Bâtiments Full Wi-Fi

Une nouvelle ère grâce au Wi-Fi 7

Kamel Cherif-Zahar - Technical Solutions Architect
Federico Ziliotto - Technical Solutions Architect
Track 2, Session 2
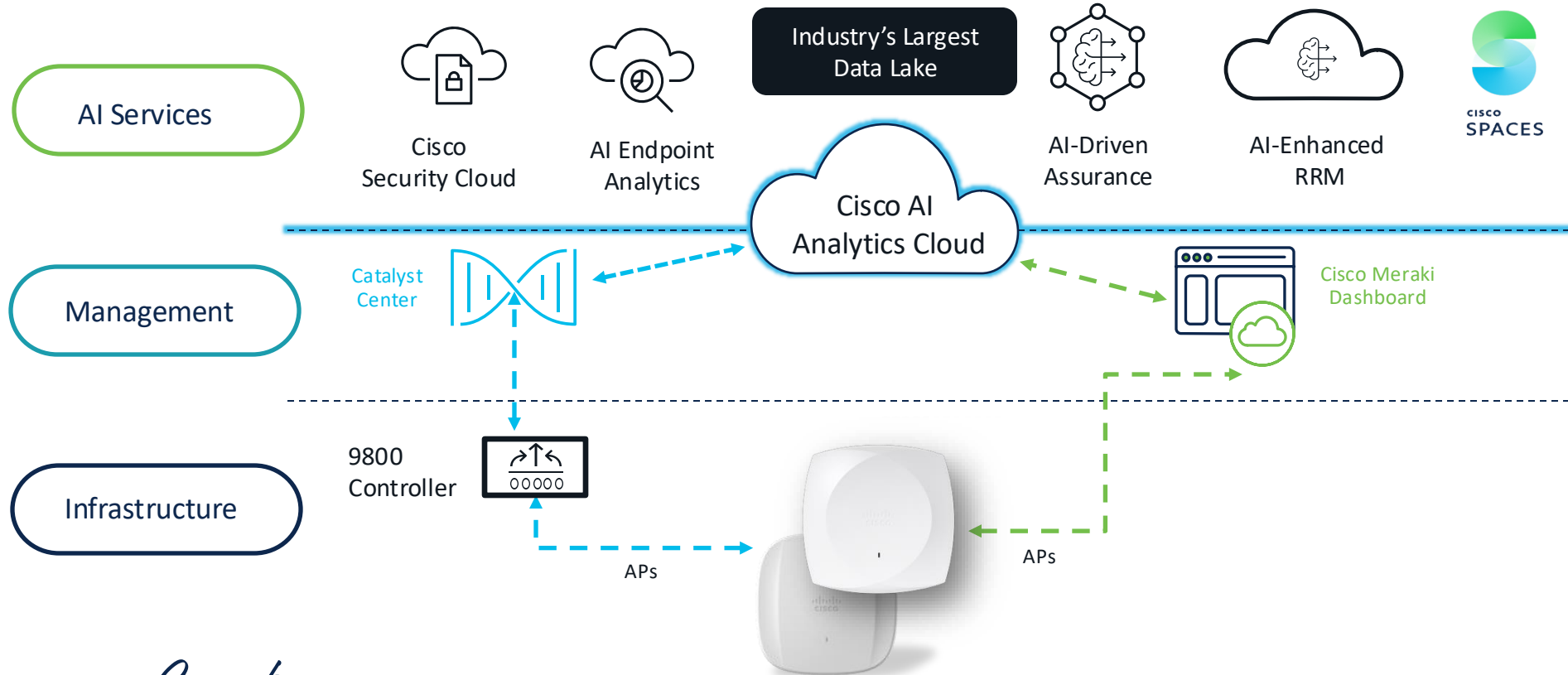
Because we all love Wi-Fi
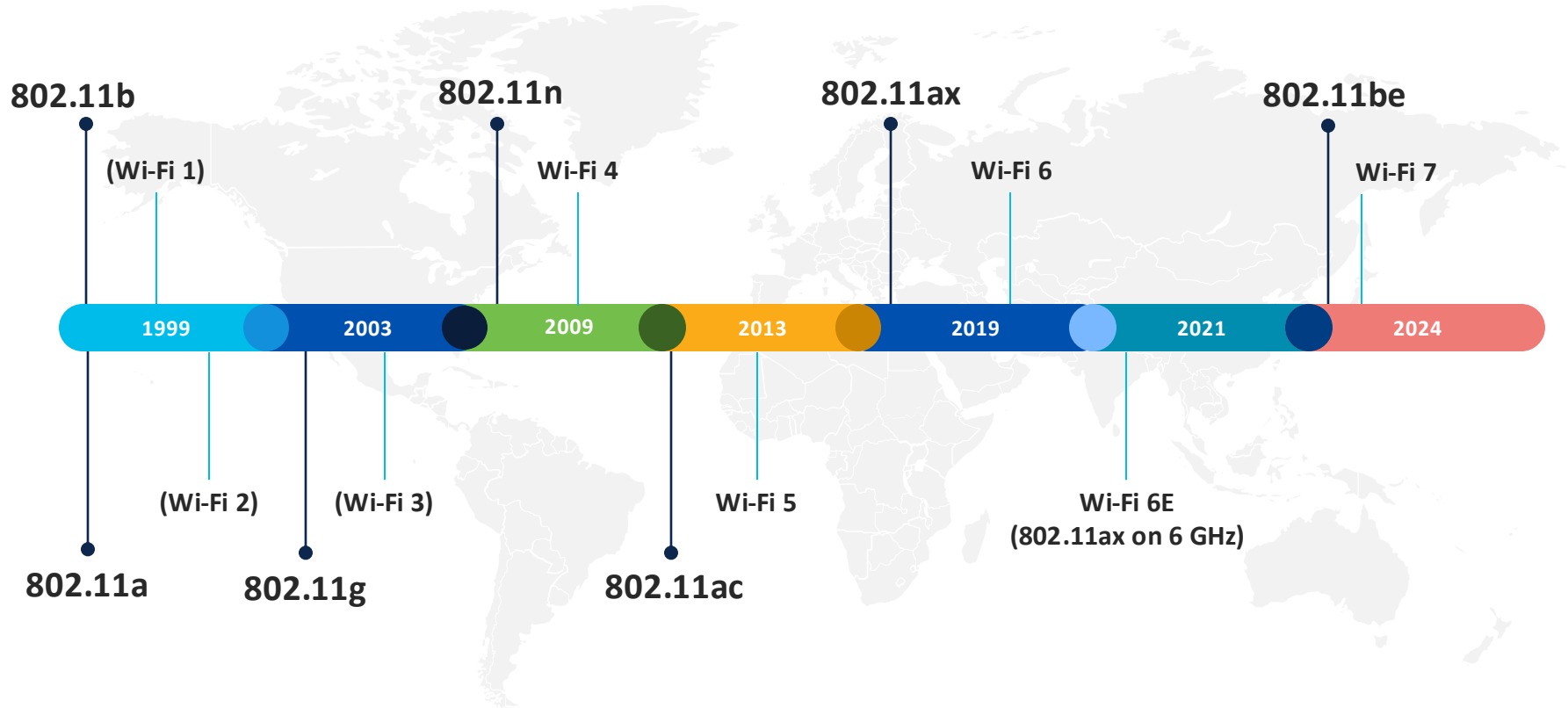

Kamel
aucune antenne n'est
assez alignée pour lui

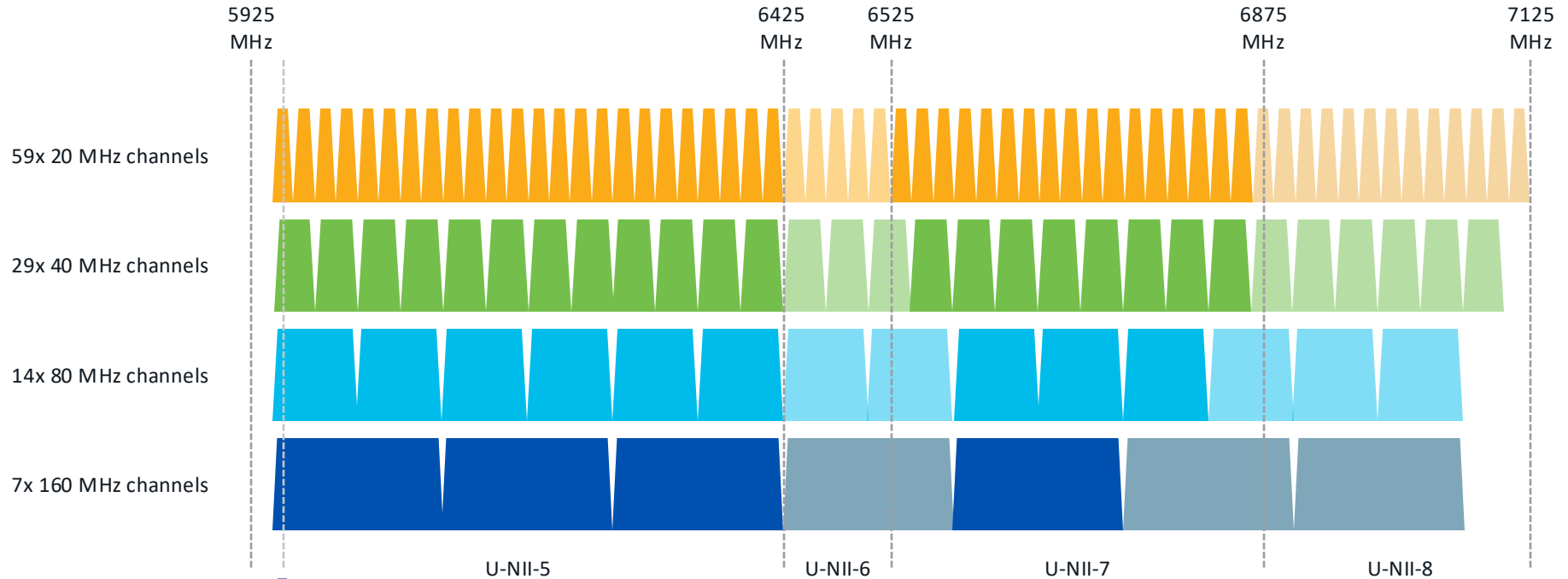Federico
il ne fait pas de roaming, les
APs viennent à lui

The unified experience for smarter buildings

AI Services

Cisco Security Cloud · AI Endpoint Analytics · Industry's Largest Data Lake · Cisco AI Analytics Cloud · AI-Driven Assurance · AI-Enhanced RRM · CISCO SPACES

Management

Catalyst Center · Cisco Meraki Dashboard

Infrastructure

9800 Controller · APs · APs

Wi-Fi evolution

802.11b
(Wi-Fi 1)

802.11n
Wi-Fi 4

802.11ax
Wi-Fi 6

802.11be
Wi-Fi 7

| 1999 | 2003 | 2009 | 2013 | 2019 | 2021 | 2024 |

802.11a

(Wi-Fi 2)

802.11g

(Wi-Fi 3)

802.11ac

Wi-Fi 5

Wi-Fi 6E
(802.11ax on 6 GHz)

cisco Connect

The new 6 GHz band: Wi-Fi 6E and later

5925 MHz · 6425 MHz · 6525 MHz · 6875 MHz · 7125 MHz

59x 20 MHz channels

29x 40 MHz channels

14x 80 MHz channels

7x 160 MHz channels

U-NII-5 · U-NII-6 · U-NII-7 · U-NII-8
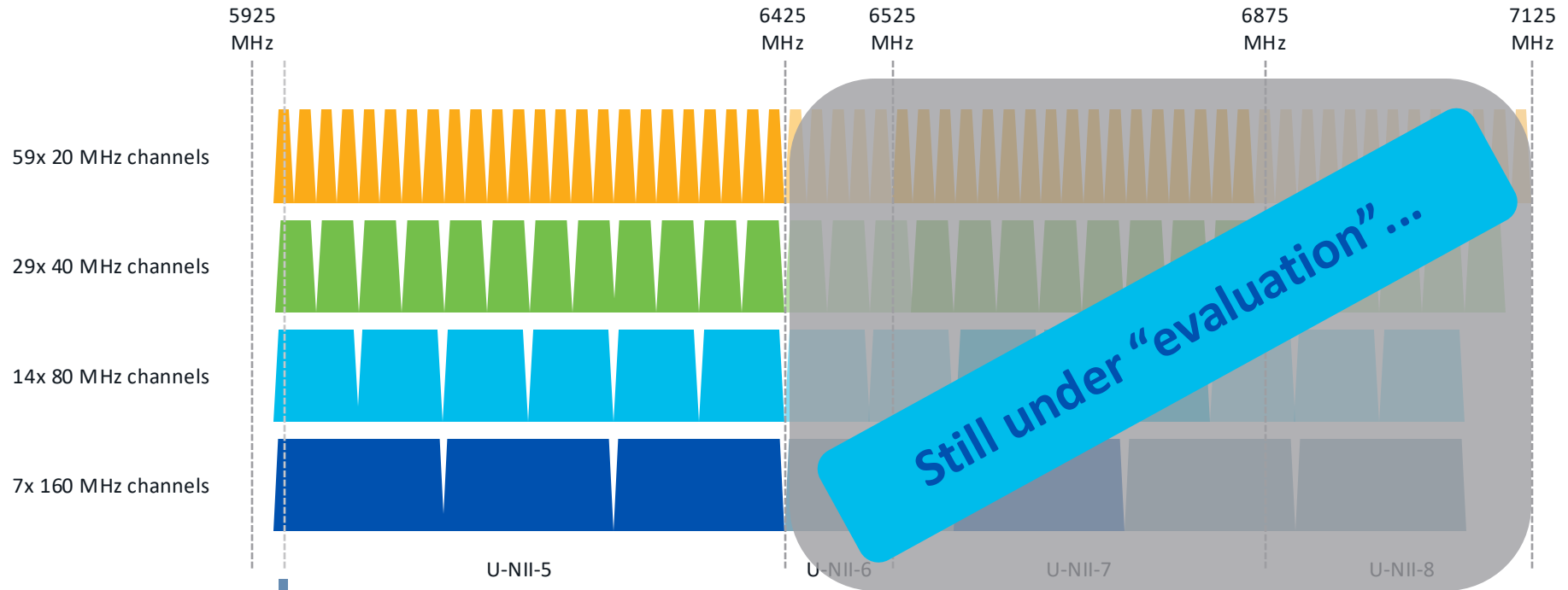
5955 MHz: central frequency of the first 20 MHz channel
➔ starting at 5925 MHz + 20 MHz of guard band + 10 MHz to get to the center of the first 20 MHz channel

For ETSI, only U-NII-5 is available "for now"

| | 5925 MHz | 6425 MHz | 6525 MHz | 6875 MHz | 7125 MHz |

59x 20 MHz channels

29x 40 MHz channels

14x 80 MHz channels

7x 160 MHz channels

Still under "evaluation"…

U-NII-5   U-NII-6   U-NII-7   U-NII-8

5955 MHz: central frequency of the first 20 MHz channel
➔ starting at 5925 MHz + 20 MHz of guard band + 10 MHz to get to the center of the first 20 MHz channel

IEEE 802.11be and Wi-Fi 7
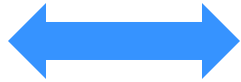
320 MHz in 6 GHz
160 MHz in 5 GHz

4K QAM

MLO

Enhanced Security

Multi-RU

Compressed Block Ack

Preamble puncturing
Mandatory in 6 GHz, optional in 5 GHz
Min channel width of 80
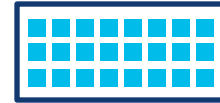
Triggered UL Access Optimization

Wi-Fi 7 – 4k QAM

QAM – Quadrature Amplitude Modulation
How many Bits per Symbol
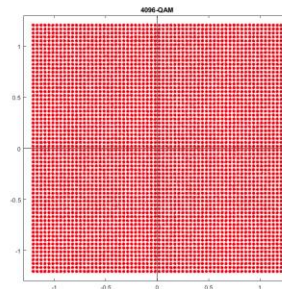
Need very high SNR for 4k QAM
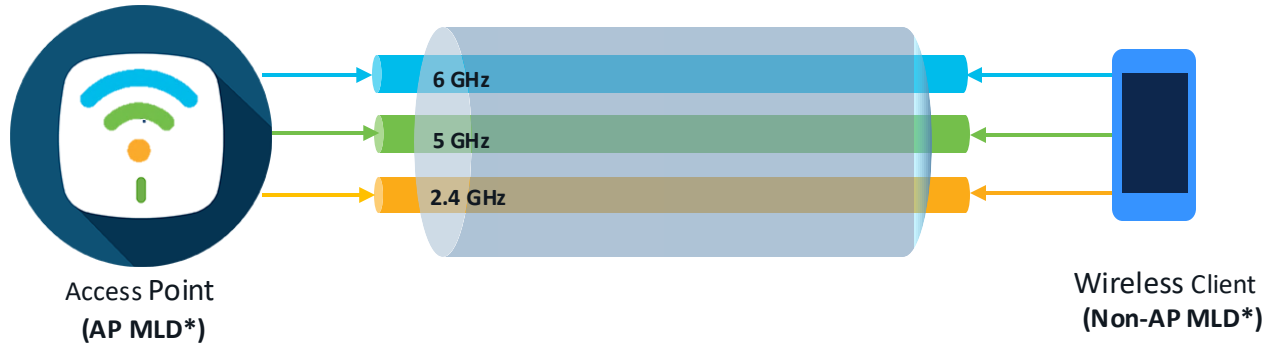
Wi-Fi 5	Wi-Fi 6/6E	Wi-Fi 7
256 QAM	1024 QAM	4096 QAM

Multi Link Operations (MLO)

Access Point
(AP MLD*)

6 GHz

5 GHz

2.4 GHz

Wireless Client
(Non-AP MLD*)

Method	Benefit
Aggregation	Throughput
Steering	Lower Latency
Redundancy	Reliability

*MLD: Multi Link Device

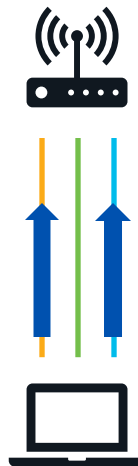# The many "modes" of MLO

Multi Link Single Radio
MLSR

Only one radio operational at a given moment

Enhanced
Multi Link Single Radio
EMLSR

MLSR, but listening on multiple links in parallel before selecting one

Multi Link Multi Radio
Non-Simultaneous Tx Rx
MLMR NSTR

Using multiple radios to transmit or receive

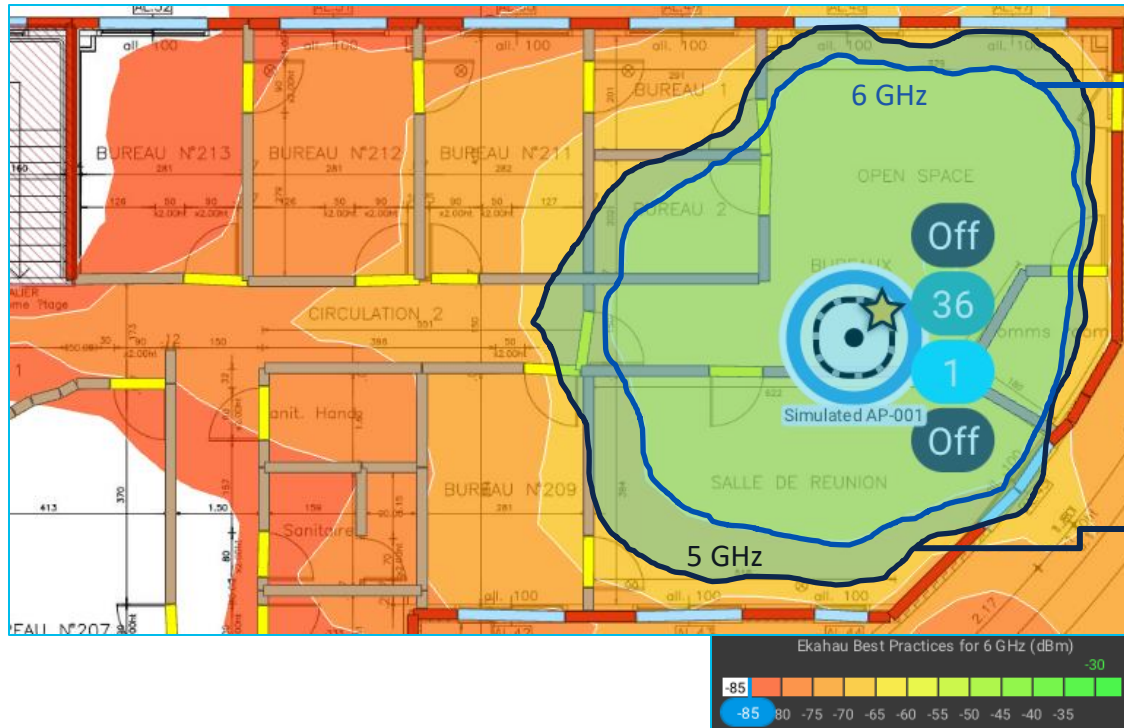Multi Link Multi Radio
Simultaneous Tx Rx
MLMR STR

Using multiple radios to transmit and/or receive
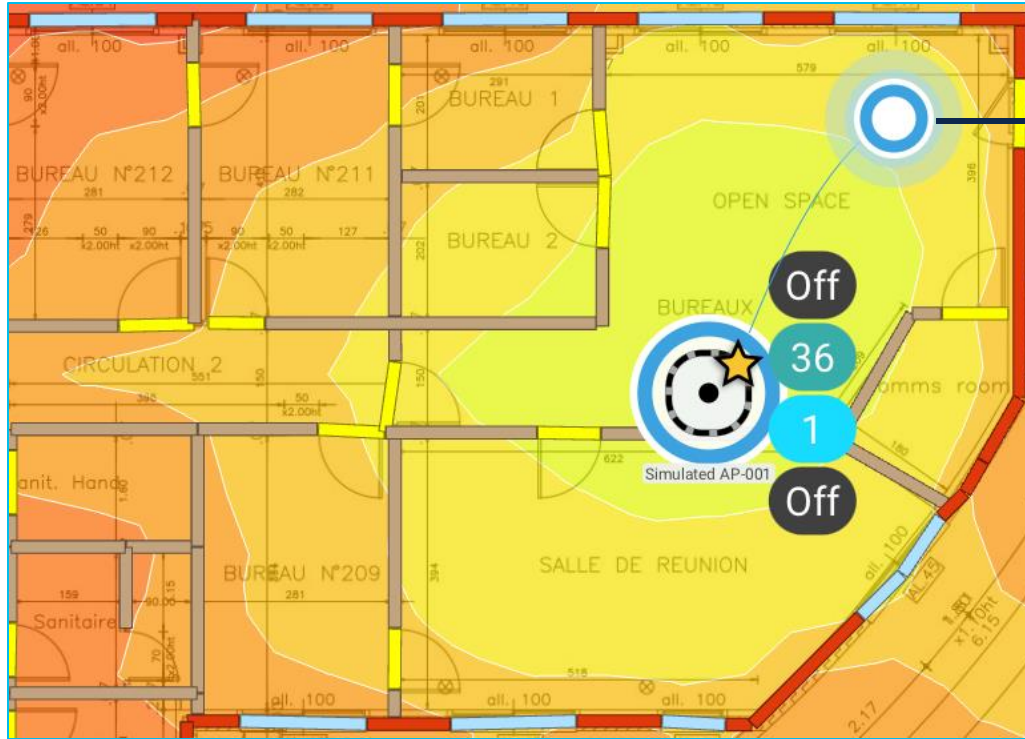
RF design considerations

RF design considerations

- AP antenna patterns at 6 GHz are similar to 5 GHz

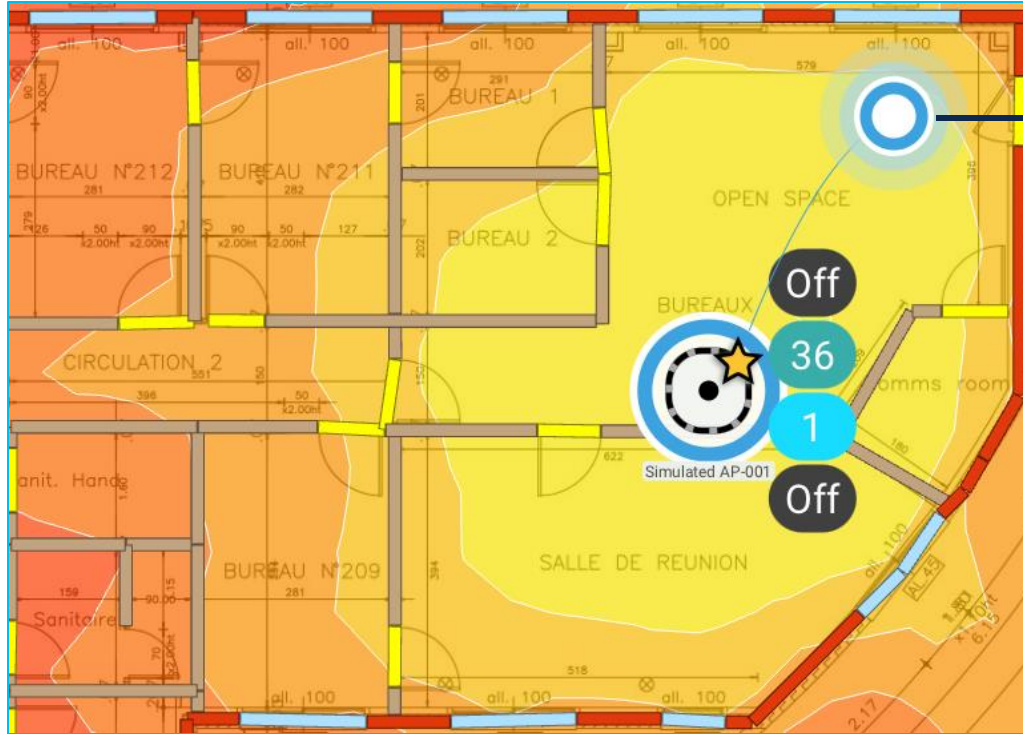- At 6 GHz @ same power level cell is smaller vs. cell size at 5 GHz

RF design considerations

5 GHz

RF design considerations

6 GHz

RADIOS (1)				
AP NAME	TECH	CH	SNR	RSSI
▼ PLAN ALIZES R+2(1) (Copy) (1)				
Simulated AP-001 Cisco Catalyst 9162		1 (20)	31	-64

- AP coverage between 5 GHz and 6 GHz will be similar, especially in open spaces BUT it does require to compensate with power > 2dB higher in 6 GHz

RF design considerations

- AP replacement for existing deployments:
  - If power level is 3-4 on 5 GHz
    - Similar coverage level between 5 GHz and 6 GHz
    - With higher power level than 5 GHz

  - If the power level is 1-2 on 5 GHz
    - Then you may need to add APs
    - Around 10 to 20% additional access points
    - Need a site survey

- For new deployments, a site survey is recommended.

5 GHz
11 dBm
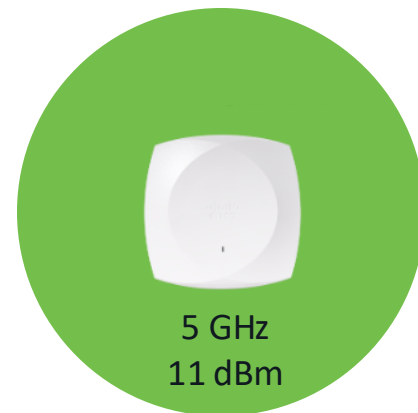
6 GHz
14 dBm

Cisco Wi-Fi 7 portfolio

CW9172I/H

CleanAir® Pro

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

BLE/IoT and monitoring radios

Single 2.5 Gbps multigigabit

USB 2.0 – 4.5W

DC Power option

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

Integrated Omnidirectional Antenna

CW9176I/D1

CleanAir® Pro

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

BLE/IoT and monitoring radios

Single 10 Gbps multigigabit

Ultra Wide Band (UWB)

USB 2.0 – 9W

Accelerometer

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

Integrated Omnidirectional or Directional Antenna (70°)

CW9178I

CleanAir® Pro

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

BLE/IoT and monitoring radios

Dual 10 Gbps 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 previous generations and PoE+ support*

* Default behavior on PoE+: CW9176I/D1 will work at 2x2 on 2.4 GHz
CW9178I will work at 2x2 on 2.4/6 GHz, 2x2 with dual 5 GHz or 4x4 with single 5 GHz

Cisco Wireless Unified Product Evolution

0%

Wi-Fi 6

1 SKU per model

17+ SKUs per model

75%

Wi-Fi 6E

- Day0 Separate SKUs (~10)
- Initial management Mode determined at purchase.
- Post-purchase/Day N option to migrate
- Separate lead time/RMA/license
- Same Warranty

100%

Wi-Fi 7 Global Use AP

Today!
Join any stack on Day 0; based on Intent
Management mode change from Day 1 to Day N

Global Use AP (GUAP)

Global Use APs simplifies the Cisco Wireless AP portfolio, by

1   Decoupling the AP PID/SKU from which geography (regulatory domain) they can be used in (No more -B, -E, -ROW etc. for Wi-Fi 7 APs)

2   Decoupling AP PID/SKU from the boot mode; i.e. Meraki or WLC based

> **What is a PID/SKU?** 🤔
> Here are some examples of non-Global Use AP PIDs:
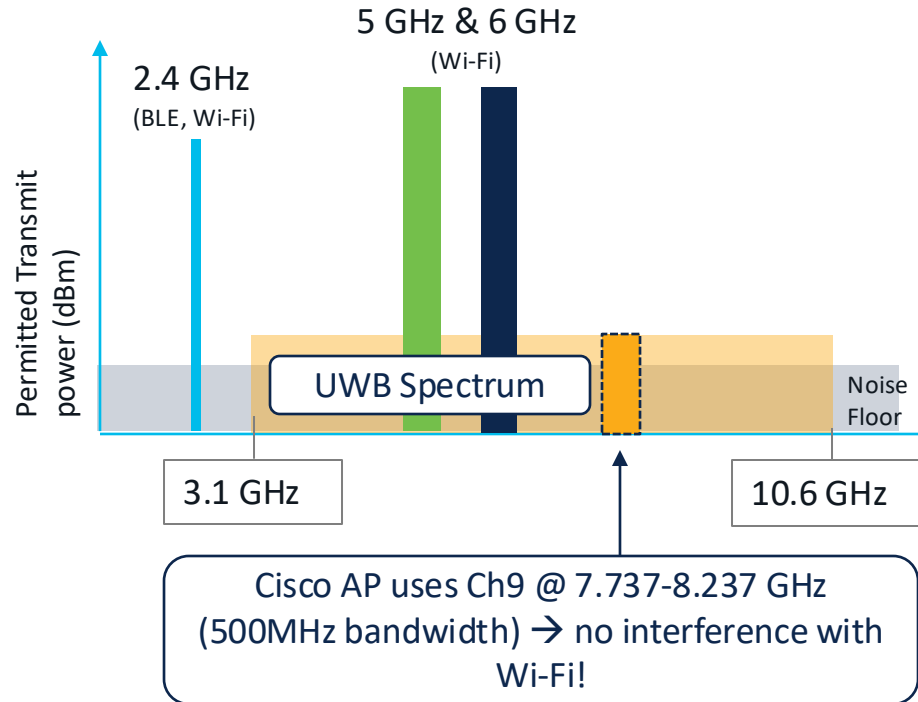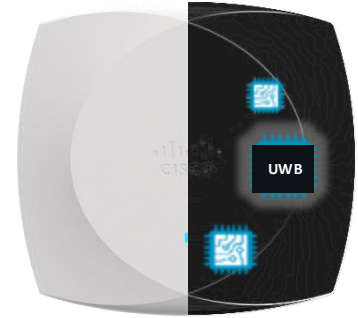>
> *C9130AXI-B (Where "–B" denotes this is for US use only)*
> *MR56-HW*
> *CW9166I-MR (Where –MR denotes it will boot in Meraki mode)*

Ultra Wide-Band (UWB)

- Integrated with Access Points CW9176 & CW9178

5 GHz & 6 GHz (Wi-Fi)

2.4 GHz (BLE, Wi-Fi)

Permitted Transmit power (dBm)

UWB Spectrum

Noise Floor

3.1 GHz

10.6 GHz

Cisco AP uses Ch9 @ 7.737-8.237 GHz (500MHz bandwidth) → no interference with Wi-Fi!

Maps: a typical challenge for planning buildings

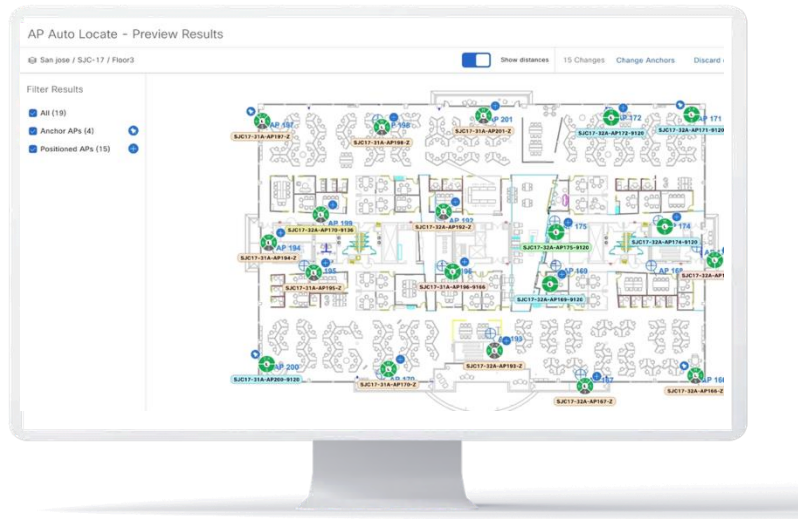**Do you have all your Access Points placed on maps?**

How much time does it take to place and maintain APs positioning?

How confident are you in your AP map placement?

AP Auto Locate to the rescue

Auto-position APs on maps!

AP Auto Locate - Preview Results

San jose / SJC-17 / Floor3

Show distances   15 Changes   Change Anchors   Discard

Filter Results

All (19)
Anchor APs (4)
Positioned APs (15)

Reduce IT admin workload with faster network deployments

AI

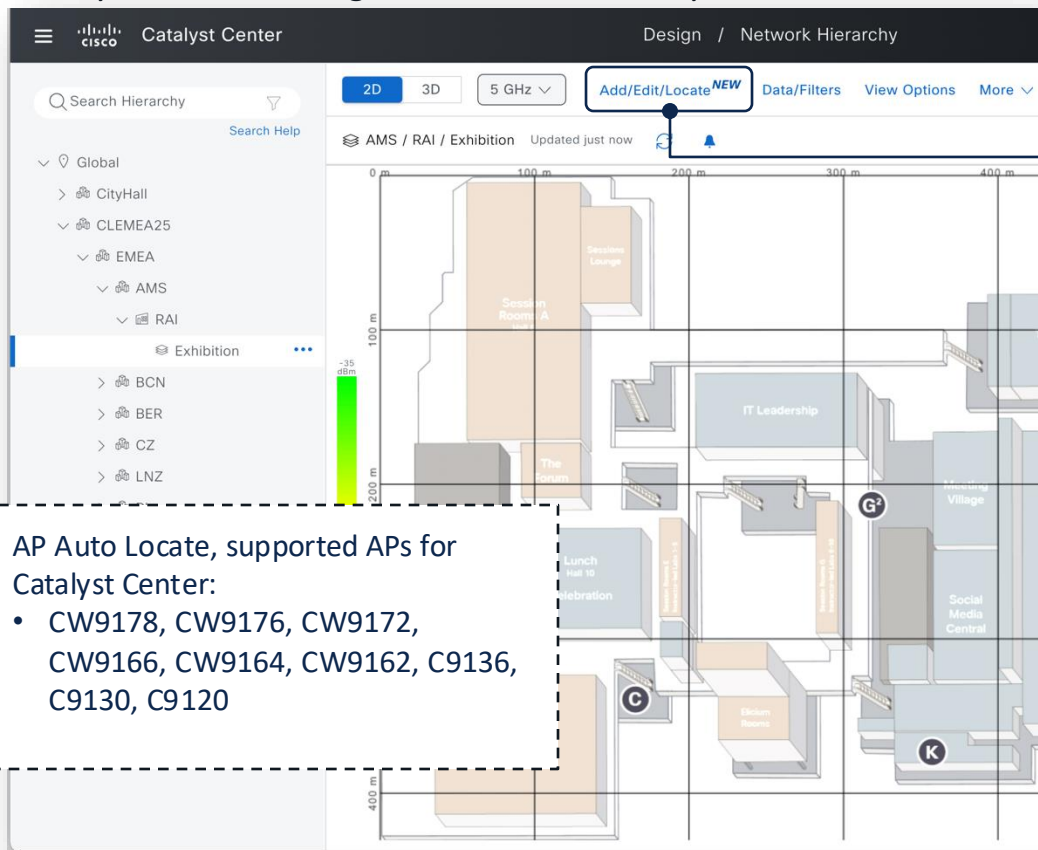Quality input for AI-driven operations & assurance

Reduce troubleshooting effort caused by incorrect AP placement

Improve client location services accuracy

Catalyst Center > Design > Network Hierarchy

Add/Edit/Locate to place APs with "AP Auto Locate"

AP Auto Locate, supported APs for Catalyst Center:
- CW9178, CW9176, CW9172, CW9166, CW9164, CW9162, C9136, C9130, C9120

Catalyst Center > Design > Network Hierarchy > AP Auto Locate

Meraki Dashboard > Network-wide > Map & floor plans

AP Auto Locate, supported APs for Meraki Dashboard:
- CW9178, CW9176, CW9166, CW9164, CW9162, MR57, MR56, MR36, MR36H, MR78

Meraki Dashboard > Network-wide > Map & floor plans

Red = Manual placement
Green = Automatic placement

Name		Placement status	Lat long
SFO		—	
SFO		Manual placement	37.7705, -122.3867
SFO		Manual placement	37.7704, -122.3875
SFO		—	
SFO		Auto-placement	37.7704, -122.3874
SFO		—	
SFO		Auto-placement	37.7704, -122.3873
SFO		—	
SFO		—	
SFO		Auto-placement	37.7704, -122.3872

AI-Enhanced RRM for improved RF robustness

AI Cloud
AI-Enhanced RRM Algorithms
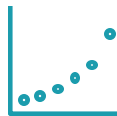
Trend-Based RRM
Optimize RF with weeks of historical analysis

Flexible Radio Assignment
Optimize band selection to minimize 2.4 GHz interference

Busy Hour Aware
Minimize disruptive changes during the critical times of day

Catalyst Center > Assurance > AI Network Analytics > AI-Enhanced RRM
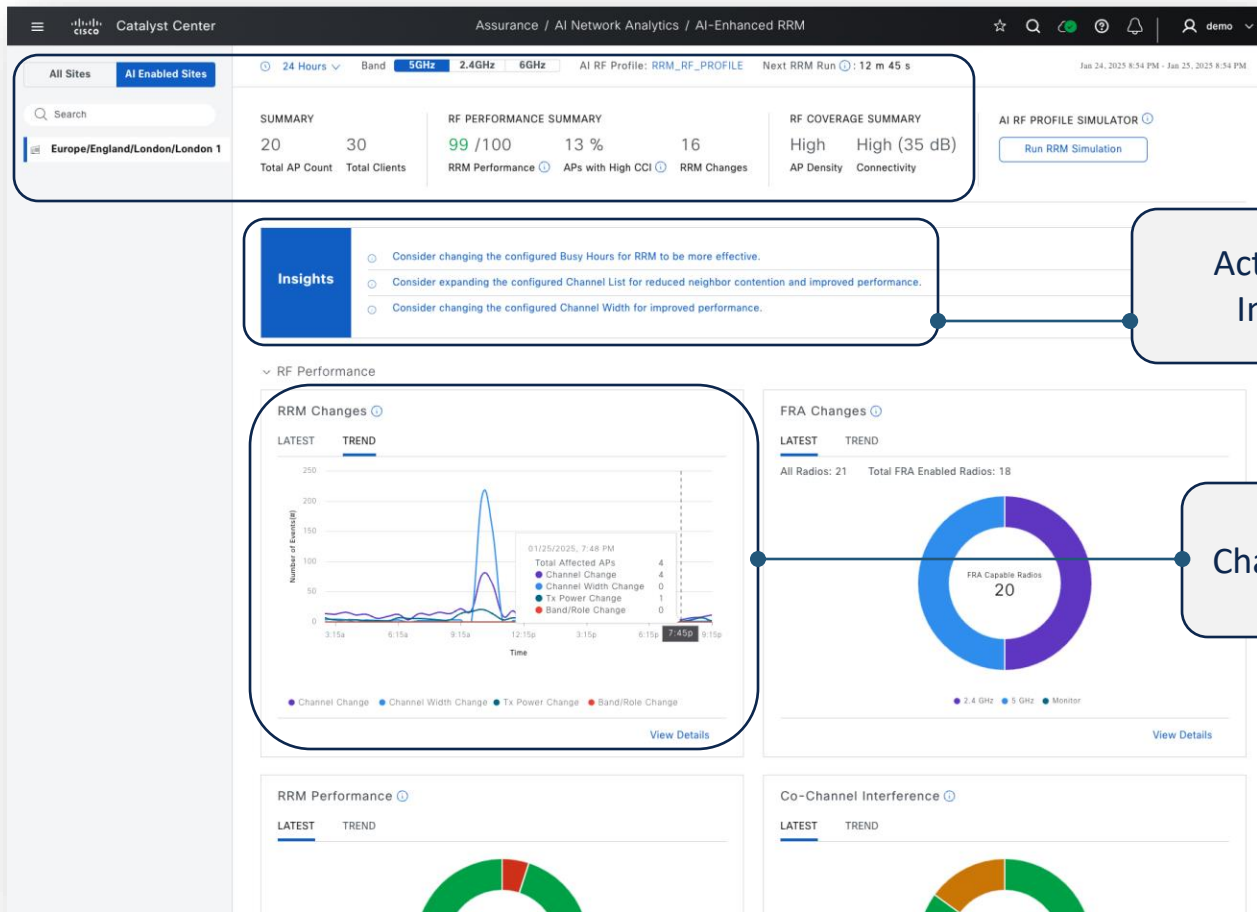

Actionable Insights

RRM Channel Change History and Details

Meraki Dashboard > Wireless > Radio Settings > Overview

RF Performance & Coverage according to selected parameters

Activation and Settings

Cisco AI Assistant to unlock network intelligence

Meet the Cisco AI Assistant

Powered by an unparalleled breadth and scale of data, Cisco AI Assistant is your virtual companion to responsibly guide and inform the decisions you make daily, helping you work faster, safer, and smarter.

Cancel

Next
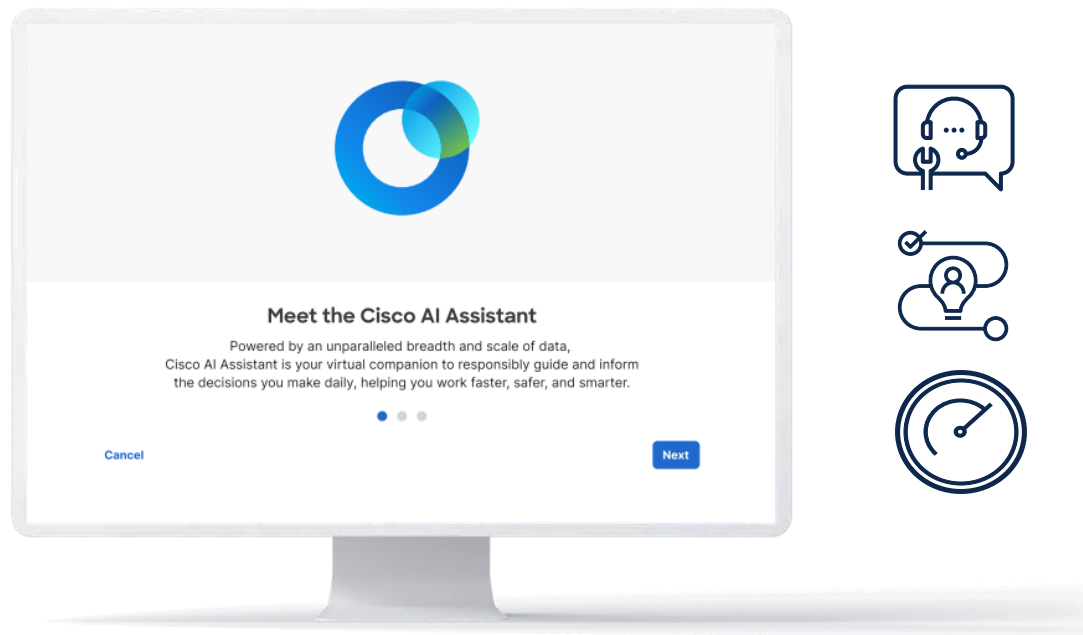
Empower IT Teams

Reduce management costs

Optimize network performance and reliability

Cisco AI Assistant to unlock network intelligence

Cisco AI Assistant

New thread

Today
Channel utilization
Configuring 3rd party VPN peers
Clients using too much Netflix
Help understanding a packet cap...

You
Which access point has the highest channel utilization right now?

AI Assistant
SFO12-2-AP22, from **Meraki San Francisco SFO12** network shows the highest channel utilization, **96.8 %** in the 5 GHz band.

You
How can I fix this?

AI Assistant
To optimize channel utilization and enhance wireless performance in high-density environments, you can follow the best practices recommended by Cisco Meraki. Here are some specific details:

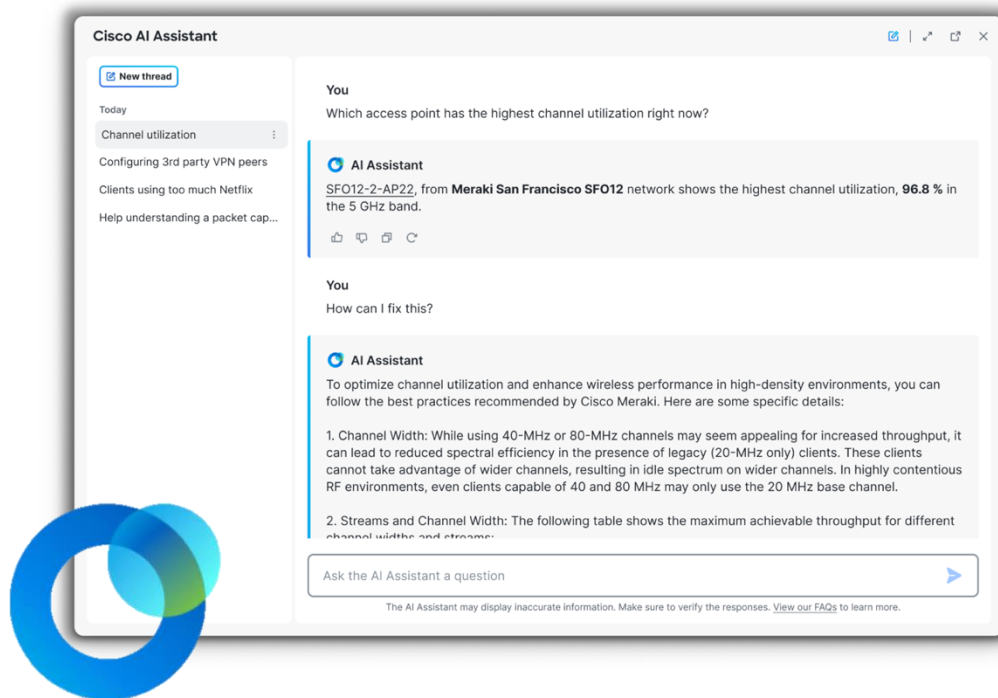1. Channel Width: While using 40-MHz or 80-MHz channels may seem appealing for increased throughput, it can lead to reduced spectral efficiency in the presence of legacy (20-MHz only) clients. These clients cannot take advantage of wider channels, resulting in idle spectrum on wider channels. In highly contentious RF environments, even clients capable of 40 and 80 MHz may only use the 20 MHz base channel.

2. Streams and Channel Width: The following table shows the maximum achievable throughput for different

Ask the AI Assistant a question

The AI Assistant may display inaccurate information. Make sure to verify the responses. View our FAQs to learn more.

✓ **Documentation Questions**

✓ **Network Visibility and Config**

✓ **Network Diagnostics**

✓ **Network Optimization**
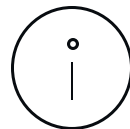
AI Assistant Availability Today:
- Meraki Dashboard: private Beta
- Catalyst Center: private Beta w/ 2.3.7.9

Network as a Sensor with Cisco Spaces

CISCO SPACES

Cisco Collaboration Devices

- Room occupancy
- People count
- Air Quality
- Temp, Humidity
- Ambient noise
- Desk Utilization
- Desk Reservation

Cisco Switches

- Occupancy
- IoT gateway

Meraki MT sensors & cameras

- People count
- Air quality
- CO2
- Temp, humidity

Cisco Access Points

- Location
- Occupancy
- Sensor gateway

Asset Tags

- Location

Panic Buttons

- Button Alert, Location

Environmental Monitors
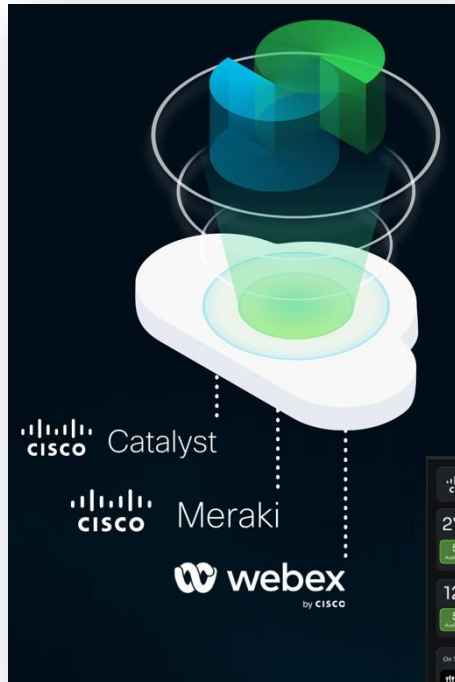
- Temp, humidity
- CO2, Air quality

Occupancy (wired & wireless)

- People Count
- Presence

Cisco Spaces for smarter buildings

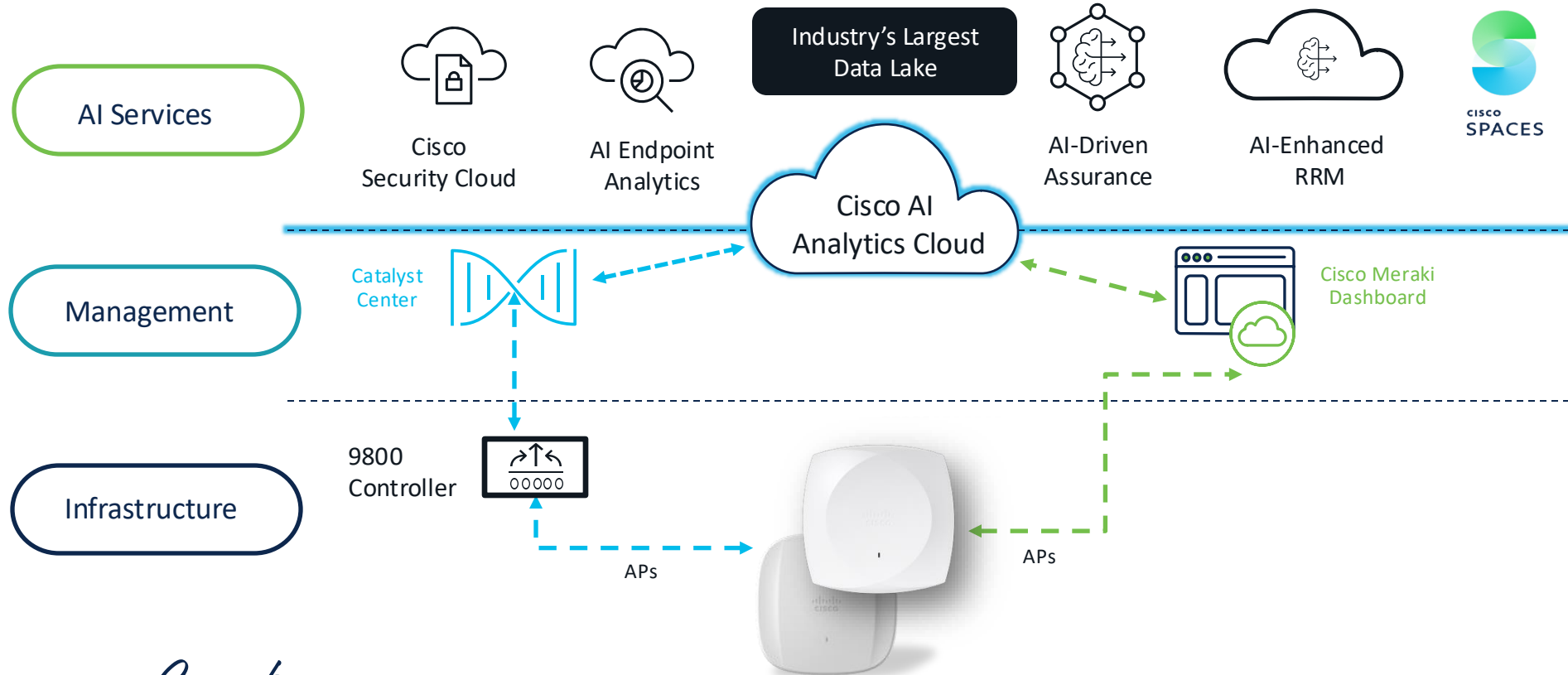Leverages data from **Wi-Fi**, BLE, UWB, IoT devices and sensors to improve operations and workspaces

Cloud **Platform**. Cisco Native & Partner Apps, APIs, monitoring

Secure & Compliant
(GDPR, PDPA, ISO 27001, SOC Type 1)

The unified experience for smarter buildings

AI Services

Cisco Security Cloud

AI Endpoint Analytics

Industry's Largest Data Lake

Cisco AI Analytics Cloud

AI-Driven Assurance

AI-Enhanced RRM

CISCO SPACES

Management

Catalyst Center

Cisco Meraki Dashboard

Infrastructure

9800 Controller

APs

APs

Meet us @World of Solution Booth

Go Beyond with Cisco CX!

	Premium Support		Solution Attached Services		Lifecycle Services
	Service	Use Case	Service	Use Case	Example Activities
Smart Building Technology Make your workplace more secure and sustainable with networking solutions and insights	Success Tracks Campus Network	Insights and observability for Campus Network including Catalyst 9k series. Campus Networking automation, segmentation, and programmability and integrations	SAS Campus Networking SAS Future-Proofed Workplaces Outcomes Program Management	Receive insights, recommendations, and optimization for network security throughout the campus for switching, wireless, and Cisco Spaces. Assistance creating a digital networking plan. Aligning Cisco Spaces to business goals along with ongoing program management such as evaluations of assessed use case implementation, alignment to third-party activities, and integration management with other Cisco devices	End-to-end visibility into energy consumption and automated power consumption management with Energy Optimization Management Service. Consultation on PoE infrastructure and guidance on leveraging data collected by sensors.

Thank you