AI-Powered Wifi7 for Optimized Network Operations

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Agenda

- Introduction
- Wireless Assurance Update
- RF Optimization
- Client Assurance
- Wireless Infrastructure RCA with AI
- AI Assistant for Wireless
- Conclusion

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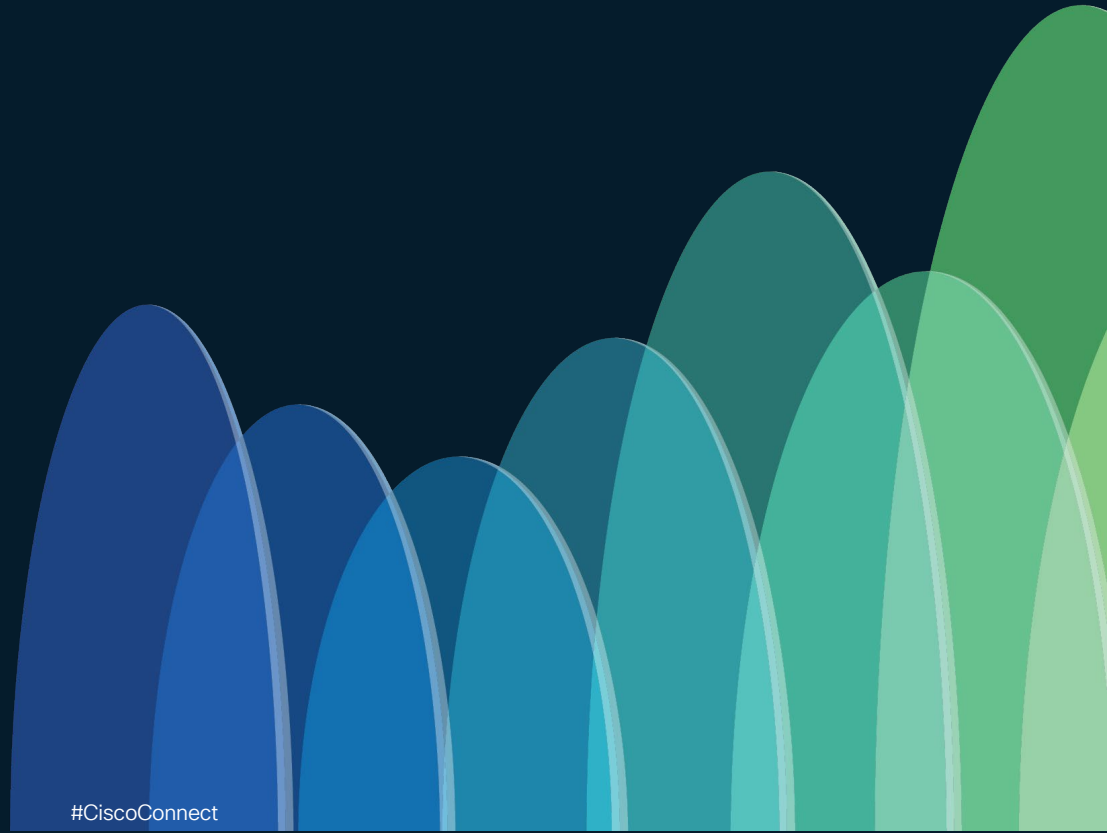
Wi-Fi 7 Update



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Intelligent, secure, and assured wireless for the future-proof workplace

Cisco Wi-Fi 7

Next-Level Unified Hardware

Resilient Wireless
for digital transformation

Spaces – the operating system for smart spaces. Delivering outcomes out of the box

Global Use AP for efficient, smart operations: No more regulatory domains!

Unified Licensing and Support

Location services with UWB, GNSS/GPS

Sustainable product experience

The Wi-Fi 7 portfolio

CW9176I

CleanAir® Pro

12 Spatial Streams
4x4: 4 MU-MIMO
across 3 radios, 3 bands
(2.4/5GHz (XOR), 5 GHz, 6GHz)

BLE/IoT and dedicated scan radio

Single 10Gbps multigigabit

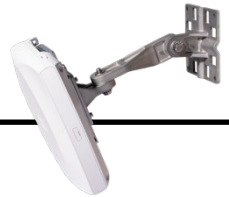
Ultra Wide Band (UWB)

USB 2.0 – 9W

Accelerometer

Built-in GPS/GNSS, w/ support for ext. antenna

Integrated Omnidirectional Antenna



CW9176D1

CleanAir® Pro

12 Spatial Streams
4x4: 4 MU-MIMO
across 3 radios, 3 bands
(2.4/5GHz (XOR), 5 GHz, 6GHz)

BLE/IoT and dedicated scan radio

Single 10Gbps multigigabit

Ultra Wide Band (UWB)

USB 2.0 – 9W

Accelerometer

Built-in GPS/GNSS, w/ support for ext. antenna

Integrated Directional Antenna (70x70)

CW9178I

CleanAir® Pro

16 Spatial Streams
4x4: 4 MU-MIMO
across 4 radios, 3 bands
(2.4 GHz, dual 5GHz, 6GHz)

BLE/IoT and dedicated scan radio

Dual 10Gbps multigigabit

Ultra Wide Band (UWB)

USB 2.0 – 9W

Accelerometer

Built-in GPS/GNSS, w/ support for ext. antenna

Integrated Omnidirectional Antenna

Same brackets as always

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The Latest Wi-Fi 7 portfolio

NEW

CleanAir® Pro

CW9172I

6 Spatial Streams
2x2:2 across 3 radios, 3 bands
(2.4GHz, 5GHz, 6GHz)
-or-
2x2:2 on 2.4GHz and 4x4:4 on 5GHz

BLE/IoT and dedicated scan radio

Single 2.5Gbps multigigabit uplink

USB 2.0 – 4.5W

DC Power Jack

Integrated Omnidirectional Antenna

NEW

CleanAir® Pro

CW9172H

6 Spatial Streams
2x2:2 across 3 radios, 3 bands
(2.4GHz, 5GHz, 6GHz)

BLE/IoT and dedicated scan radio

Single 2.5Gbps multigigabit uplink

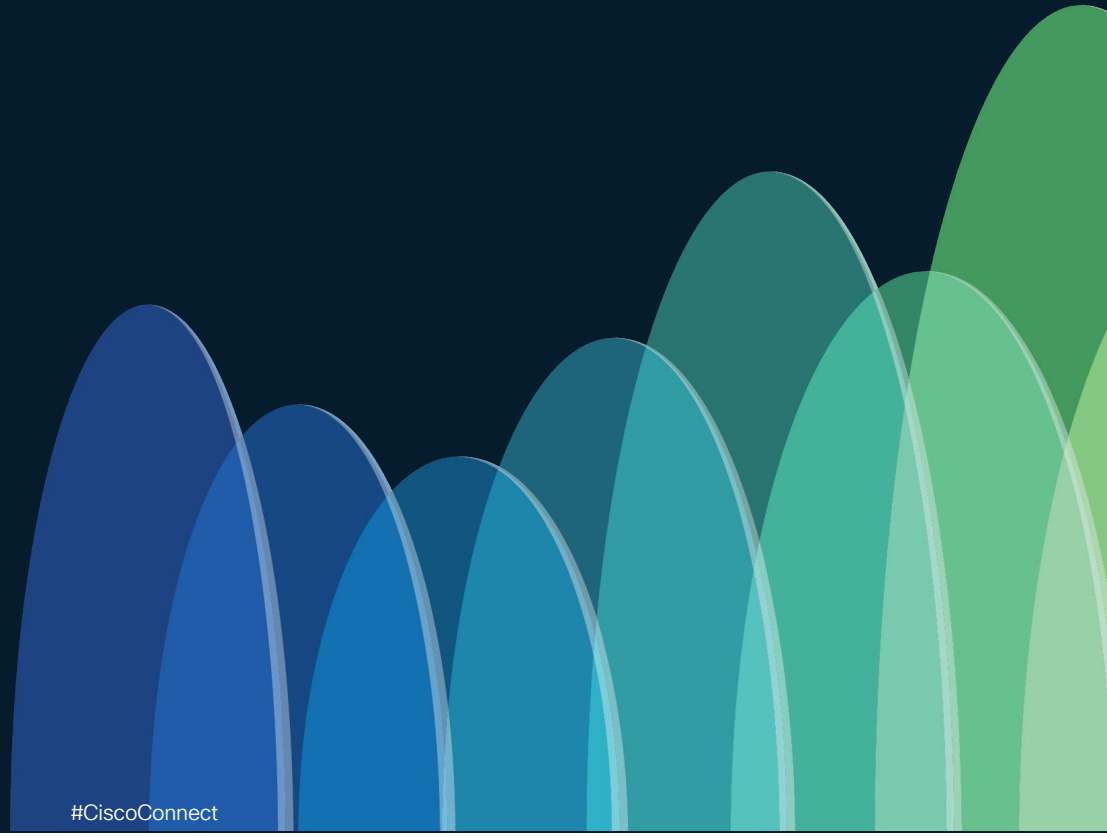
3x 1Gbps LAN port with 1x POE out

1x Passthrough port

Integrated Omnidirectional Antenna

Same brackets as always. 9172H compatible with Meraki or Catalyst brackets

Wireless Assurance Update



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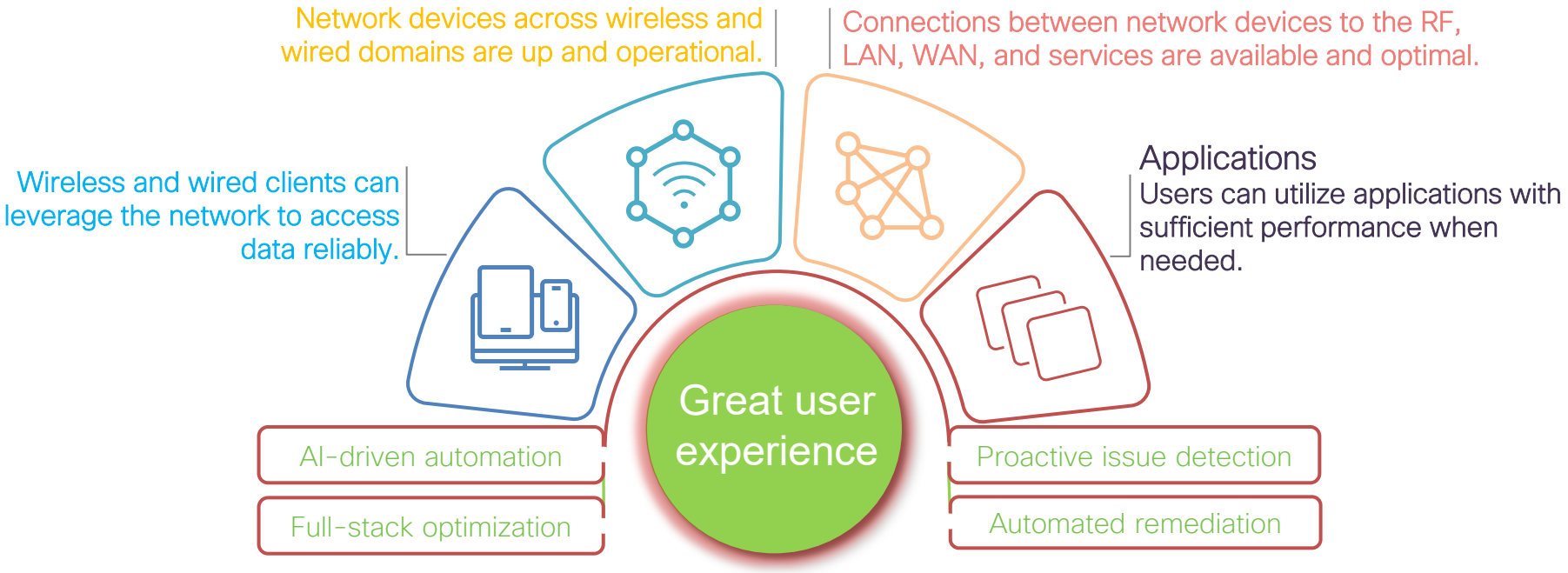
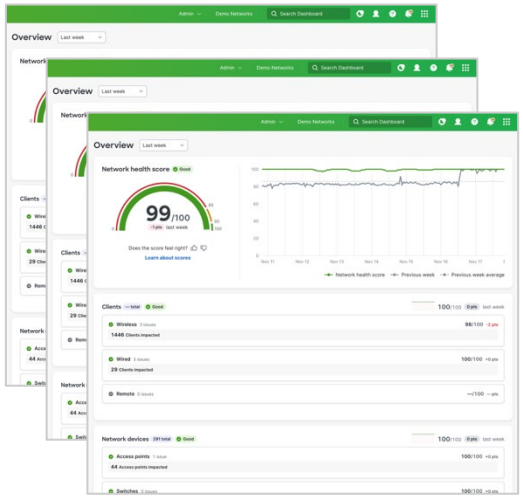
Assurance focus areas and vision



AIOps & Assurance enables great user experiences.

Expanded Org-level assurance view

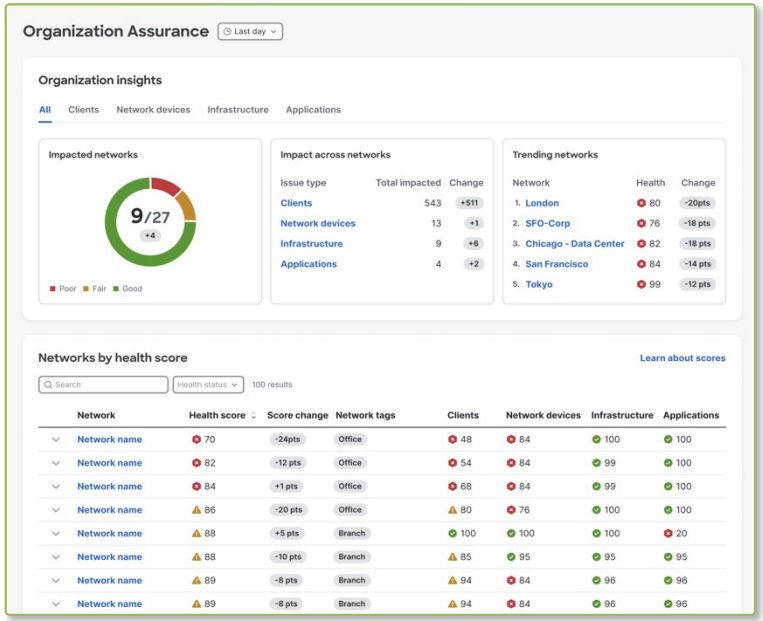
Network-wide Assurance



Network to -> Client or Device-level drill down

Org-wide Assurance

In-Beta



Org-level discovery workflow

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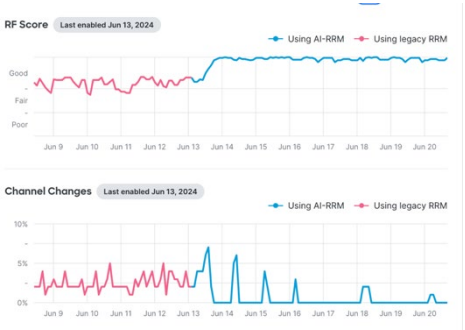
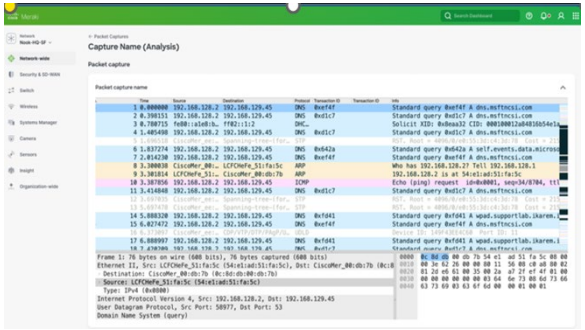
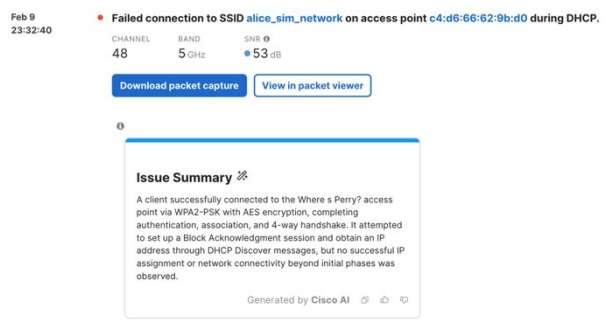
Improving operation efficiency…



Visible impact of Before & After AI-RRM





AI-RRM

- Using AI to tune and select channels best suited for your network
- Learning your network usage patterns to auto determine busy hours
- Optimizing to enhance client experience

Intelligent Packet Captures

- Complex troubleshooting made simple
- Save expensive issue recreation cycles

AI Packet Analyzer

- AI based RCA derived from packet captures
- Simple to consume based on evidence

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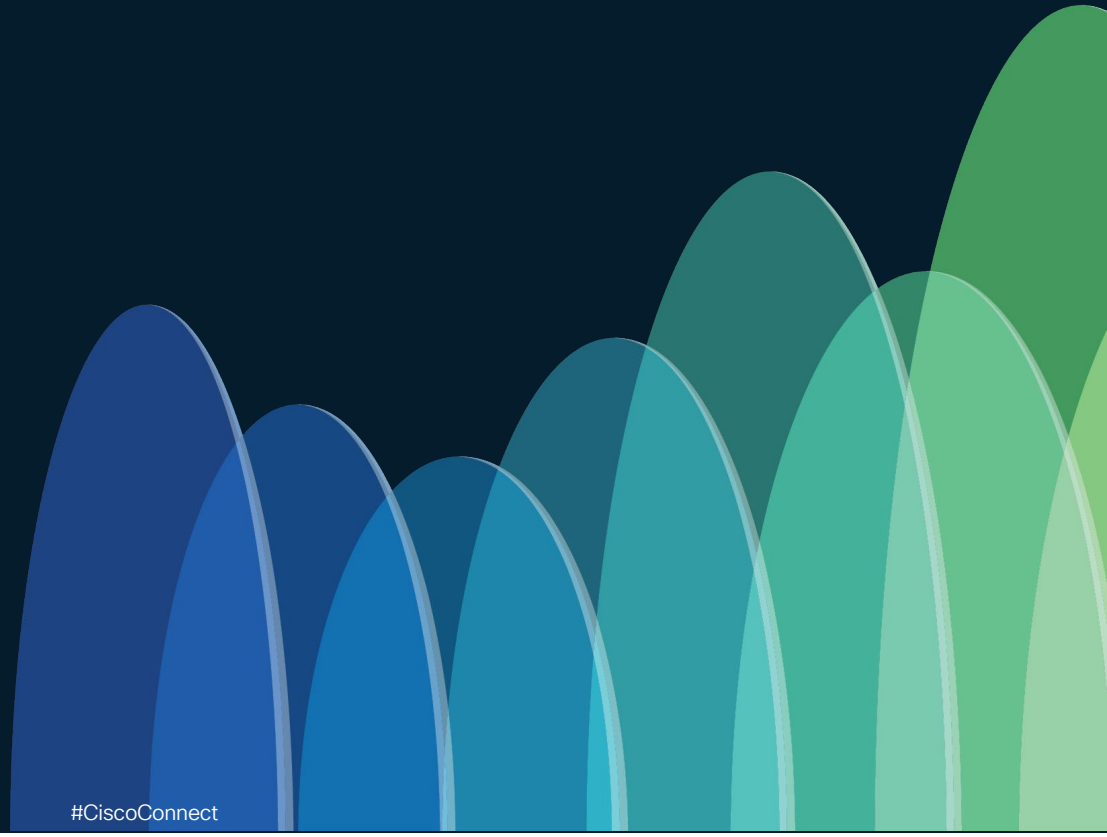
RF Optimization



What is radio resource management?

RRM is a Radio config optimization features that constantly update wireless's RF configurations to improve wireless performance.

Some examples

- Busy Hour, AI Channel Planning
- Transmit Power Control (TPC)
- Dynamic Channel Assignment (DCA)
- Dynamic Band Selection (DBS)

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Why AI-RRM

Better Connection

Improved SNR using AI-based TPC/DCA

Improved Application

Avoided Interferences

Wire-like

Reduce Ch. Changes to 1/100

AI RF Optimization works at every steps of Wi-Fi experience

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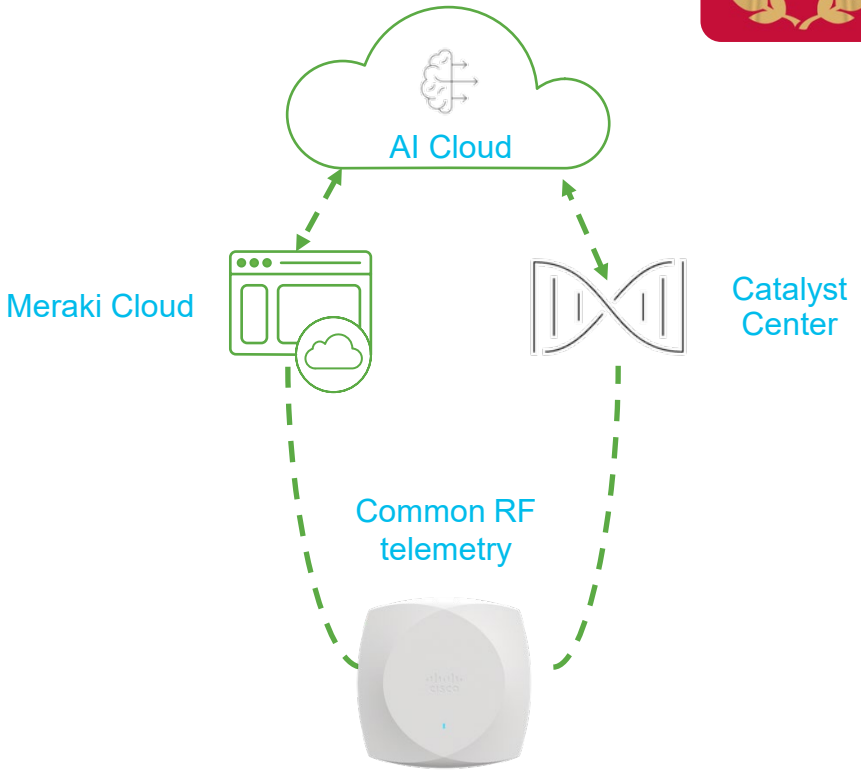
AI-RRM with Cisco Wireless

Path to autonomous Wi-Fi

RF Intelligence powered by the unified AI cloud

- Interferences reduction
- Reduced Channel Changes
- Client Experience Improvement
- Wi-Fi Performance Improvement

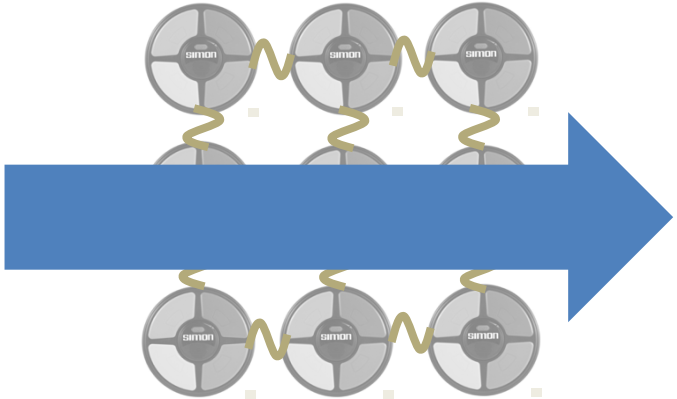


AI-RRM leapfrogs decades of innovations

Gen.1 Per-AP RRM

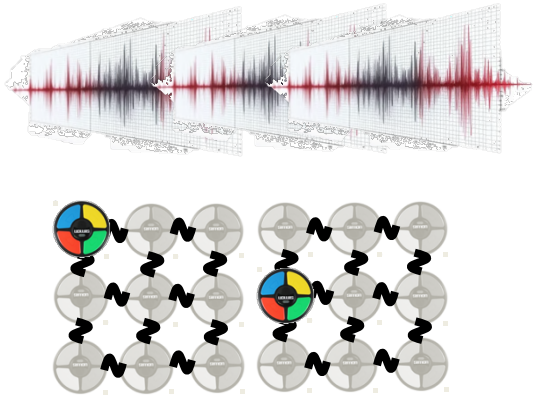
- Each AP makes own RF changes independently, at own timing
- Cascading RF changes could introduce infinite change-loops

Gen.2 Snapshot RRM



- All APs in the same building (RF group) makes RRM decision all at once
- No cascading effect
- 10~15min, short scanning duration for RF change

Gen.3 Trend-based, AI-RRM



- Long-term Trend-based RF telemetry pre-processing
- Minimal RF change from AI Busy Hour
- AI-RRM Dashboard

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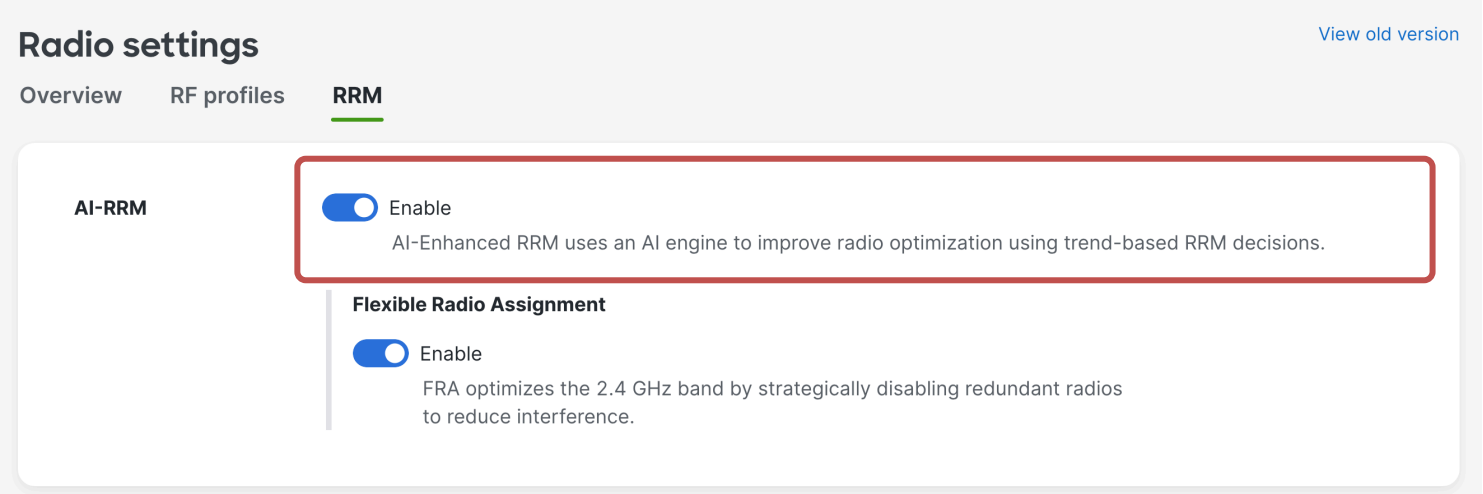
AI-RRM UX/UI Principal

Insanely Simplified, seamless RF Brain transplant



- Just one click to turn on AI-RRM
- Keep Everything else – RF Profiles or any other existing configs “as-is”
- No separate page or learning curve

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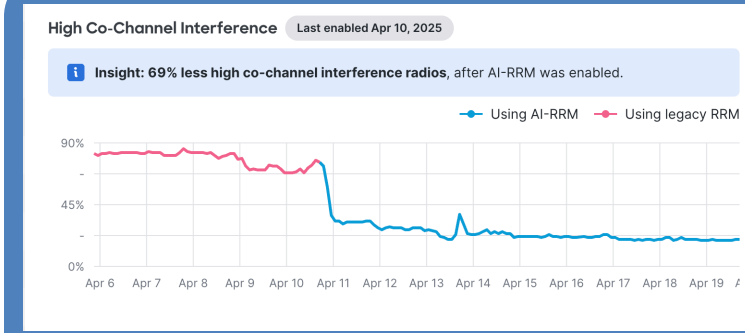
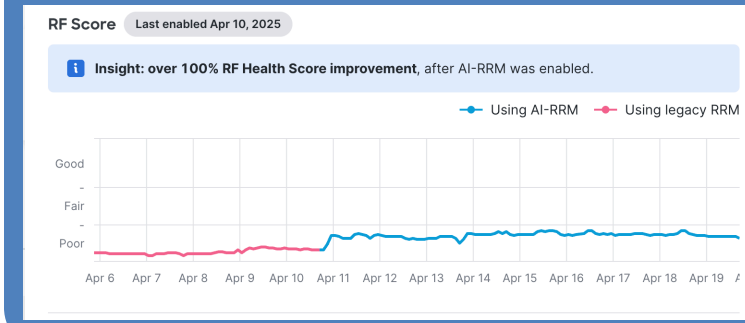
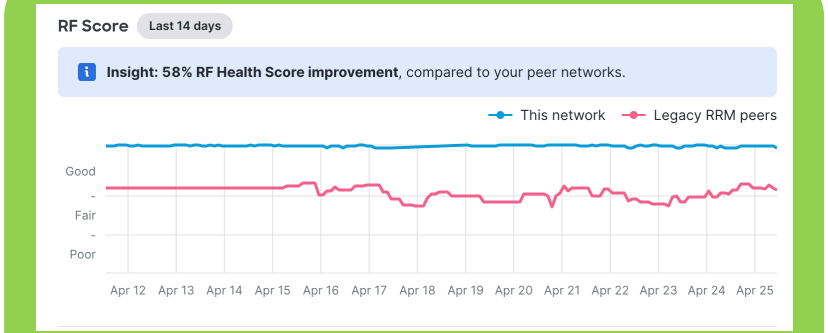
AI-RRM Insights

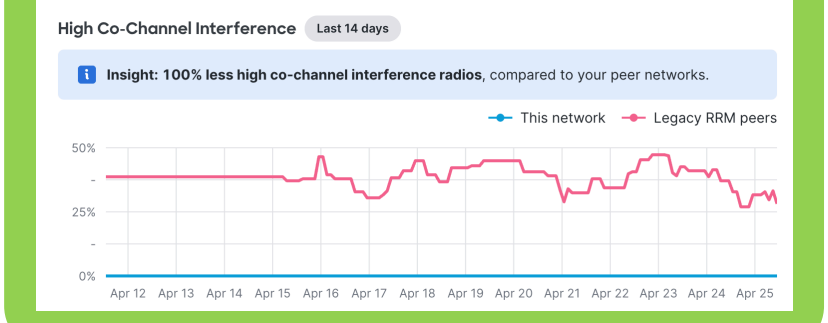
Before & After View





Peer Comparisons





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Real-Time Wi-Fi Analyzer at your hand from anywhere, anytime

- Detect and Visualize Root cause of interferers
- Concurrent Operation – running full Wi-Fi analyzer while AP is in service
- Concurrent Inline Packet Capture for further forensic

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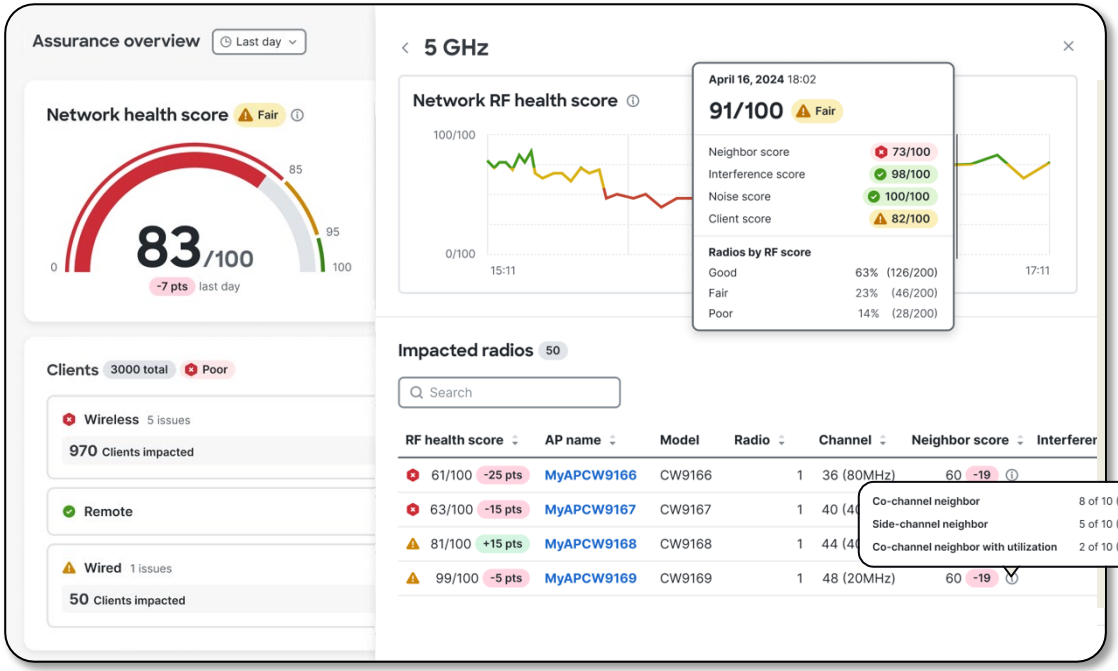
RF Health

- Highlights problematic frequency bands – 2.4, 5, 6 GHz
- Provide per-radio RF scoring, the same algorithm used for AI-RRM
- Provides further scoring and insights on critical RF categories -neighbors, interference, noise, and client connectivity



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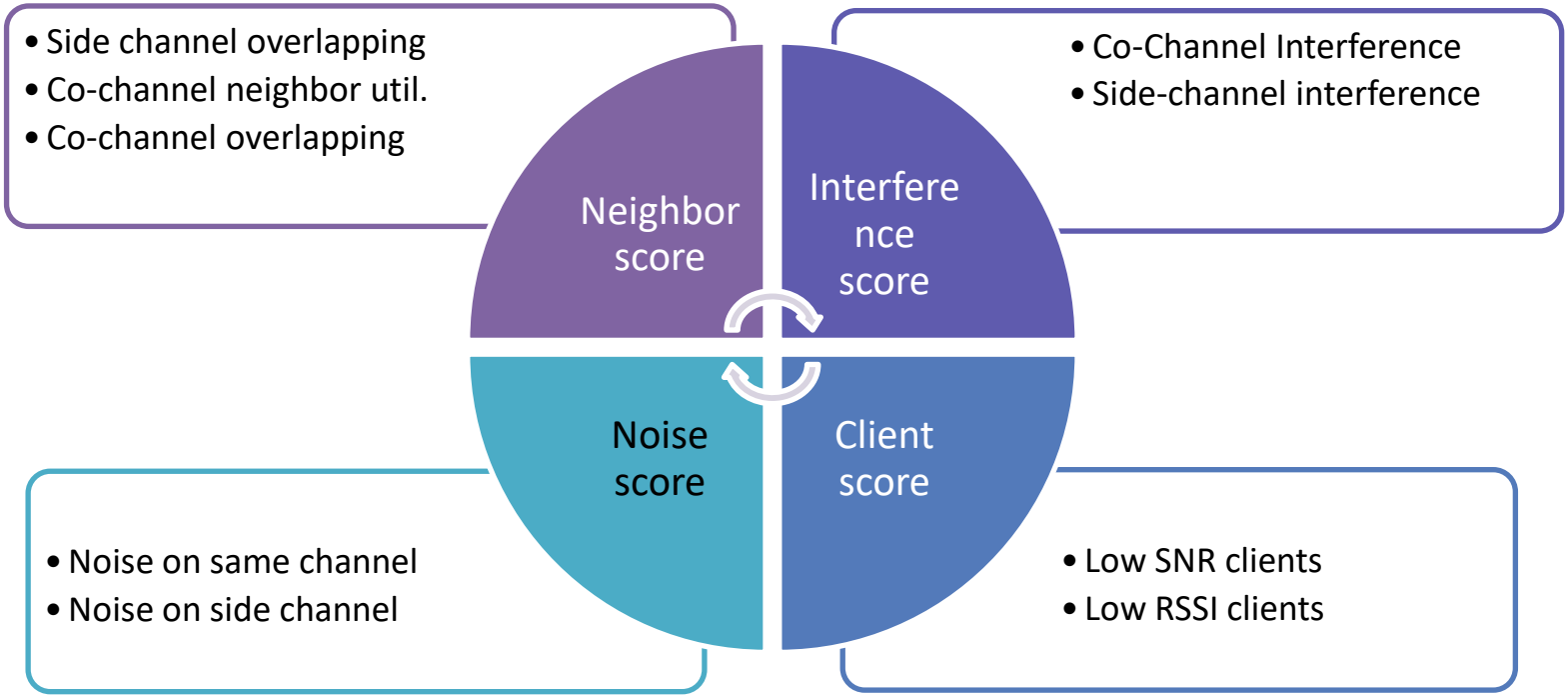
RF Health – Barometers for Over-the-Air RF Spectrum quality assessment tool



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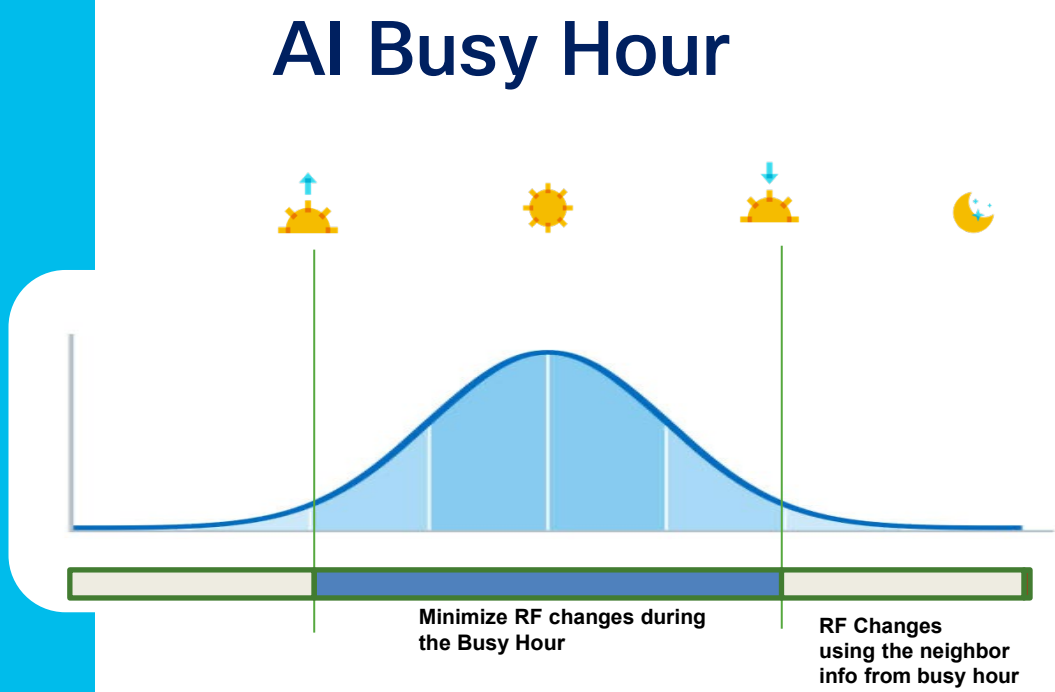
Minimize Channel-Change in Busy Hour

- Busy Hour can be either automatically or manually configured
- Every Changes are done off hour, using busy hour data.
- Avoid client disconnection or roaming due to channel change



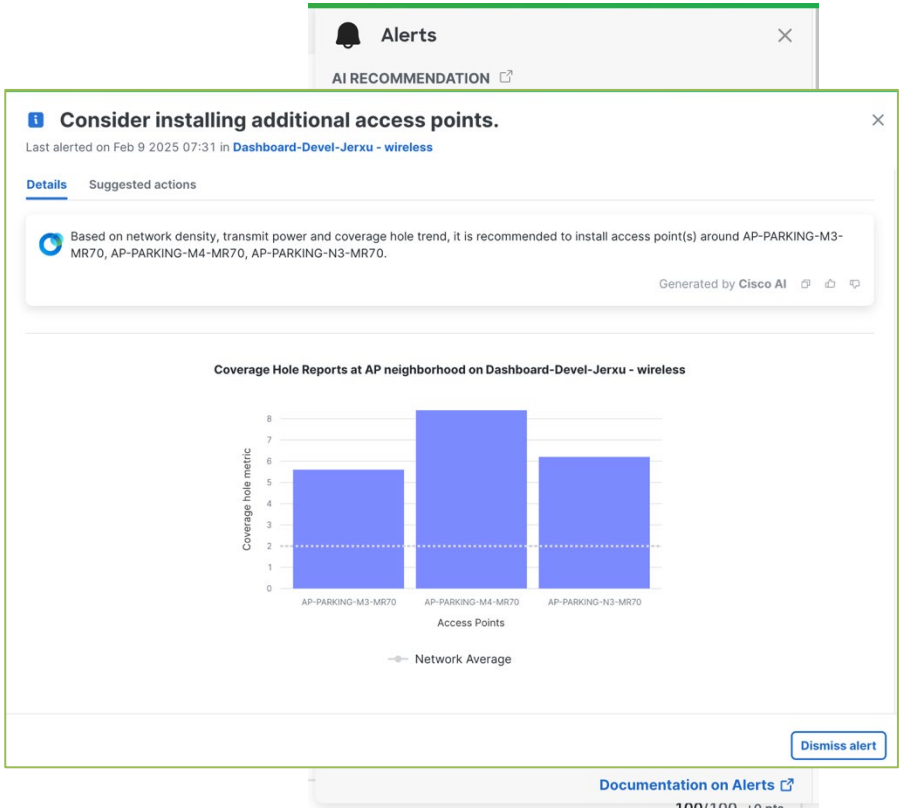
What's next – Wireless Insight and Recommendation

H2CY25

Network AI Agent continually assess network operation holistically and suggest the best possible remediation

Recommendation Types

- Config Insight
- Firmware Insight
- Coverage Insight (non-config)
- Per Client telemetry



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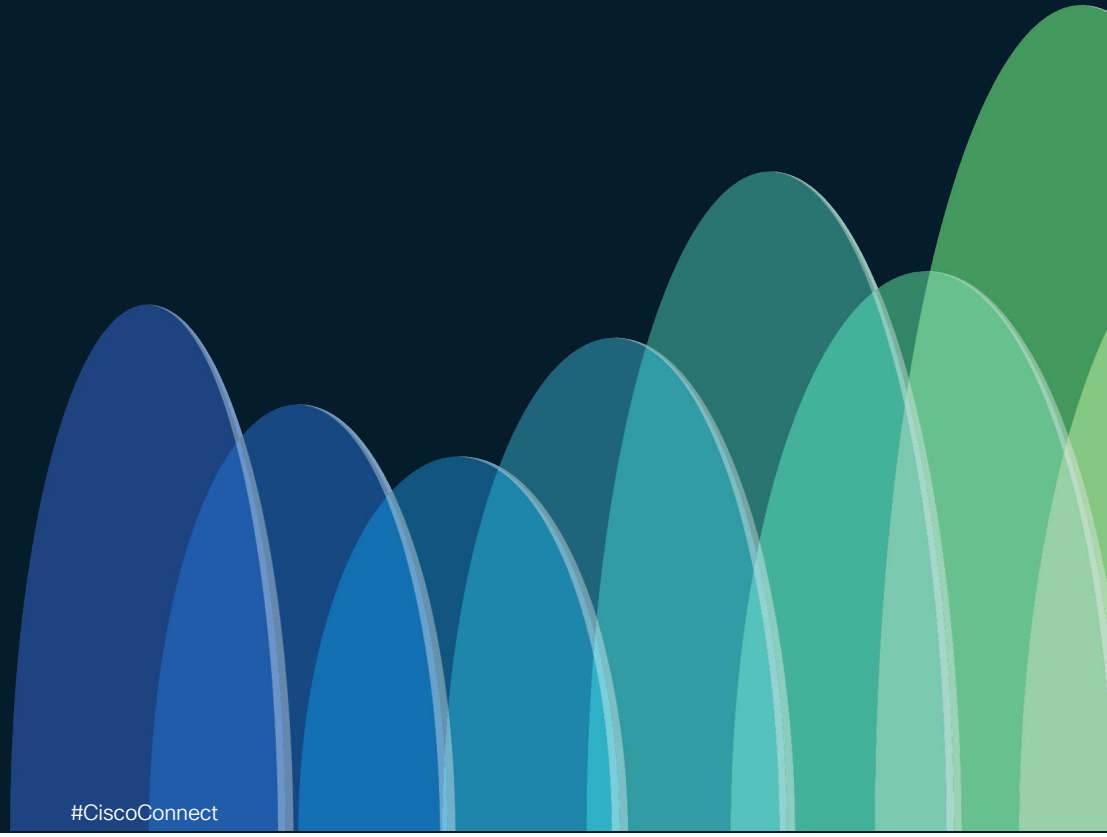
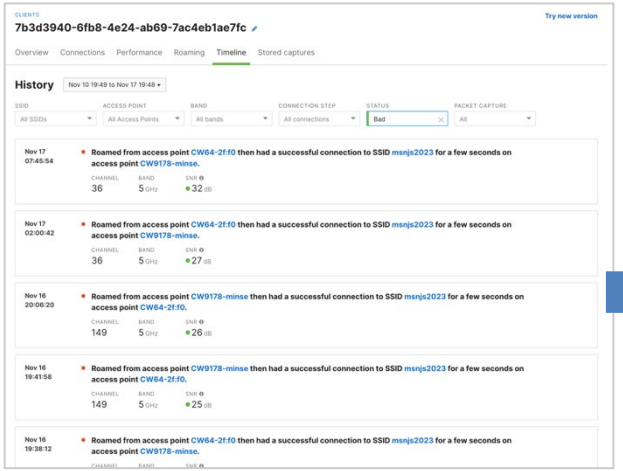
Demo
– RF Optimization

Wireless client troubleshooting



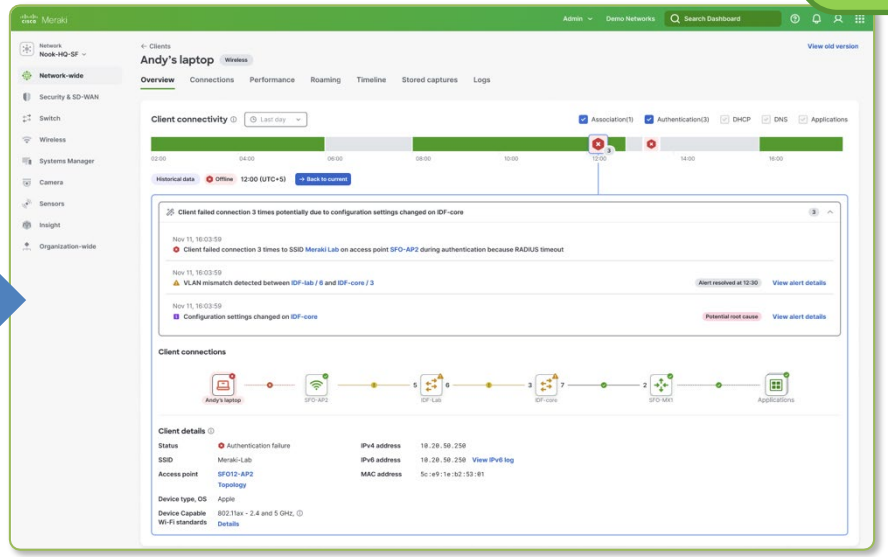
Brings all the internetworking level timeline view to the forefront of the client page

Wireless-only Timeline



Client Network Timeline

InProgress



Network-wide client experience with timeline
E2E network correlation and Topology

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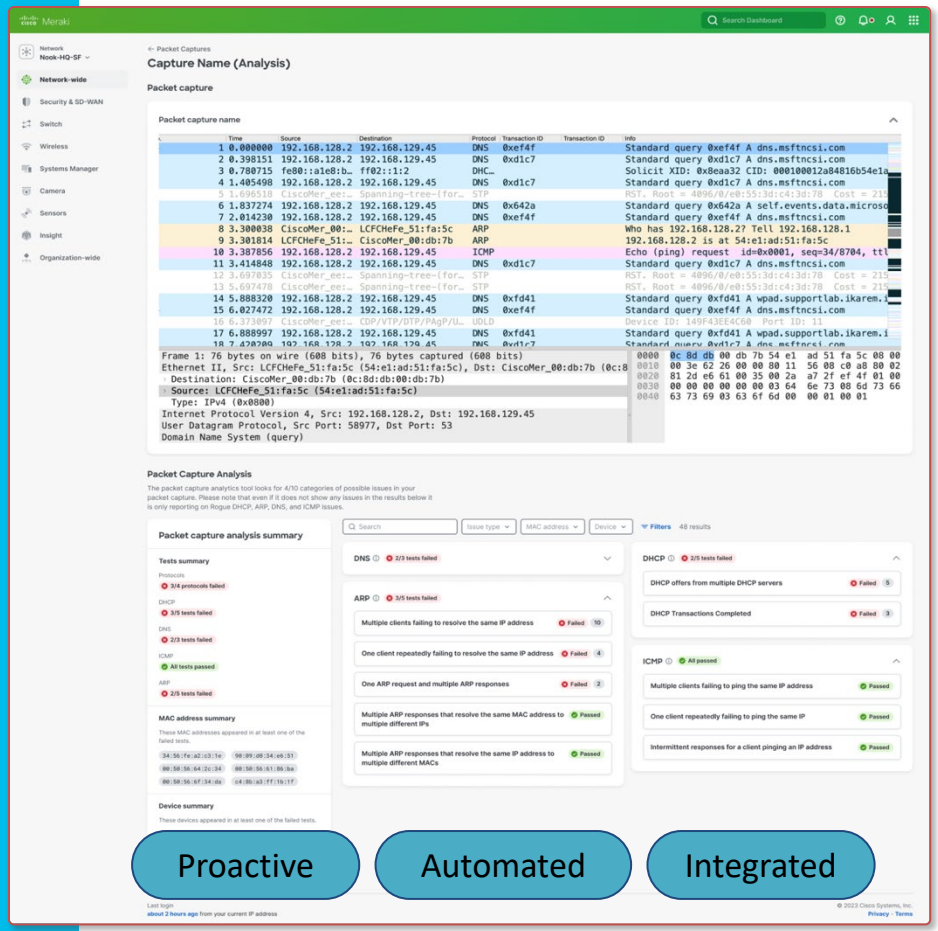
Intelligent capture

Next Generation Packet Capture Solution for Wired and Wireless



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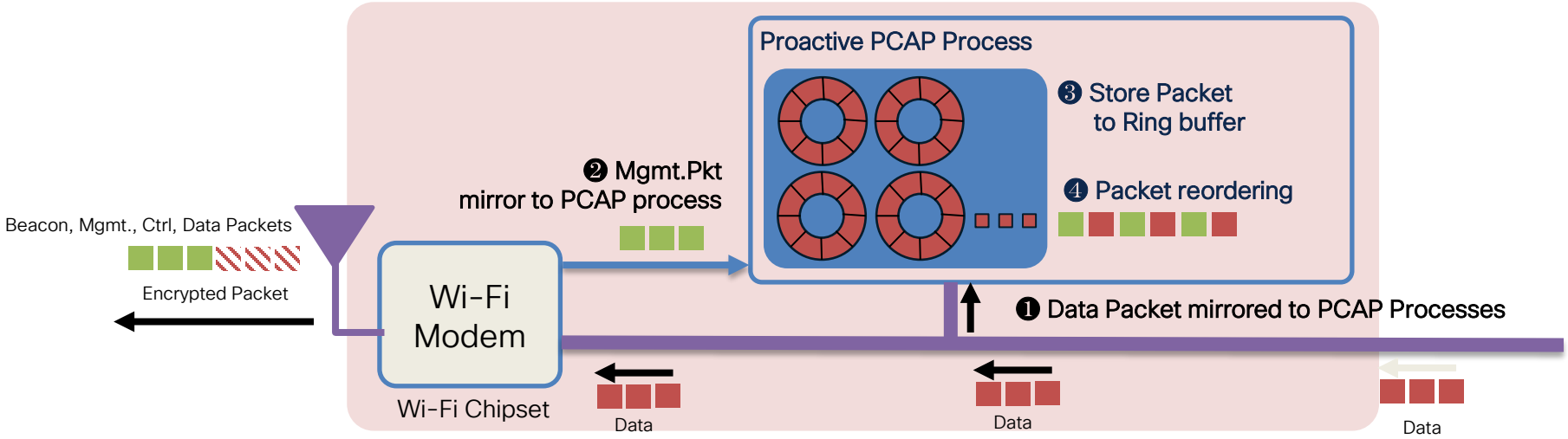
Purpose-Built Packet Capture Architecture



- Packet Capture doesn't change AP or radio mode and continue to serve client without any performance impact
- Management Frames from modem gets replicated and copied back into PCAP Buffer
- Resequencing packet capture frame between Data Frame and Management frame in the right order
- Per-Client Ring Buffer for Proactive PCAP enabled concurrent packet capture

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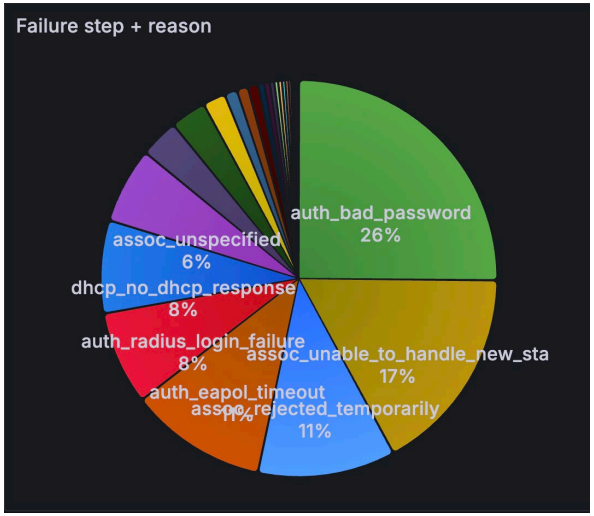
Proactive Packet capture conditions



auth_bad_password	2206828
assoc_unable_to_handle_new_sta	1485015
assoc_rejected_temporarily	982336
auth_eapol_timeout	**979787**
auth_radius_login_failure	664526
dhcp_no_dhcp_response	659806
assoc_unspecified	538172
ip_timeout	271664
dns_no_dns_response	251430
assoc_invalid_pmkid	156542
auth_radius_timeout	84535
deauth_unspecified	73841
dhcp_no_dhcp_ack	67767
assoc_reserved	36707
assoc_na	32037
auth_conn_refused	25953
null_null	20904
dhcp_dhcp_nack	20368
disassoc_invalid_auth	16555
assoc_invalid_mdie	14811
assoc_akmp_invalid	12227
deauth_invalid_auth	9079
assoc_status_invalid_IE	6529
assoc_robust_mgmt_frame_policy_violation	6058
auth_unspecified	6039

Proactive PCAP automatically collect Wireless PCAP

All the time at every conditions,

including “unknown failure” cases

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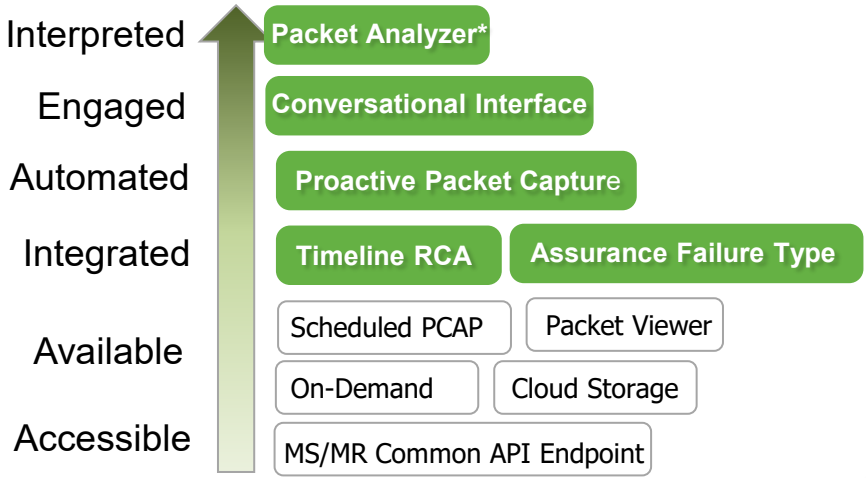
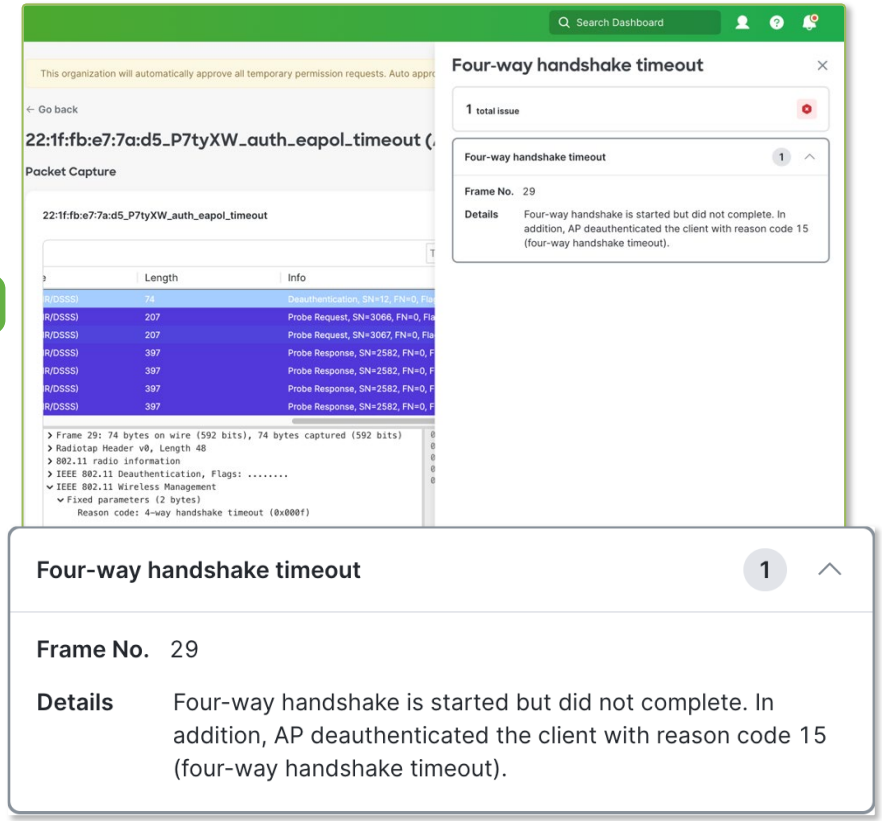
Intelligent Capture - MR





- Every client connection failure condition leaves Packet as evidence
- PCAP Analyzer shows exact reason why client failed to connect

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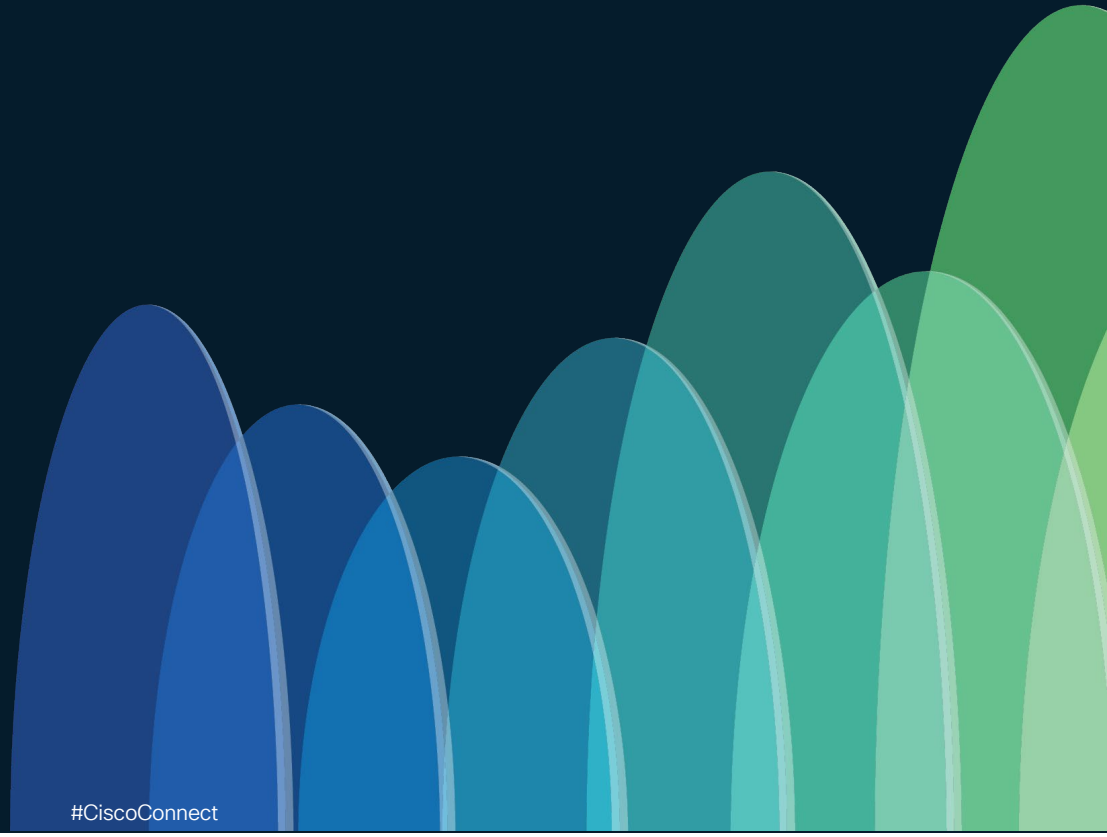
Demo

– Client Troubleshooting

Device Assurance



AP Device Health

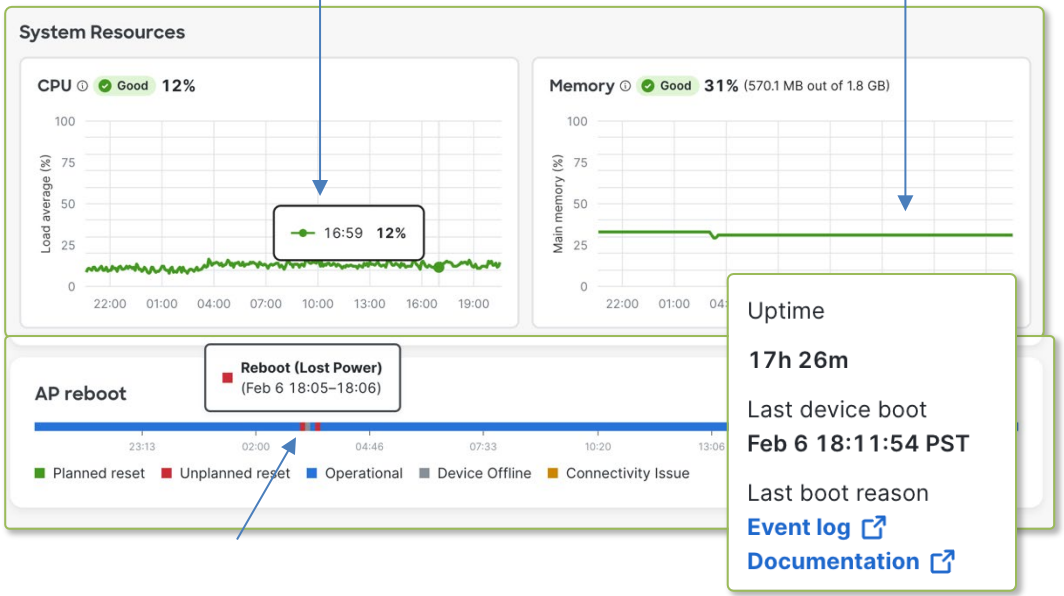
Don’t forget the basic

Validate there is No Memory Leak

Any CPU Spikes may lead to AP reboot?

- PoE / Power monitoring
- Build your Own Dashboard, Org-Wide API Ready!

/organizations/{organizationId}/wireless/devices/system/cpu/load/history



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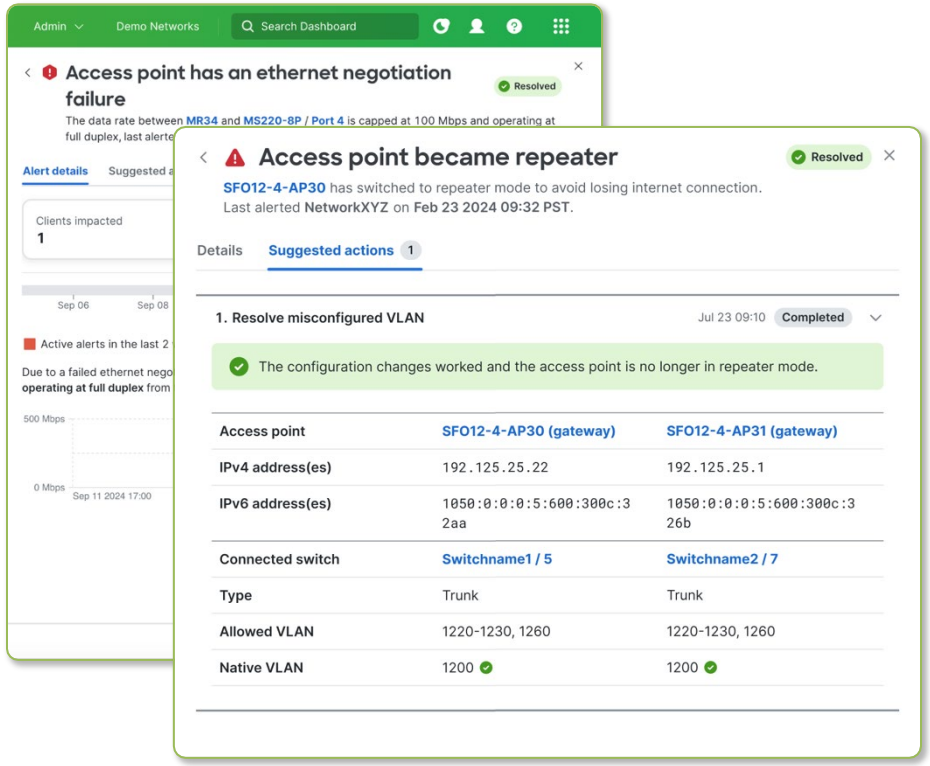
AP Alert Root Cause Analysis



- Detect AP which became repeater.
- RCA Engine lists all the possible scenario and provides active RCA steps to corresponding root cause.
  - Lost gateway connectivity
  - DHCP doesn’t serve IP address to it’s wired uplink port
  - Config change (Config management)
  - AP firmware mismatch
  - Last resort, force AP reboot

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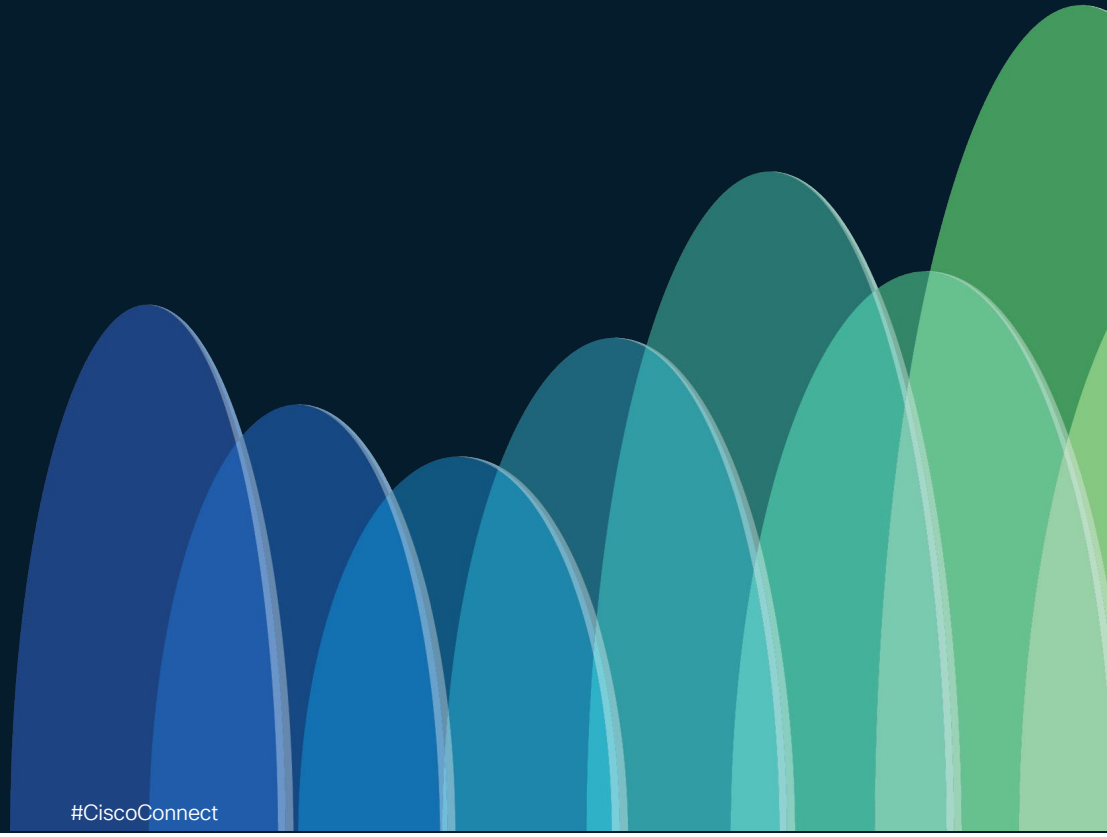
Demo

– Infrastructure Assurance

AI Assistant for Networking



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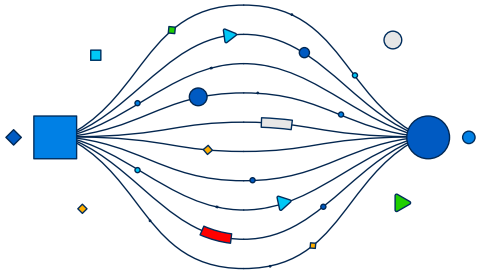
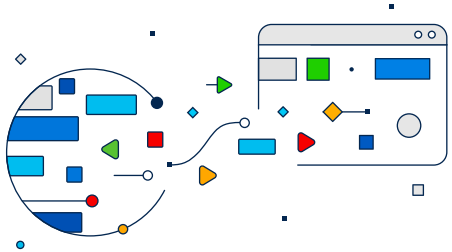
AI Assistant Use-case



Intent processing

- Operate as a Network Engineer
- Answering machine for any NetOps inquiry
- Problem Discovery



Document Summary

- Create summarization of public document
- Best Practice summarization
- Provide additional references on the inquiry

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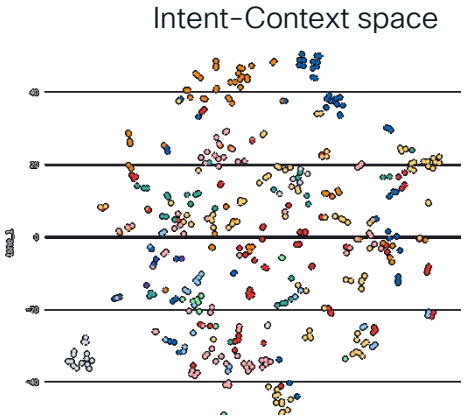
What's the "Intent"

Context :
List the wireless client with the most failures



Step1.
End-user ask a question through the Chat Interface

Step2.
AI Assistant translate user question into Context. Context often includes parameters and query conditions

Step3.
User Context compared and matched up to the nearest intent from intent-context space

"intent" refers to the purpose or goal behind a user's input, which the assistant interprets to provide an appropriate response or action.

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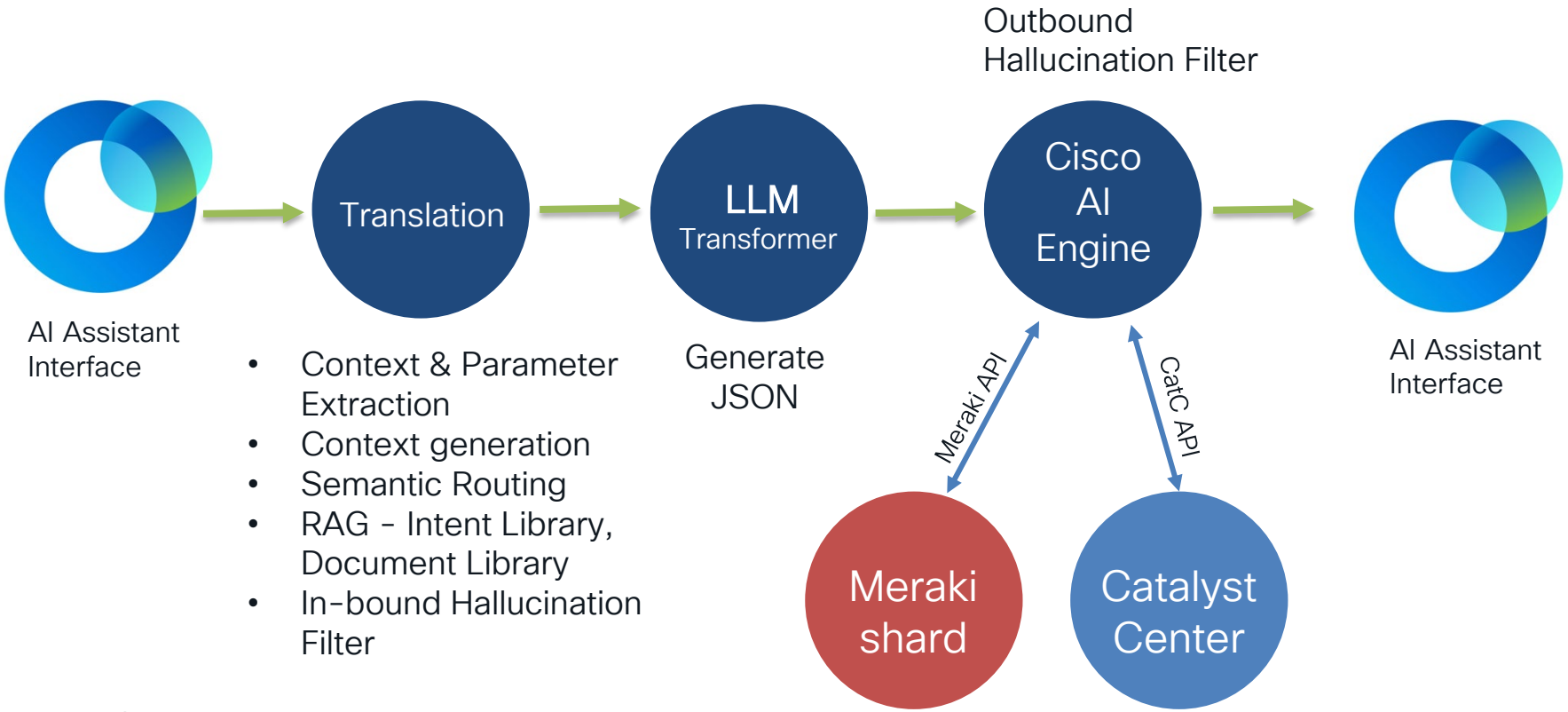
AI Assistant for Networking Architecture
In a nutshell



- Context & Parameter Extraction
- Context generation
- Semantic Routing
- RAG - Intent Library, Document Library
- In-bound Hallucination Filter

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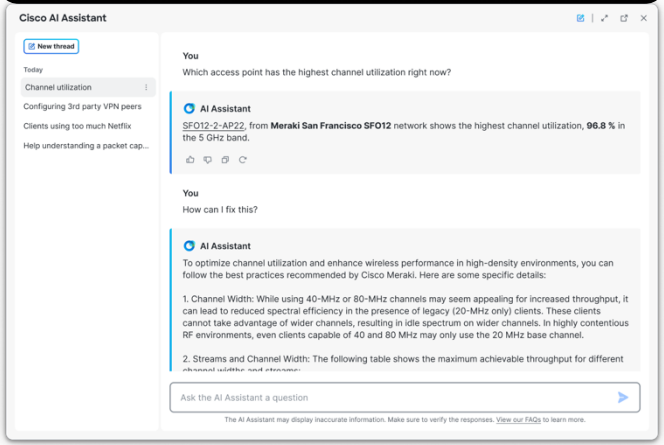
AI Assistant for Cisco Networking

Customer Beta

GenAI-based, Conversational Interface



- **Client Troubleshooting** — Client Troubleshooting using unique partnership with Apple, Intel, Samsung
- **Infrastructure Troubleshooting** — AI-Driven RCA, End-to-End Network Correlation orchestrated through conversational interface
- **Network Automation** — Conduct Network Change Management by conversation
- **Documentation, Best Practice, Tips** — AI Generated, Summarization of Cisco Document Libraries and CX Best Practices

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Demo

– AI Assistant

Conclusion

- Cisco Wireless AIOps committed to offer scalable, resilient wireless network
- Wireless AIOps automate Packet Capture process and its analysis as the seamless, connected experience.
- Cisco AI-RRM proves its outcome and advantage through open, measurable, success metric.
- Cisco AI Assistant for Networking will offer secure, privacy first operation

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Thank you

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