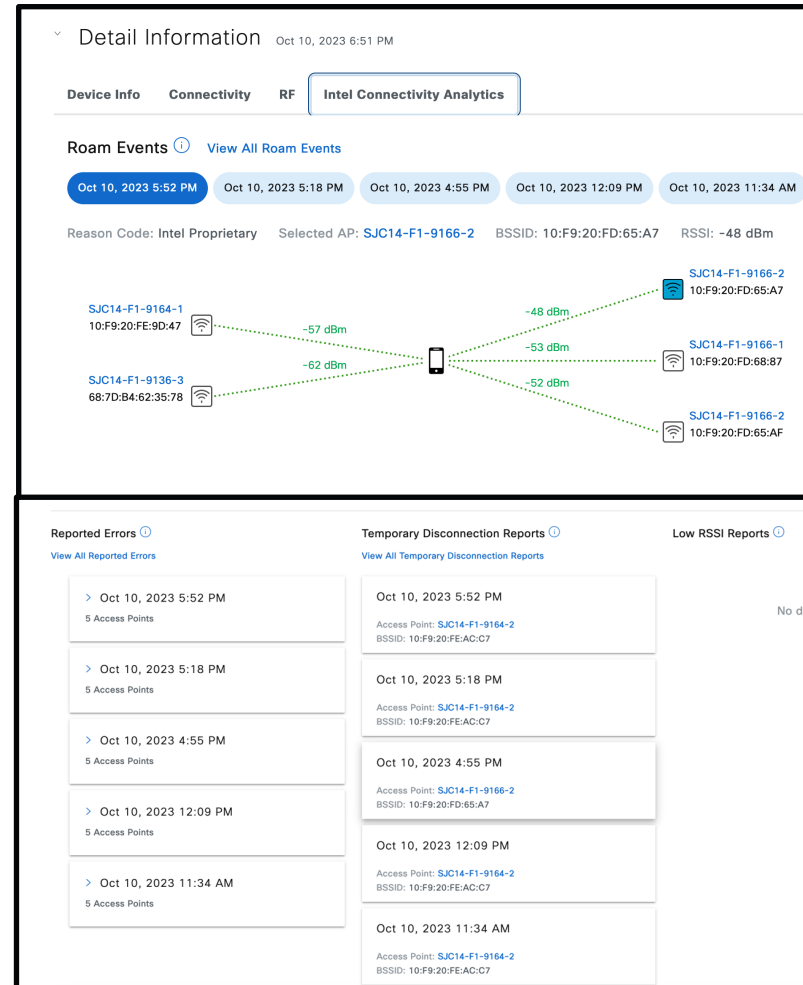
Provides Intel client model, driver version, coverage hole reporting, roaming, power type, etc.



No need for client-side agent to provide data.



Integration with Catalyst Center's client 360.



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

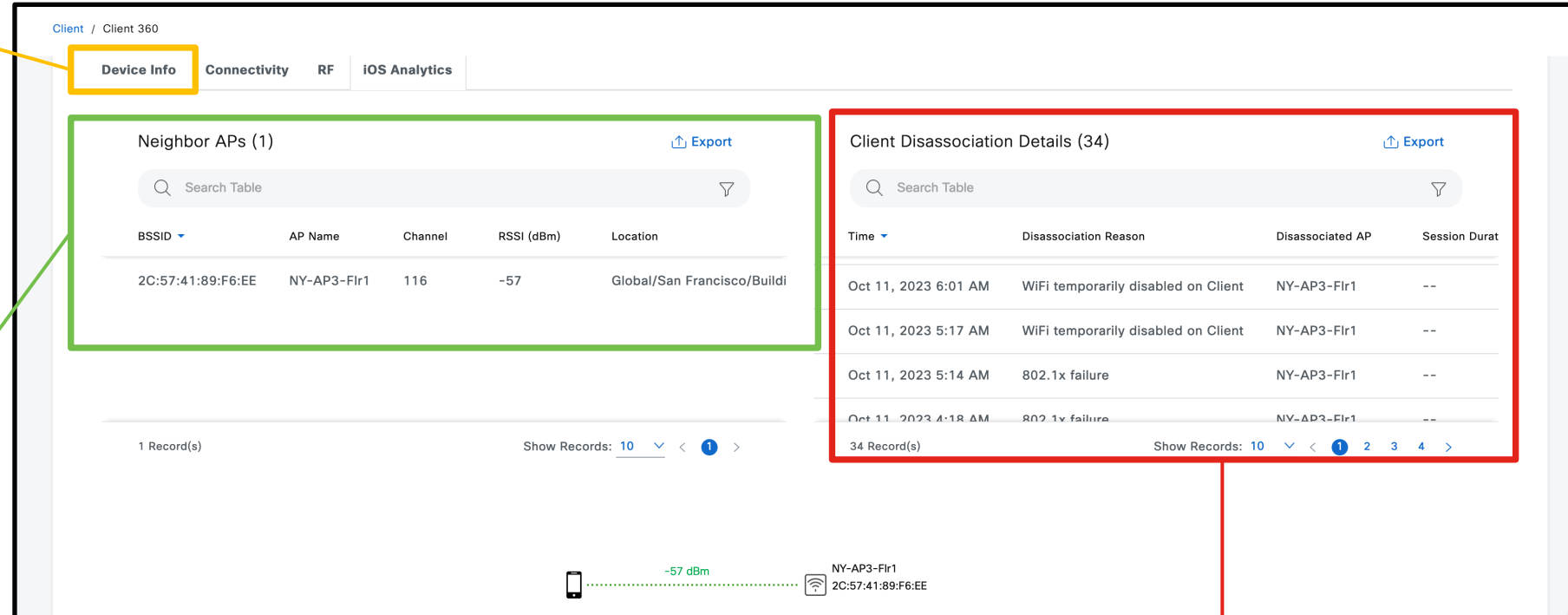
Cisco and Inter Chipset Devices

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 Neighboring Access Points with RSSI information



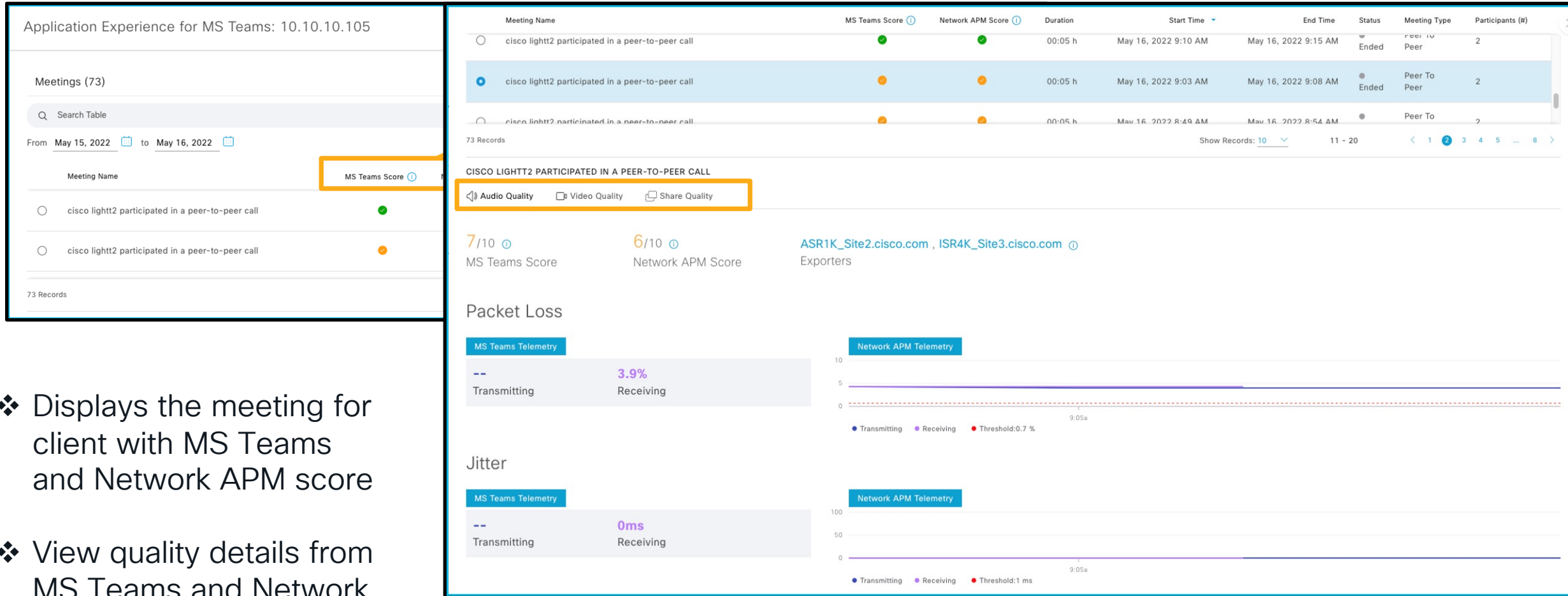
Provide clarity into the reliability of connectivity – client disassociation details

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



- ❖ 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

Application Experience for Webex: Grace.Smith-iPad

Meetings Using This Device in the Past 24 Hours (3)

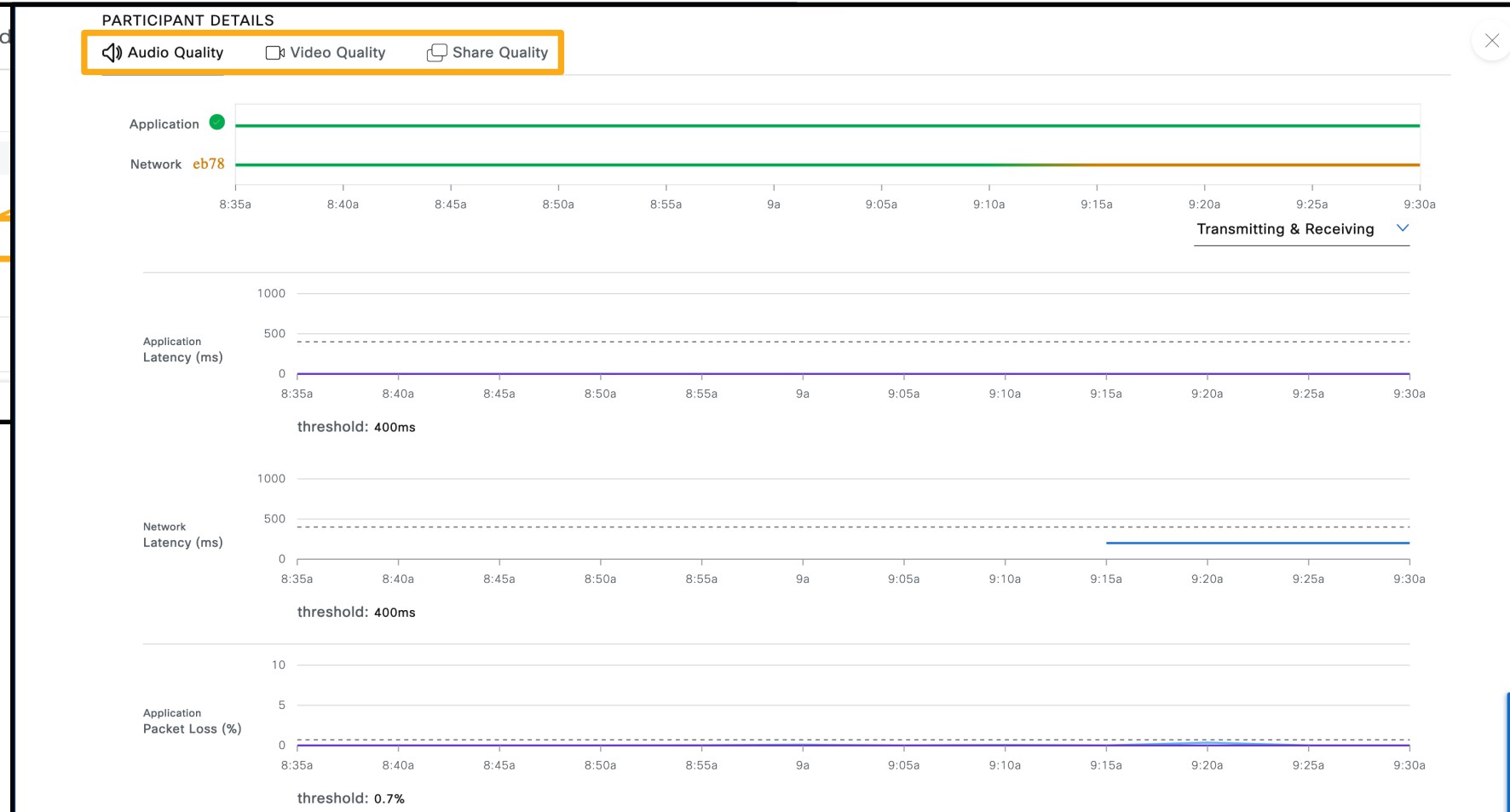
Search Table

From Nov 8, 2023 to Nov 9, 2023

Meeting Name	Application
Grace Smith's Personal Room - Nov 9, 2023 8:35 AM	✓
Grace Smith's Personal Room - Nov 9, 2023 7:40 AM	✓

3 Record(s)

- ❖ 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

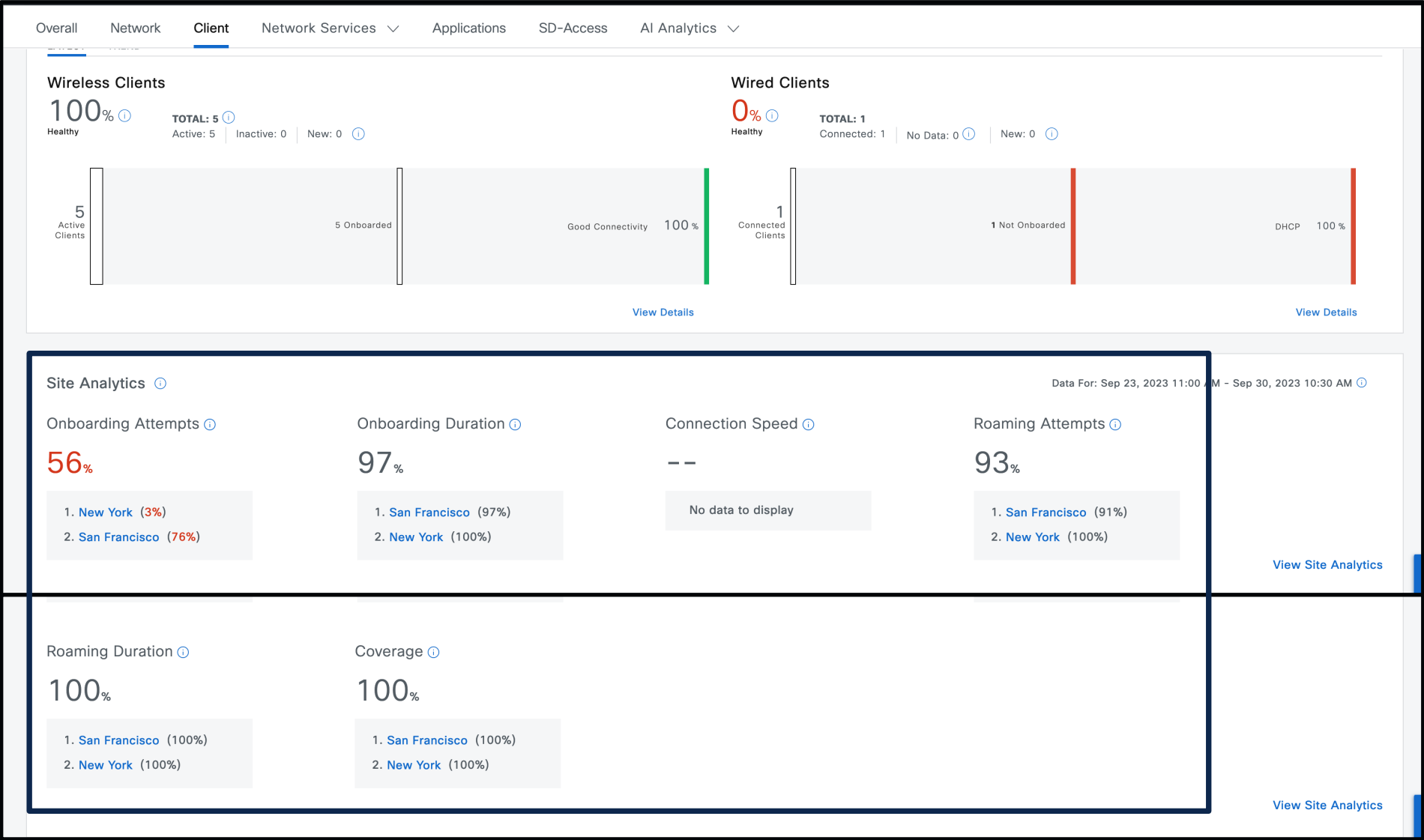


Use Case 5: Proactive Troubleshooting of Wireless Client Onboarding Issues

Site Analytics

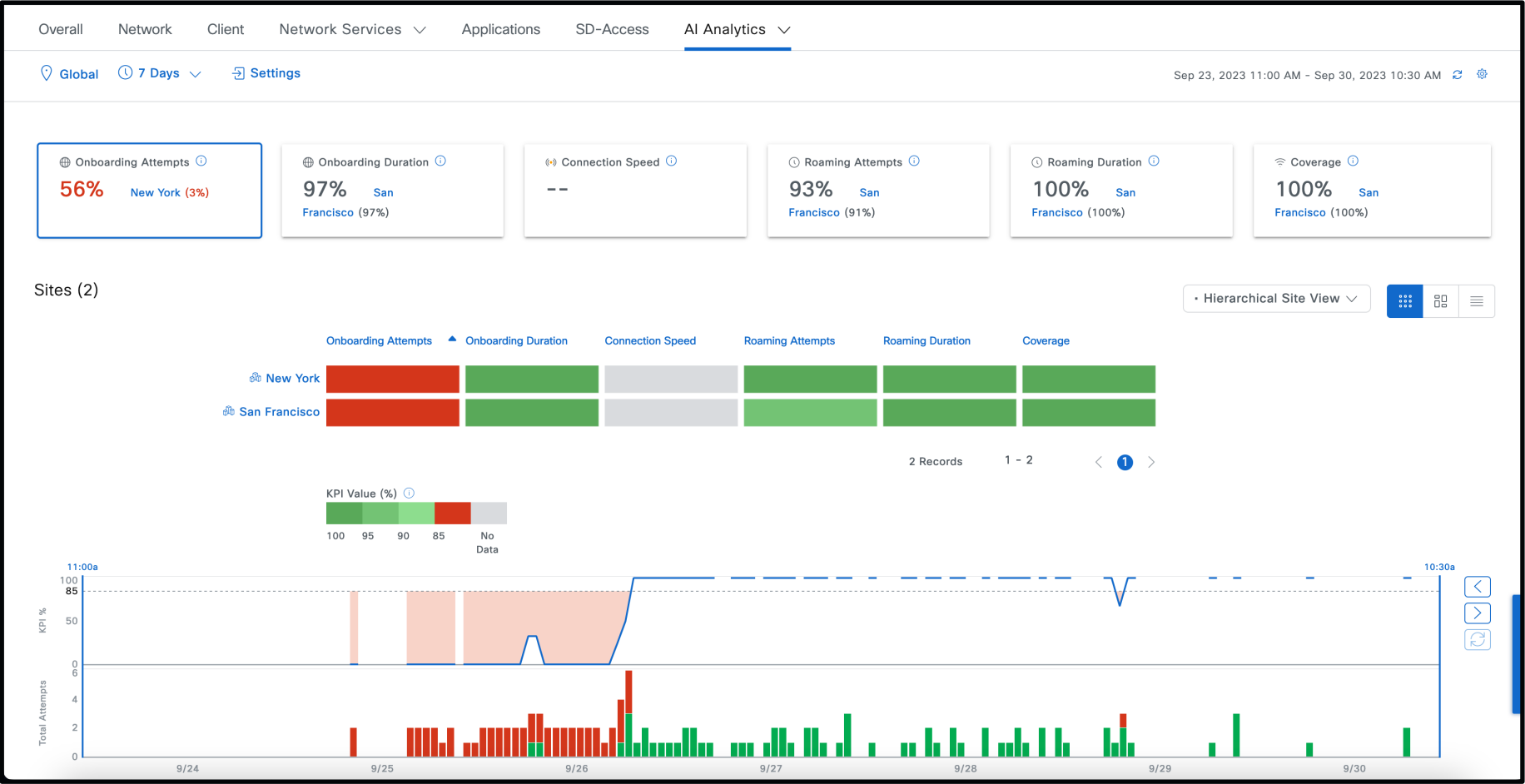


Site Analytics – Client Health Dashboard



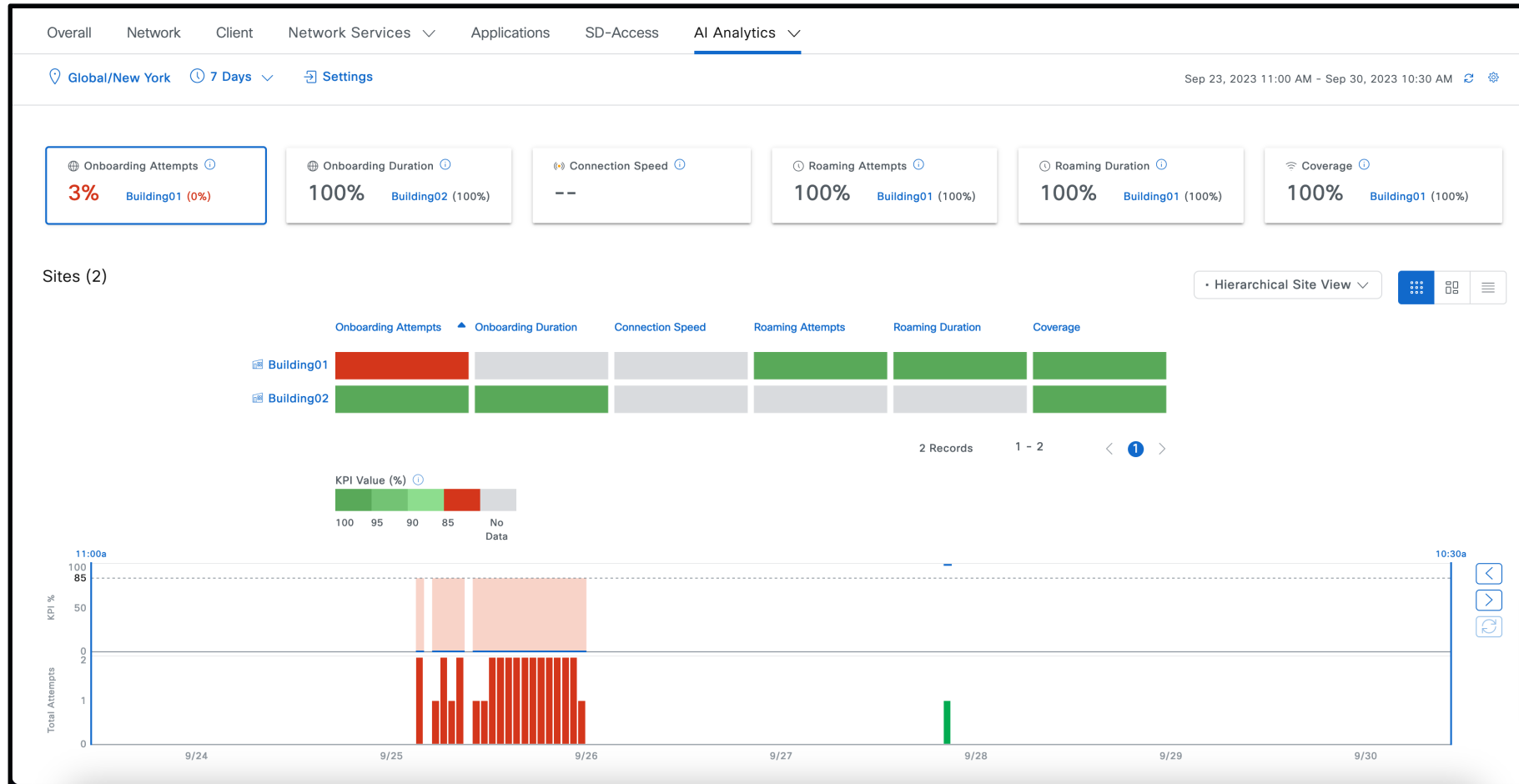
- ❖ Overview of how the sites are doing
- ❖ Which are my worst performing sites?
- ❖ Which site do we need to investigate proactively?

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

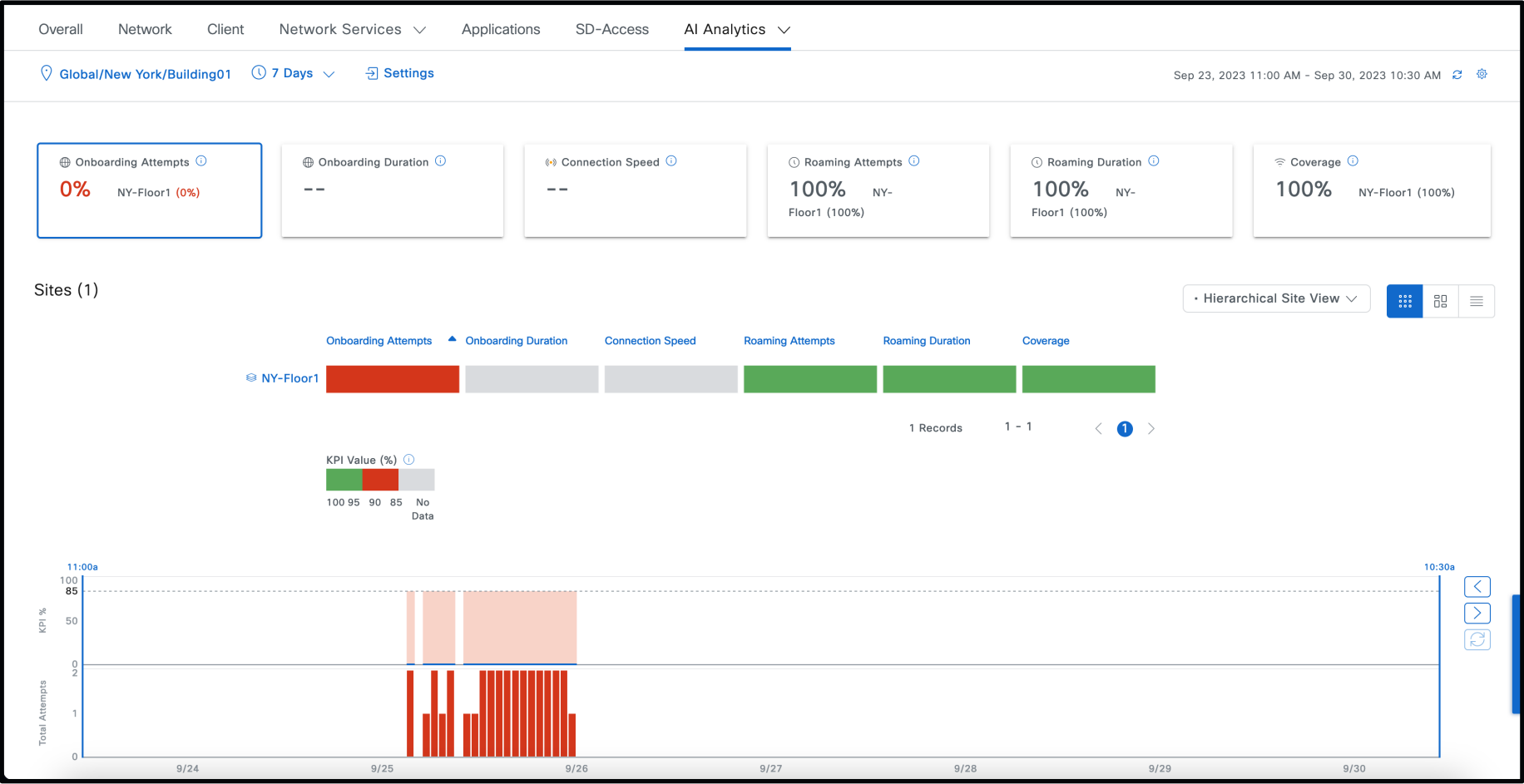
Site Analytics Dashboard - Building



❖ Each KPI can be tracked till floor level to understand which building/floor is contributing to poor performance

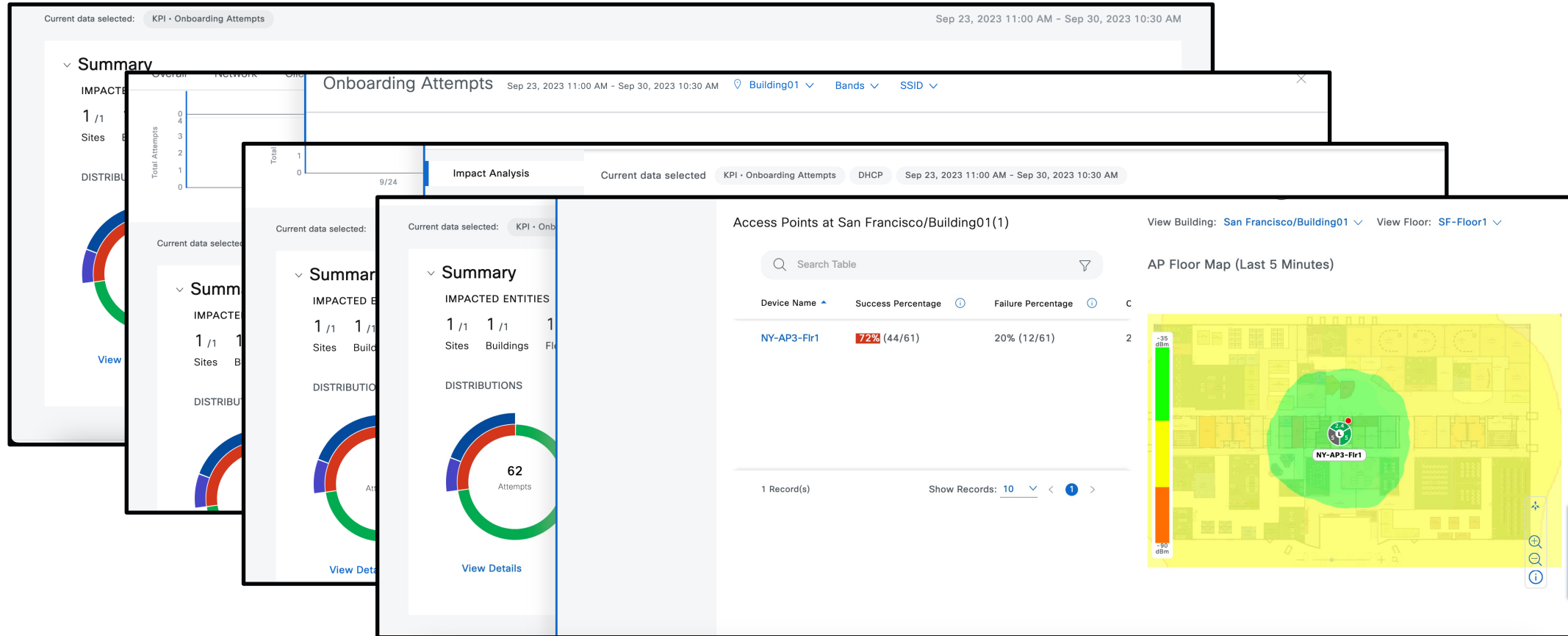
❖ Granular view into the exact time when the issue was seen

Site Analytics Dashboard – Floor



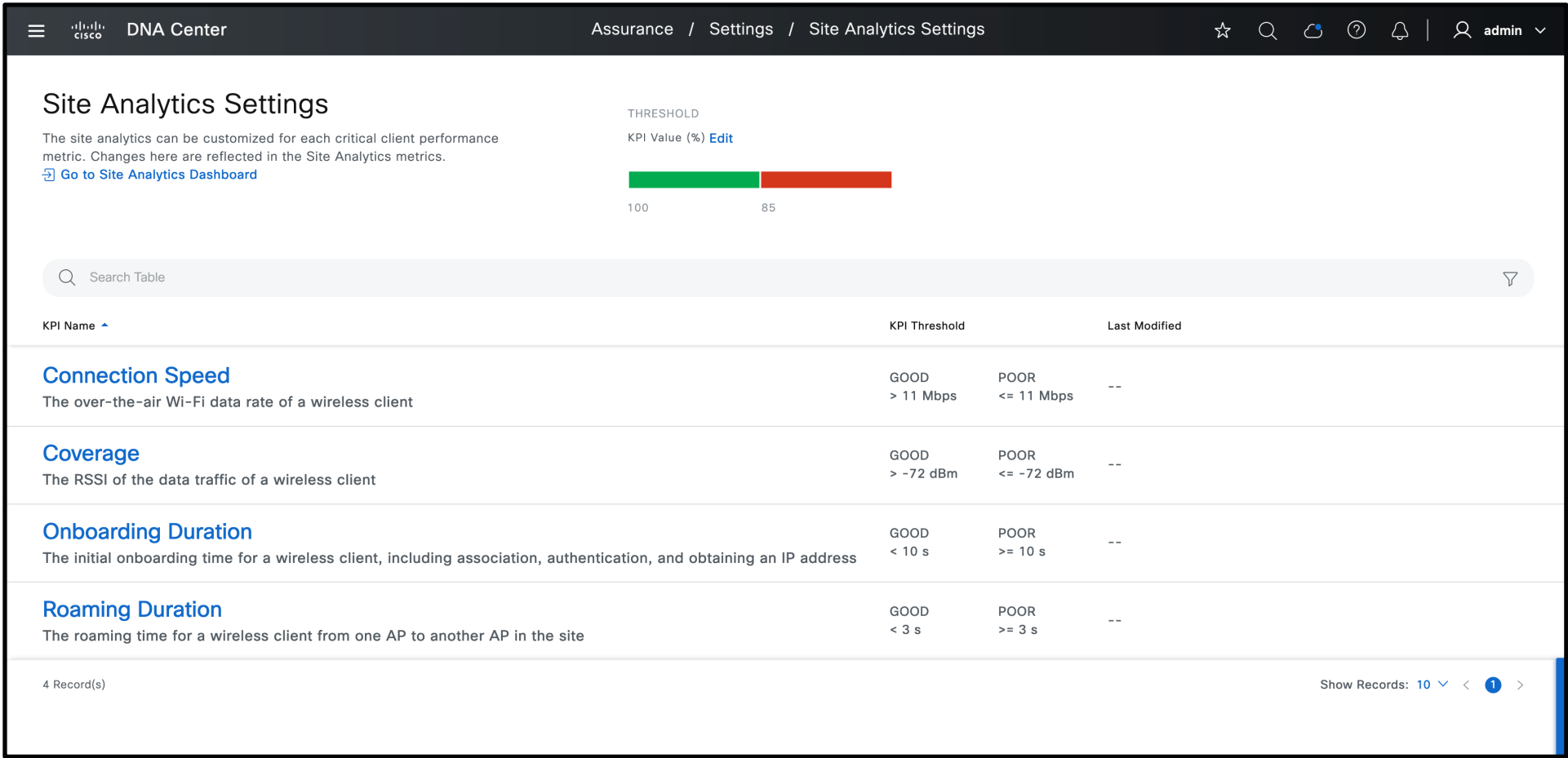
- ❖ Each KPI can be tracked till floor level to understand which building/floor is contributing to poor performance
- ❖ Granular view into the exact time when the issue was seen

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 behavior

Site Analytics - Settings

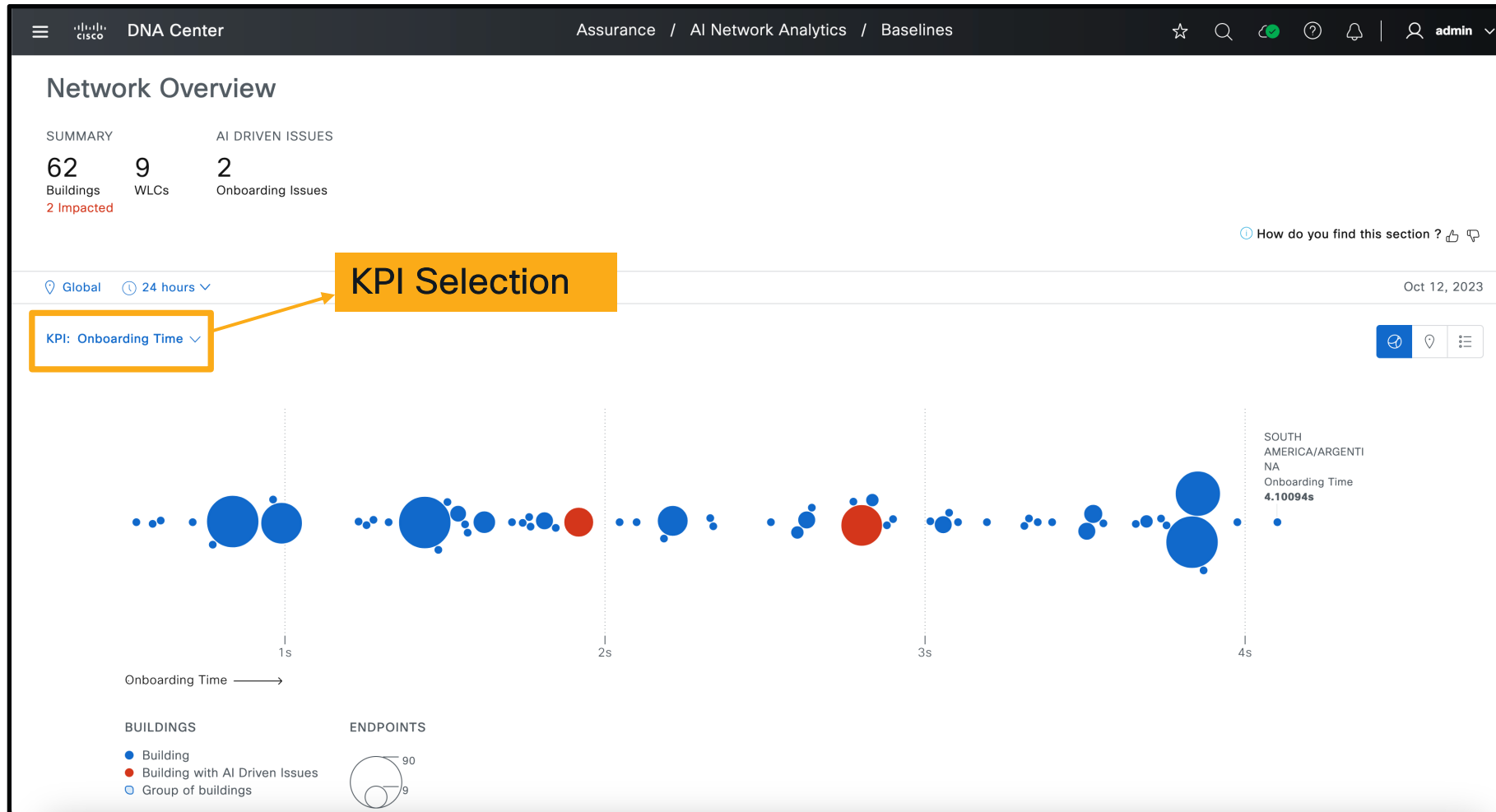


❖ All the KPIs are customizable based on the expected values for a customer network

Baselines

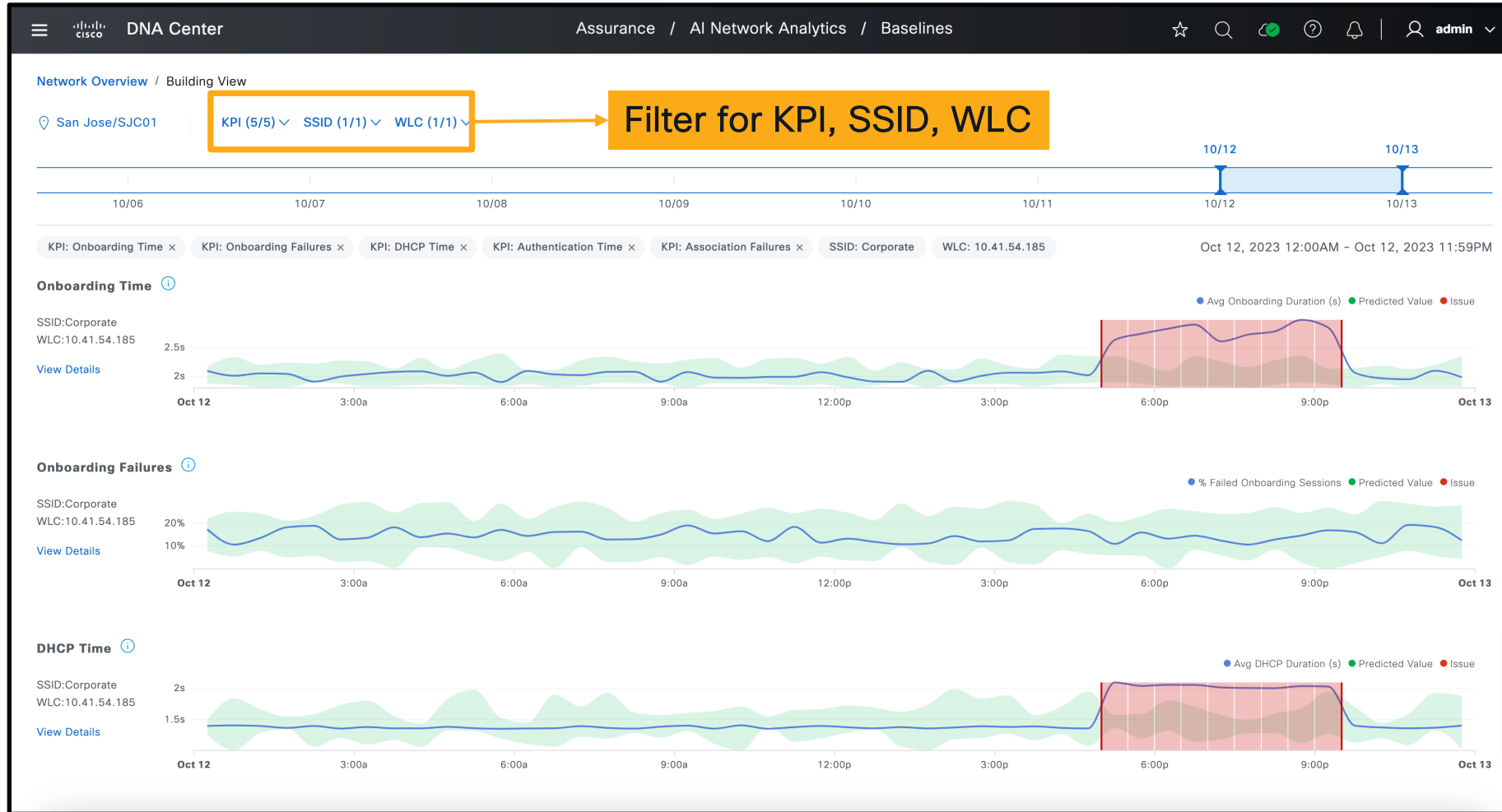


Baselines Dashboard



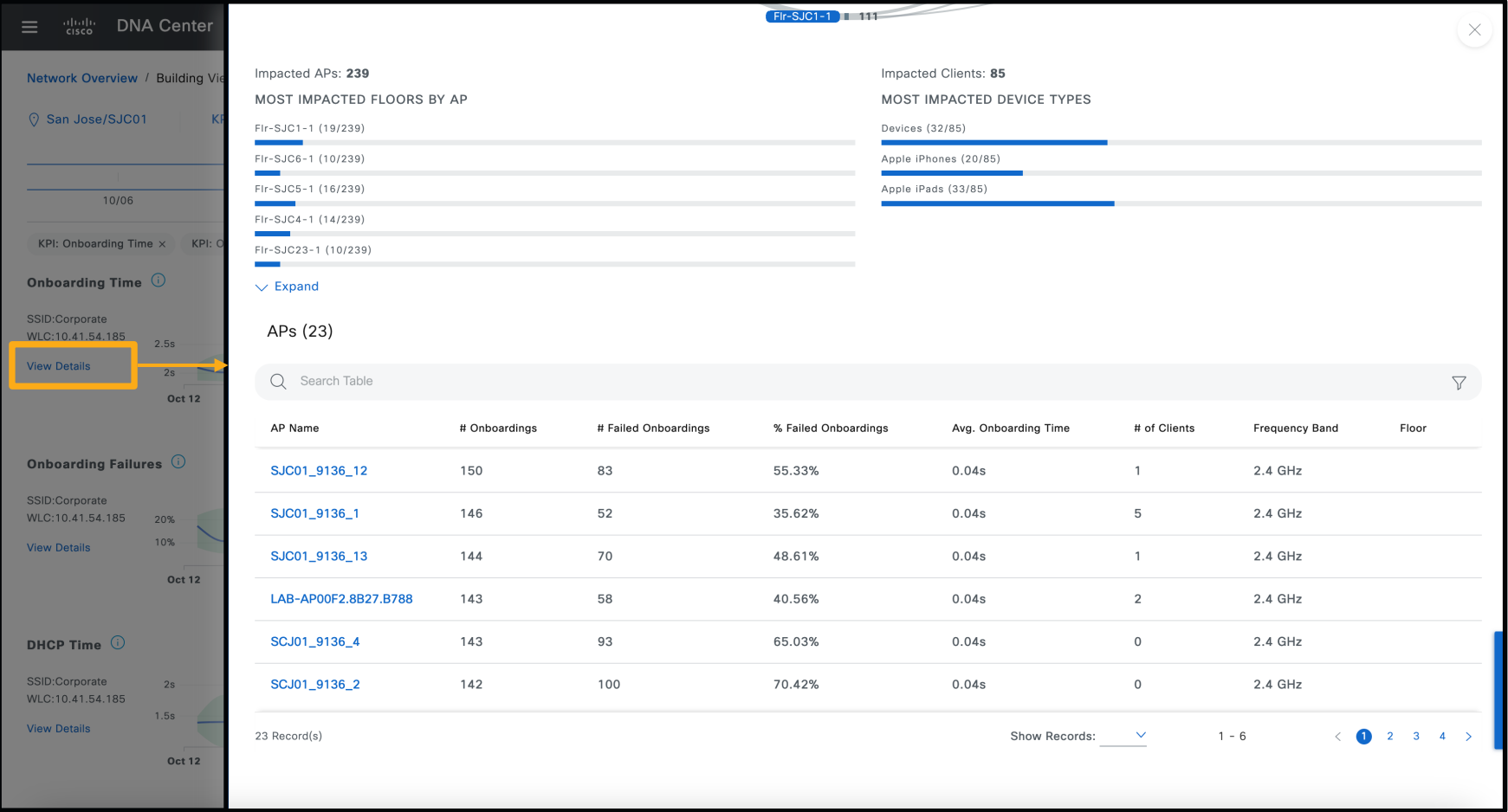
- ❖ Each bubble is a building
- ❖ Size of bubble indicates number of clients
- ❖ Red bubble indicates an AI Issue in that building
- ❖ Click on a building to view the detailed baselines for that building

Baseline for Onboarding KPIs for a Building



- ❖ Green depicts the dynamic threshold predicted by ML
- ❖ Blue depicts the Realtime data
- ❖ The Realtime data for Onboarding Time is greater than the baseline indicating an issue
- ❖ DHCP Time is also seen to be more than the baseline

Baseline Detail for Onboarding Time



- ❖ View Details to give more insights into Onboarding Time
- ❖ View Onboarding Time by Floor and Endpoint Types
- ❖ Impact Analysis
- ❖ AP List

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

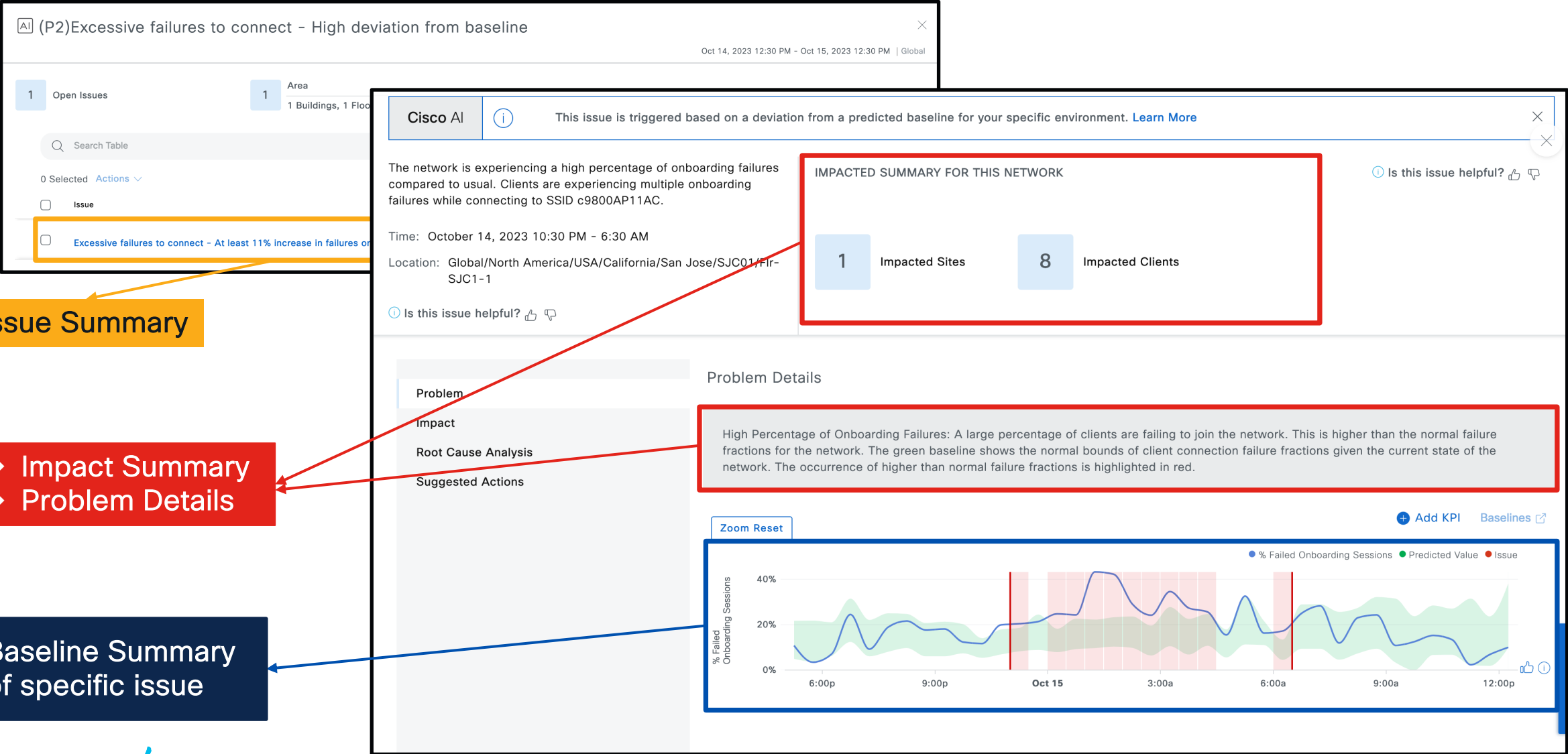
Priority	Issue Type	Device Role	Category	Issue Count	Site Count (Area)	Device Count	Last Occurred Time
P2	Excessive failures to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Apr 10, 2023 2:20 PM
P2	Excessive time to connect - High deviation from baseline	WIRELESS	Onboarding	1	1	1	Apr 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)

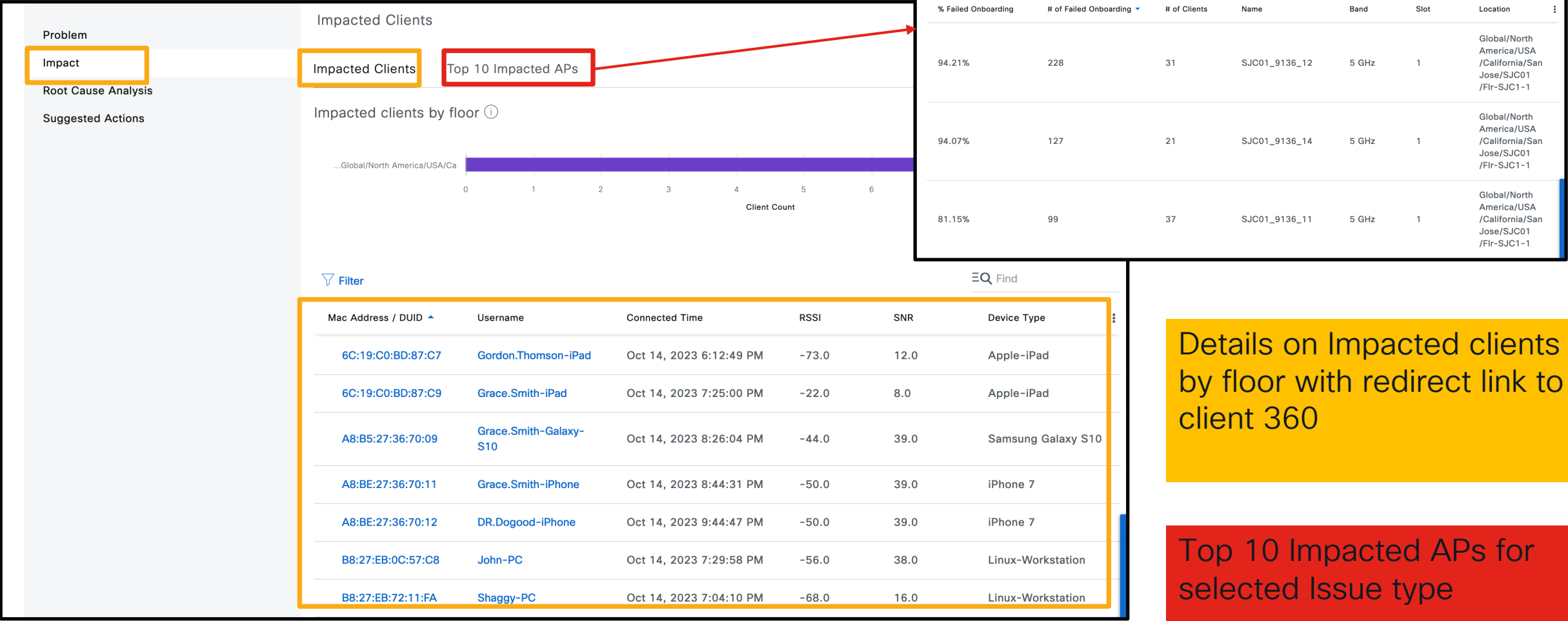
Show Records: 10 < 1 >

- ❖ 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

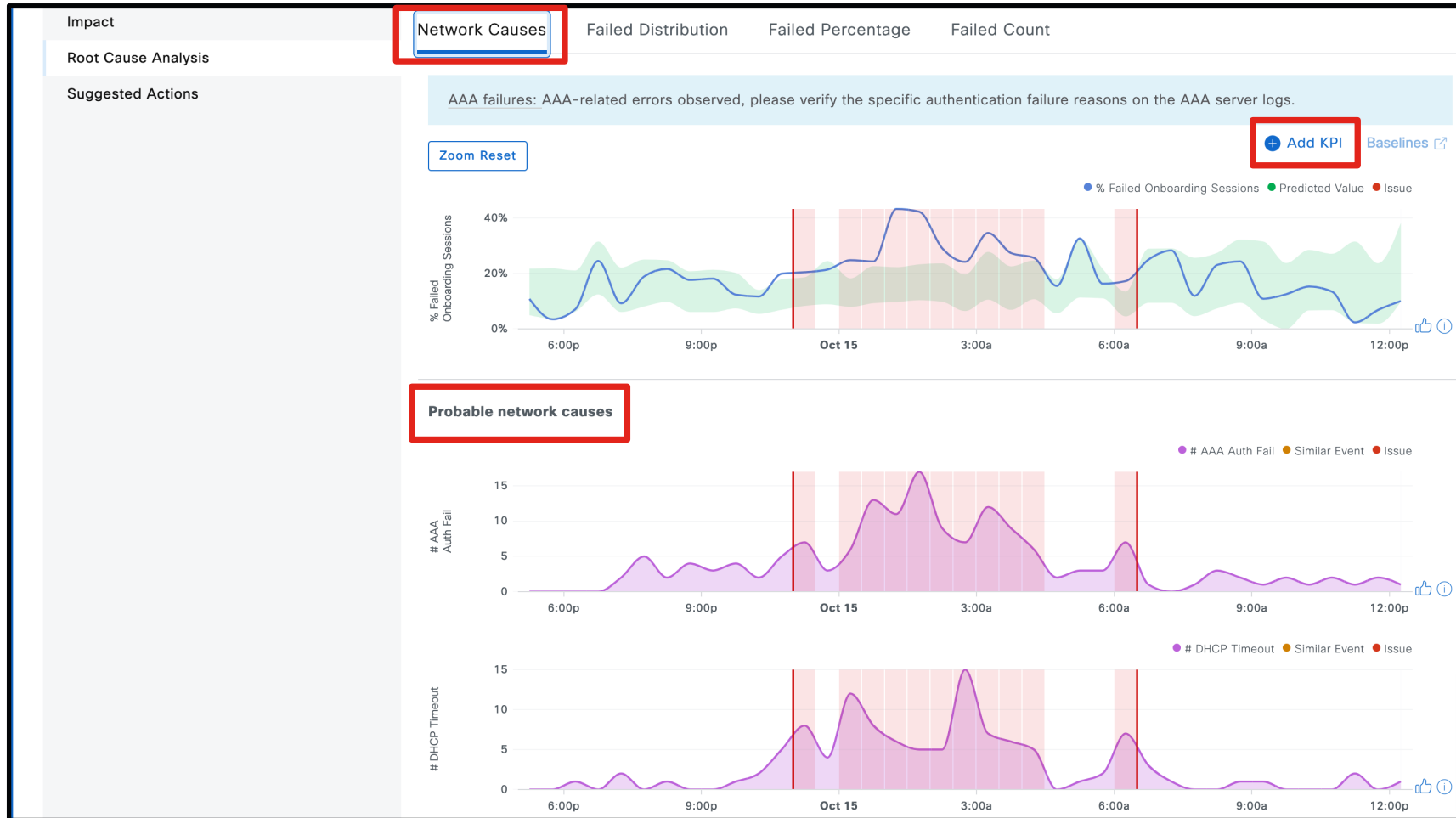
Find

% 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

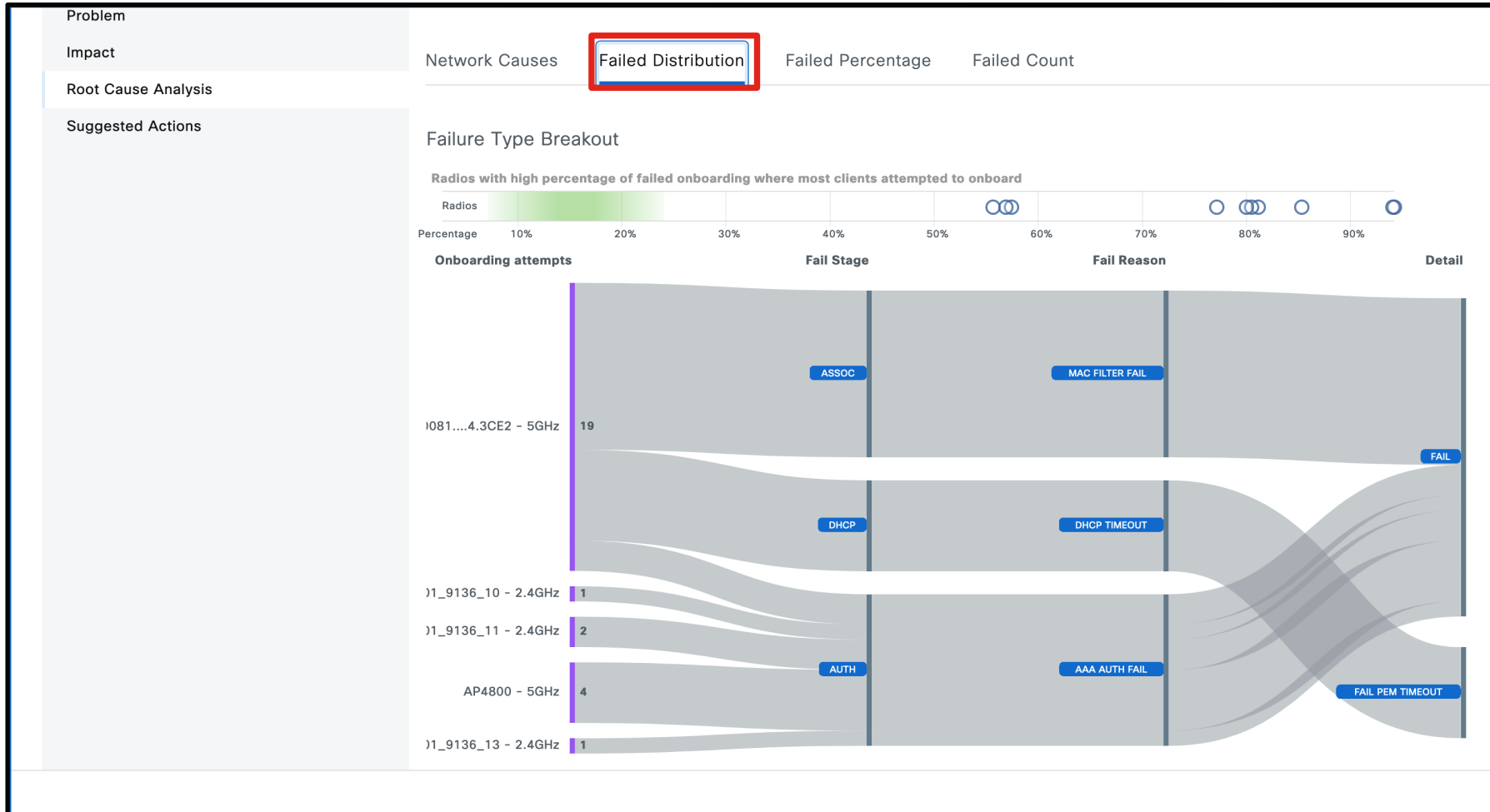
Top 10 Impacted APs for selected Issue type

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

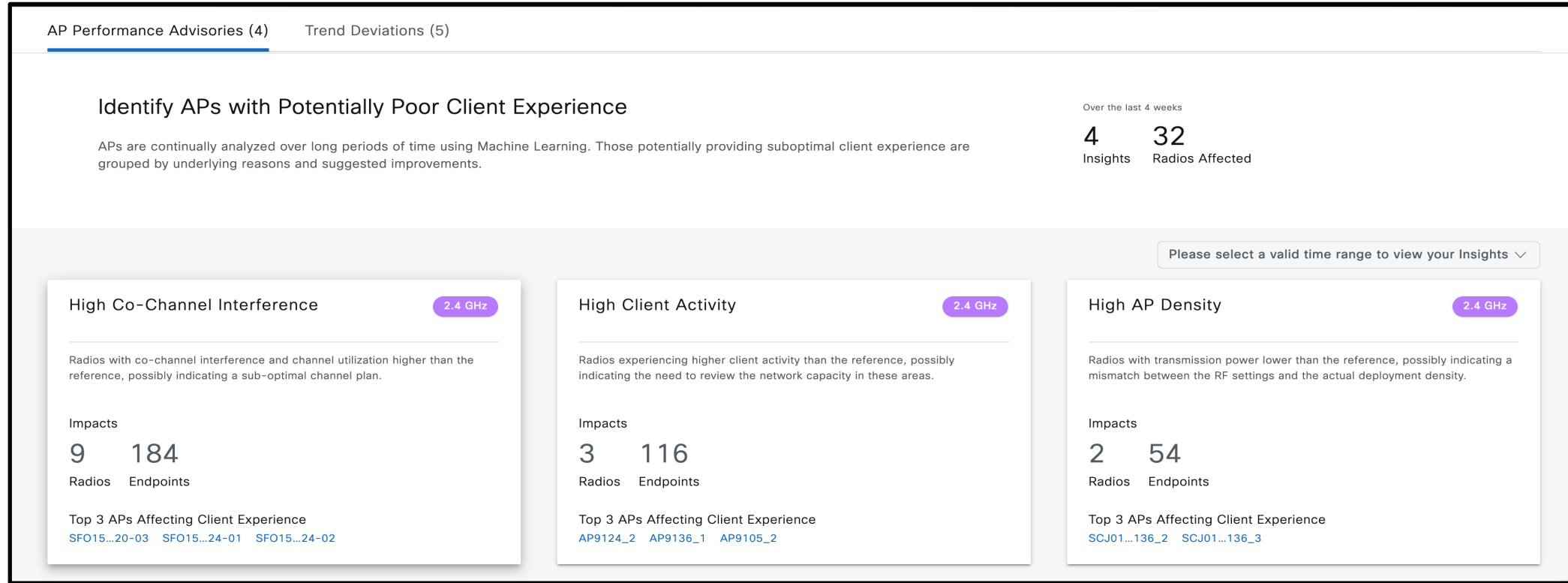
AI-Driven Issues – Suggested Actions

The screenshot displays the Cisco AI-driven issues dashboard. On the left, a sidebar shows 'Most Impacted Areas by Location' with 'San Jose' selected, indicating 0 P1 and 12 Open issues. Below this, a 'Total Open: 25' summary and a 'Search Table' input are visible. A table lists various issues with columns for Priority and Issue Type. The main content area features a 'Cisco AI' header with a note: 'This issue is triggered based on a deviation from a predicted baseline for your specific environment. [Learn More](#)'. The primary issue 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 includes a time range of 'October 14, 2023 10:30 PM - 6:30 AM' and a location of 'Global/North America/USA/California/San Jose/SJC01/Flr-SJC1-1'. An 'IMPACTED SUMMARY FOR THIS NETWORK' shows '1 Impacted Sites' and '8 Impacted Clients'. A 'Suggested Actions' section lists several categories: 'AAA failures', 'DHCP Verification' (with sub-points: 'Verify that DHCP server is responsive', 'Verify that DHCP clients are responsive'), 'AAA Verification' (with sub-point: 'Verify the load on AAA server'), 'CPU and Memory Usage' (with sub-point: 'Verify the CPU and memory load on the WLC'), and 'RF Conditions' (with sub-point: 'Verify the RF conditions at clients location').

❖ Areas to look into for remediating the Issue

Use Case 6: Proactive Identification of APs with Poor Client Experience

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

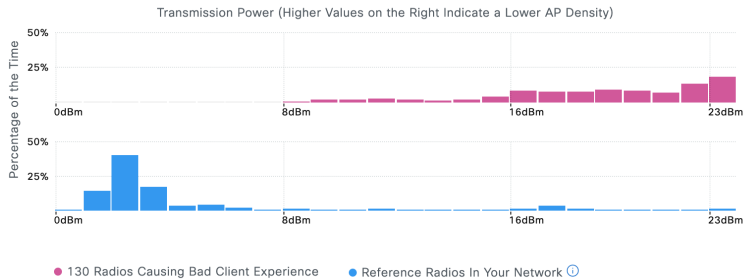
Buildings

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

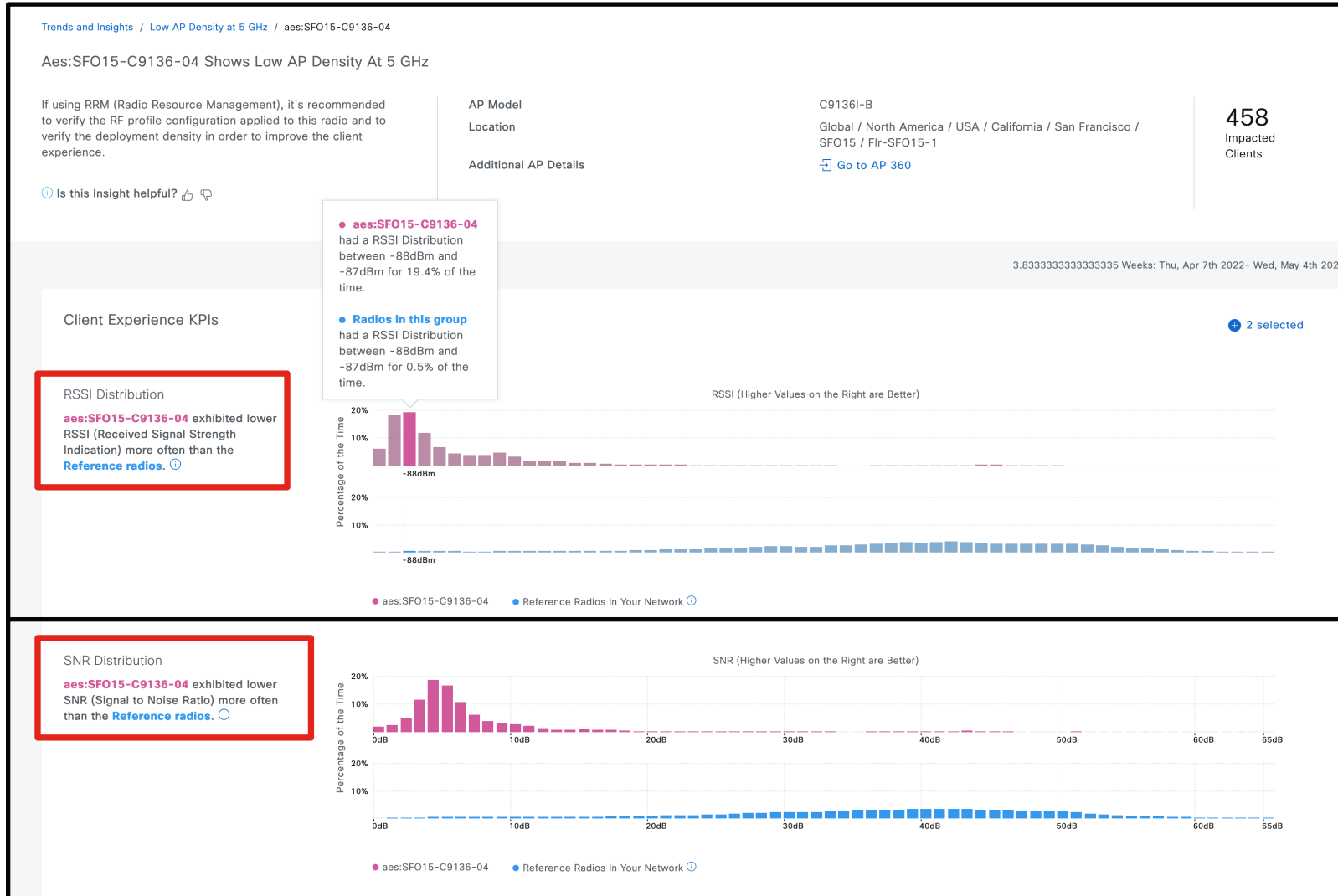
18 Record(s)

Show Records: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#)

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

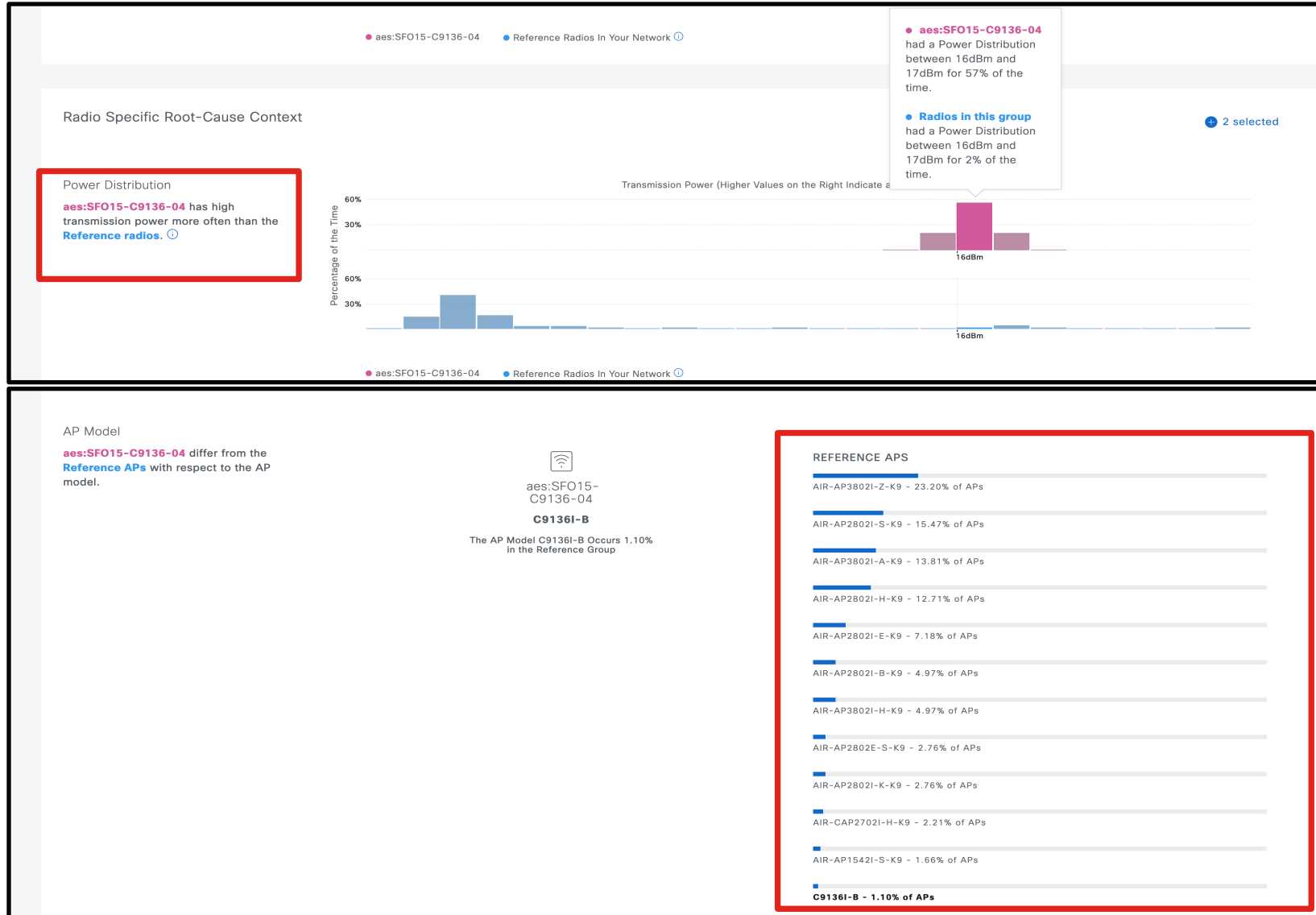
AP Performance Advisories – Low AP Density 5 GHz



❖ 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

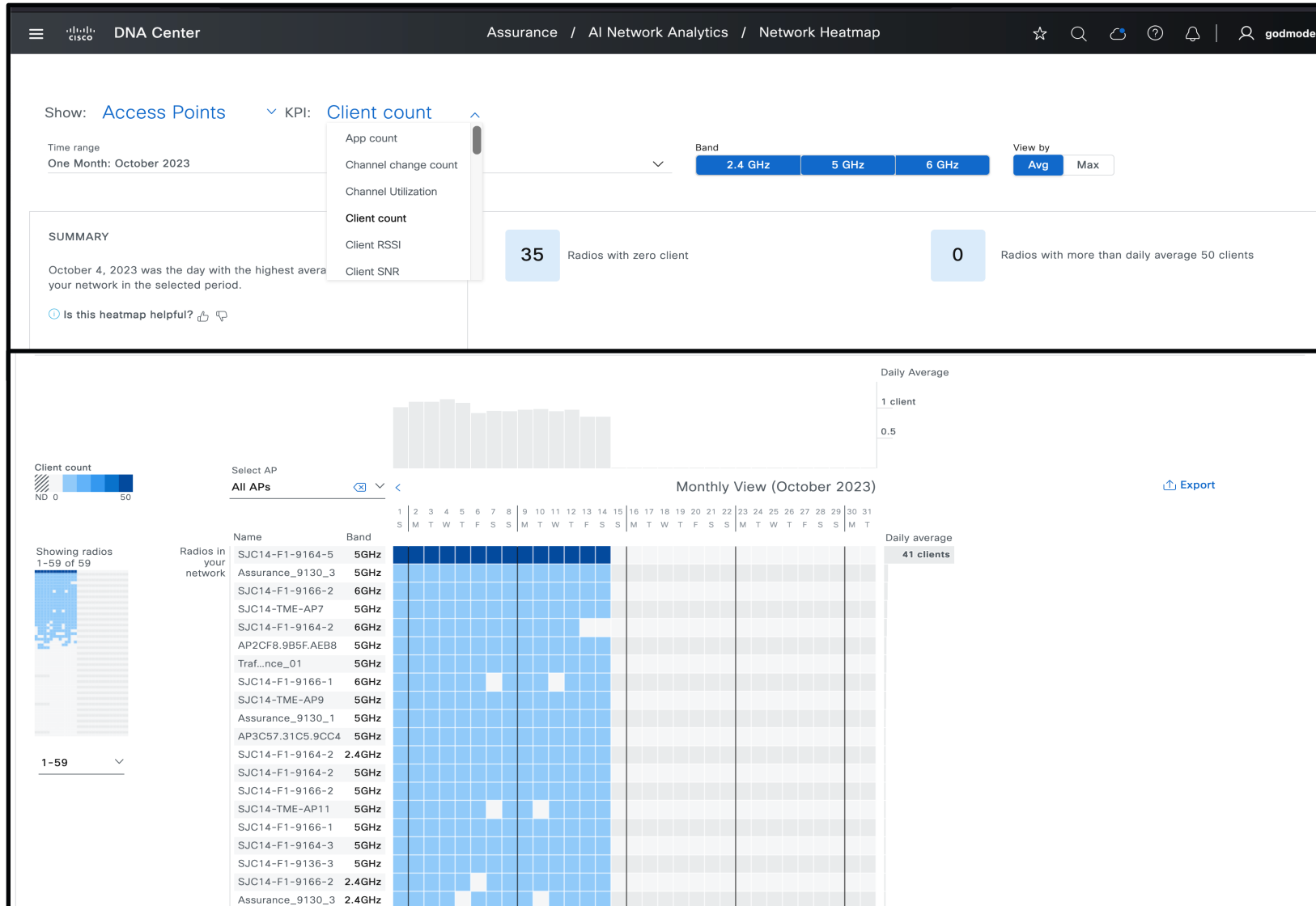
AP Performance Advisories – Low AP Density 5 GHz



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

❖ What are the Reference APs?

Network Heatmap



- ❖ Can I compare the problem APs with the reference APs?
- ❖ Network Heatmap for All APs over a month using custom selectable, interested KPI
- ❖ Sort by Building, Bands
- ❖ Can be broken down to daily view as well

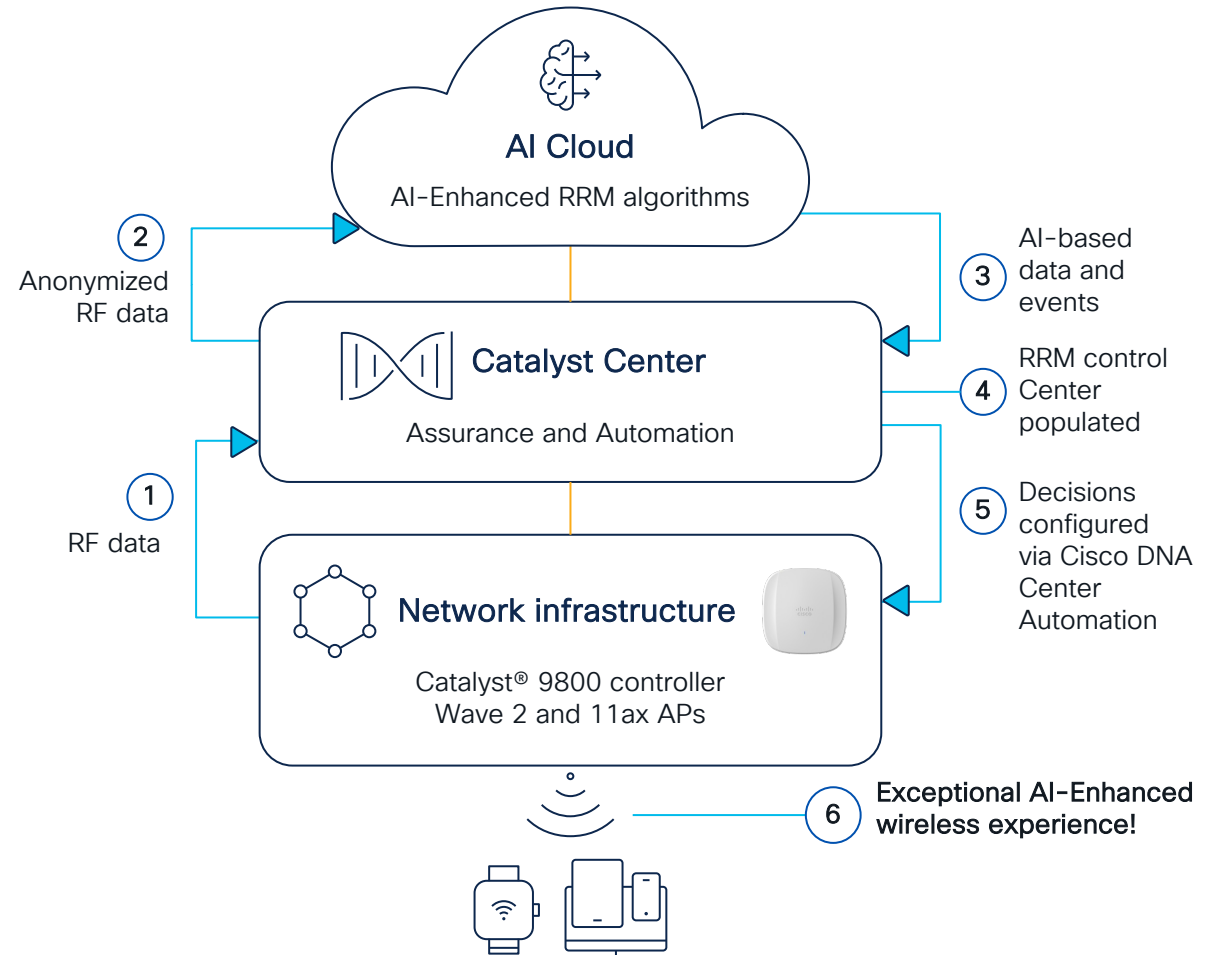
Use Case 7: RF Optimization for Different kinds of Deployment using AI-Enhanced RRM

AI-Enhanced RRM architecture and data flow

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

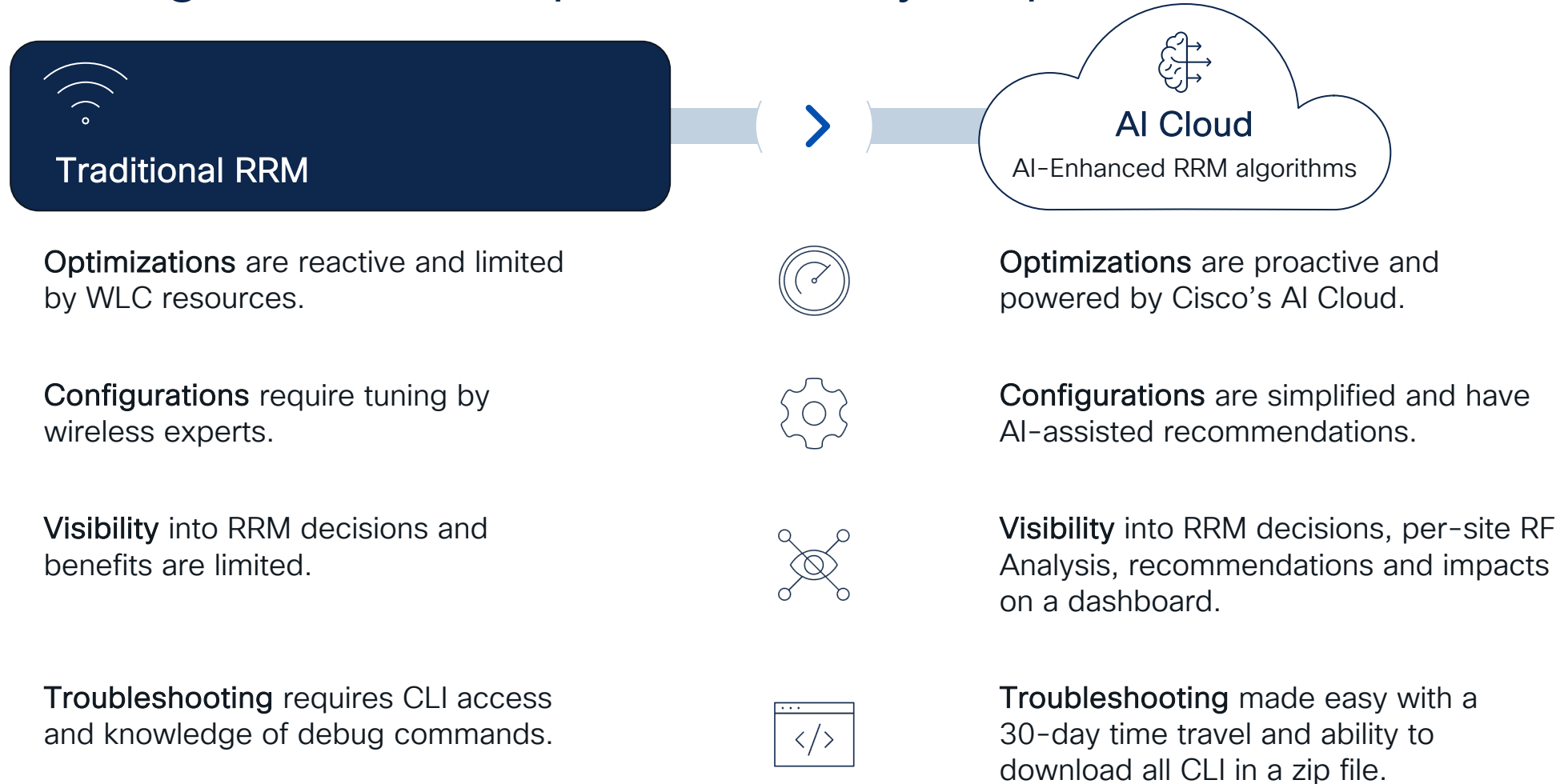
AI processes 2 weeks of RF data to discover patterns.

Proactive optimizations make Wi-Fi exceptional.



AI-Enhanced RRM is much better than traditional RRM

Easy Configuration, Complete Visibility, Improved Serviceability



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. The left sidebar has a search bar with 'AI' and a dropdown for 'External Services'. The main content area is titled 'Cisco AI Analytics' and contains several sections: 'AI Network Analytics' with a description and an 'Enable AI Network Analytics' checkbox (checked); 'AI-ENHANCED RRM' with a description and an 'Enable AI-Enhanced RRM' checkbox (checked); 'EVENTS ANALYTICS' with a 'PREVIEW' link and a description; and 'Enable log export' checkbox (checked).

2 Create an AI RF profile

The screenshot shows the 'Edit AI Radio Frequency Profile' page. The profile name is 'AI-RRM-TME-Profile'. Under 'Basic Settings', 'Radio Frequency Settings' are configured with 2.4 GHz, 5 GHz, and 6 GHz all checked. 'Busy Hours' are set from 9:00 to 17:00 with 'Busy Hour Sensitivity' set to 'High'. Under 'Enable RF Settings', 'Flexible Radio Assignment', 'Dynamic Channel Assignment', 'Dynamic Bandwidth Selection', and 'Transmit Power Control' are all enabled (checked).

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: AI_RF_Profile' dialog. A warning message states: 'Below selected and impacted locations will be upgraded with AI RF Profile and APs will be provisioned with new AI RF Tags.' The 'Site selection summary' table shows 'Building 14' as the 'Selected Location' with 'No impacted locations available'. The 'Search Hierarchy' on the left shows a tree structure with 'San Jose' selected, containing 'Building 10', 'Building 14' (checked), 'Building 18', 'Building 24', and 'Utah-Lakepoint'. At the bottom, there are 'Cancel' and 'Assign' buttons.

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 ⓘ

Define how often RRM optimizes Wi-Fi during period

Busy Hours ⓘ

Start Time

9:00

End Time

17:00

Busy Hour Sensitivity ⓘ

☐ Low ☒ Medium ☐ High

Enable RF Settings

Flexible Radio Assignment ⓘ

Dynamic Channel Assignment ⓘ

Dynamic Bandwidth Selection ⓘ

Transmit Power Control ⓘ

2.4 GHz



5 GHz



6 GHz



Advanced settings

Channel width, available channels, data rates, etc.

Advanced

Display Tuning Controls for

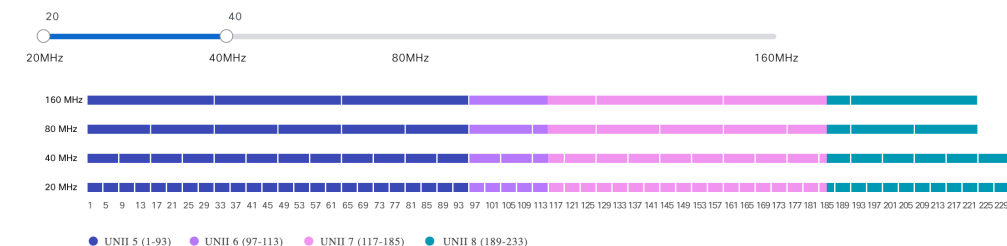
2.4 GHz

5 GHz

6 GHz

Channel Width Best

DBS WIDTH



DCA CHANNEL

Enable PSC Enforcing ⓘ ☐

Select All

☐ UNII-5 1-93

☐ 1 ☐ 5 ☐ 9 ☐ 13
☐ 17 ☐ 21 ☐ 25 ☐ 29
☐ 33 ☐ 37 ☐ 41 ☐ 45
☐ 49 ☐ 53 ☐ 57 ☐ 61

☒ UNII-6 97-113

☒ 97 ☒ 101 ☒ 105 ☒ 109
☒ 113

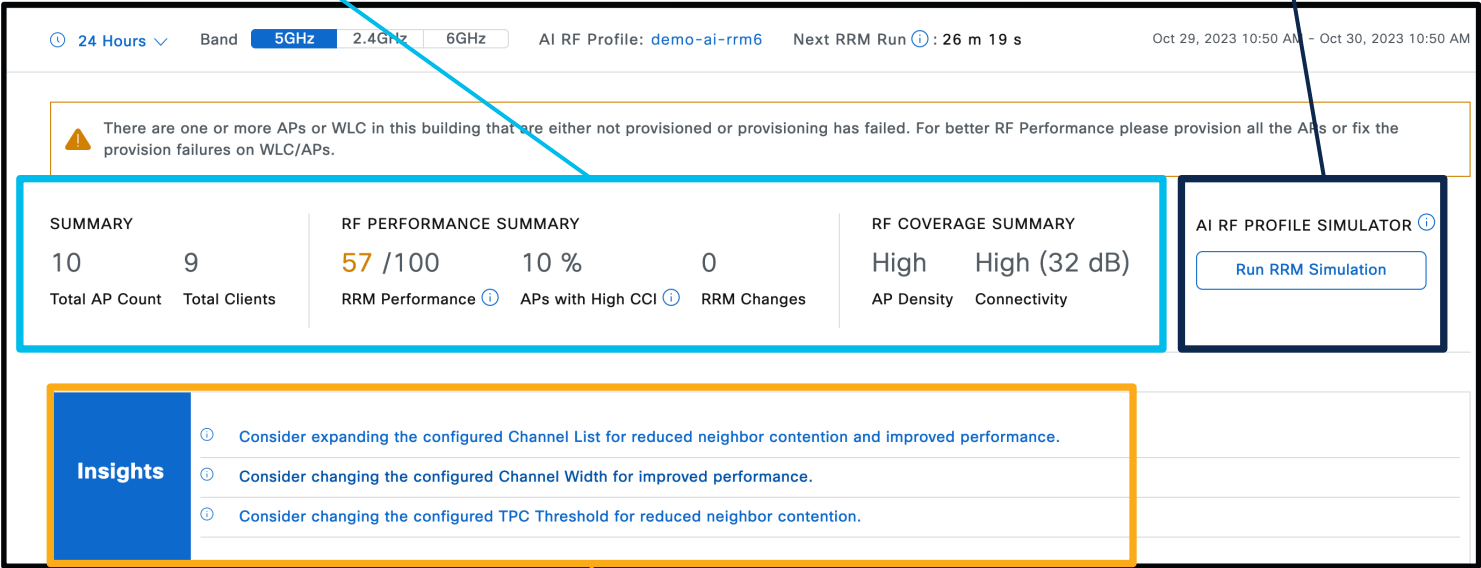
☐ UNII-7 117-185

☐ 117 ☐ 121 ☐ 125 ☐ 129
☐ 133 ☐ 137 ☐ 141 ☐ 145
☐ 149 ☐ 153 ☐ 157 ☐ 161
☐ 165 ☐ 169 ☐ 173 ☐ 177

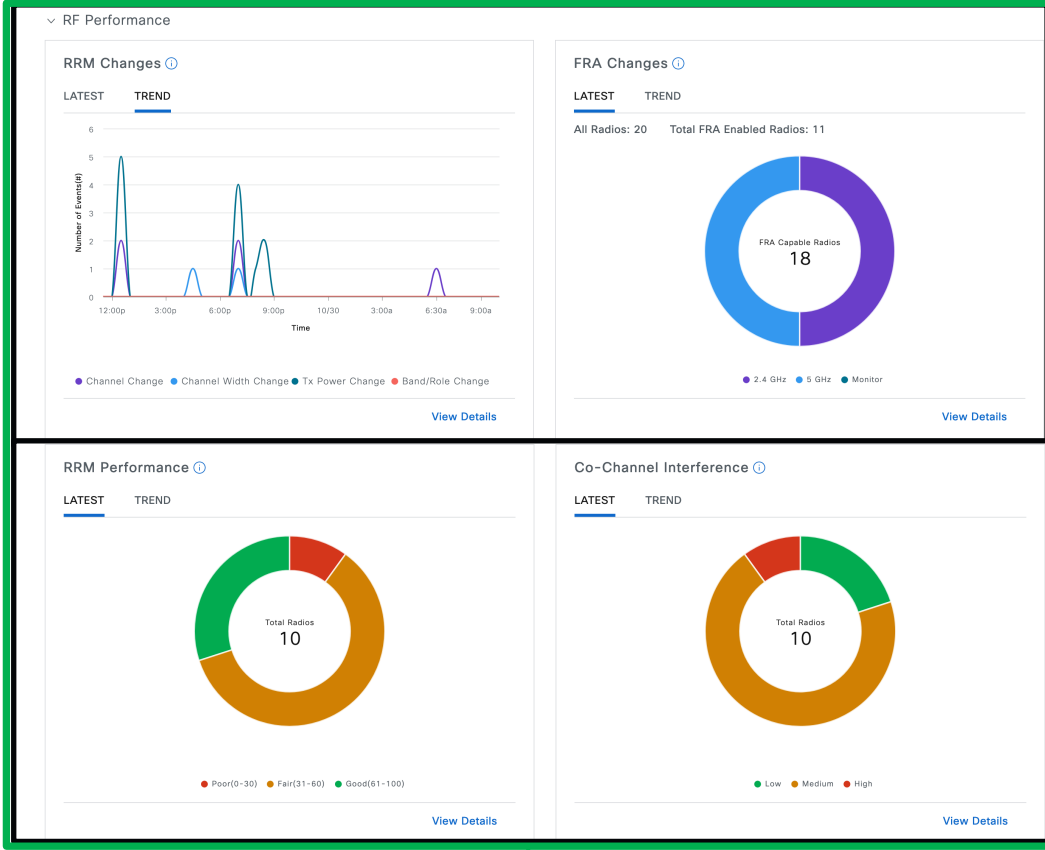
AI-Enhanced RRM Visibility

RRM Summary

RRM Simulator



AI Driven Actionable Insights



RF Performance

AI-Enhanced RRM Visibility (Continued)

Visualize how co-channel interference and high utilization are minimized

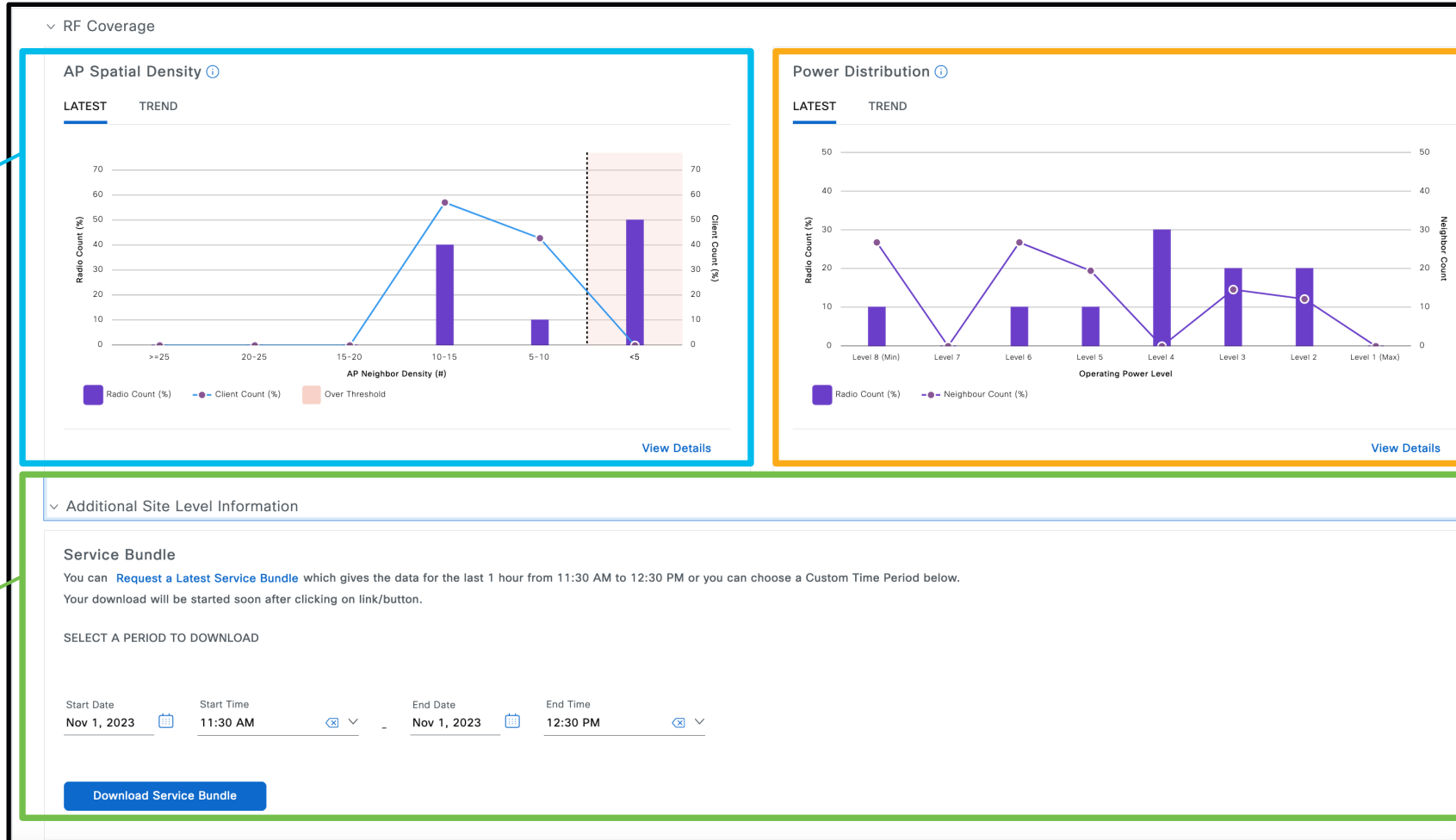


Utilization per channel

AP Radios and Radar per channel

AI-Enhanced RRM Visibility (Continued)

Visualize RF Coverage and serviceability



Spatial Density

Radio power distribution

Serviceability

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.

Summary

Wireless Assurance Data Collection using Telemetry

Proactive & Reactive Troubleshooting of Wireless clients

Proactive Identification of APs giving poor client experience

RF Optimization using AI-Enhanced RRM

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Friday	10:30am – 1:30pm

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The bridge to possible

Thank you

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The background is a vibrant, abstract graphic featuring a rainbow color palette. On the left, there are horizontal, wavy bands of color in shades of red, orange, yellow, and green. On the right, a bright white light source emits a series of sharp, triangular rays of light in various shades of blue, cyan, and yellow, creating a sunburst effect.

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Let's go

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