

CISCO *Live!*

Let's go

# Cisco Wireless AIOps

Karthik Iyer, Technical Marketing Engineer  
Vishal Desai, Principal Engineer

# Karthik Iyer

Technical Marketing Engineer– AI-Driven Wireless Solutions



## Fields of Expertise

Wireless Assurance and Automation, Wi-Fi 6/6E APs

## Personal Life

Indian, Silicon Valley Resident, San Jose State University Alumni

## Hobbies

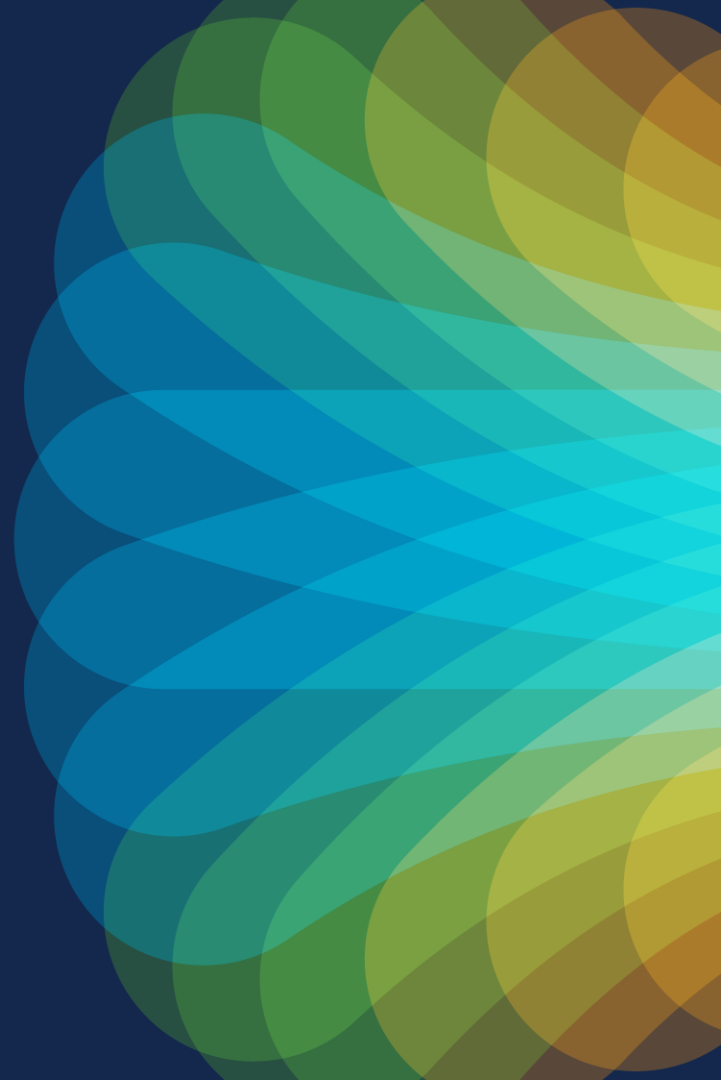
Motorcyclist, Formula 1 Enthusiast

# Agenda

CISCO *Live!*

- **The Power of AIOps with Wireless Assurance**
  - What is AIOps?
  - 3D Maps
  - AI-Enhanced RRM
  - Auto RF
- **Wireless Troubleshooting with AIOps**
  - AI Network Analytics
  - Assurance dashboard
  - Site Analytics
  - OTA Sniffer
- **Conclusion**

# What is AIOps?



# AI Ops – Artificial Intelligence for IT Operations

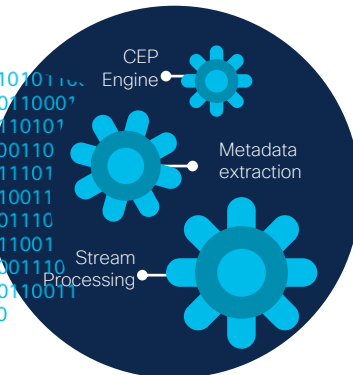
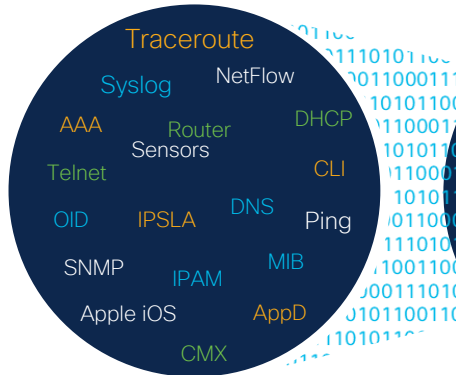
*Transforms raw data into actionable insights*

Raw Network  
Telemetry

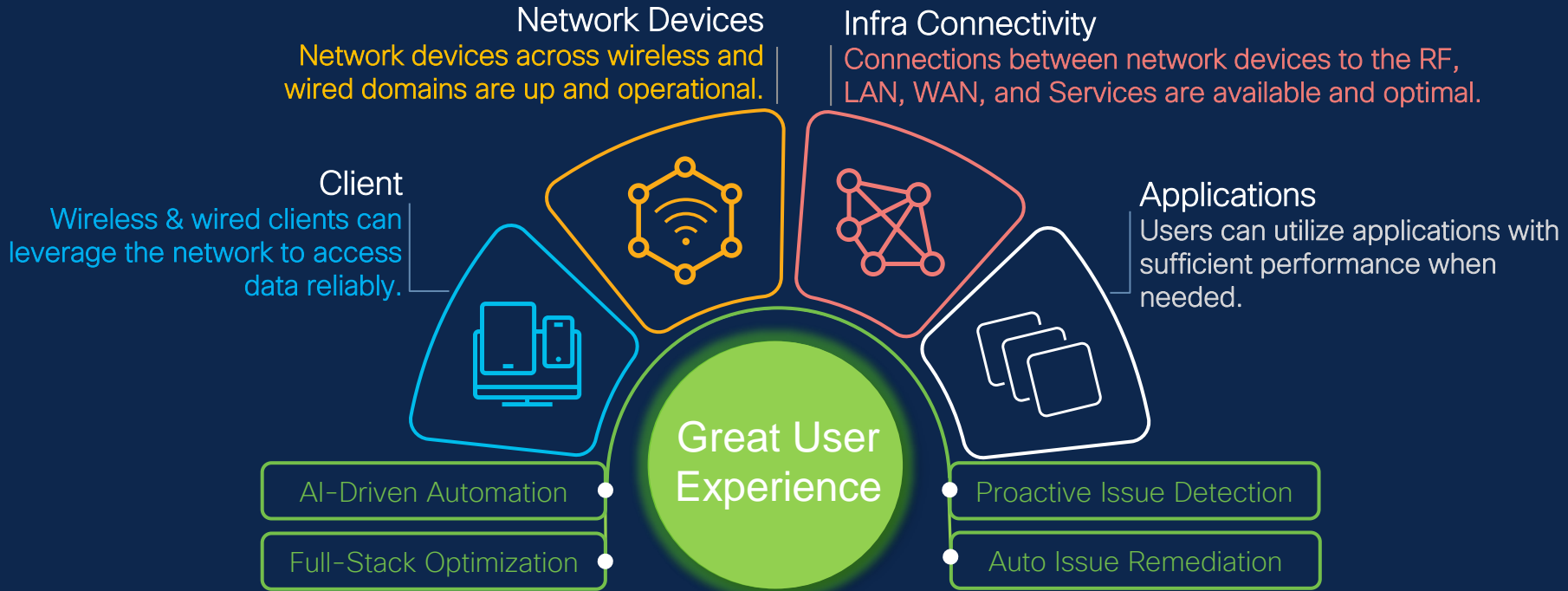
Data  
Processing

Health Scores  
and Insights

Optimize, Monitor  
& Troubleshoot



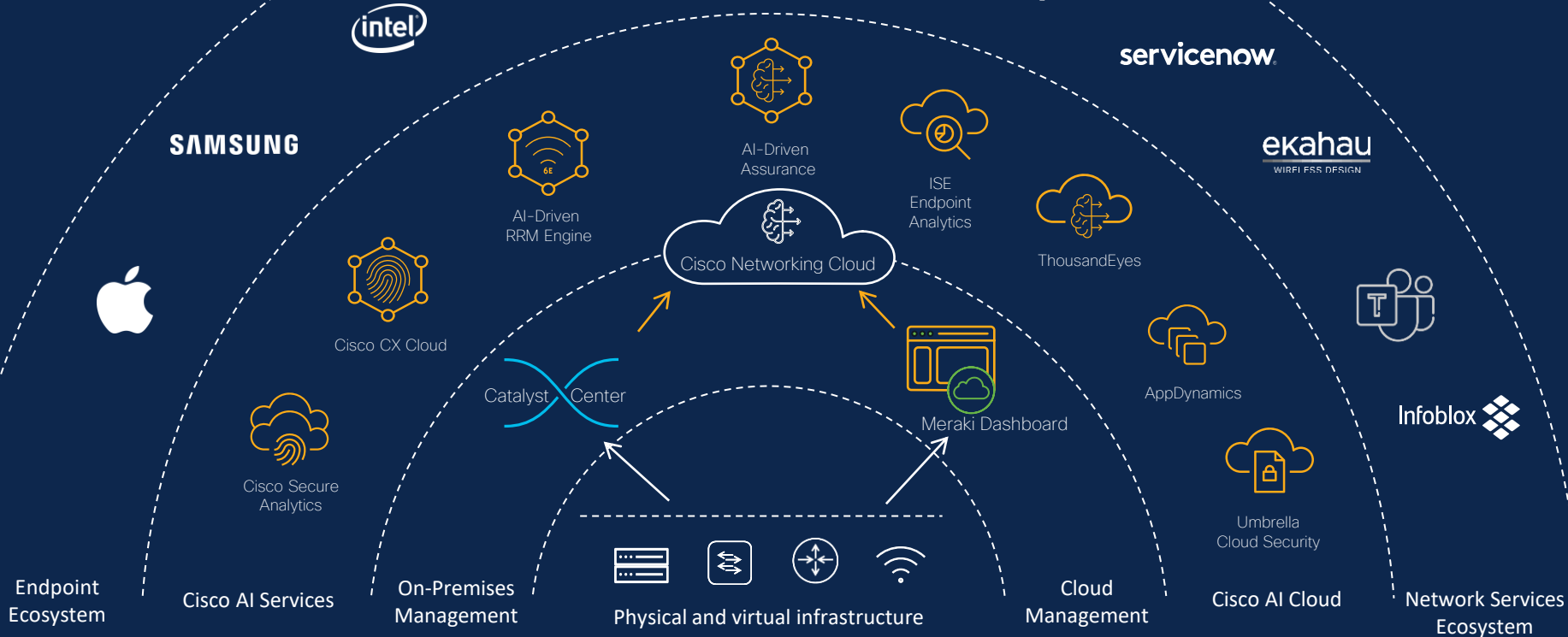
# Cisco AIOps & Assurance Focus Areas and Vision



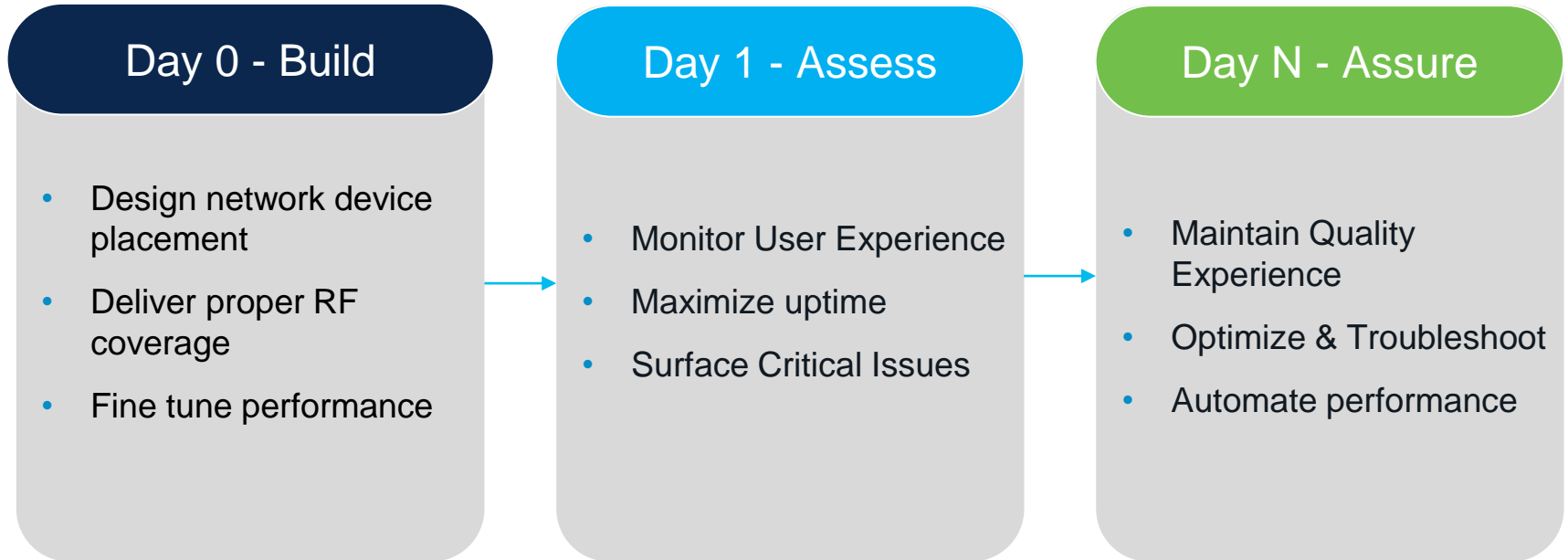
*Cisco AIOps & Assurance enables great user experiences!*

# AIOps: Full-Stack Network Intelligence

splunk >



# Simplify Network Management with AIOps & Assurance



Day 0

# 3D Maps

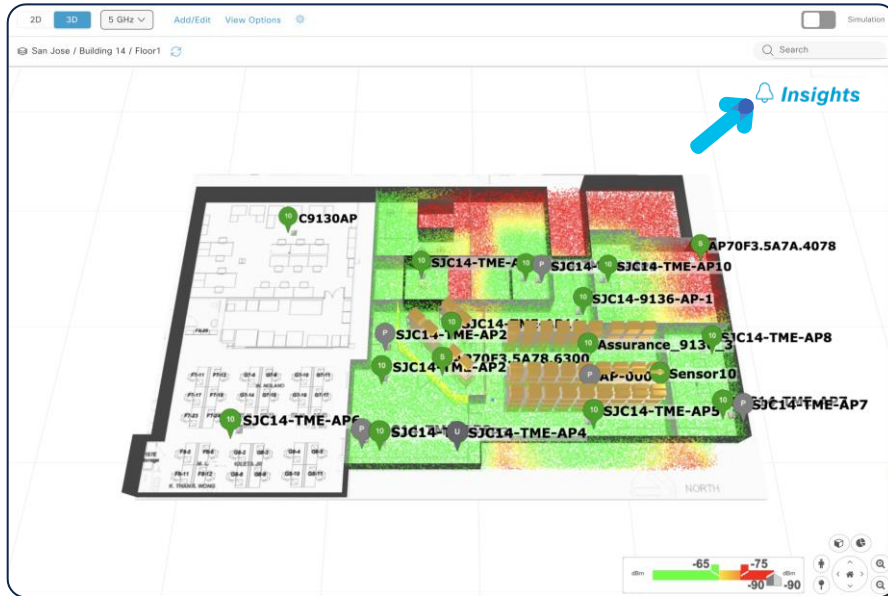
Advanced Insights and  
Recommendations



# Monitoring SLAs With Visual Insights

## Visibility Into Areas of Coverage That Need Attention

1 Click on the  **Insights** icon to view SLAs that meet or miss the configured threshold.



2 A banner appears with a list of insights. Clicking on **Click** adjusts the map for you to view insight details.



# Customizing SLAs for Visual Insights

## Tailor Visual Insights to Your Network Environment

Insight Configuration / Global Configuration

### Global Configuration

Global configuration for all insights

2.4GHz Noise Floor <b>-90</b> dB	5GHz Noise Floor <b>-90</b> dB	6GHz Noise Floor <b>-90</b> dB
---	---	---

Last Modified: Fri, 12 Mar 2021 16:59:53 GMT

Cancel Save

Insight Configuration / SLA Compliance

### SLA Compliance

Insight on SLA compliance percentage

Enabled

2.4GHz RSSI Target <b>-40</b> dBm SNR Target <b>10</b> dB Height <b>3.00</b> ft Coverage <b>85</b> %	5GHz RSSI Target <b>-40</b> dBm SNR Target <b>10</b> dB Height <b>3.00</b> ft Coverage <b>85</b> %	6GHz RSSI Target <b>-40</b> dBm SNR Target <b>10</b> dB Height <b>3.00</b> ft Coverage <b>85</b> %
--	--	--

Last Modified: Wed, 26 Jan 2022 20:37:37 GMT

Cancel Save

Insight Configuration / Voice Coverage

### Voice Coverage

Insight on percentage of voice coverage

Enabled

2.4GHz RSSI Target <b>-67</b> dBm SNR Target <b>25</b> dB Height <b>3.00</b> ft coverage <b>85</b> %	5GHz RSSI Target <b>-67</b> dBm SNR Target <b>25</b> dB Height <b>3.00</b> ft coverage <b>85</b> %	6GHz RSSI Target <b>-67</b> dBm SNR Target <b>25</b> dB Height <b>3.00</b> ft coverage <b>85</b> %
--	--	--

Last Modified: Fri, 12 Mar 2021 16:59:53 GMT

Cancel Save

# Leverage RF Optimizer for AP Redeployment Suggestions

## Starting from 2.3.3!

The screenshot displays a 2D simulation of a floor plan for SJSU / B1 / F1. The interface includes a top navigation bar with '2D', '3D', and '5 GHz' options, along with 'Add/Edit' and 'View Options' buttons. A 'Simulation' toggle is in the top right. A search bar is located in the upper right corner. The main area shows a floor plan with various AP locations labeled (e.g., AP-0001, AP-0002, AP-0003, AP-0004, AP-0005, AP-0006, AP-0007, AP-0008, AP-0009, AP-0010, AP-0010-1, AP-0012, AP-0013). Coverage areas are shown in green and red. A blue arrow points from AP-0001 to AP-0005, and another blue arrow points from AP-0005 to AP-0008. A notification box at the bottom left contains the following text:

Your floor coverage with RSSI of  $-65$  or more will be increased from 68 % to 78% by the optimizations below:

- Add 2 AP(s).
- Move 3 AP(s).
- Save as a plan

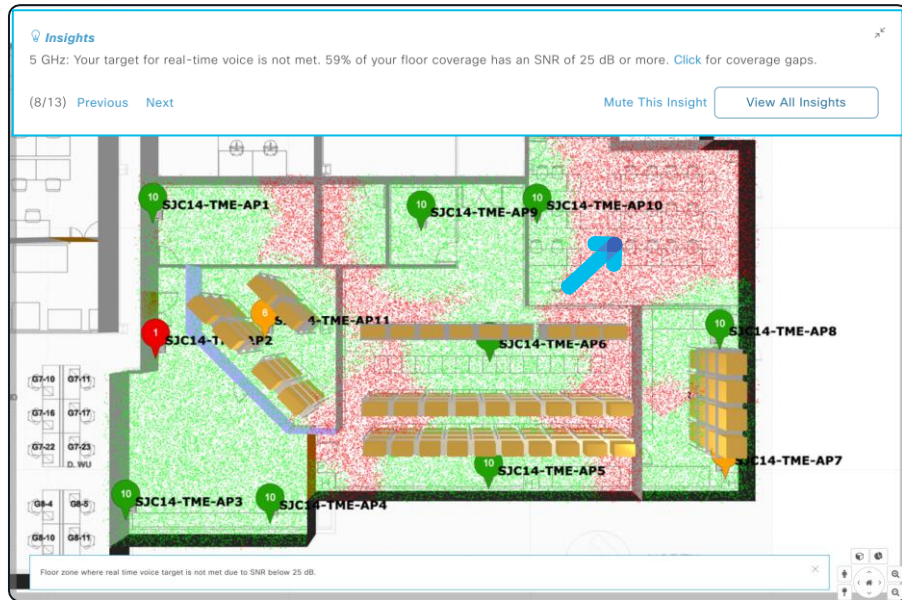
The bottom right corner features a control panel with icons for simulation, zoom, and other navigation functions.

# Discover and Resolve RF Coverage Hole

# Discover and Resolve RF Coverage Holes

## Use Wireless 3D Maps to Simulate the Solution Before Deployment

1 Use Visual Insights to find areas with poor RF coverage.



2 Click on the AP in that room to view coverage.



# Discover and Resolve RF Coverage Holes

## Use Wireless 3D Maps To Simulate the Solution Before Deployment

3

Click **Add/Edit**, select AP, change the X and Y coordinates to center the AP in the room.



4

Change the antenna angle so that the AP broadcasts the RF equally in all angles.



# Discover and Resolve RF Coverage Holes

## Use Wireless 3D Maps To Simulate the Solution Before Deployment

- 5 Validate modifying this AP did not create an additional coverage issue.



Day 1

# AI-Enhanced RRM



# Vishal Desai

Principal Engineer

New Speaker



## Expertise

AI-Driven Wireless Solutions, Wi-Fi PHY Optimizations, Distributed Systems, Resource Management

## Experience

17+ years experience in the Wi-Fi industry. Holds 107 patents in the areas of wireless communications and closed loop systems

## Education

MENG in Computer Science from Cornell University



# AI-Enhanced RRM Vision

*Create unified architecture to enable AI-Driven RRM services for all Cisco's customers*



Simplify Network  
Programming



Client Assisted  
RF Optimizations

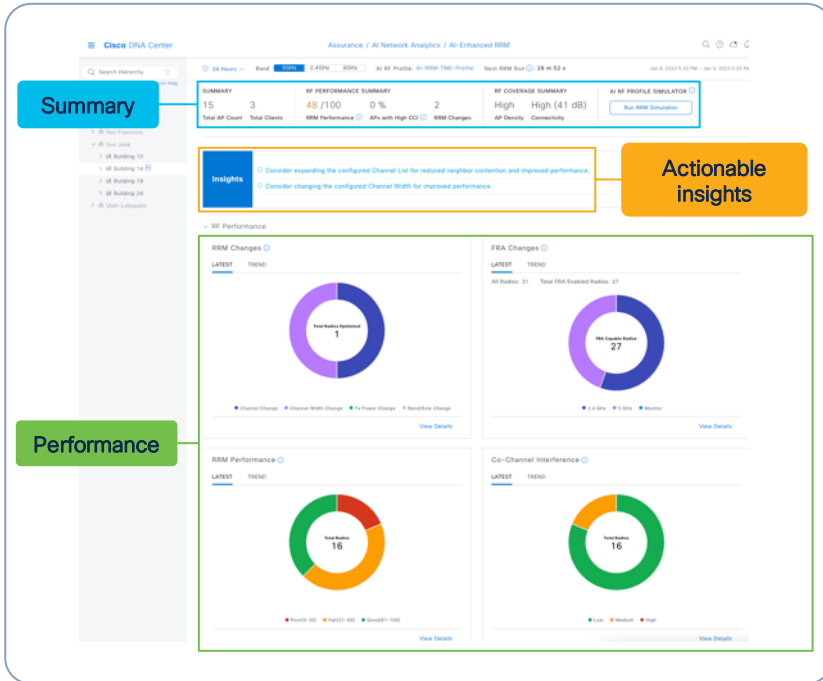


Deployment  
Agnostic RRM

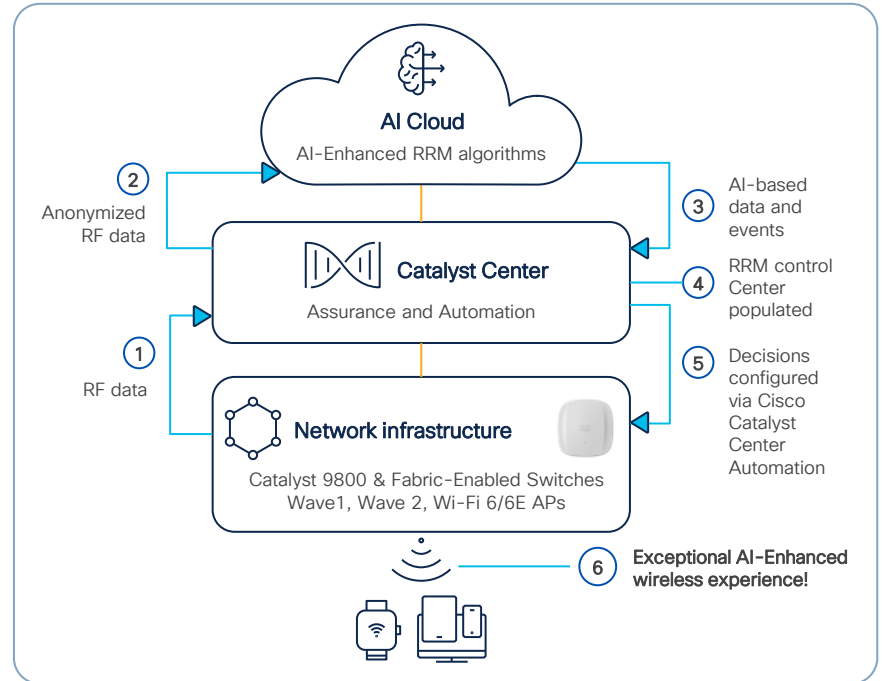
# AI-Enhanced RRM is AI that Powers RF Optimization

Provides Users with Better Wi-Fi and Admins with a Better RF Management Experience!

## Instantaneous visibility



## Proactive optimizations

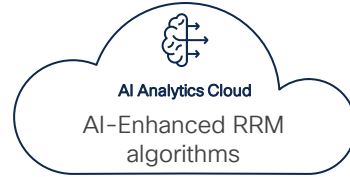


# AI-Enhanced RRM key customer benefits

Better RF, better insights, reduced operational costs and time

## AI-driven self-optimizing RF

Leverages machine learning to find patterns and optimize your RF before issues happen.



## Measured Improvements in RF KPIs!

- CCI Reduction: Up to 40%
- SNR Downlink Gain: Up to 7 dB
- RRM Changes Reduction: Up to 75% at busy hours

## Performance visibility

Provides per-building visibility into RF health using Wireless Config Analyzer algorithm.

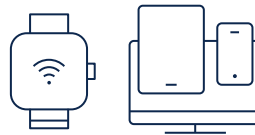


## Actionable insights

AI-derived recommendations on RRM setting changes for a more optimal performance.

## Complete historical context

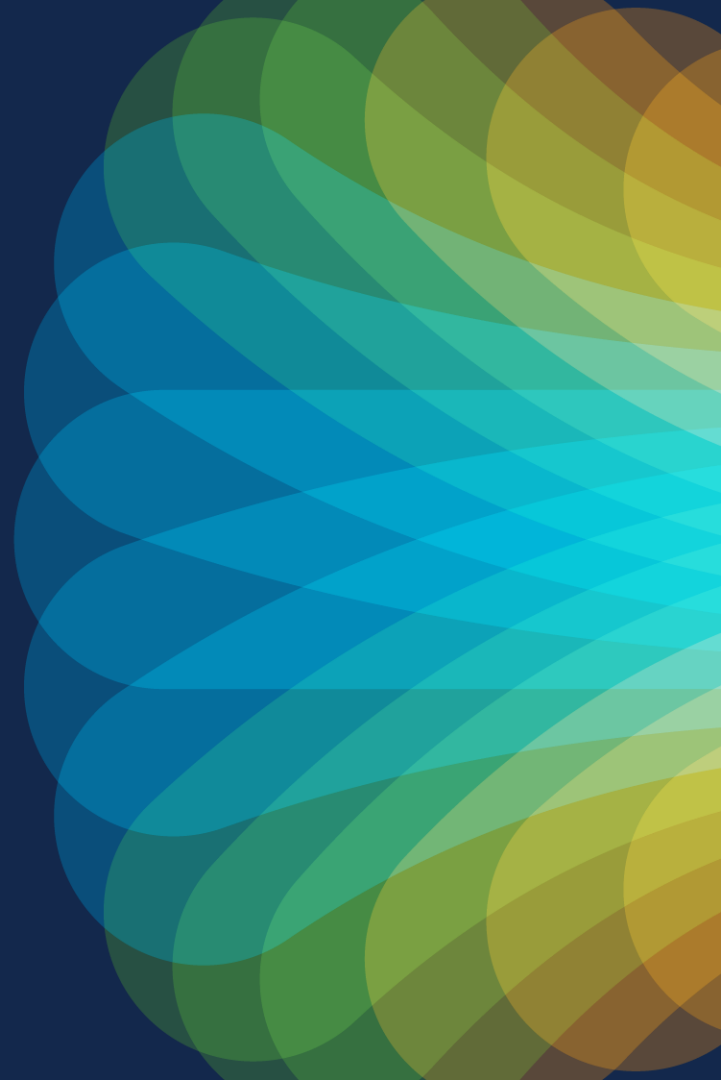
Understand exactly what RRM changes occurred at a per-AP level, and how they benefit the network.



## Simplified RRM configuration

Complicated traditional RRM configurations are simplified, with policy toggles and thresholds.

# Architecture & System Flow





Network  
Infra

→  
RF  
Telemetry

←  
Configure  
Decisions



## Cisco Catalyst Center

- Manages Configs Per Site
- RRM Control Center endpoint
- Anonymize before transporting to Cloud

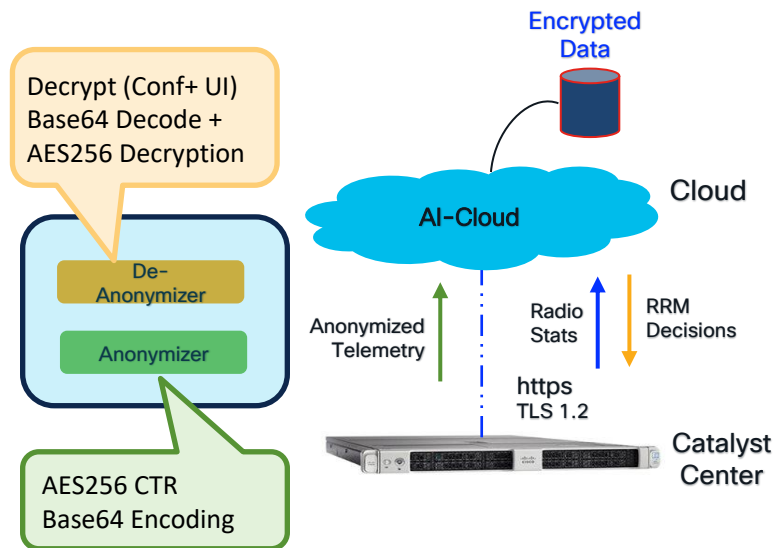


## Cisco AI Cloud

- Integrates RRM Core Services
- Analyzes long term wireless trends
- Aggregates site/building telemetry

# Ensuring your privacy

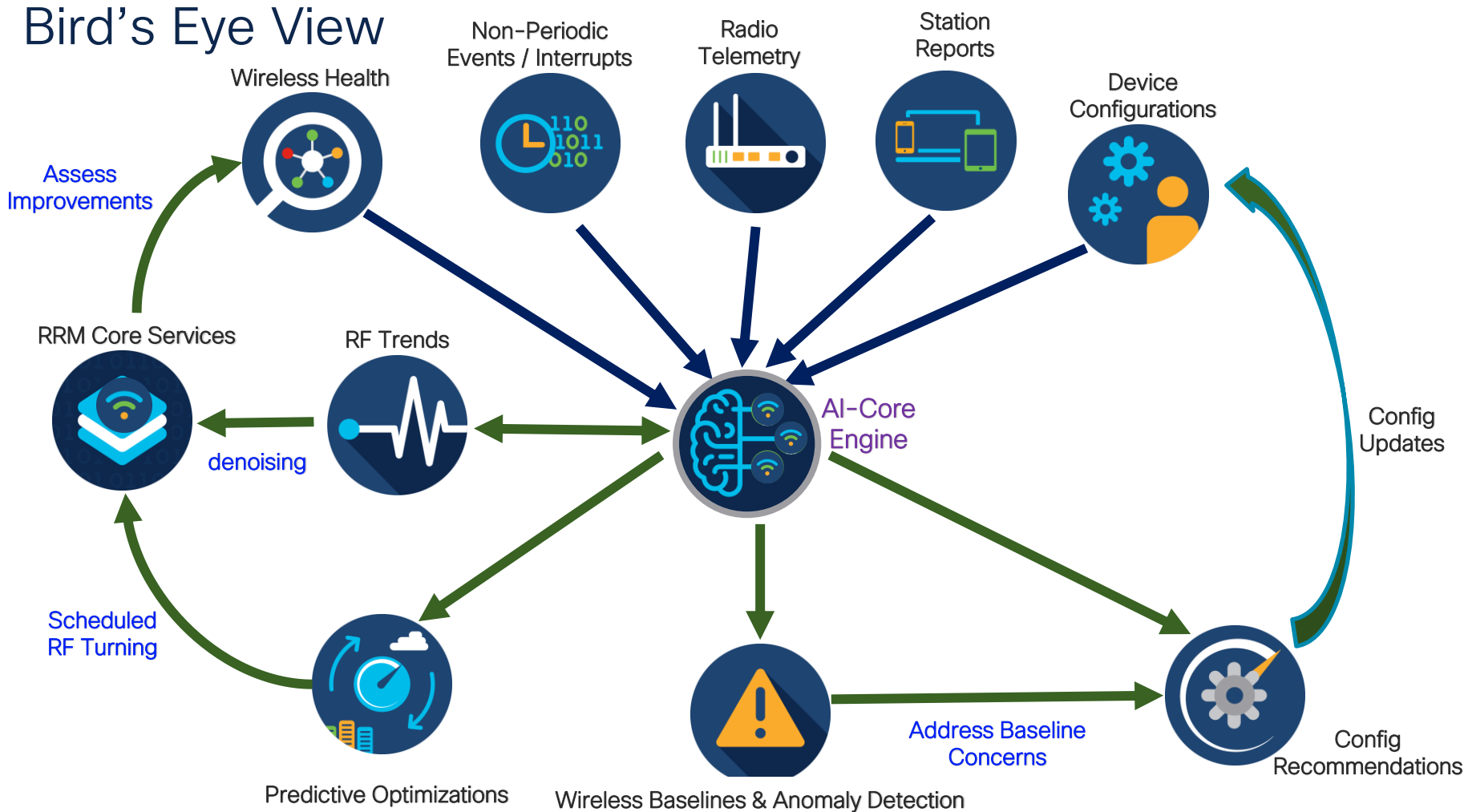
- Cisco places the highest priority on protecting user privacy!!
- AI-Enhanced RRM requires RF PHY/MAC telemetry and configs from radios as well as network Information
- Network information is used to group collocated radios in the site
- Anonymization runs on-prem to encrypt + encode network information
- Network Data is encrypted with AES256 and then encoded prior to sending it to the AI-Cloud
- Encryption Key is securely stored on the the on-prem Catalyst Center
- All Data Stored in the cloud is also encrypted with AWS
- On-prem decryption runs on the fly to render data on the UI



RF Stats	Radio Configs	Network Information
PHY Stats	Channel	WLC IP
MAC Stats	Power	Base Radio MAC
Client Count	Bandwidth	WLC MAC
RF Events (Interrupts)	Operational Mode	AP Ethernet MAC

# AI-Core Engine & ML sub methods

# Bird's Eye View



# Sub Methods for Config Recommendations



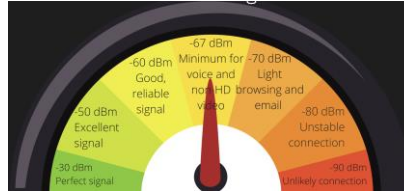
## Recommended Config(s)

Busy Hour Start & End Times

## Key Benefits

Minimizes Service Disruptions

Substantially reduce config updates



## Recommended Config(s)

Transmit Power Control Threshold

## Key Benefits

Minimizes Coverage Holes

Increases Wireless Performance



## Recommended Config(s)

Preferred Scanning Channel Bias

## Key Benefits

Improves 6E Radio Discovery

Minimizes Roaming Delays

# Busy Hours <sup>AKA</sup> Critical hours of wireless operations

Connection Stability



Wireless Performance



RF Management

# How is it achieved?

Traditional 9800 RRM



AI-Enhanced RRM

Configuration > Radio Configurations > RRM

6 GHz Band 5 GHz Band 2.4 GHz Band FRA

General Coverage **DCA** TPC RF Grouping Spatial Reuse

## Dynamic Channel Assignment Algorithm

Channel Assignment Mode

Automatic

Off

Interval

8 hours

Anchortime

4

Channel Assignment Leader

CA-C9800 (10.10.105.240)

Last Auto Channel Assignment

410 second(s) ago

DCA Channel Sensitivity

medium

Optimize  
Wi-Fi every  
8 hours at 4 am  
12 noon & 8 pm

Basic Settings

Radio Frequency Settings

2.4 GHz  5 GHz  6 GHz

Busy Hours

Start Tim 9:00  
End Tim 17:00

Busy Hour Sensitivity

Low  Medium  High

Minimize RRM  
updates during MY  
business hours

Enable RF Settings

2.4 GHz

5 GHz

6 GHz

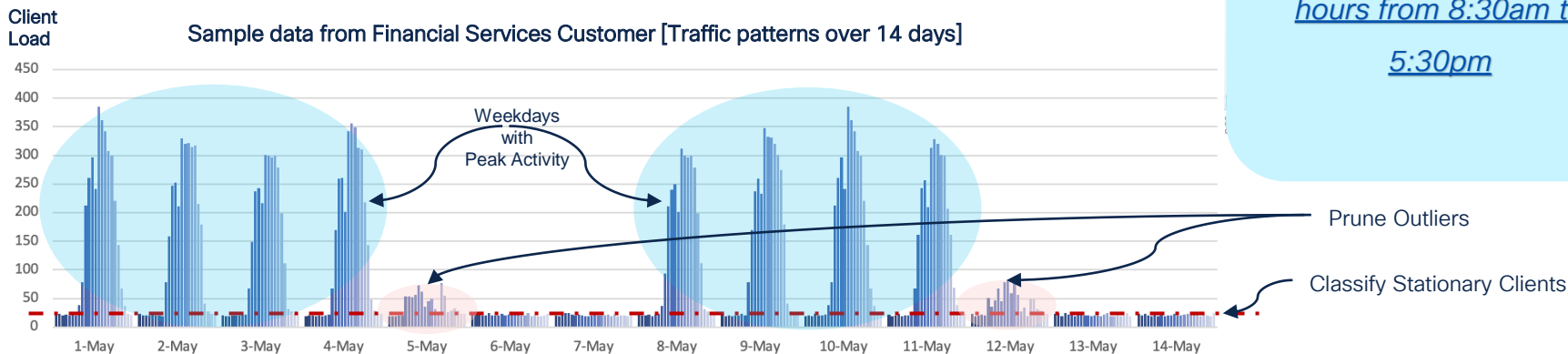
Flexible Radio Assignment

Dynamic Channel Assignment

Dynamic Bandwidth Selection

Transmit Power Control

# AI Generated Busy Hours



**Insights**

*Consider changing busy hours from 8:30am to 5:30pm*

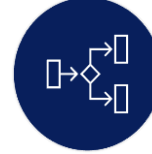
Unlabeled Radio Data

Feature Engineering

Classifier

ML Prediction

Busy Hour Generation



**Model Training**

**Prediction**

RF telemetry  
From APs

Denoising & Transformation  
Features: (24 x 2)  
{ Client Stats | TxUtil | RxUtil }

Generate Labels  
KNN Classifier  
Skew towards Utilization

KNN Prediction

Pits & Peaks Cost Tuning  
Circular Cost Optimization

# Sub Methods for Config Recommendations



## Recommended Config(s)

Busy Hour Start & End Times

## Key Benefits

Minimizes Service Disruptions

Substantially reduce config updates



## Recommended Config(s)

Transmit Power Control Threshold

## Key Benefits

Minimizes Coverage Holes

Increases Wireless Performance



## Recommended Config(s)

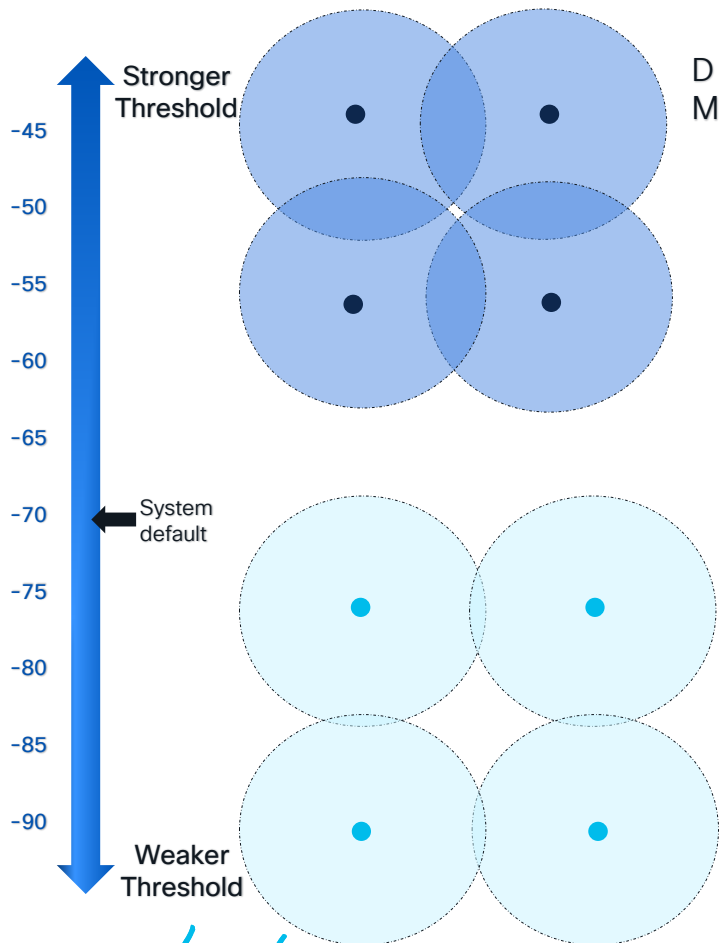
Preferred Scanning Channel Bias

## Key Benefits

Improves 6E Radio Discovery

Minimizes Roaming Delays

# TxPower Control Threshold



Dense Wi-Fi Deployment  
Minimize Co-Channel Contention

## Insights

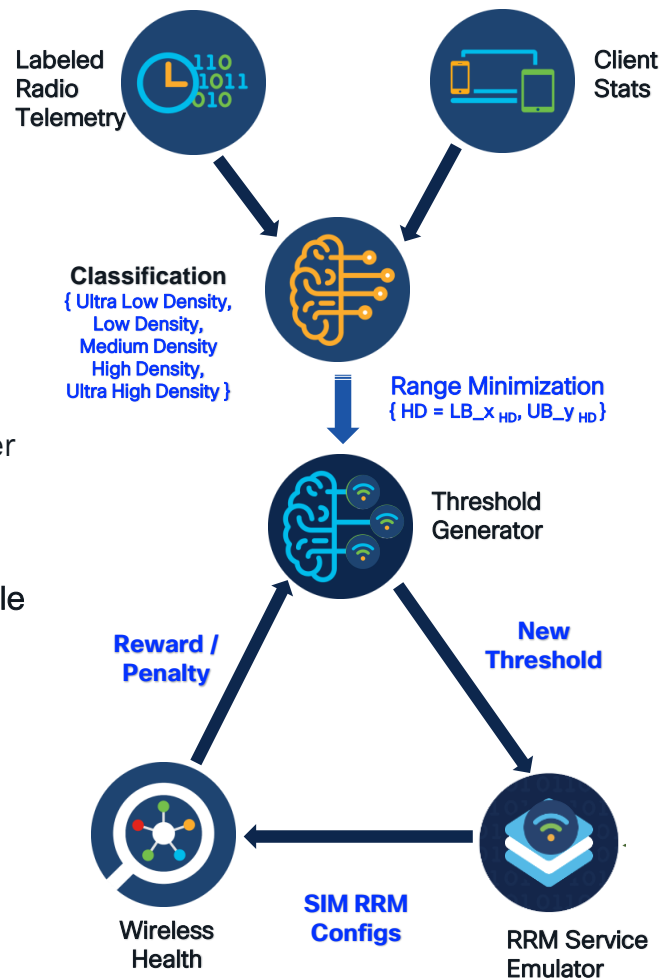
Intuitive AI Driven system calibrated config tuning customized for your network

Consider increasing Transmit Power Control Threshold to -67dBm to reduce wireless contention in your network

Sparse Wi-Fi Deployment  
Maximize Cell Overlap

# AI Generated TPC Threshold

- Influences amount of cell overlap between the adjacent APs
- Needs to get tuned based on overall **RF density and associated clients**
- AI-Enhanced RRM optimizes threshold leveraging **combination of SL & RL**
  - Model training is conducted based on labeled data set to achieve power control **threshold range minimization**
  - **SL determines threshold range**, RL is enforced to **iterate through multiple instances** of Transmit Power Control service
  - Threshold generator determines optimal Power Control threshold that **maximizes RF health** of radios and clients



# Sub Methods for AI-Driven Config Recommendations



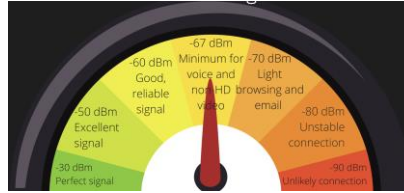
## Recommended Config(s)

Busy Hour Start & End Times

## Key Benefits

Minimizes Service Disruptions

Substantially reduce config updates



## Recommended Config(s)

Transmit Power Control Threshold

## Key Benefits

Minimizes Coverage Holes

Increases Wireless Performance



## Recommended Config(s)

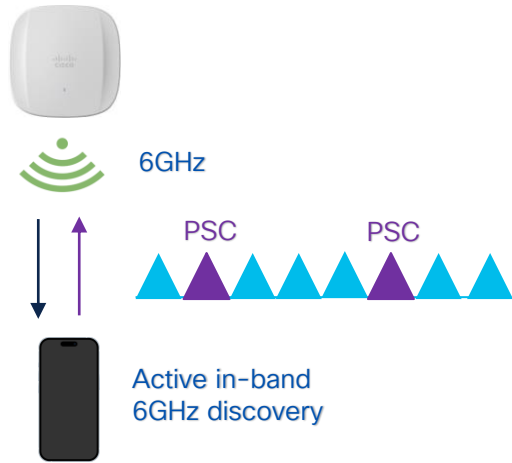
Preferred Scanning Channel Bias

## Key Benefits

Improves 6E Radio Discovery

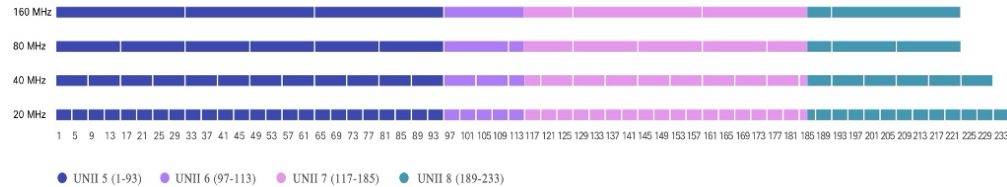
Minimizes Roaming Delays

# Preferred Scanning Channels



6GHz Frequency Band\*: **59** 20MHz Channels  
Preferred Scanning Channels: **14** 20MHz Channels

Wireless / Edit AI RF Profile



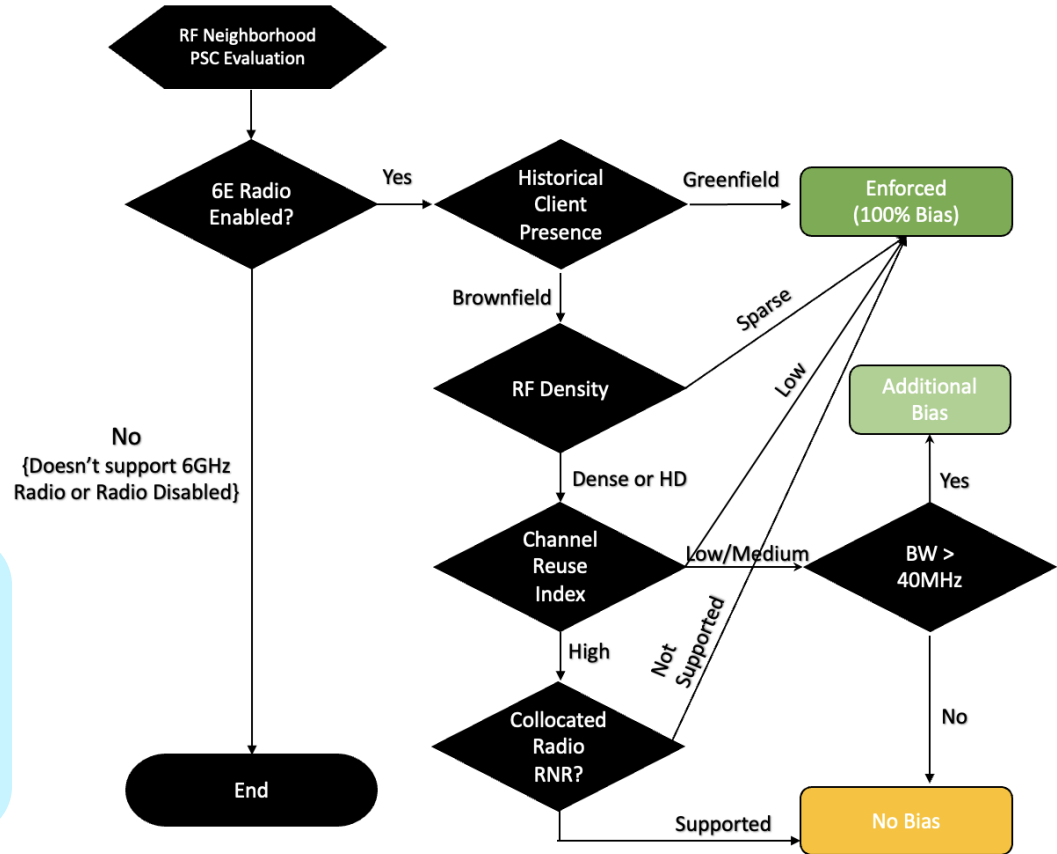
- So, **WHY** not enforce PSC-only channels for every Wi-Fi deployment?
  - Drastically reduces channel availability in 6GHz
  - Clients can discover 6E Radio via 2.4/5 RNR
  - Limits channelization further for outdoor with AFC

# Preferred Scanning Channel Bias Determination

- 6GHz Spectrum introduces Preferred Scanning Channels to **minimize client roaming delays**
- PSC includes **subset of channels that are 80MHz apart**
- AI-Enhanced RRM evaluates whether PSC enforcement is recommended for a given site using **rule-based modeling**
- Model determined enforcement/bias based

## Insights

[Consider disabling PSC Enforcement to maximize 6GHz channels in your network](#)



# Diverse Insights for diverse environments



Business Vertical	Financial Services	Retail	Education
Country	no (Norway)	us (USA)	nz (New Zealand)
Total APs	496	202	2,928
Avg. Clients	~3,200	~1,700	~11,000

## AI-Driven Config Insights

Busy Hours	10am - 6:30pm (UTC+2)	3pm - 10pm (UTC-5)	7:00am - 2:30pm (UTC+13)
5GHz DBS_Max	40MHz	20MHz	80MHz
FRA	Yes	Yes	Yes
TPC_Thresh	-65dBm	-60dBm	-75dBm
Enforce PSC	N/A	Yes	N/A

High Density

Low Density

# Leading to Performance Improvements



Business Vertical

Financial Services

Retail

Education

Country

no (Norway)

us (USA)

nz (New Zealand)

## Improvements in the Wireless KPIs

Wireless Performance

51 → 94

Before After

34 → 70

Before After

17 → 91

Before After

Config Updates

41% Reduction

79% Reduction

83% Reduction

Stable Wi-Fi

Client SNR

38 dB (+9 dB)

(39 dB) (+11 dB)

33 dB (+8 dB)

Maximize Performance

Interference

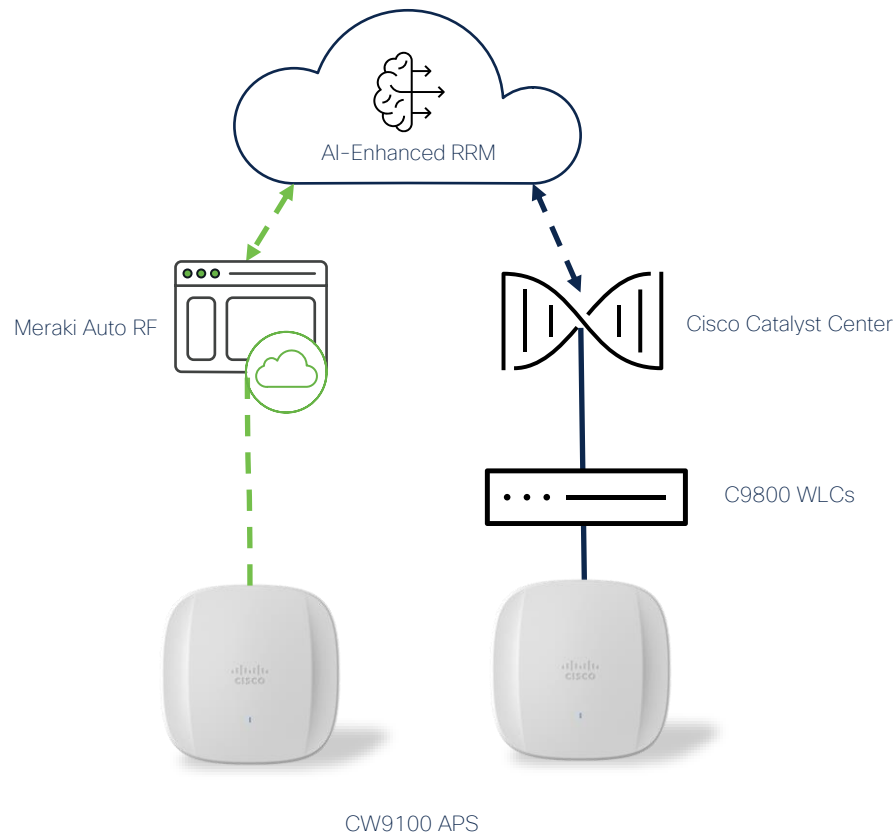
37% Reduction

56% Reduction

65% Reduction

Best Capacity

# Simplified enablement AI-enhanced RRM

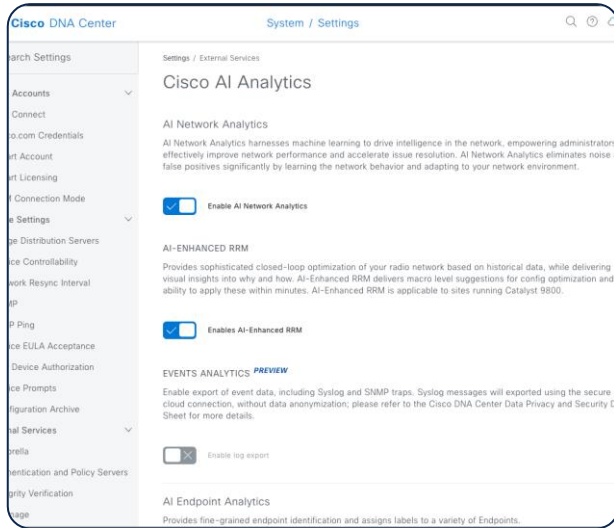


# Enabling AI-Enhanced RRM for Provisioning-Enabled Deployments

Traditionally, this solutions requires customers to manage their Catalyst 9800 configurations through Catalyst Center's Network Settings

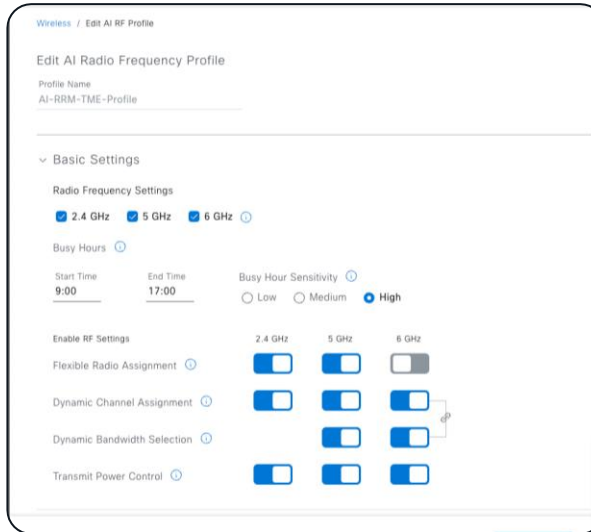
1

Give AI-Enhanced RRM  
Cloud Access in Settings.



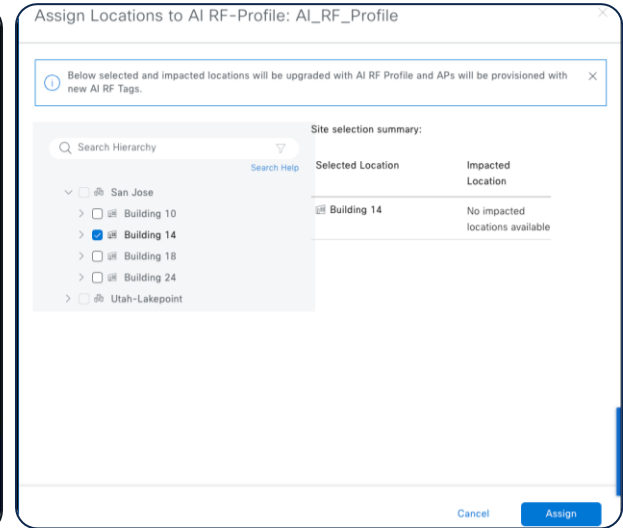
2

Create an AI RF Profile.



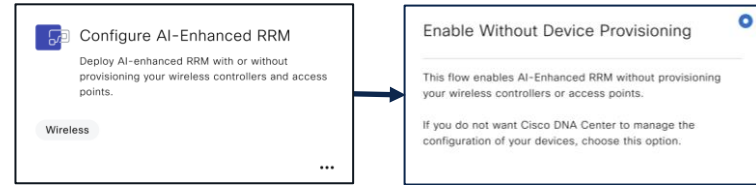
3

Assign AI RF Profile to a building,  
and provision your C9800 & APs.





What mitigates  
these pain points?



New AI-Enhanced RRM Workflow  
for Assurance Only Customers!

# Benefits of the AI-Enhanced RRM Workflow

Easier to Enable, with the Same Power of AI!

## Doesn't Require C9800 to be Provisioned on Catalyst Center!

- Taking away this requirement means that all Catalyst Center users with supported hardware can leverage the power of AI.
- Users can continue managing their network settings on their C9800 directly.

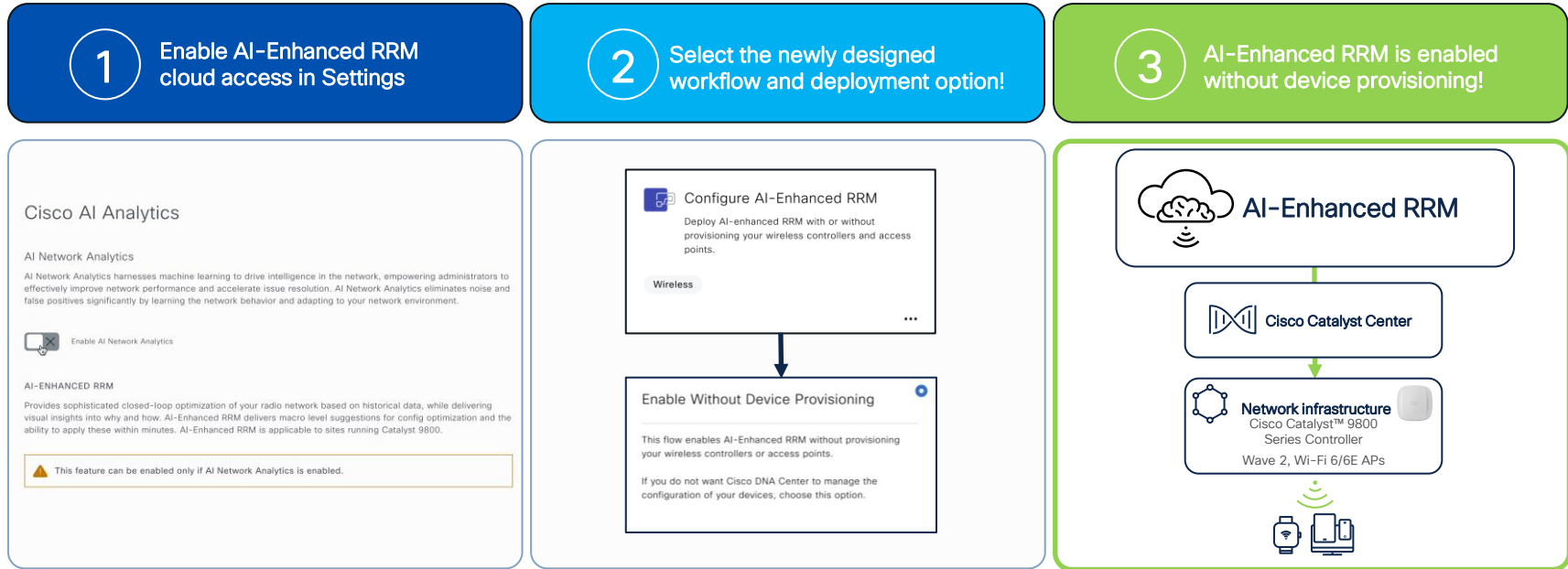
## Greatly Simplified Workflow!

- Combined all steps to enable AI-Enhanced RRM to a single workflow within the Workflow page titled, "Configure AI-Enhanced RRM -> Enable Without Device Provisioning".
- Admins no longer need to jump to different areas on Catalyst Center to figure out how to enable AI-Enhanced RRM!

## Power of AI Remains the Same

- While enabling AI-Enhanced RRM has gotten significantly easier, all the amazing customer benefits remain the same.
- There are no loss with regards to solution capability.

# We've created a new enablement workflow that doesn't require admins to manage their network configurations on Catalyst Center!



# Software and Hardware Support Matrix

for AI-Enhanced RRM's Workflow for Assurance-Only Deployments

Cisco IOS XE WLC Software	Cisco Catalyst Center Software and Licensing
17.9.3 or newer (17.12.1 recommended)	2.3.7.4 (Patch 2) with DNA Advantage License
Cisco Access Point Hardware	
Wave 1, Wave 2, Catalyst Wi-Fi 6 and 6E Access Points	
Cisco IOS XE WLC Hardware	
C9800-CL	
C9800-L	
C9800-40	
C9800-80	



**How do we efficiently  
bring Auto RF towards  
the RRM North Star  
vision?**



X



## Integration with AI-Enhanced RRM

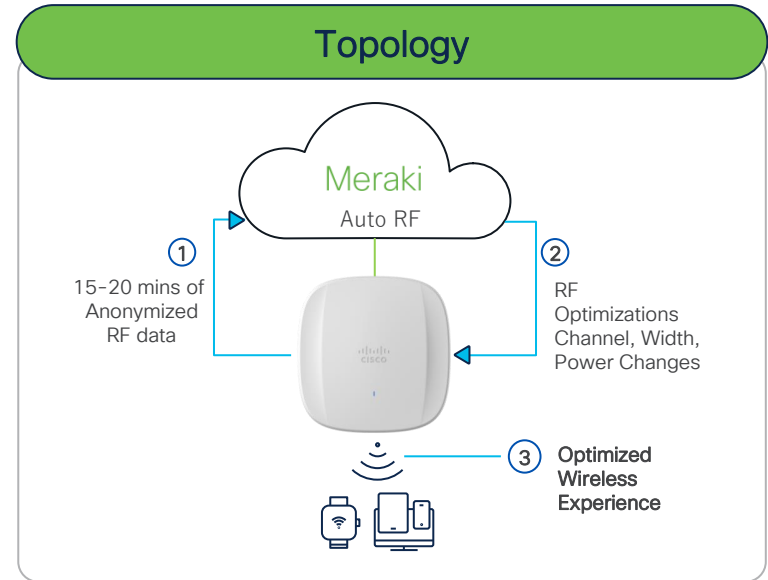
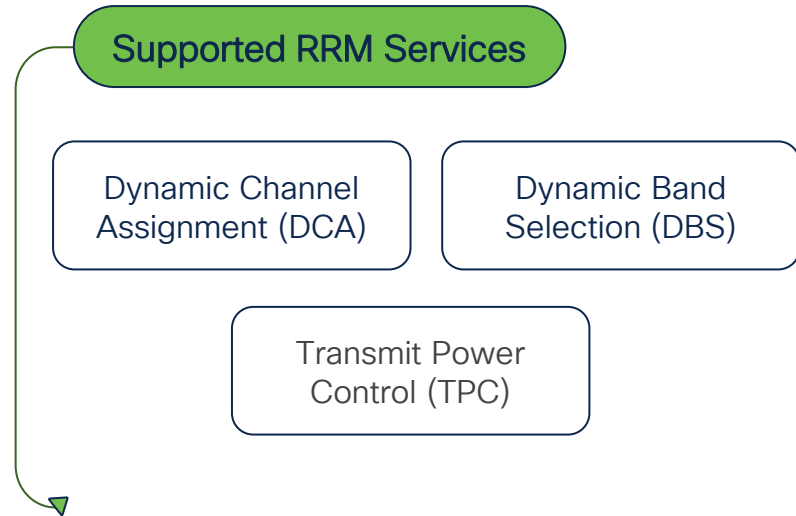
- Inherit advanced RRM features with less development cycles.
- Auto RF will be enterprise & high-density deployment ready

Day 1

# Meraki Auto RF Powered by AI-Enhanced RRM

# What is Meraki's Auto RF?

**Auto RF** is Cisco Meraki's radio resource management (RRM) solution that optimizes wireless configurations using 15-20 mins of RF data (Snapshot-based) to improve RF performance.



# Capabilities that AI-Enhanced RRM will bring to Meraki!

## Wireless Client Disruption

### RRM Services Ready at Any Scale

Supports RRM services, DCA, DBS, TPC, FRA, and AP zone-level configurations for deployments of all sizes and use cases.

### Trend, Reward, Client-Based RRM

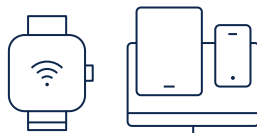
Uses AI to optimize based on historical trends, RF performance, and client-side telemetry.

### After Hours RF Tuning

Defers optimizations after peak hours to minimize disruptions but uses peak hour data for relevance to clients' activity times.



AI-Enhanced RRM



## Trust & Visibility

## Config Simplification

### RF Visibility Widgets

Provides org-to-AP level visibility of RF health, RRM changes, co-channel interference, etc.

### RF Insights and Recommendation

AI reviews customer config against intended outcomes and provides insight recommendations to ensure goals are met.

### Predictive RF Simulator

Uses historical data to predict outcomes of RRM config changes, giving admins peace of mind before applying them.

# AI-Enhanced RRM Will Significantly Improve Meraki's Wi-Fi!

## Trend-Based RRM

Optimize RF with 2 weeks of data enabling more sophisticated & efficient RRM optimization!



## Flexible Radio Assignment

Place radios on the most optimal band/mode to minimize interference on 2.4 GHz at the touch of a button!



## Enhanced Busy Hour

Optimizations are deferred until after the busy hour, using busy hour data, rather than just suppressed!



The screenshot displays the 'Radio Settings' page with the 'AI-RRM' tab selected. It features three main sections: 'Trend-based RRM' which is enabled; 'Flexible radio assignment' which is disabled; and 'AI channel planning' which is enabled. Under 'AI channel planning', there is a 'Busy hour' section with 'Enable busy hour' disabled and 'Sensitivity' set to 'High'. The 'Auto schedule' option is selected for the busy hour, with a time range of 23:00 to 08:00.

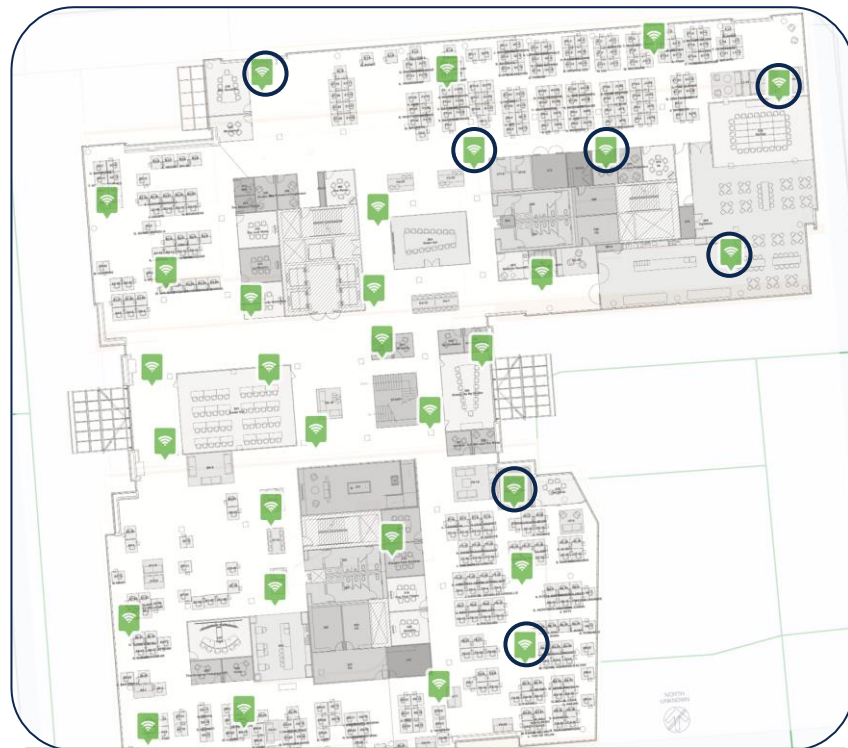
Available

# Reduce

Client Disruptions by 50%  
AI Channel Planning



Powered by  
AI-Enhanced RRM



AI learns your wireless with 6+ weeks of data to  
prioritize channels with the best wireless experience.

# How does AI Channel Planning work?

Channels that face a DFS or channel jammed event will be put on an avoid list starting at severity 6.

**Avoid List** – Channels on this list won't be used; after the period, it'll be added to the monitor list with the same severity.

**Monitor List** – If a DFS or jammed channel event occurs, the channel is added to the avoid list and the severity is increased.

Severity	Avoid Period	Monitor Period
6	1 Day	1 hour
5	2 Days	2 hours
4	4 Days	3 hours
3	8 Days	4 hours
2	14 Days	5 hours
1	30 Days	6 hours

# How to enable AI Channel Planning

Enable AI Channel Planning to empower Auto RF with Artificial Intelligence.

## Radio Settings

Overview

RF Profiles

**Auto RF**

### AI channel planning

AI channel planning OFF

[Download details](#)

2 RF jammed APs

2 DFS hit APs

Enable AI

AI channel planning ON

Enhance Auto RF by leveraging artificial intelligence to optimize channel planning capabilities ⓘ

Issues Mitigated!

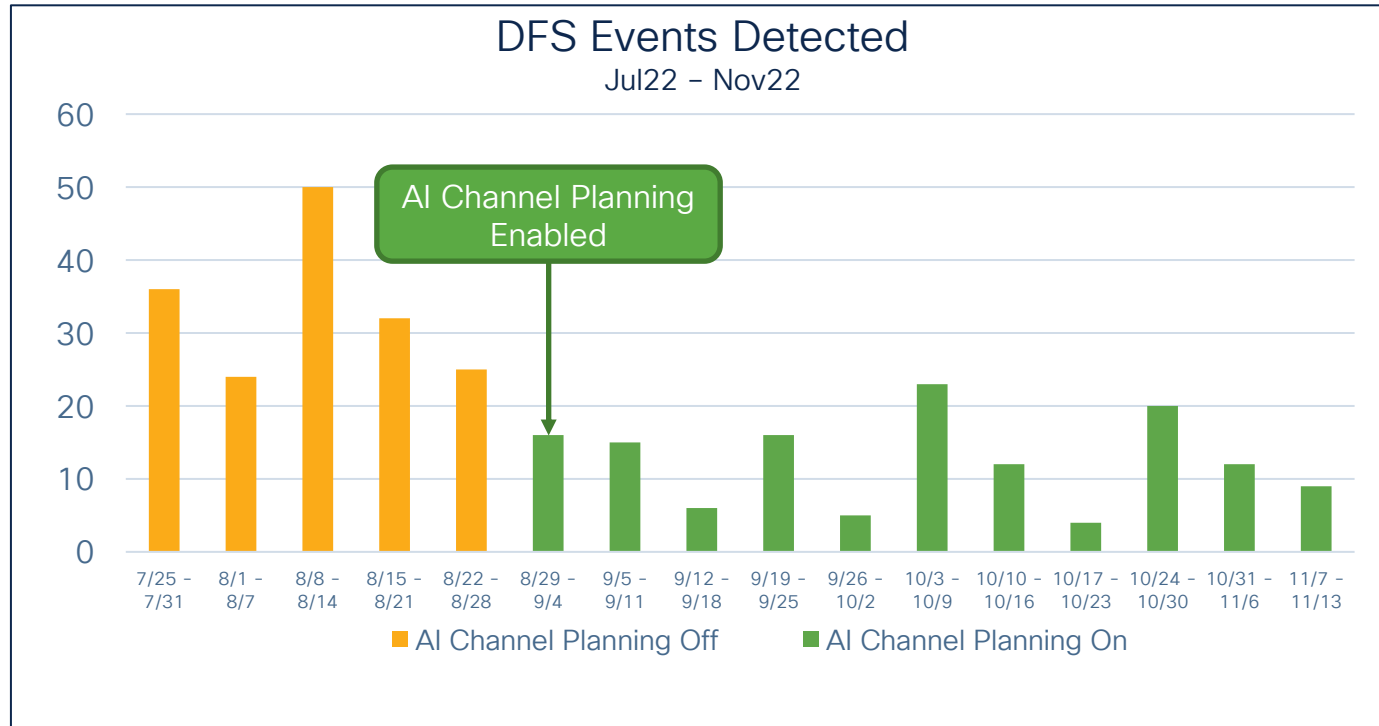
2 RF jammed APs mitigated

2 DFS hit APs mitigated

AP Name	Issue	Band (GHz)	Channel	AI Channel Planning Mitigation	Start Time	End Time
AP1	<None, Frequent DFS Hit, RF Jammed>	<2.4, 5, 6>	<Channel>	<Channel Avoided, Channel Monitored, Feature Disabled>	<Start Time>	<End Time>
AP1	RF Jammed	6	104	Channel Avoided	3/23/23 - 12:45 PM	3/25/23 - 12:45 PM
AP1	Frequent DFS Hit	5	108	Channel Monitored	3/23/23 - 5:45 PM	4/23/23 - 5:45 PM
AP2	RF Jammed	6	100	Channel Avoided	3/23/23 - 5:45 PM	3/27/23 - 5:45 PM
AP3	RF Jammed	6	100	Feature Disabled	N/A	N/A

# AI Channel Planning Reduced DFS Hits by ~50%

Top Consulting Firm in Copenhagen with 135 APs



# What are the options for enabling **Busy Hour**?

Simplicity or control, it's your choice!

**Radio settings** [View old version](#)

Overview RF profiles **Auto RF** ← **New Auto RF Tab**

**Busy hour**  Minimize RF changes during busy hour  
Auto RF will minimize changes during the most active hours of the day ⓘ

**Daily busy hour (UTC-7)**

Auto  
Based on historical data of up to the last 6 weeks ⓘ

05:00 → 04:00

Manual

**Save changes** **Cancel**

Have AI decide for you...

*Derived from 6 weeks of client count & traffic data*

**Radio settings** [View old version](#)

Overview RF profiles **Auto RF**

**Busy hour**  Minimize RF changes during busy hour  
Auto RF will minimize changes during the most active hours of the day ⓘ

**Daily busy hour (UTC-7)**

Auto

Manual

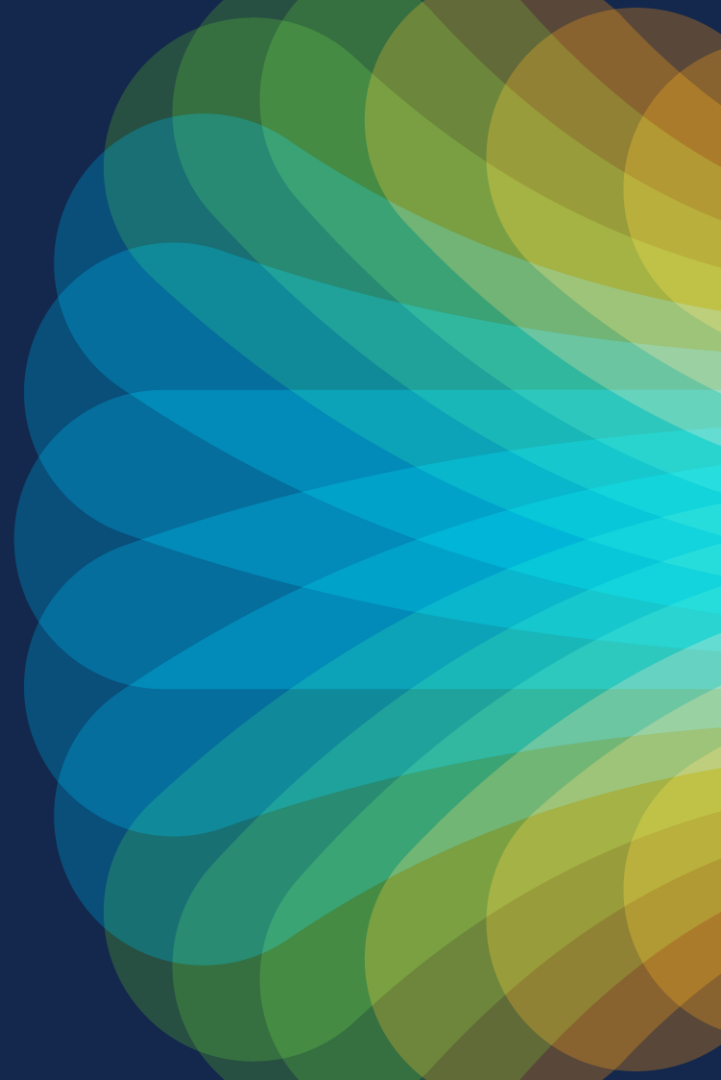
08:00 → 05:00

05  
06  
07  
08

**Save changes** **Cancel**

...or configure time range manually!

# Customer Deployments with AI-Powered AutoRF

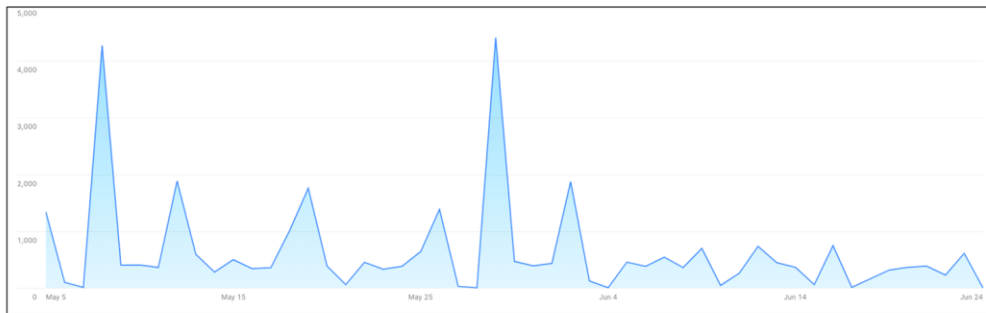


# A Reduction in Channel & Power Changes Meant a Better and More Stable Wireless Experience for Room & Board!

Channel Switch Changes Decrease



Tx Power Changes Decrease

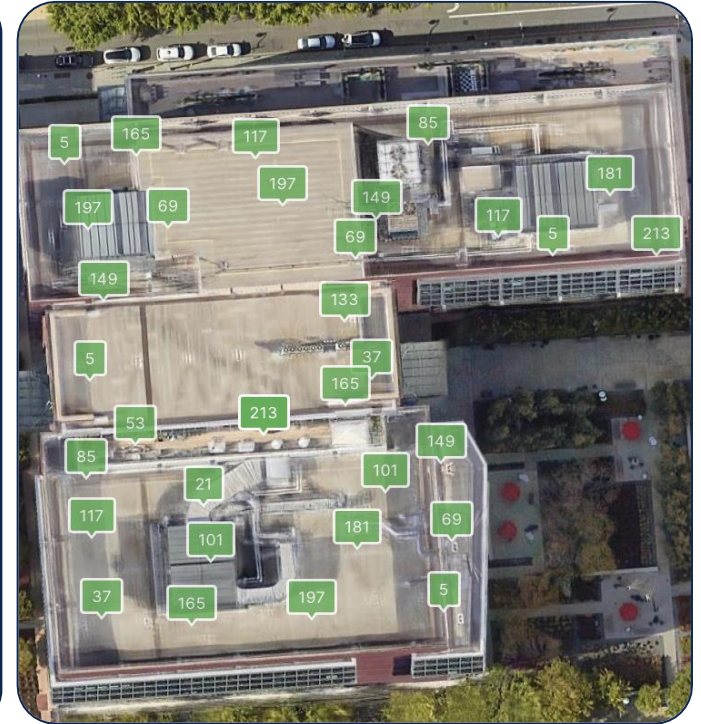


**Once we enabled both Busy Hour and AI Channel Planning, we observed a more stable channel state with far fewer changes among access points, in addition the radio power changes also became steadier.**

**In client experience this has translated to more efficient roaming, less sticky clients, and a decrease in undesirable client behavior like stationary clients floating between access points.**






# Beta Testing AI-Enhanced RRM on Meraki's Corporate Network!

Building:	Meraki SF Corporate Office
Area:	110,000 sq ft
Access Point Count:	143 (319 Radios)
Access Point Type:	MR53, MR56, MR86, CW9164I, CW9166I
Beta Services:	Dynamic Channel Assignment Transmit Power Control Automatic Bandwidth Selection



**Disclaimer:** This Beta is using an early version of AI-Enhanced RRM code. Much larger improvements are expected to be seen when the product is GA!

# Enabling AI-Enhanced RRM Improved the Overall Wireless Experience on All Bands on the Meraki's Corporate Network!

Band	RRM Health Score <small>Calculated by combining key RF metrics</small>		Average Client SNR		RRM Changes
	Before AI-RRM	After AI-RRM	Before AI-RRM	After AI-RRM	
6 GHz	91	100 	36 dB	38 dB 	23% Decrease During Peak Hours
5 GHz	70	76 	39 dB	42 dB 	
2.4 GHz	8	10 	27 dB	27dB	

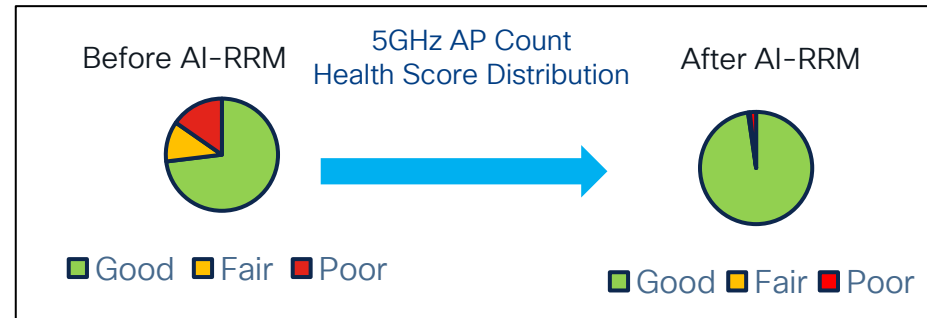
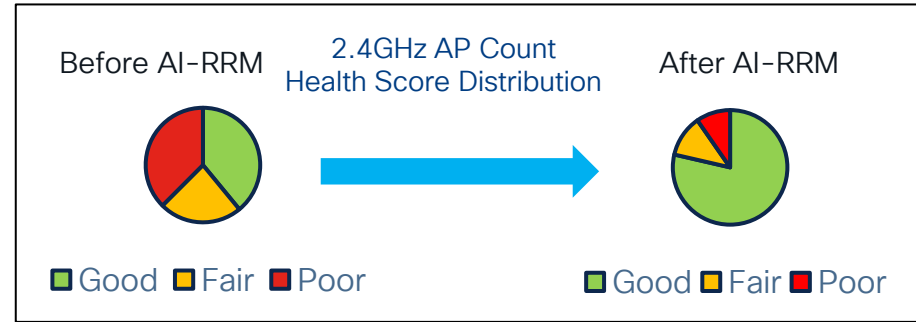
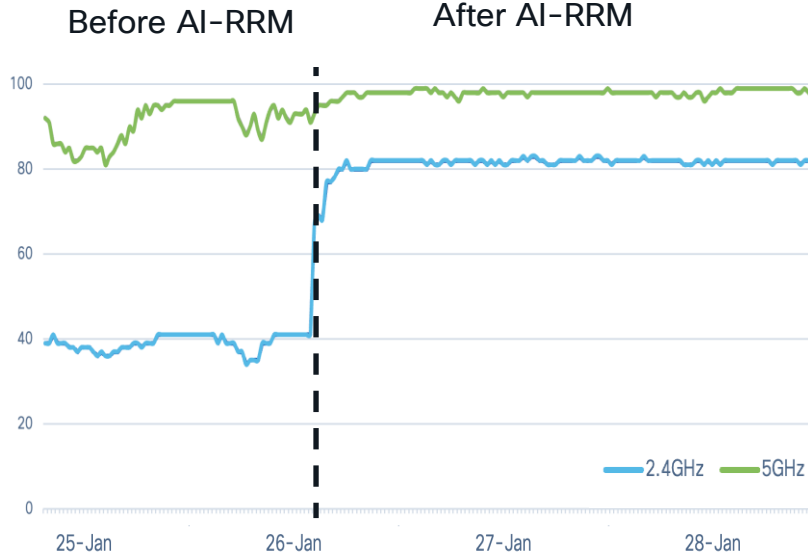
**Roadmap Alert:** The Health Score and SNR of the 2.4 GHz band are slightly lower due to a very high AP density. With Flexible Radio Assignment coming as part of this AI-Enhanced RRM integration, major improvements in this band are expected, stay tuned!

# AI-Enhanced RRM Significantly Improves Channel Distribution

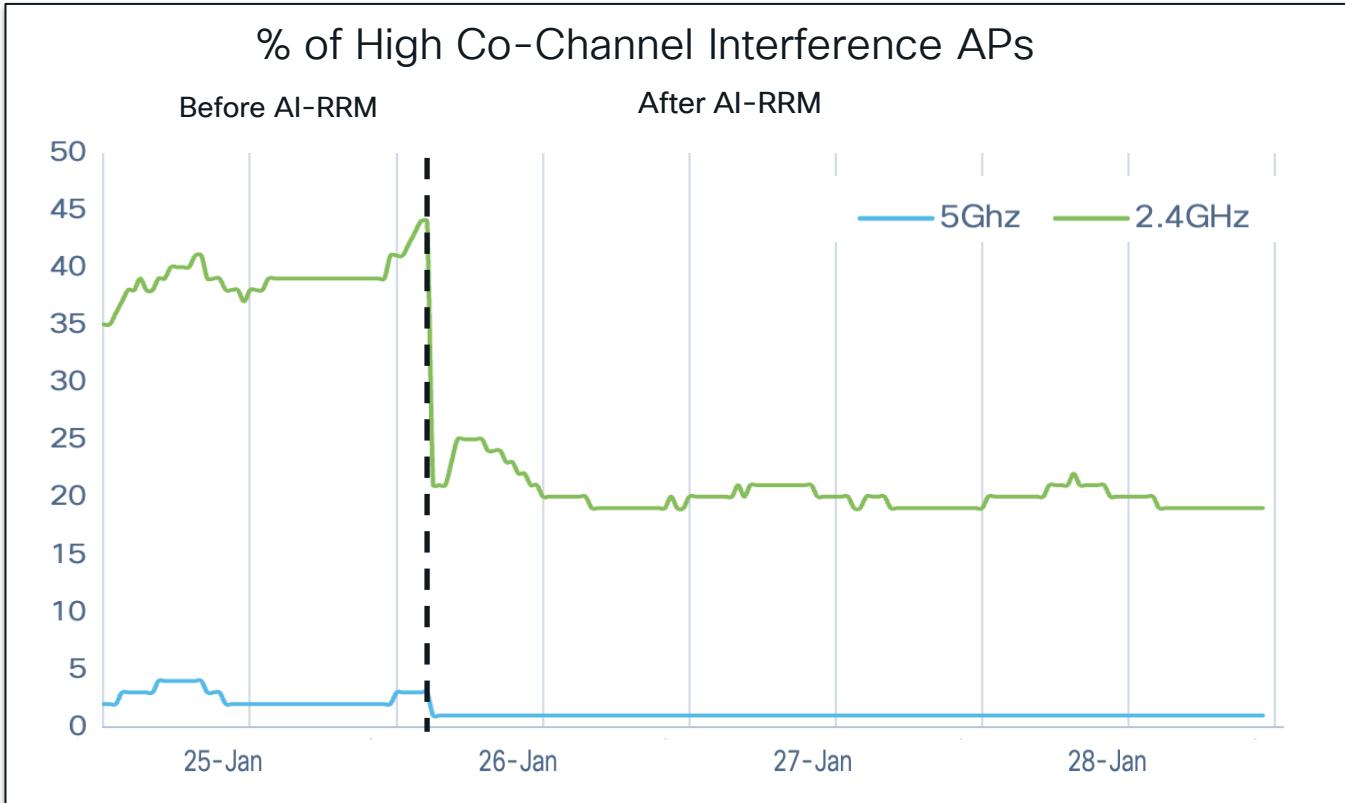


# Trend-Based RRM Improved a Large Japanese University Network of 776 APs in Just Three Days!

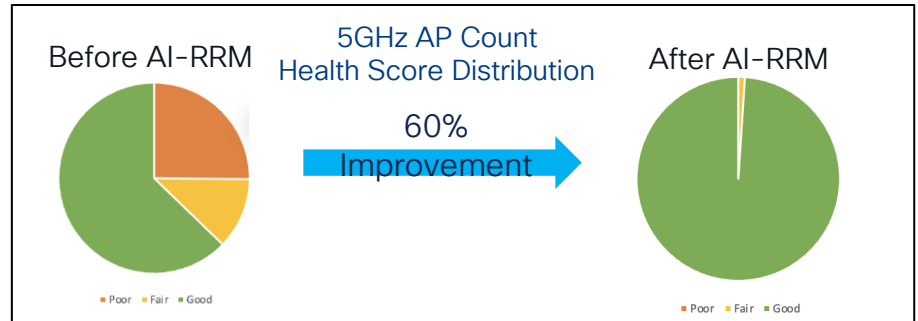
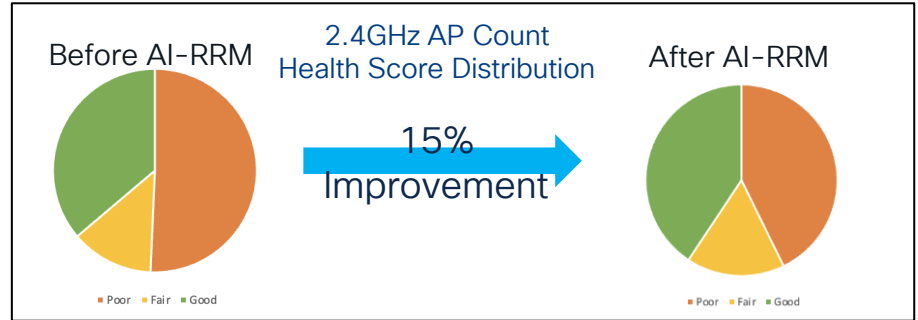
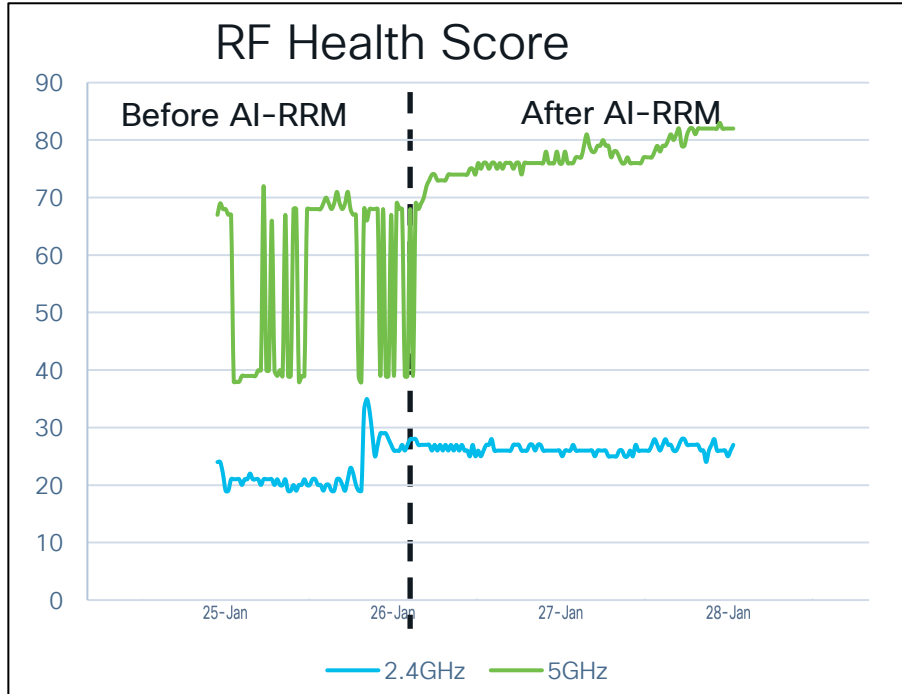
## RF Health Score



# Trend-Based RRM Improved a Large Japanese University Network of 776 APs in Just Three Days!



# Trend-Based RRM Improved a Another Japanese University with 290 APs



Day 1

# AI Network Analytics



**Meet Alex, a professional facing WiFi issues. Frustrated by poor connectivity, Alex seeks a solution. Join us as we explore the journey to resolve Alex's WiFi problems.**



# Unleash AI Network Analytics

## to Prioritize, Optimize, and Remediate with AI

**Predictive Analytics/Self-Heal**  
Anticipate and Prevent Failures

 AI-Enhanced RRM


 Wireless Data Collection Machine Reasoning Engine

**Comparative Analytics**  
Compare KPIs Internally and to Peers

**Peer Comparison**

 Network Comparison

**Trends and Insights**  
Proactive exploration plus system generated insights

 Event Analytics

 AP Performance Advisories

 Network Insights

 Network Heatmaps

**Personalized Anomaly Detection**  
Separate normal from abnormal and show RCA

 AI-Driven RCA

**Dynamic Baselining**  
Define Normal for a Given Network

 Baselines

# Cisco AI Network Analytics

Leverage AI to Proactively Mitigate Risks with Patterns and Trends



Proactive Exploration



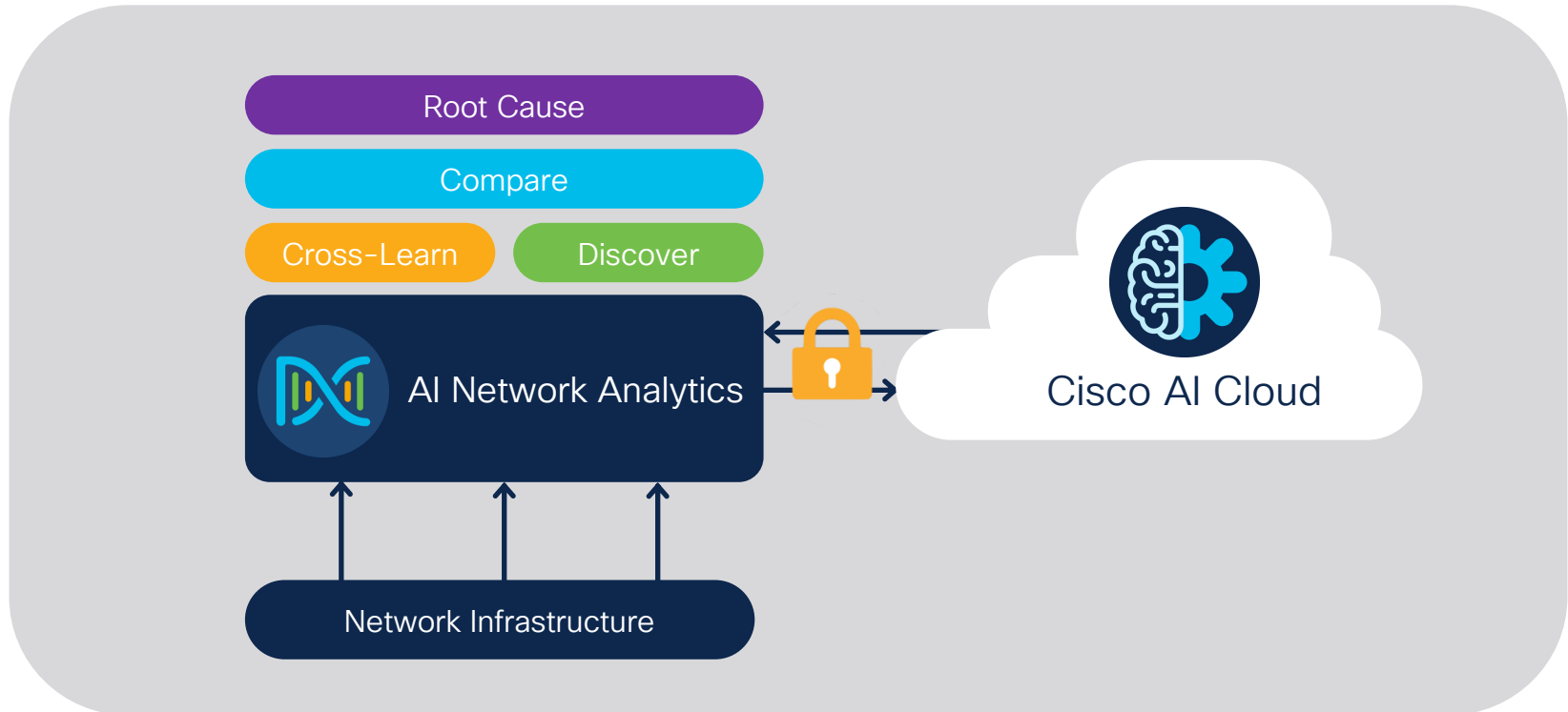
System Generated Insights



Comparative Analytics

# Cisco AI Network Analytics Architecture

Proactively Discover and Root Cause Your Issues



# AI-Driven Dynamic Baseline

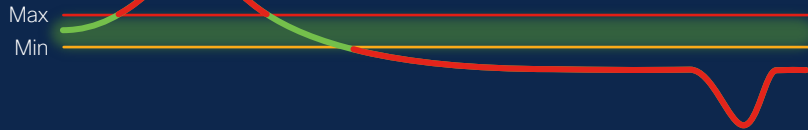
Learn About the Issues that Really Matter

Custom Thresholds = False Positives

Environment 1



Environment 2

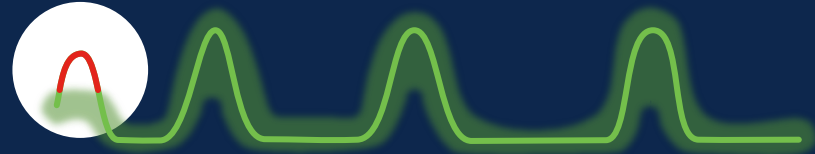


Environment 3



AI-Driven Dynamic Baselines = Relevant Anomalies

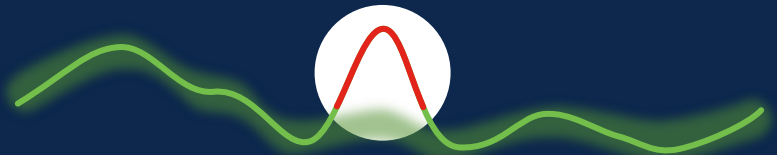
Environment 1



Environment 2



Environment 3



# Cisco AI Network Analytics

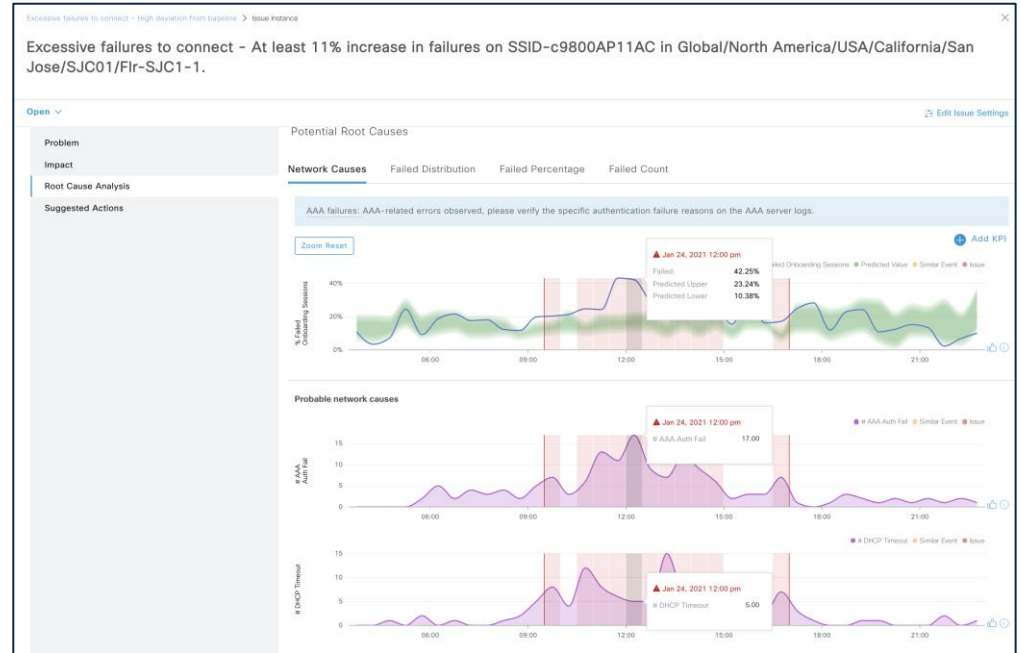
## Feature Summary



### AI Driven Issues

Discover and Root Cause network risks and anomalies from the AI-generated baselines

13 KPIs: Onboarding & Throughput



# Cisco AI Network Analytics

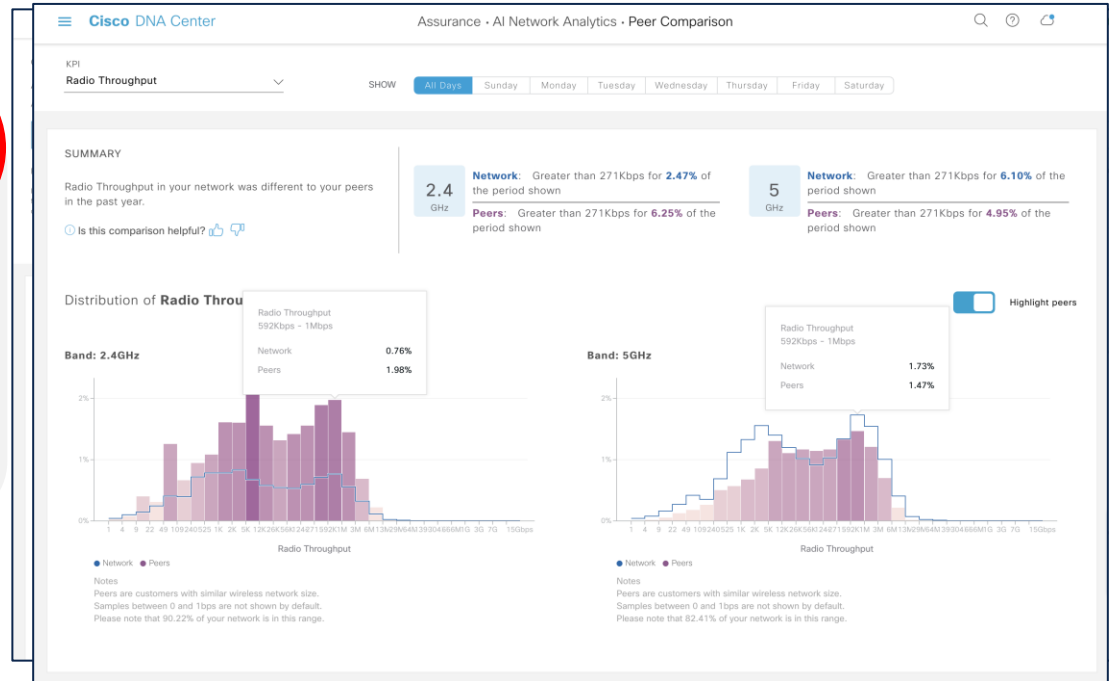
## Feature Summary



### Peer Comparison

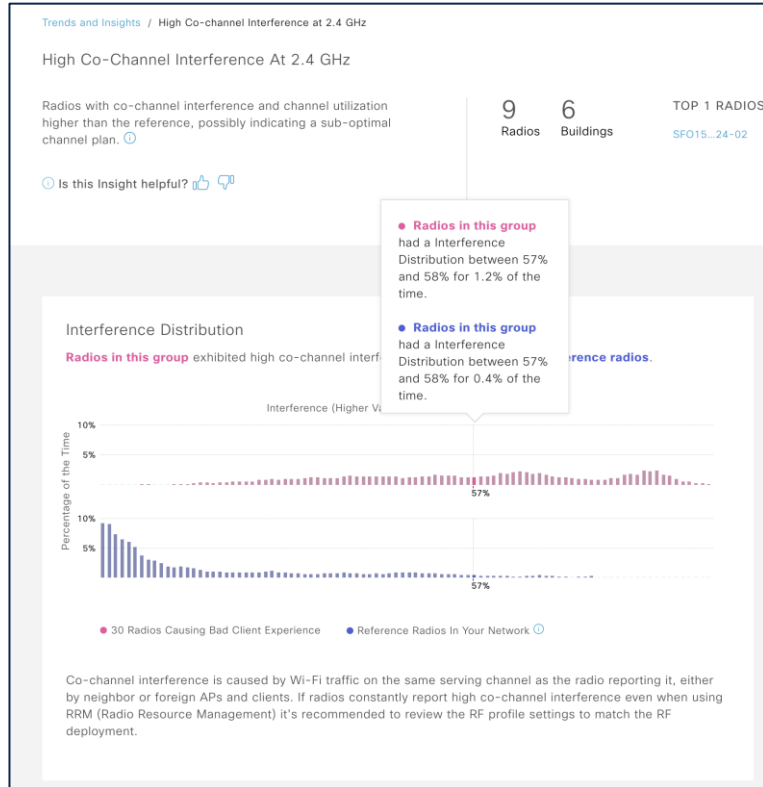
Benchmark your network Performance against thousands of similar networks

6 KPIs: RF & Throughput



# AP Performance Advisories

## Leverage AI to Group APs Giving Poor Client Experience from 2.2.3 & 2.2.2.4



### Pain Points

No view into groups of APs causing poor client experience due to similar reasons.

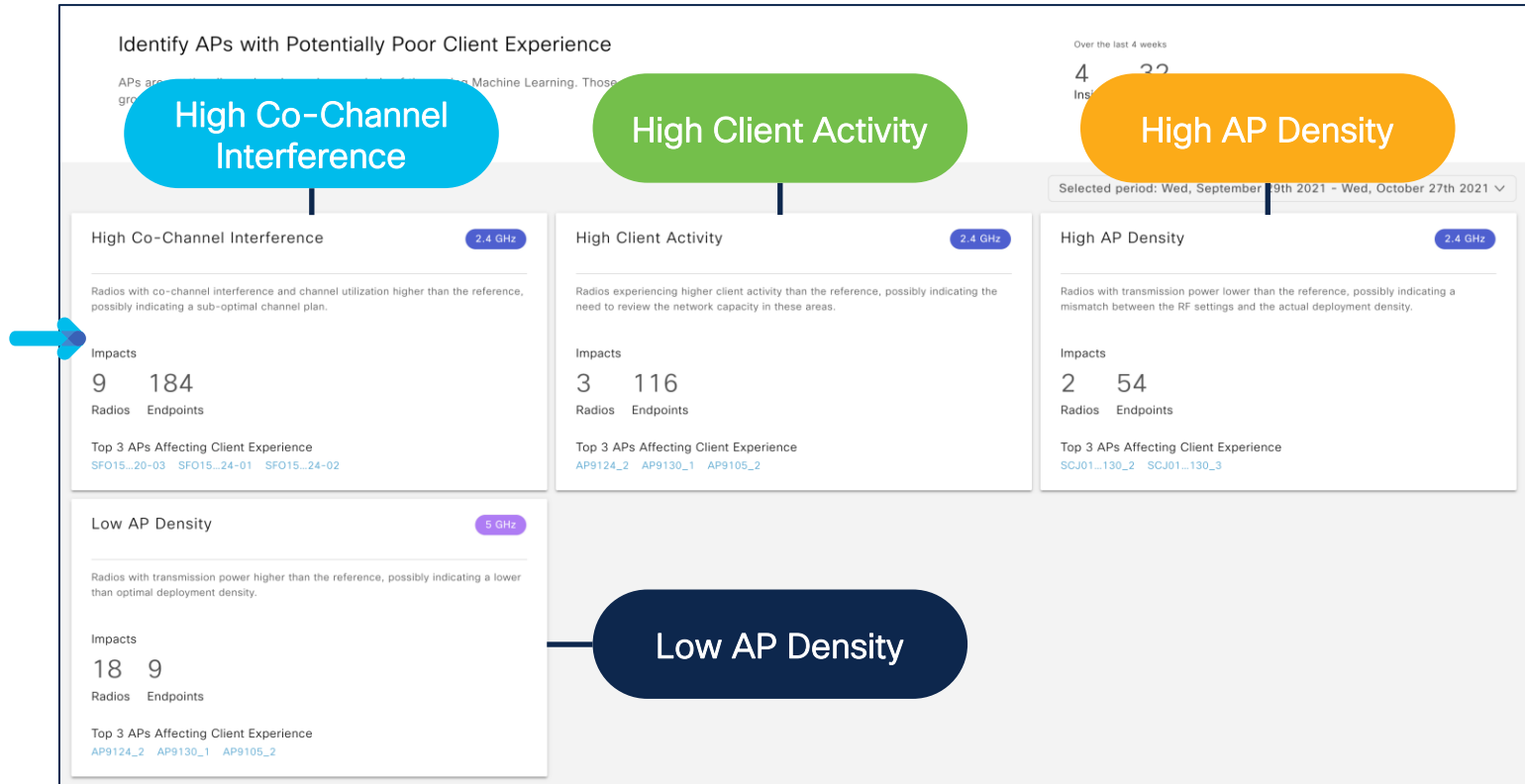
### Feature Capability

Leverages AI to analyze 4 weeks of data to group APs and provides impact and root causes.

### Customer Benefits

Identify poor performing groups of APs and mitigates potential risks more efficiently.

# AI-Driven AP Performance Advisories



# Wireless Troubleshooting with AIOps

Alex tried to google how to fix the WiFi and found a gazillion types of issues and solutions to fix the issue. What could it be?



Day 1

# Site Analytics

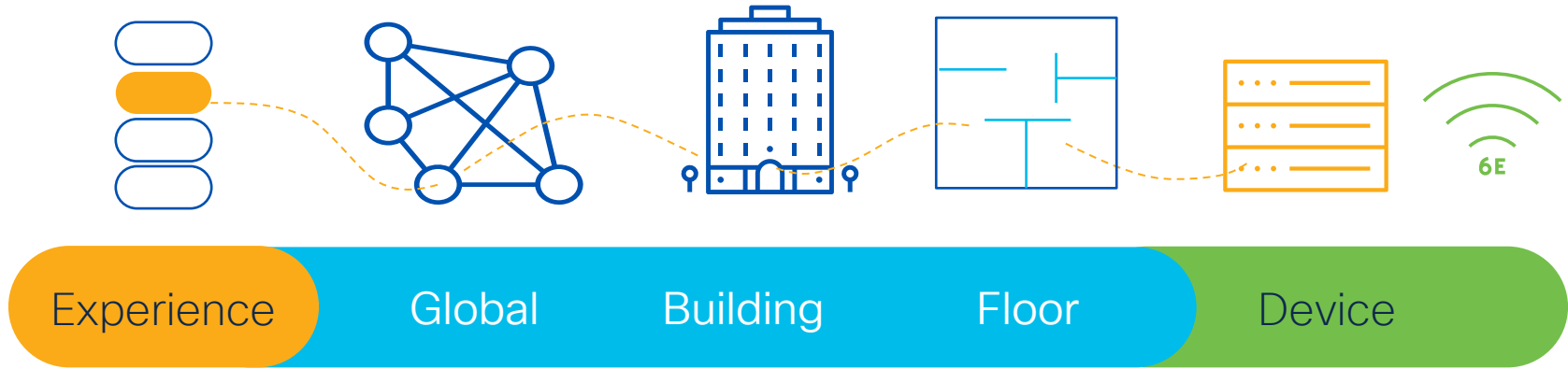


# Use Case- Proactive Insights of the wireless environment



# Focus on End User Experience with Site Analytics

Visualize Critical Wireless SLAs from global to Endpoint Level

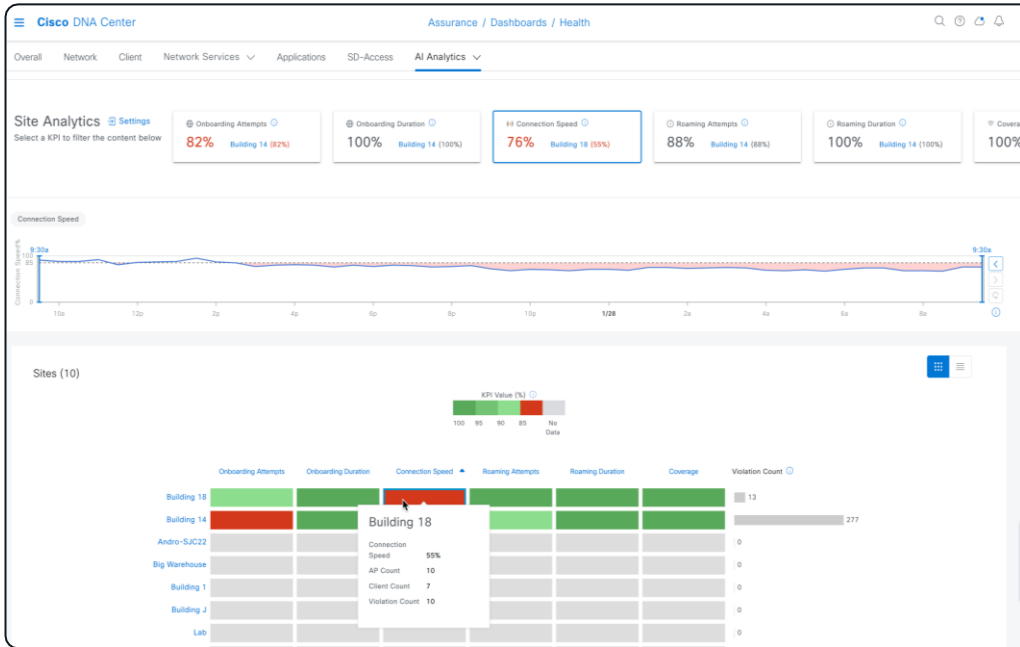


SLAs Personalized to your network

Critical SLAs such as onboarding speed, connection speed, and coverage visualized at every level!

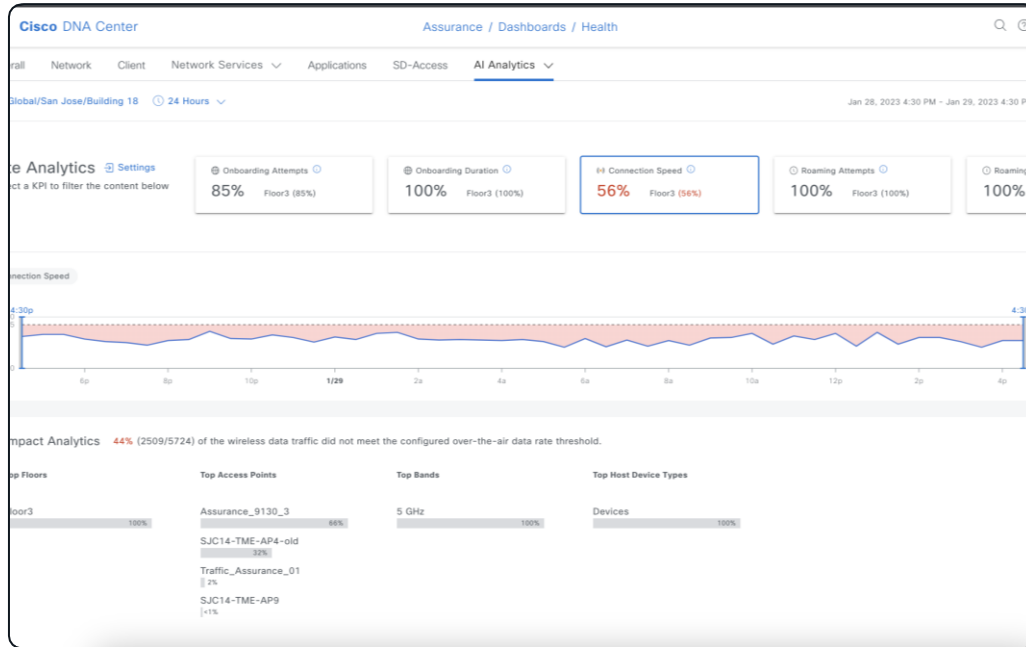
Isolate Problem Devices Supporting Up to Wi-Fi 6 & 6E

# Network experience from a Global to Endpoint level with Site Analytics



Global view of per-site Wireless experience via SLAs

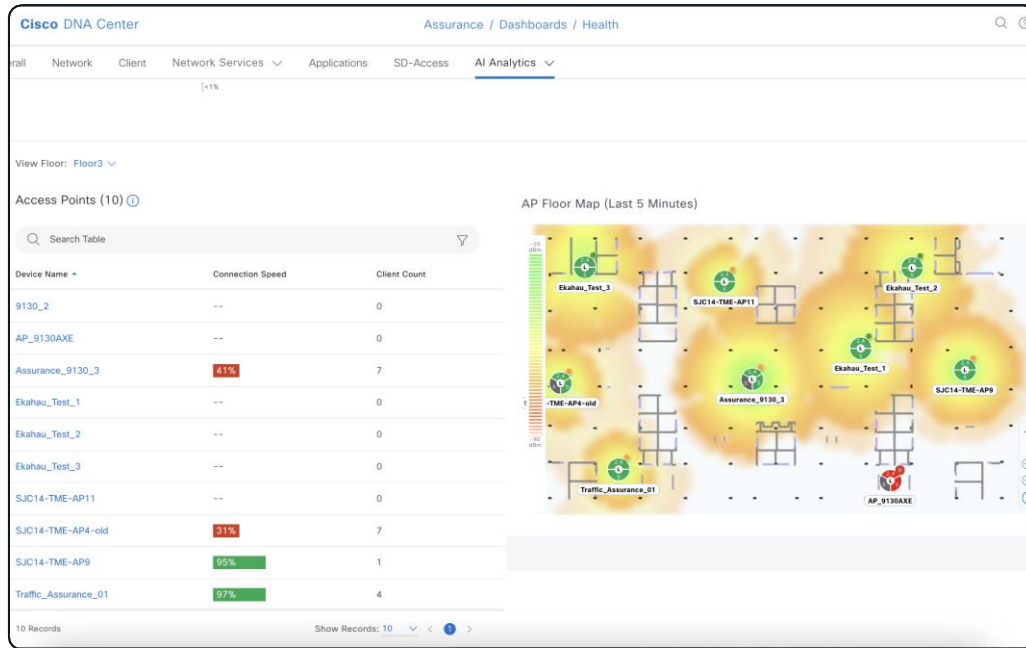
# Network experience from a Global to Endpoint level with Site Analytics



Global view of per-site Wireless experience via SLAs

Building view of KPI trendline and Impact Analysis

# Network experience from a Global to Endpoint level with Site Analytics



Global view of per-site Wireless experience via SLAs

Building view of KPI trendline and Impact Analysis

Floor view device level KPIs with heat map

Day 1

# Troubleshooting with Assurance

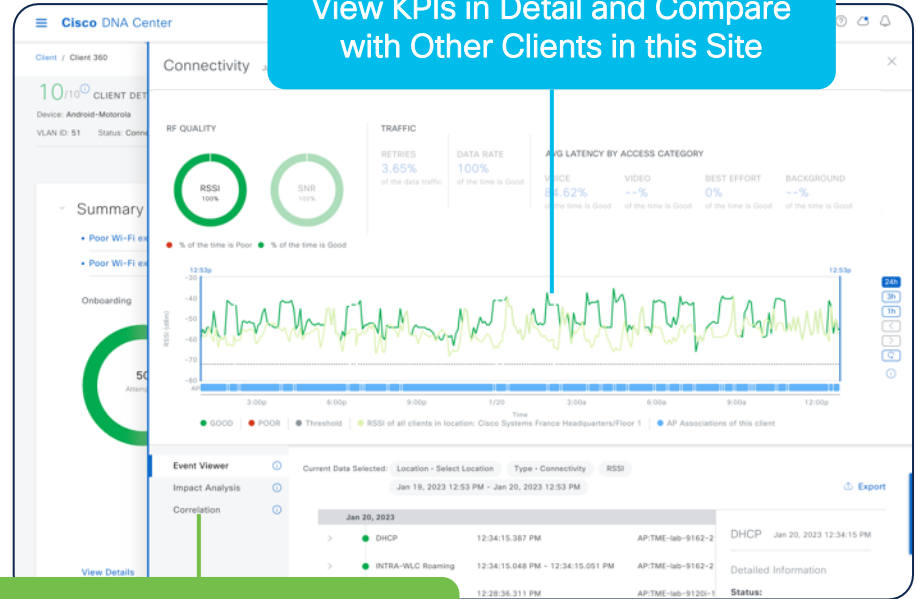
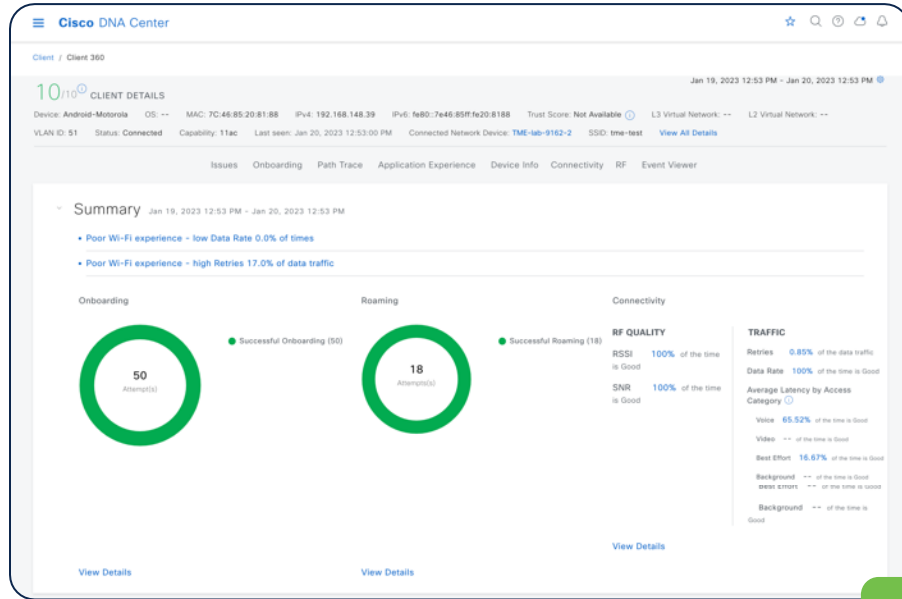
## A View of All Things Networking

Reactive  
Troubleshooting of  
wireless client  
connectivity/latency is  
sues



# Enhanced Troubleshooting on the Client 360!

## Critical KPIs that Define Wireless Experience from v2.3.6



View KPIs in Detail and Compare with Other Clients in this Site

Correlate KPIs with Onboarding Events and Other KPIs

# Intelligent Capture to Support Packet Capture in 6 GHz Unencrypted Data Packet Capture for Wi-Fi 6E from 2.3.2

1 Enable Globally

The screenshot displays the Cisco DNA Center interface for Intelligent Capture. At the top, the page title is "Intelligent Capture: bruce". Below this, there's a timeline showing a capture period from 6:59p to 7:25p on May 22. A "Run Packet Capture" button is highlighted with a blue arrow and the number "1".

In the foreground, a "Data Packet Captures" window is open, showing a table of captured packets:

First Packet Time	Last Packet Time	Type	Duration (h:ms)	Size	Download
May 22, 2022 7:58:20 PM	May 22, 2022 7:59:10 PM	Wireless	00:00:50	12 KB	<a href="#">Download</a>

A blue arrow points to the "Download" link in the table, accompanied by the number "2".

Below the table, a packet capture viewer is shown, displaying a list of captured packets. A blue arrow points to a specific packet (No. 100), with the number "3" next to it. The packet details are expanded, showing:

- Frame 100: 224 bytes on wire (1792 bits), 224 bytes captured (1792 bits)
- Header revision: 0
- Header flags: 0
- Header length: 48
- Present flags: None
- MAC timestamp: 159133498940818
- Flags: none
- Channel frequency: 5248 [A 48]
- Channel flags: 0x0140, orthogonal Frequency-Division Multiplexing (OFDM), 5 GHz spectrum
- Antenna signal: -60dbm
- Antenna noise: -187dbm

# Intelligent Capture Captures 6 GHz Packets

Data, live, and anomaly packet capture inline on the serving radio from 2.3.2



Powered by CleanAir Pro

1 Enable globally

View unencrypted 6-GHz data packets

3

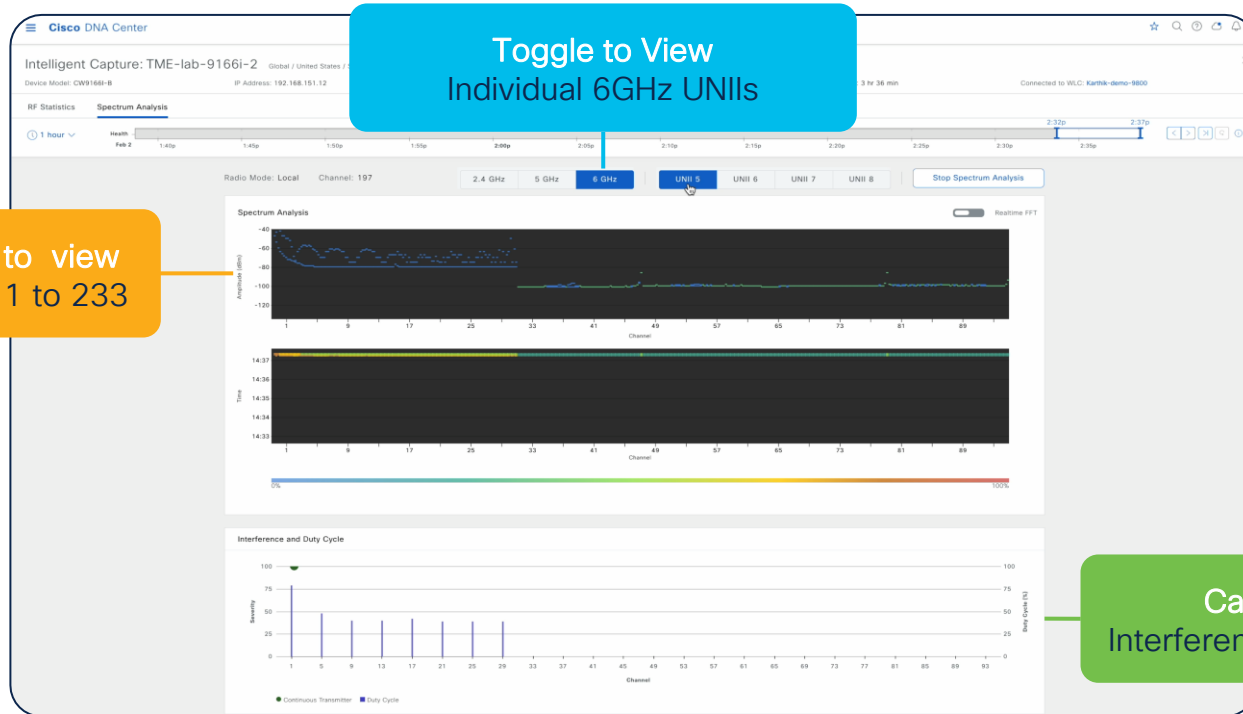
2 Download packets

The screenshot displays the Cisco DNA Center interface for Intelligent Capture. The top navigation bar shows 'Cisco DNA Center' and 'Assurance - Dashboards - Health - User 360'. The main content area is titled 'Intelligent Capture: Grace.Smith' and includes a 'Run Data Packet Capture' button and a 'Download' button. A 'Data Packet Captures' table is visible, showing a list of captured packets with columns for 'First Packet Time', 'Last Packet Time', 'Type', 'Duration (h:m:s)', 'Size', and 'Download'. The table shows a single entry for a wireless capture on Nov 15, 2020, at 11:53:23 am, with a duration of 00:33:20 and a size of 10 MB. Below the table, a detailed view of a captured packet is shown, including the packet structure and a hex dump. The packet is identified as a 'Wired' type and contains data from a client location of 'Global(San Jose)'. The packet structure shows a 'Wired' type with a duration of 00:33:20 and a size of 10 MB. The hex dump shows the raw data of the packet, including the MAC address and other protocol fields.

# Get a Spectrum view of all the bands in Network 360



Powered by CleanAir Pro



Toggle to View Individual 6GHz UNII's

Capable to view channels 1 to 233

Capture 6 GHz Interference and Duty Cycle

Day N

# OTA Sniffer



# Introducing OTA Sniffer with Intelligent Capture



Capture All Packets on AP Supported Bands from 2.3.6!



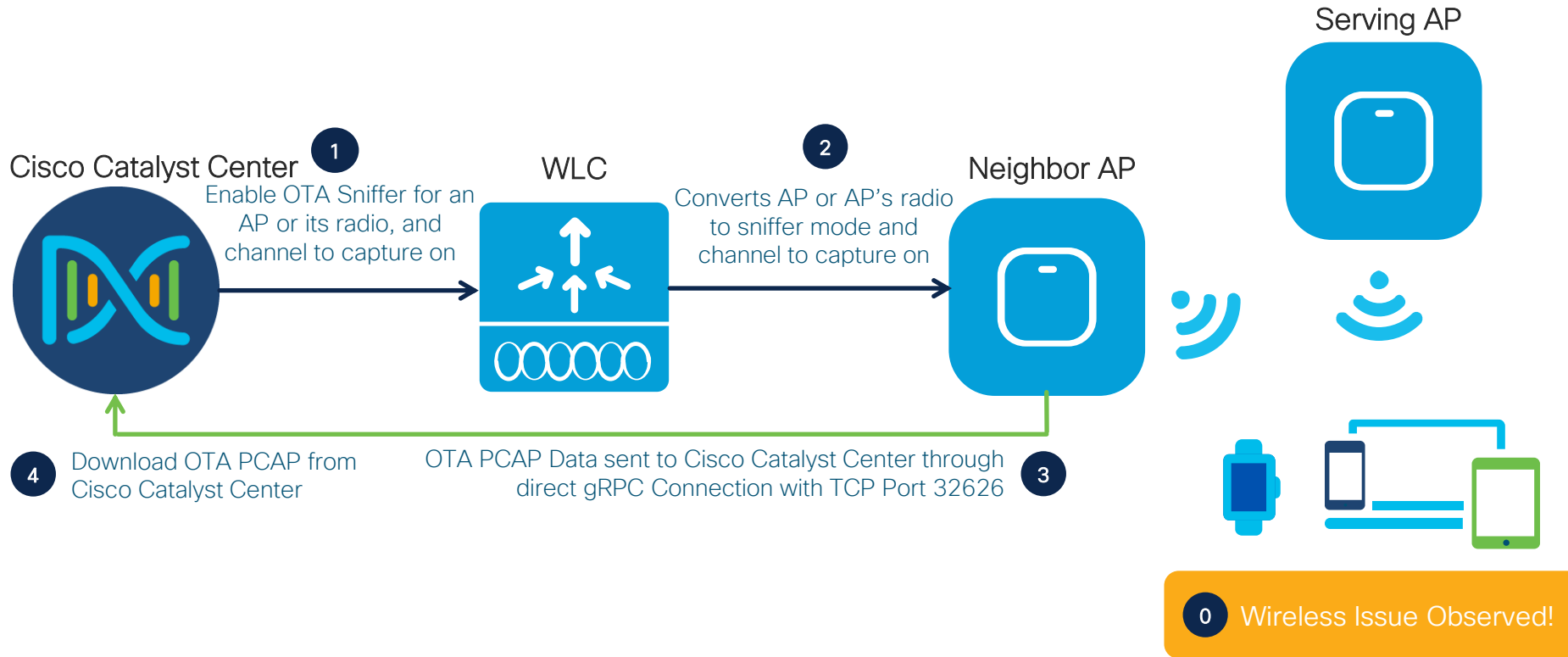
1

Perform OTA channel packet capture from anywhere in your wireless network remotely.

2

Diagnose wireless roaming, non-roaming, and any other issues at the channel level.

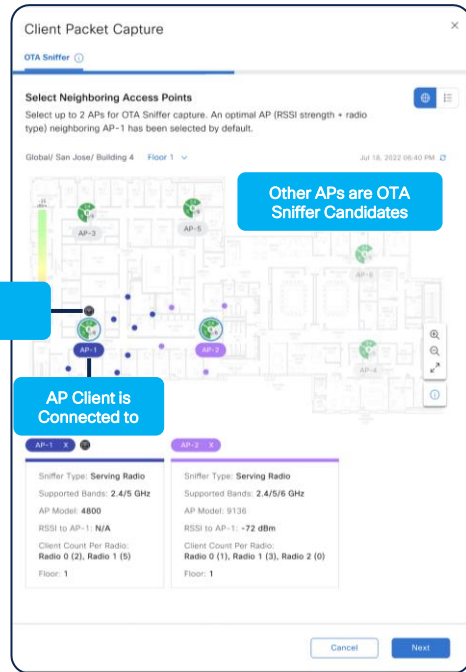
# Intelligent Capture OTA Sniffer Topology



# Next Level Serviceability with the OTA Sniffer Capture

Intelligent Capture can now capture ALL packets on a defined band from 2.3.6!

1 Start OTA PCAP on **Client or AP 360** and Select Up to 2 APs



2 Define Radio and Band to Capture and Start it!



3 Download the OTA PCAPs Directly on the Page!



# Event Analytics

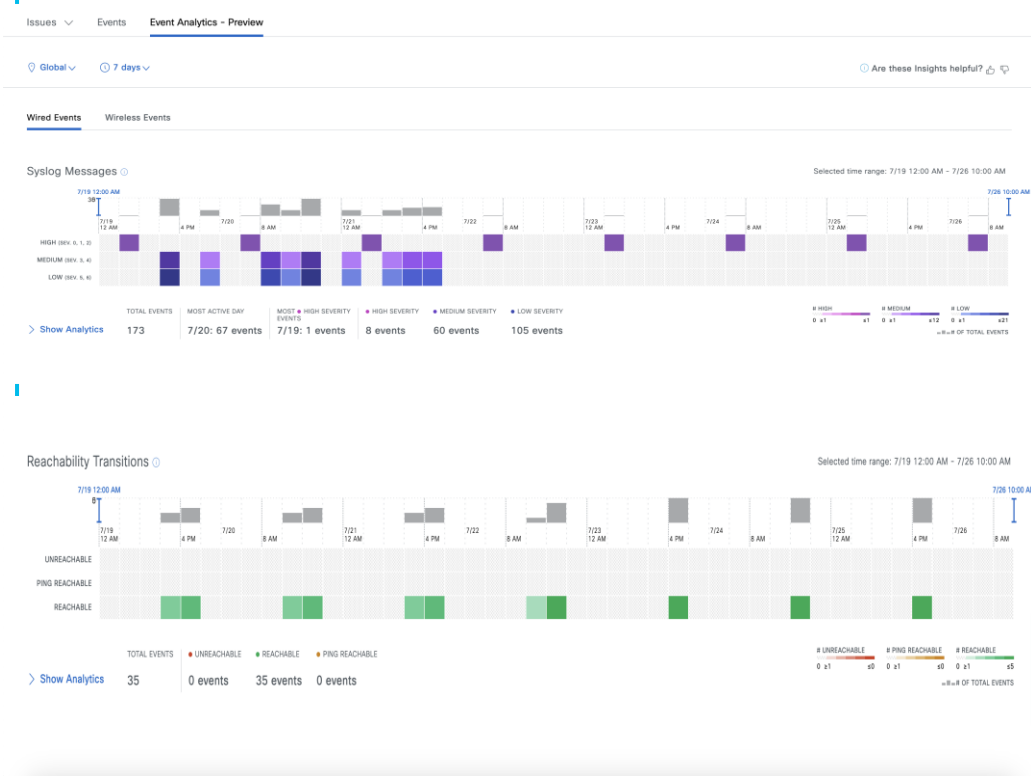
## Challenge/Pain Points

- As a network administrator I would like the events dashboard to be more interactive and provide comprehensive analytics and powerful visualisation of the network events. It should provide valuable insights into network performance, security, and troubleshooting

## Feature Capability

- Event Analytics aggregates and processes event data, extracting relevant metrics and generating insightful analytics.
- It offers a user-friendly interface that allows users to explore data visually through intuitive graphs and charts to allow specific focus on areas of the network, time periods and event types of interest
- Type of events supported are Syslog and Reachability

## Assurance -> Issues and Events -> Event Analytics - Preview



# Machine Reasoning Engine for Wireless Serviceability

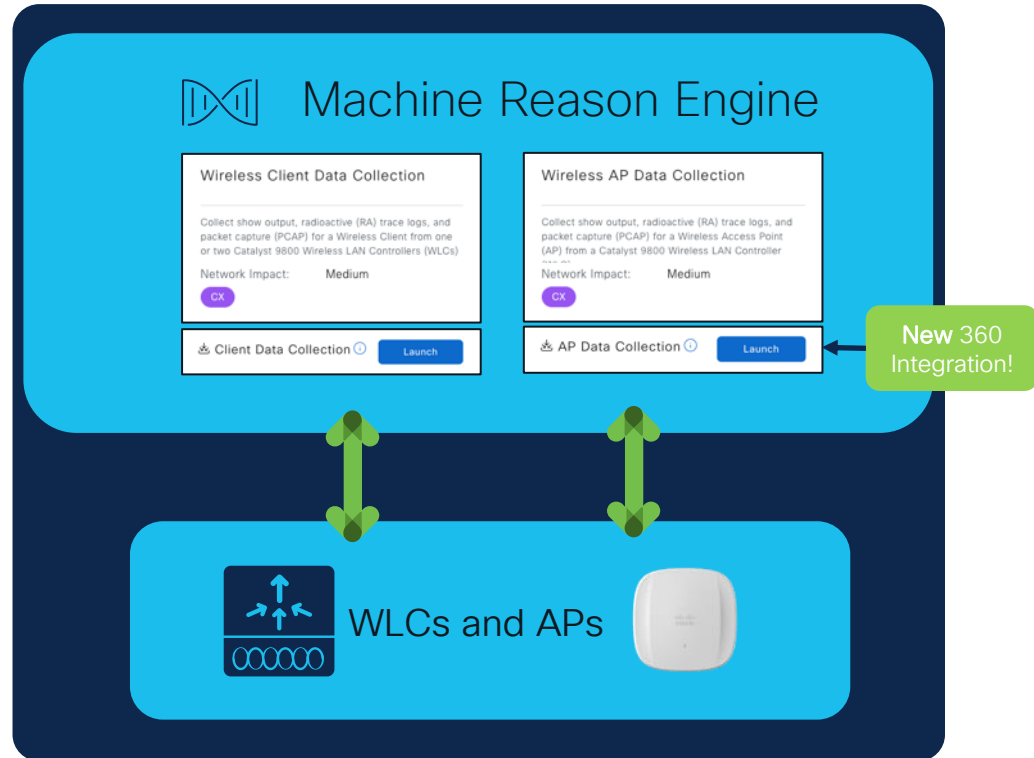
## With Client and AP Data Collection Catalyst Center v2.3.6

### Use case:

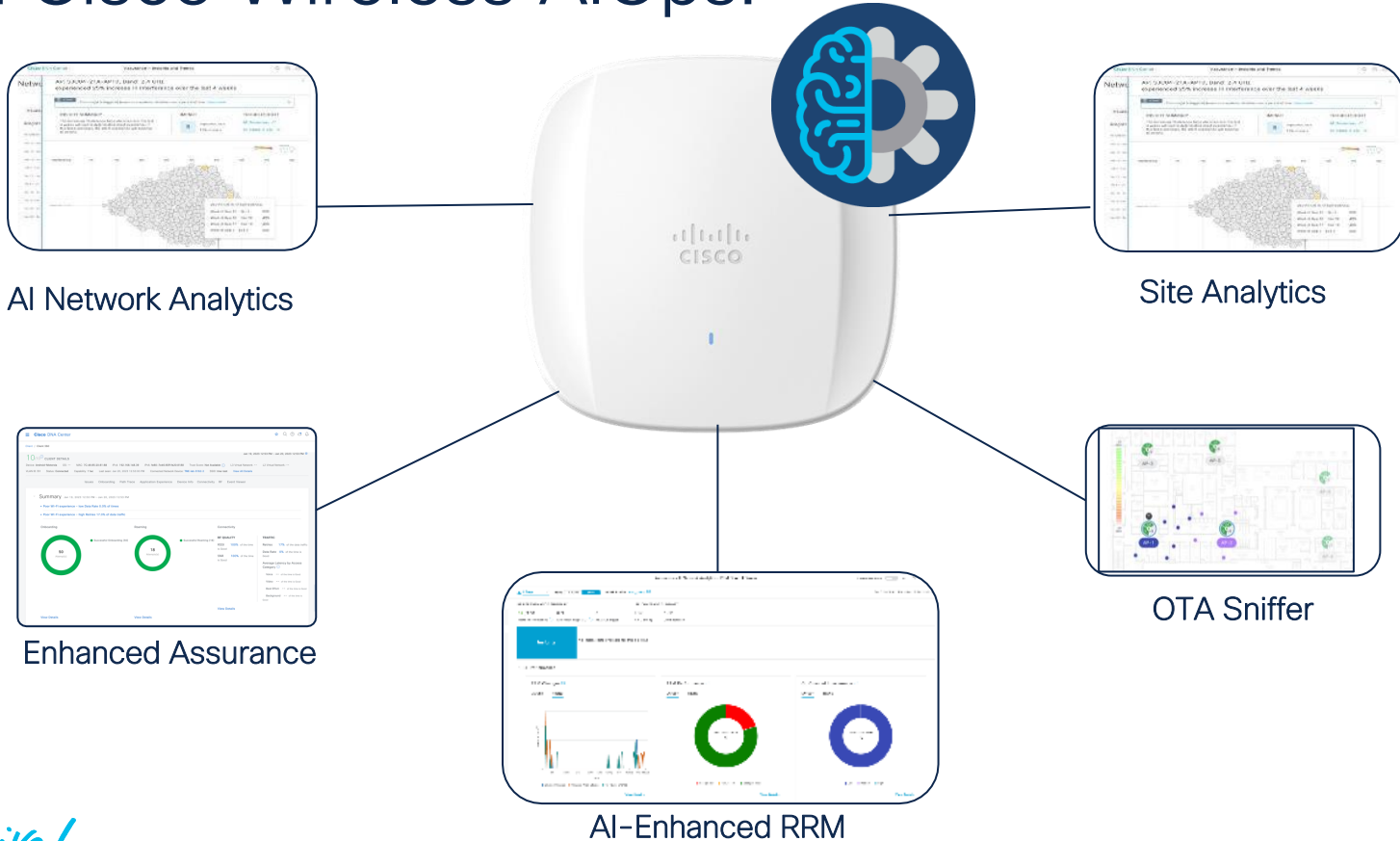
Cisco Catalyst Center can grab AP and Client debug logs needed for troubleshooting via the Wireless Client and AP Data Collection MRE Workflows on the Network Reasoner page.

### Key Benefits:

- Significantly improves serviceability experience as logs are collected for you and made available directly on the MRE UI.
- No need to manually SSH into WLC/APs, run CLI/Debug commands then copy paste logs into .txt files any longer.
- Integration into Client and AP 360 page under tools from Cisco Catalyst Center v.2.3.7.



# Unleash the True Potential of Your Wireless with Cisco Wireless AIOps!



# Networking

## Wireless Automation & Troubleshooting

Learn from experts on wireless topics such as automation and analytics for enterprise wireless networks, and best practice in troubleshooting wireless networks from speakers who are at the forefront of wireless innovation. You will understand our AI/ML strategy for Cisco Wireless.

START

Monday, February 5 | 2:15 p.m.

**TECEWN-3369**

TAC stories : WiFi networks that save lives...and your job

Tuesday, February 6 | 8:00 a.m.

**BRKEWN-2014**

Meraki Wireless AIOps - An Intuitive AI Solution to Optimize Wi-Fi at Scale !

Tuesday, February 6 | 4:45 p.m.

**BRKEWN-2029**

Cisco Wireless AIOps

Wednesday, February 7 | 4:00 p.m.

**BRKEWN-2097**

Monitoring Catalyst Wireless with the Meraki Dashboard

Thursday, February 8 | 10:45 a.m.

**BRKEWN-2667**

Cisco Wireless Supercharged by Cisco Catalyst Center - The Ultimate Guide to Bring Your Wireless Operation to the Next Level

Thursday, February 8 | 1:30 p.m.

**BRKEWN-2043**

Saving Energy and Money with Your Cisco Wireless Network

Friday, February 9 | 9:00 a.m.

**BRKEWN-3628**

Troubleshoot Catalyst 9800 Wireless Controllers

Friday, February 9 | 11:00 a.m.

**BRKEWN-2399**

Meraki Wireless from a Troubleshooter Perspective

Friday, February 9 | 11:00 a.m.

**BRKEWN-3006**

Keep your Catalyst 9800 & AP-COS Wireless Network Healthy, with Wireless Config Analyzer Express and other Advanced Tools

FINISH

# Networking

## Wi-Fi 6/6E

Learn from experts on wireless topics such as WiFi6 and WiFi6E standards enhancements. You will understand what you need to know about designing for 6GHz, migrating from AireOS to Catalyst 9800 or to Cloud management with Meraki. You will understand how to design your enterprise wireless network using Cisco on-premise, cloud or hybrid portfolio.

START

Monday, February 5 | 8:45 a.m.

**TECEWN-2234**

Demystify Wi-Fi : because fundamentals matter

Tuesday, February 6 | 11:30 a.m.

**BRKEWN-2339**

Catalyst 9800 Configuration Best Practices

Tuesday, February 6 | 1:30 p.m.

**BRKEWN-1742**

7 Ways to Fail - on Wi-Fi 6(E)

Tuesday, February 6 | 2:45 p.m.

**BRKEWN-2094**

Successfully Configuring Catalyst 9800 Wireless on Your First Shot

Wednesday, February 7 | 8:30 a.m.

**BRKEWN-2087**

High Density Wi-Fi Design, Deployment, and Optimization

Wednesday, February 7 | 10:30 a.m.

**BRKEWN-2024**

Architecting Next Generation Wireless Network with Catalyst Wi-Fi 6E Access Points

Thursday, February 8 | 10:30 a.m.

**BRKEWN-1538**

Internet of Things on the Next Generation Cisco Catalyst Wireless Wi-Fi 6E Access Points

Thursday, February 8 | 3:00 p.m.

**BRKEWN-3413**

Advanced RF Tuning for Wi-Fi6E with Catalyst Wireless: Become an Expert, while getting a little help from AI

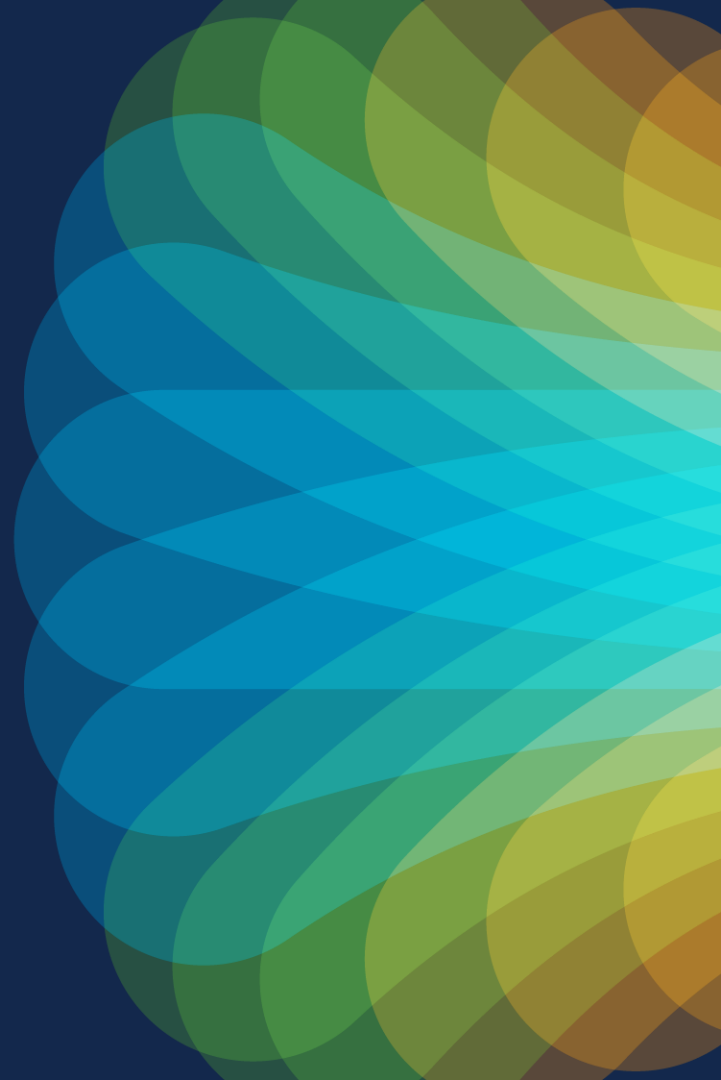
FINISH



The bridge to possible

# Thank you

CISCO *Live!*



The Cisco Live! logo features the word "CISCO" in a bold, black, sans-serif font, followed by "Live!" in a black, cursive script font. The background of the entire image is a vibrant, multi-colored abstract pattern of overlapping, wavy bands in shades of red, orange, yellow, green, and blue, creating a sense of motion and energy.

CISCO *Live!*

Let's go