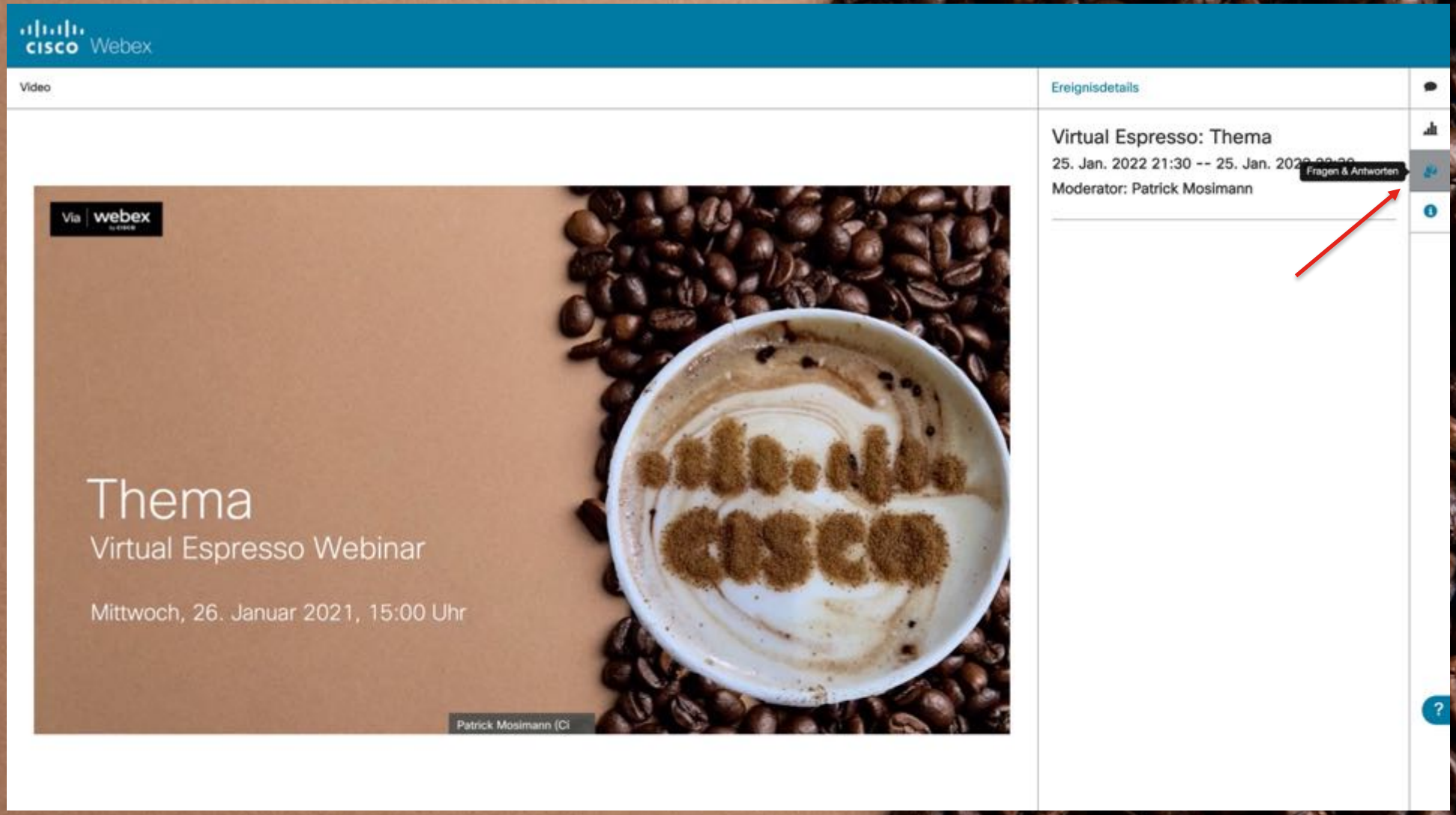
WiFi Innovations

Virtual Espresso Webinar

Mittwoch, 23. März 2022, 15:00 Uhr

👉 please utilise the Q&A function to get your question answered



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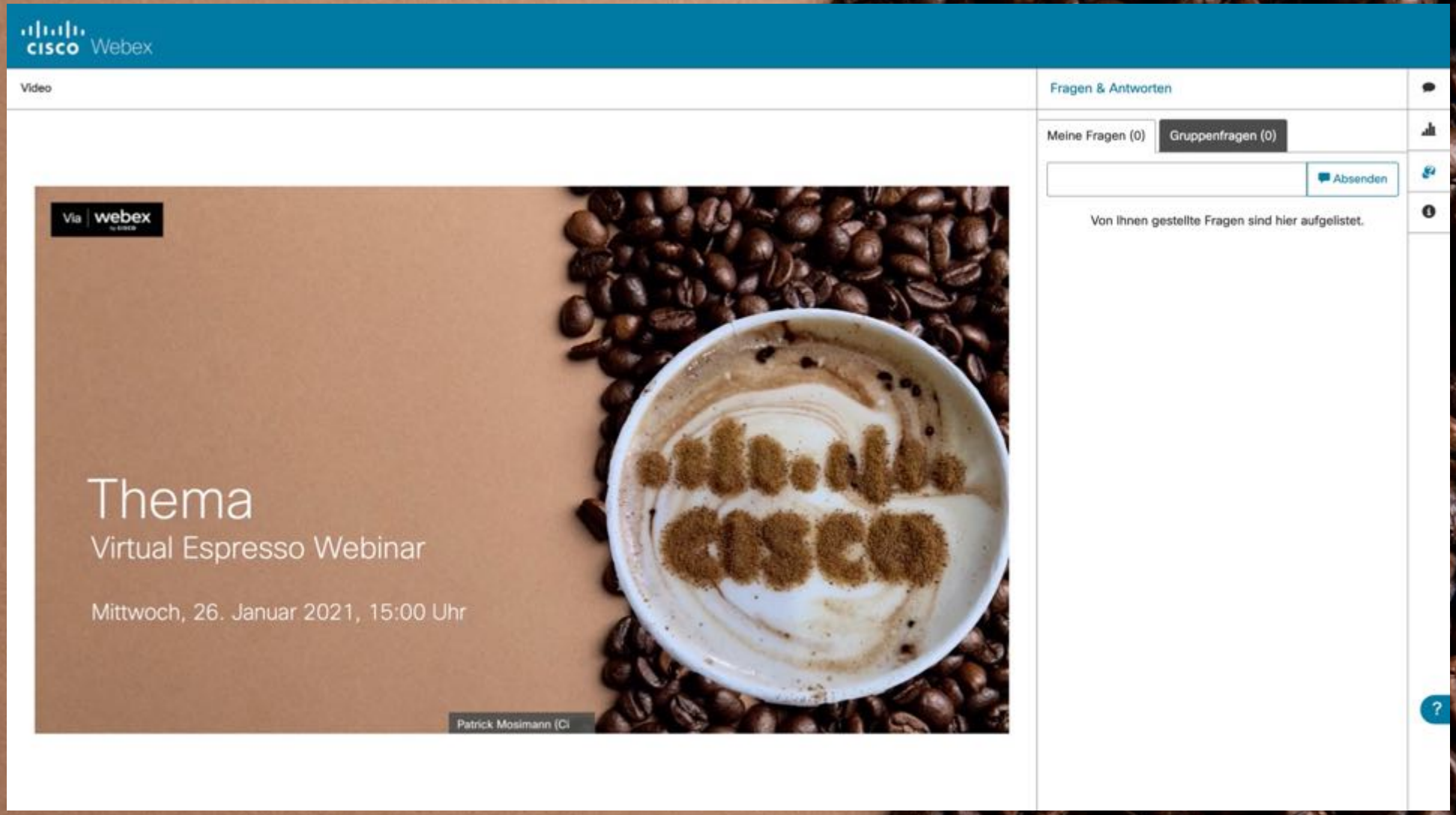


Wi-Fi 6E – The Future of Wireless

Enterprise Networking

Robert Rosenberger
Wireless Specialist

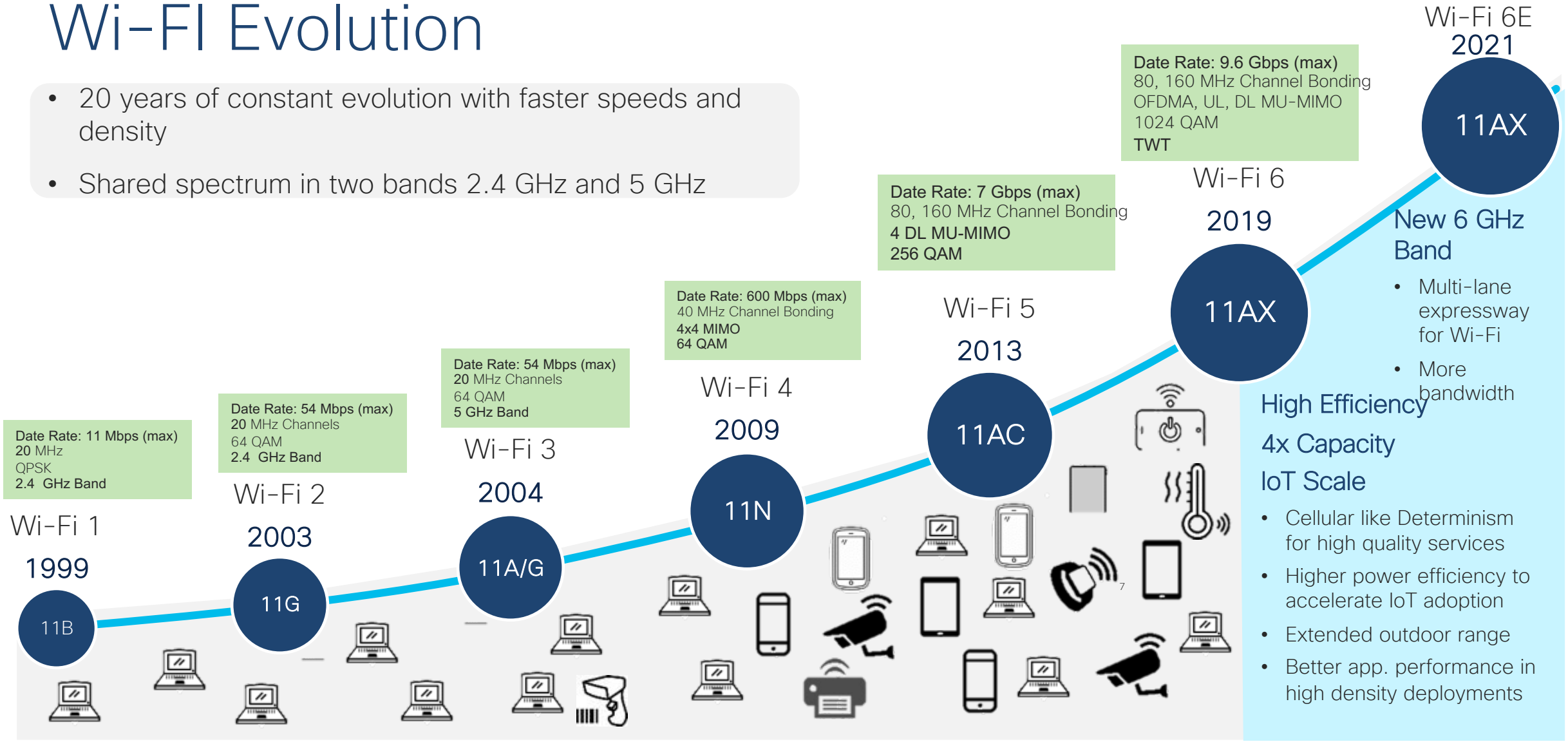
23. März 2022

Agenda

1. Wi-Fi 6E
2. Product Overview
3. Wi-Fi 6E with DNA Center
4. Migration
5. DNA Spaces integration
6. Software solution compatibility

Wi-FI Evolution

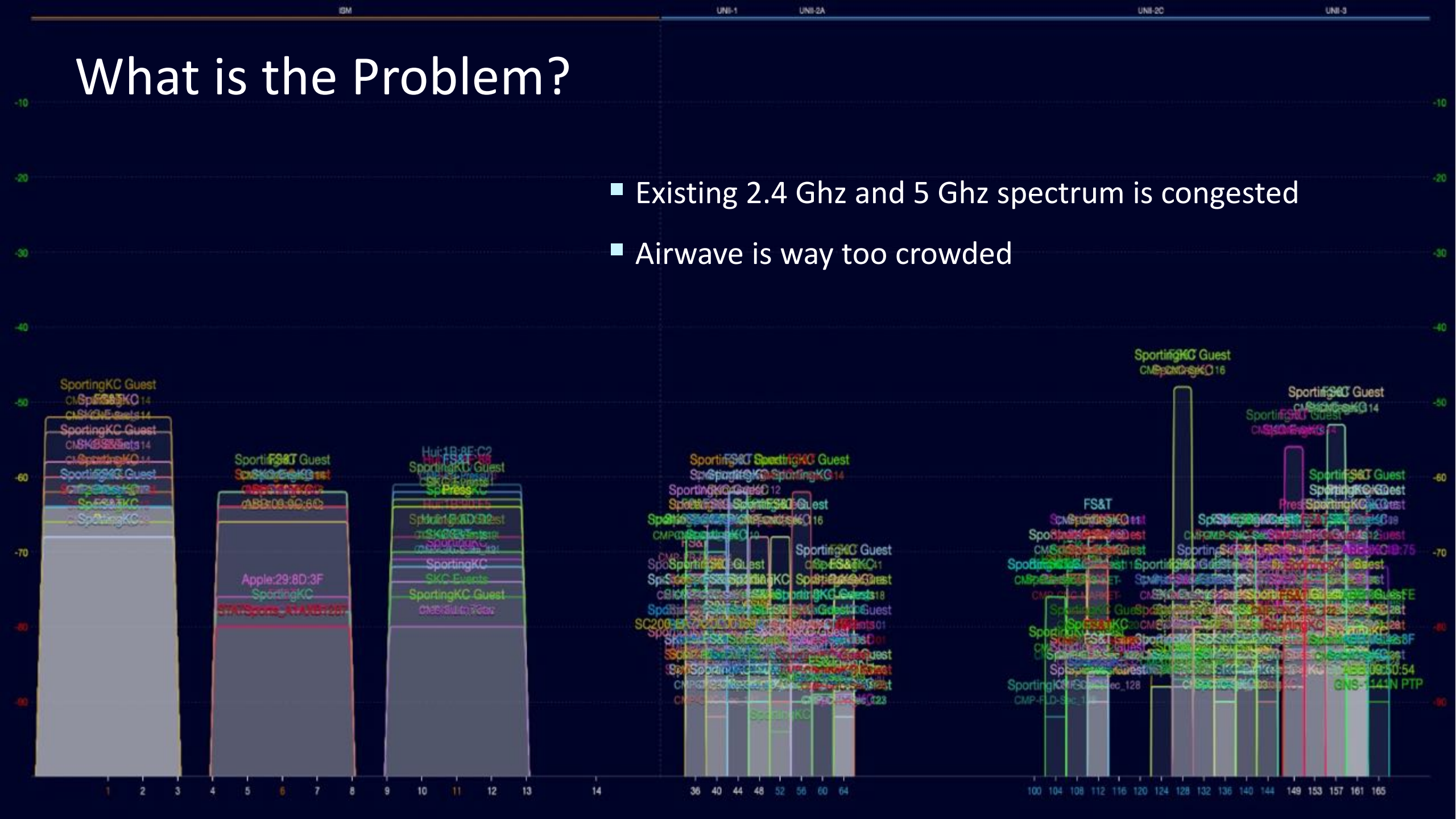
- 20 years of constant evolution with faster speeds and density
- Shared spectrum in two bands 2.4 GHz and 5 GHz



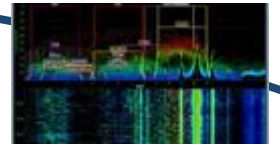

THIS LANE
EXIT
ONLY

What is the Problem?

- Existing 2.4 Ghz and 5 Ghz spectrum is congested
- Airwave is way too crowded

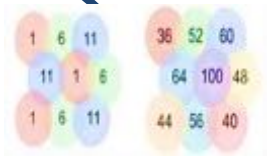


Current Challenges



Why is my Wi-Fi bad ?

- Too many devices
- Shared Spectrum – Interferers
- Channel Congestion
- Limited number of re-usable channels
- DFS Channels
- Legacy devices

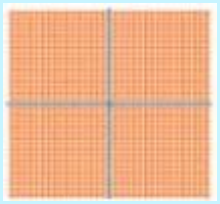


Wi-Fi 6E

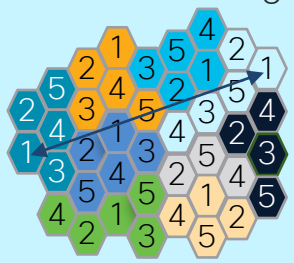
Wi-Fi 6 and 6GHz are friends

802.11ax

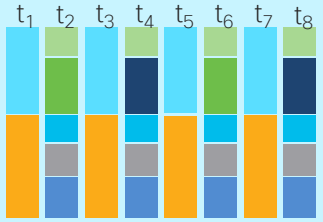
1024 QAM



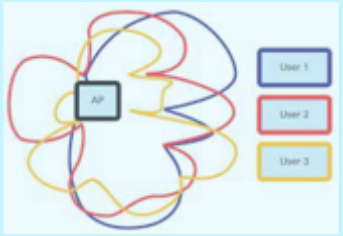
BSS Coloring



OFDMA



DL, UL MU-MIMO

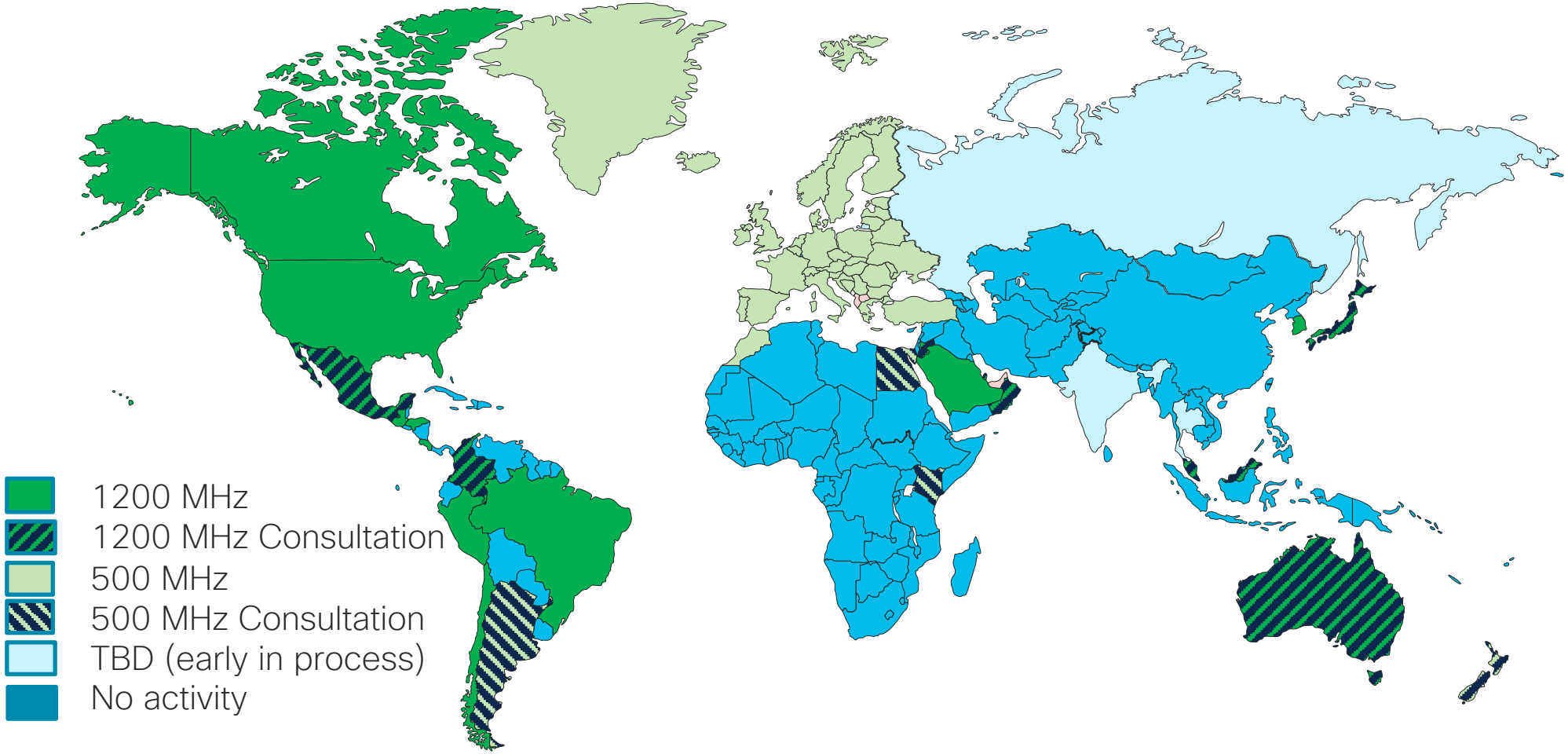


TWT

- Additional Spectrum
  - 1200MHz (5.925 GHz to 7.125 GHz) i US
  - 500 MHz (5.925 GHz to 6.425 GHz) in
- Wider Channels
- Clean RF
- No Slow Devices
- Security Upgrade
- 6 GHz WLAN Discovery

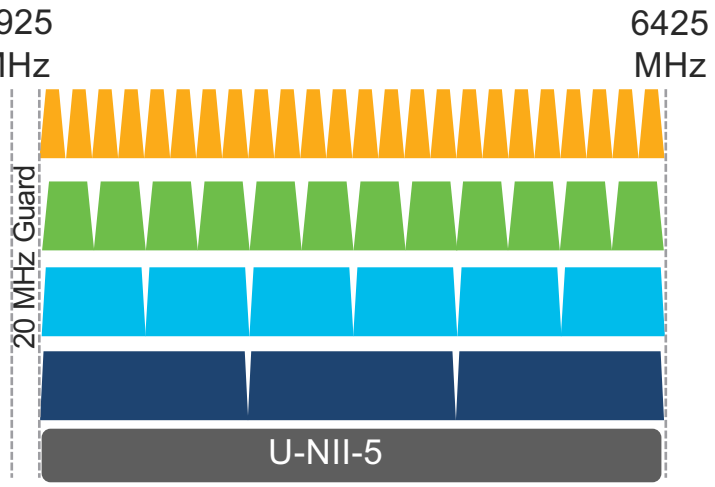
Global availability of 6 GHz band for Wi-Fi

(https://www.wi-fi.org/countries-enabling-wi-fi-6e)



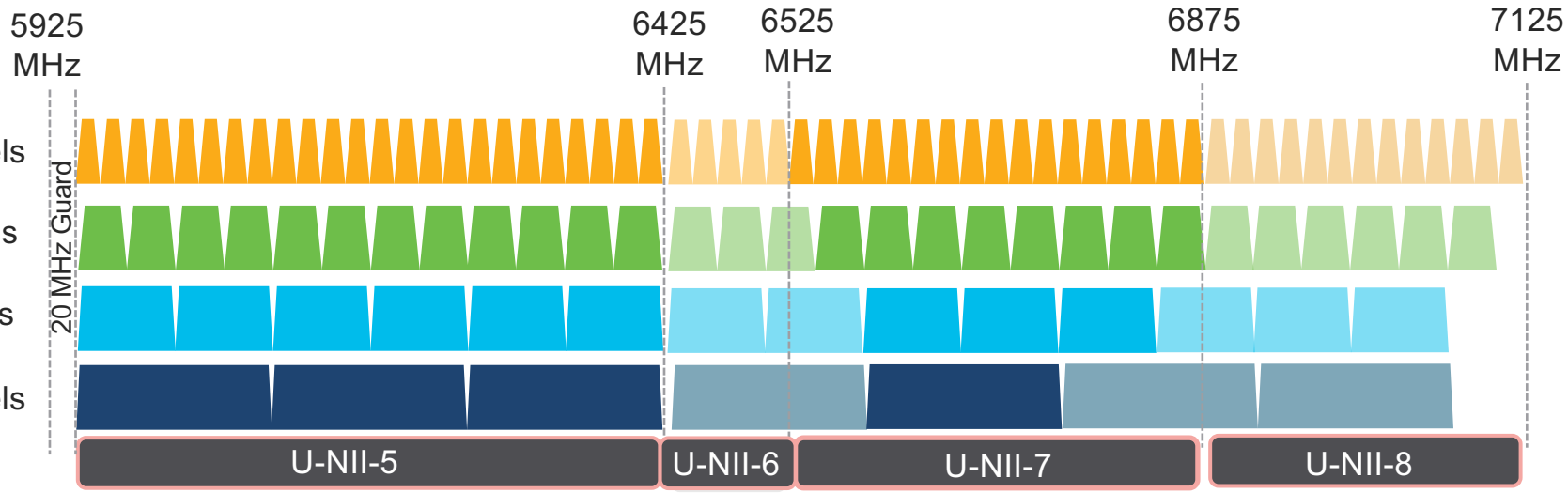
The new 6 GHz band :

Unii-5



5955 – 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

Europe/CEPT
500 MHz



United States
1200 MHz

6 GHz – New Device Classes

- Wi-Fi 6E introduces new device classes for optimized capability
- Supported Classes vary by country/regulatory

Standard Power AP

- Indoor or Outdoor
- No Antenna restrictions
- UNII-5 and UNII-7 Only (US)
- Requires AFC

Low Power Indoor AP

- Indoor Only
- Integrated Antenna Required
- Can use the full 500/1200 MHz

Very Lower Power AP

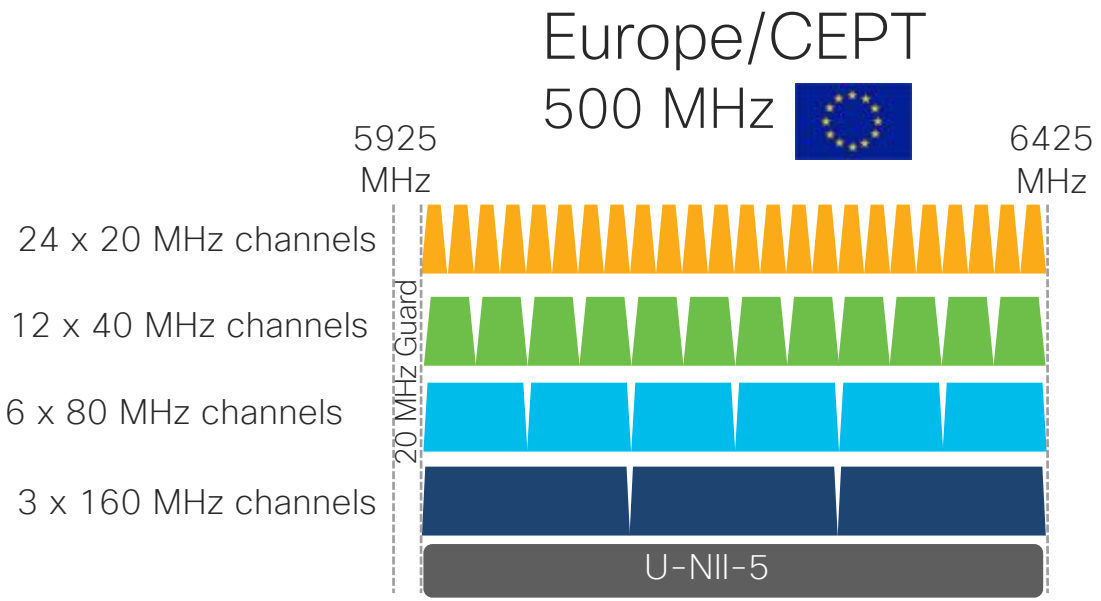
- Mobile Indoor or Outdoor
- Limited Range

Client Devices

- Indoor or Outdoor
- Only Indoor under control of LPI AP
- (6 dBm lower than AP – US)

The new 6 GHz band :

- ETSI will support LPI and VLP
- Tx power varies by regulatory
- Tx power limits are expressed as PSD Power Spectral Density
- For ETSI –
  - LPI 10 dBm/MHz Max EIRP 23 dBm
  - VLP -8 dBm/MHz Max EIRP 14 dBm
  - Client and AP TX pwr is the same
- No Standard Power outdoors for now



Wi-Fi 6E Security

Wi-Fi 6E up level's security with WPA3 and OWE

WPA3 and Enhanced Open Security made mandatory for Wi-Fi 6E certification.

No backward compatibility with Open and WPA2 Security.

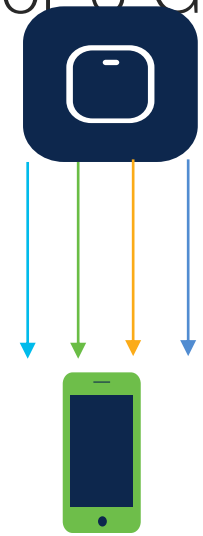
Requires Protected Management Frame (PMF) in both AP and Clients.

Wi-Fi 6E Security Deployment Considerations

- Layers of Wi-Fi Security
  - Clients with WPA2/WPA/Open continue to operate in 2.4 and 5 GHz bands.
  - 6 GHz operates exclusively with WPA3 and Enhanced Open Security
- Use of different SSIDs for 6 GHz band

2.4 & 5 GHz Bands

SSID: employees
(WPA2-Enterprise)
SSID: employees-wpa3
(WPA3-Enterprise)
SSID: guest
(WPA2-Personal)



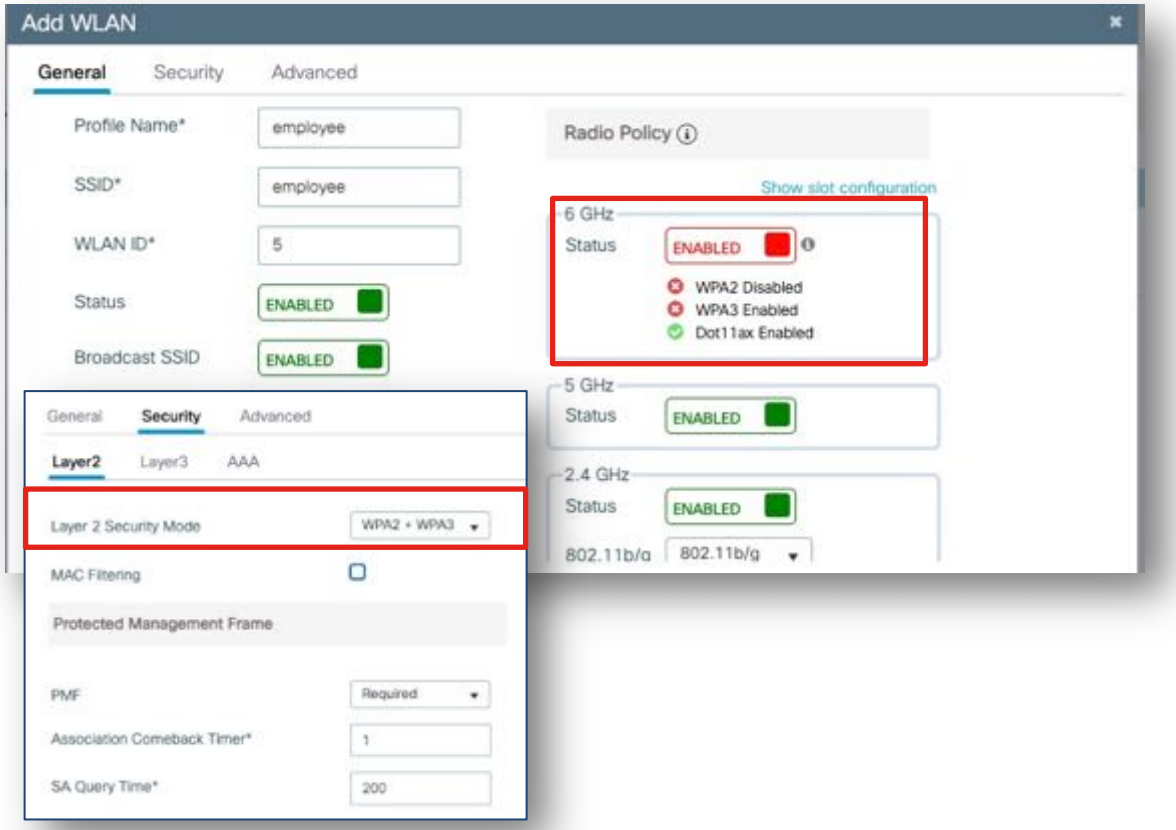
6 GHz Band

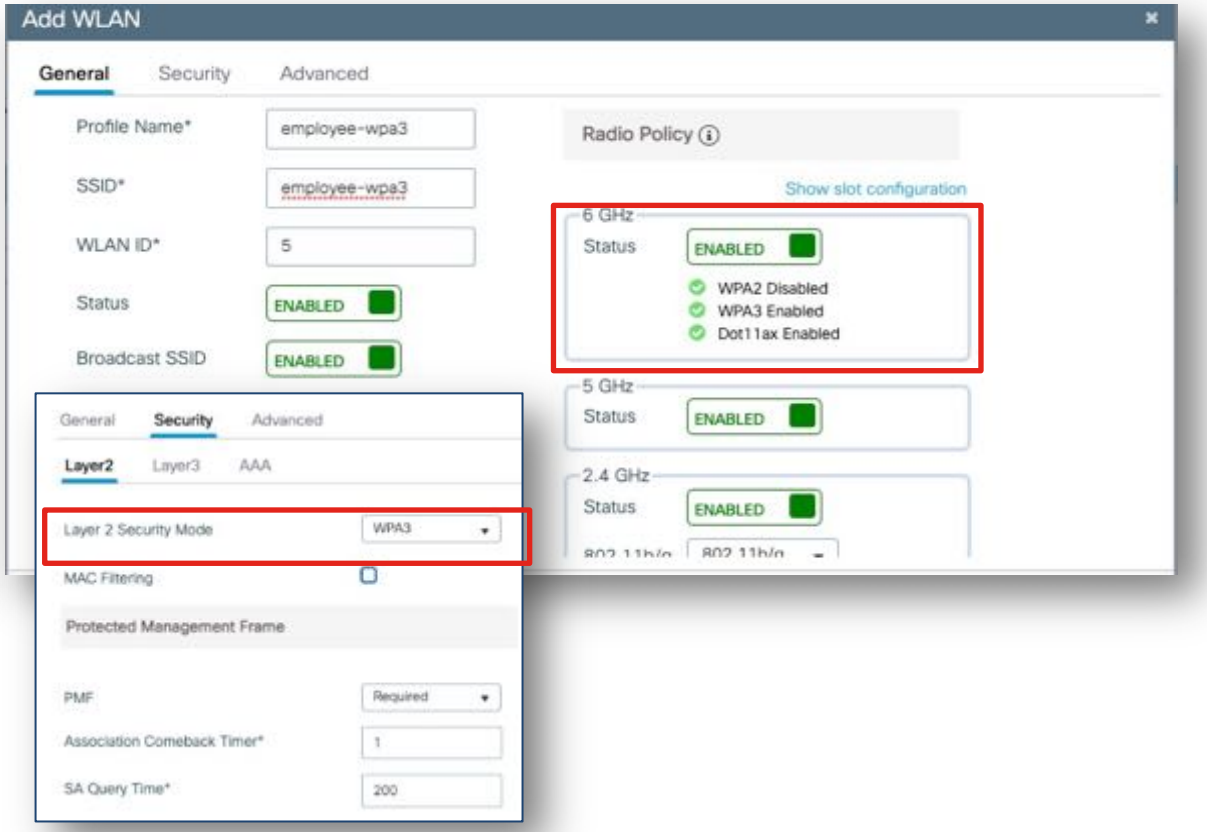
SSID: employees-wpa3
(WPA3-Enterprise)
SSID: guest-wpa3
(WPA3-Personal/H2E *)

**Note: Only H2E (hash to element) is the supported SAE (Simultaneous Authentication of Equals) in 6GHz Band*

Wi-Fi 6E WLAN Configuration

- 6 GHz Band gets disabled automatically if Security is less than WPA3
- Max 8 SSIDs broadcasted in 6 GHz radio*





*Note: Will be extended to 16 in Future Release

Wi-Fi 6E Client Device Eco System

Wide range of client support ..

Samsung Galaxy Ultra S21

Samsung Galaxy Z Fold

Google Pixel 6 /Pro

Xiaomi Mi 11 /Ultra

ASUS Zenfone 8 and 8 Flip

Motorola Edge (2022)

Laptops with Intel AX210 Chipset

Wi-Fi 6E Chipsets

with more coming soon .....

Cisco Wi-Fi 6E AP

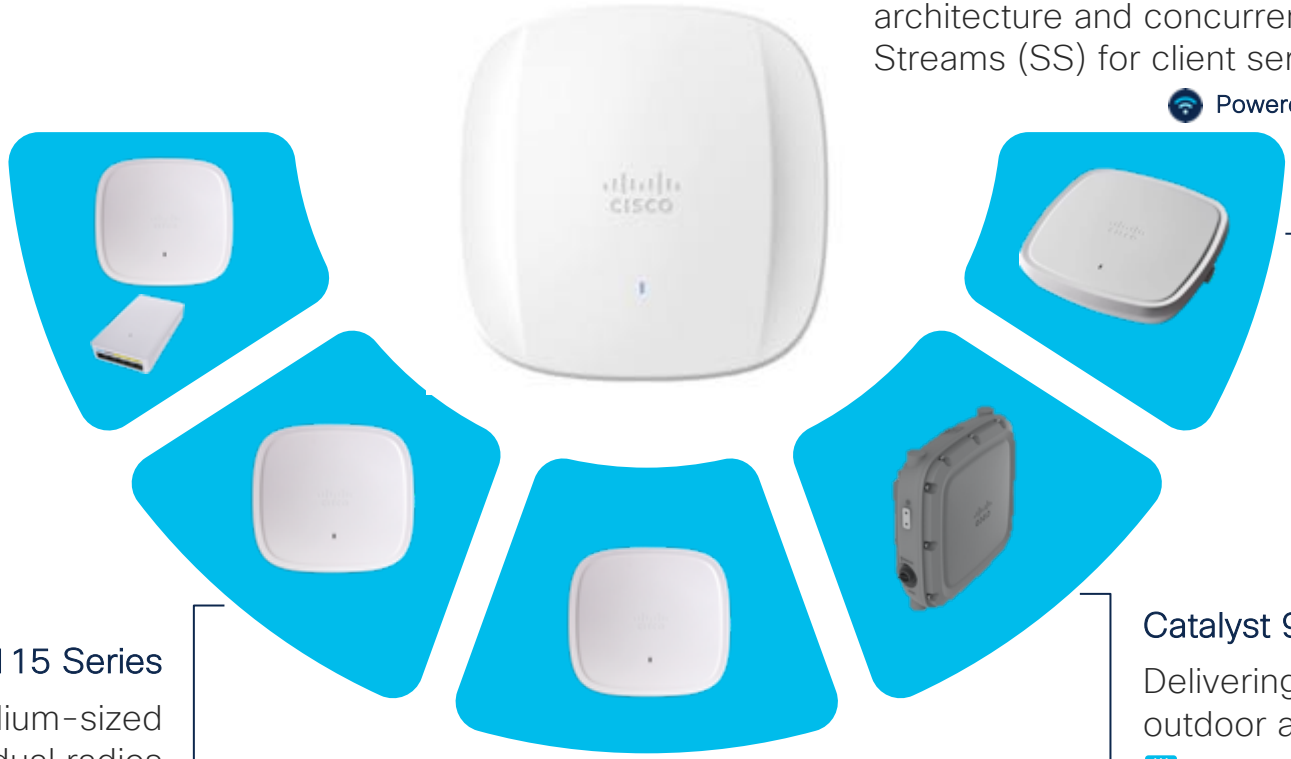
Enhanced Catalyst Wi-Fi 6/6E product line

Purpose-built for immersive experiences

Catalyst 9136 Series

Industry-leading Wi-Fi 6E access point with hexa-radio architecture and concurrent tri-radio with 16 Spatial Streams (SS) for client serving

Powered by Cisco's AI/ML-driven scanning radio



Catalyst® 9105 Series

Perfect for teleworkers and smaller branch sites

Catalyst 9130 Series

Industry-leading Wi-Fi 6 access points with 8x8, tri-radio architecture

Powered by Cisco® RF ASIC

Catalyst 9115 Series

For small to medium-sized deployments with dual radios

Catalyst 9124 Series

Delivering best-in-class connectivity in outdoor and challenging environments

Powered by Cisco RF ASIC

Catalyst 9120 Series

For mission-critical deployments using dual 5 GHz and integrated IoT radio

Powered by Cisco RF ASIC

Catalyst 9136 Series access point

Best-in-class Wi-Fi 6E technology starting from Cisco IOS® XE 17.7.1

NEW

Catalyst® 9136 Series

Concurrent tri-radio with 16 spatial streams

Hexa-radio architecture

- 2.4-GHz serving radio (slot 0): 4x4, 4SS
- 5-GHz serving radio (slots 1 and 2): 8x8, 8SS
- Dual 5-GHz serving radio (slot 1 or 2*): 4x4, 4SS
- 6-GHz serving radio (slot 3): 4x4, 4SS
- Dedicated AI/ML-driven scanning radio
- 2.4-GHz IoT radio “BLE”

Dual PoE for power redundancy

- 2x 5 Multigigabit (mGig) PoE ports
- 802.3 link aggregation > up to 10 Gbps uplink

Internet of Things (IoT) capabilities

- Built-in environmental sensors
- Application hosting technology
- USB port with 9W power output

Analytics with Cisco DNA Center 2.3.2	Extending Cisco’s intent-based network	Location and IoT with Cisco DNA Spaces

* The slot 2 radio in 4x4 will be supported in a future software release.

Key product specifications

Best-in-class Wi-Fi 6E technology starting from Cisco IOS ® XE 17.7.1

Catalyst® 9136I platform

- PID: C9136I-x
- USB 2.0 with 9W
- RJ-45 console port
- Min/max power: 802.3af/802.3bt*

Supported platform software

- Cisco IOS® XE: 17.7.1
- AireOS: Not supported
- License: Cisco DNA Essentials, Cisco DNA Advantage

Scale and performance

- Max Wi-Fi clients: 1200 per AP (400 per radio)
- Antenna gain: 2.4 GHz: 4 dBi, 5 GHz: 5 dBi, 6 GHz: 6 dBi
- Max Tx power: 2.4 GHz: 23 dBm, 5 GHz: 26 dBm, 6 GHz: 23 dBm (FCC)

Radio features

- Hexa-radio architecture with concurrent tri-radio and 16 spatial streams
- Dedicated AI/ML-driven scanning radio for off-channel scanning
- Uplink/downlink OFDMA (37RU) and multiuser multiple input, multiple output (MU-MIMO)
- 1024 QAM, 10.2 Gbps max PHY
- BSS coloring, Target Wake Time (TWT), beamforming

Access point modes

- Local, Cisco FlexConnect®, OfficeExtend Access Point (OEAP), monitor, sniffer
- Site survey mode
- Embedded wireless controller (EWC) on AP is not supported
- Max PHY: 10.2 Gbps
- Channel width: 20 to 160 MHz
- MTBF – 25°C: 312,422 hours, 50°C: 171,539 hours
- Operating temperature: 0° to 50°C

Clean spectrum
Additional 1.2 GHz with no interference

High throughput
Wider channels (>1 Gbps)

Ultra-low latency

* AIR-PWRINJ7 is the 9136's official 802.3bt power injector.

Catalyst 9136I mechanical design

Platform hardware enhanced with practicality

Brand new design

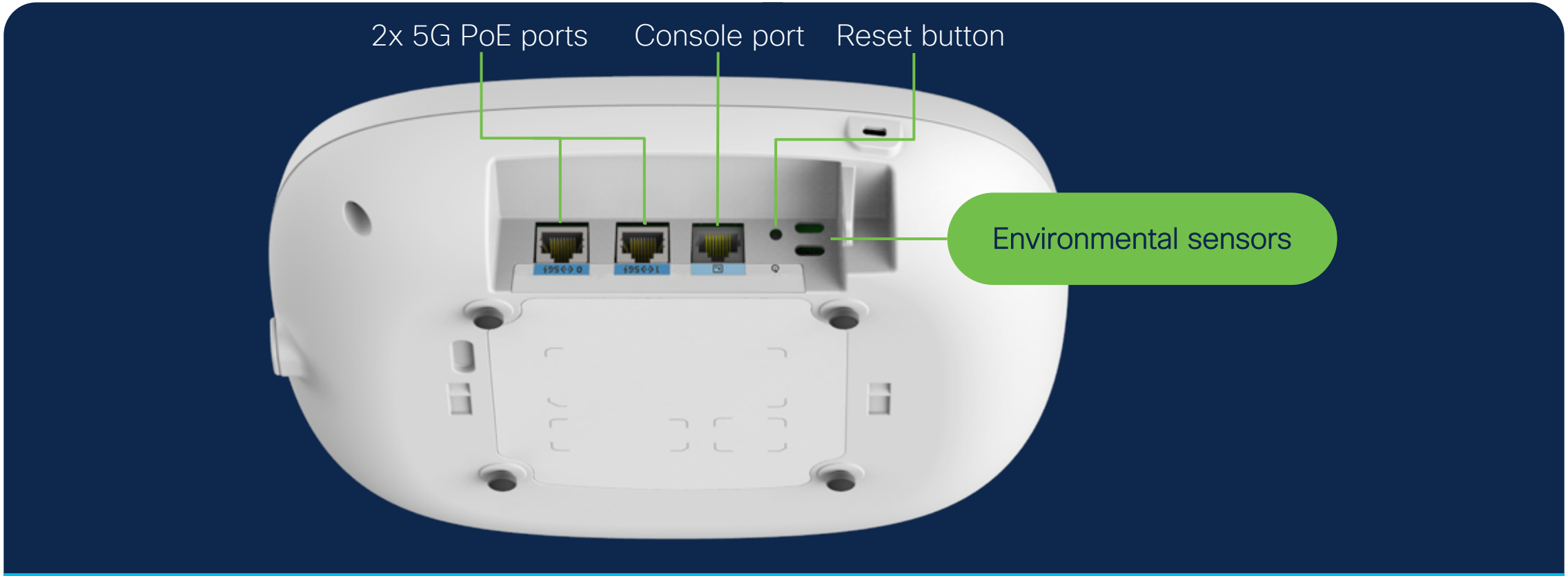
Enlarged recessed area

Compatible with standard mounts:
AIR-AP-BRACKET-1 and AIR-AP-BRACKET-2

Improved cabling experience:
Larger recessed area than previous APs

Catalyst 9136I ports

Power redundancy, link aggregation, and more

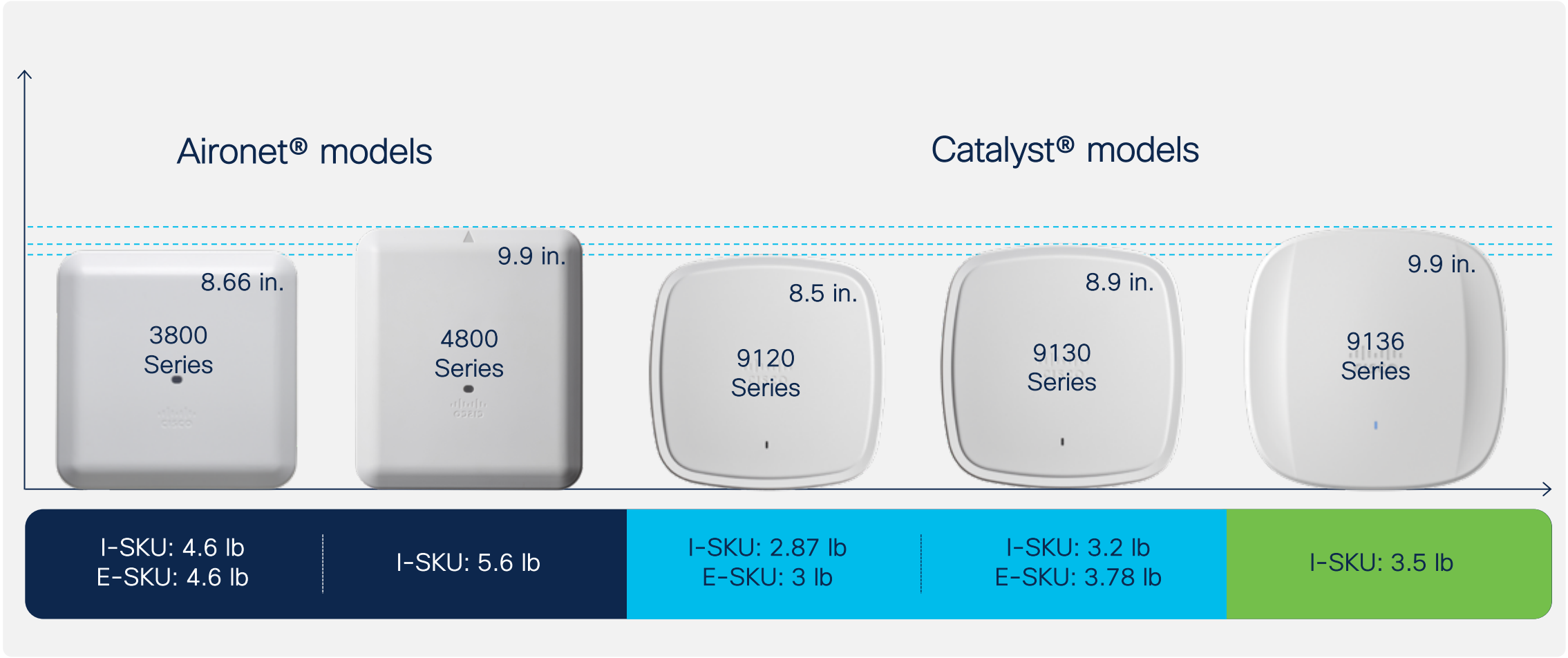


Dual PoE ports for hitless PoE:
No reboot required if a port loses power

Uplink ports support:
802.3 link aggregation for increased throughput resiliency

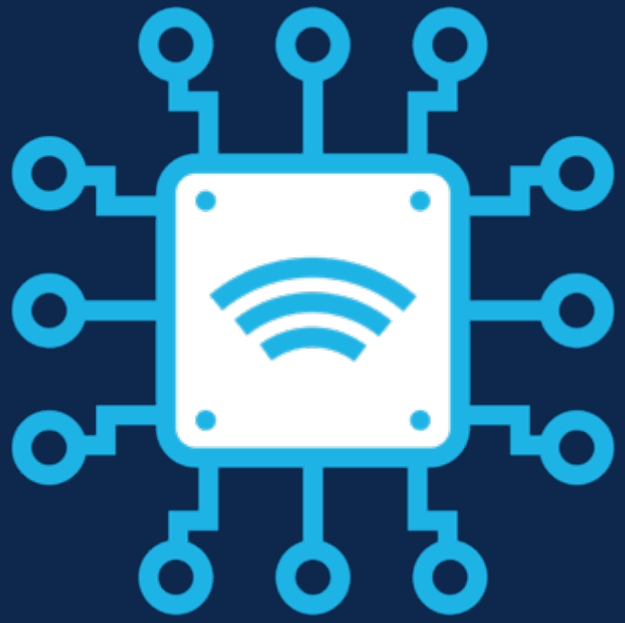
Indoor Catalyst and Aironet access point dimensions

Catalyst 9136 is similar in size but significantly more capable



Cisco excellence with CleanAir and RF ASIC

Features and use cases



Cisco CleanAir Pro

Evolving Wi-Fi excellence

Introducing Cisco CleanAir Pro

15 years of innovations and excellence carried forward

Cisco CleanAir Pro

Evolving Wi-Fi excellence into 6 GHz

- Full 2.4-, 5-, and 6-GHz band support
- Multiradio architecture
- AI/ML-driven scanning radio decoding HE frames
- ML-based interferer classification, on AP

Zero-wait DFS support on Catalyst 9100 access points

No more 1-minute channel available checks needed

01

AI/ML-driven scanning radio Channel Availability Check (CAC) DFS channels for radar activity.

02

If no radar activity is found, the channel is added from the exclusion to inclusion list.

Exclusion channels	Inclusion channels
100 to 108 124 to 132 140	112 to 120 136

03

The AP can change to that channel and operationalize immediately.

Channel 140 › Channel 136

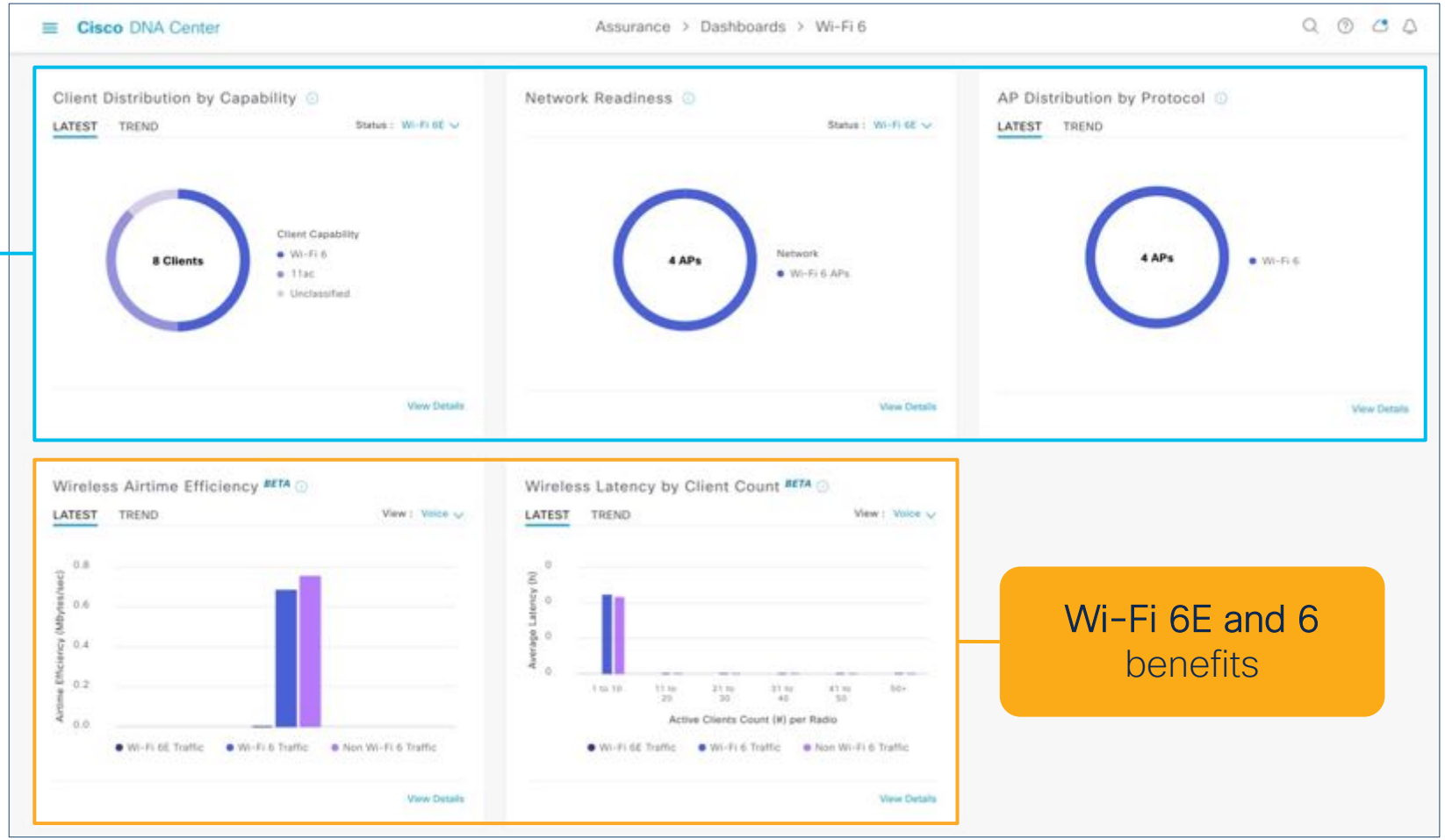
Note: ETSI domain can have multiple pre-CAC channels, but FCC can have only one.

Wi-Fi 6E Cisco DNA Center integration

Wi-Fi 6E integrated into Wi-Fi 6 dashboard

Observe the readiness and benefits of 6 GHz

Wi-Fi 6E and 6 readiness



Wi-Fi 6E and 6 benefits

Intelligent Capture's spectrum analysis to capture 6 GHz

Enhanced with the Catalyst 9136I's AI/ML-driven scanning radio

Toggle to view 6-GHz spectrum

Capable to view channels 1 to 233

Capture 6-GHz duty cycle and interference

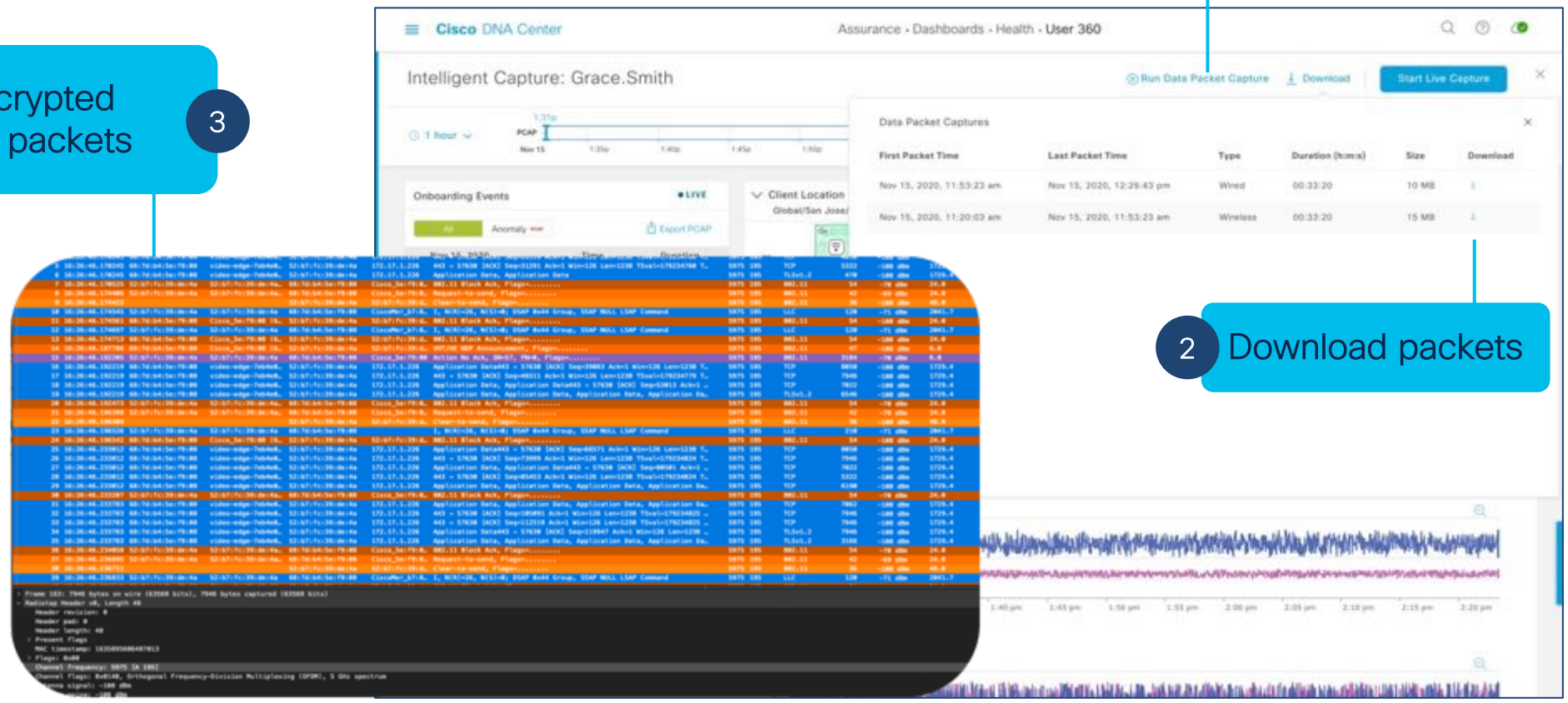
Intelligent Capture to support packet capture in 6 GHz

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

1 Enable globally

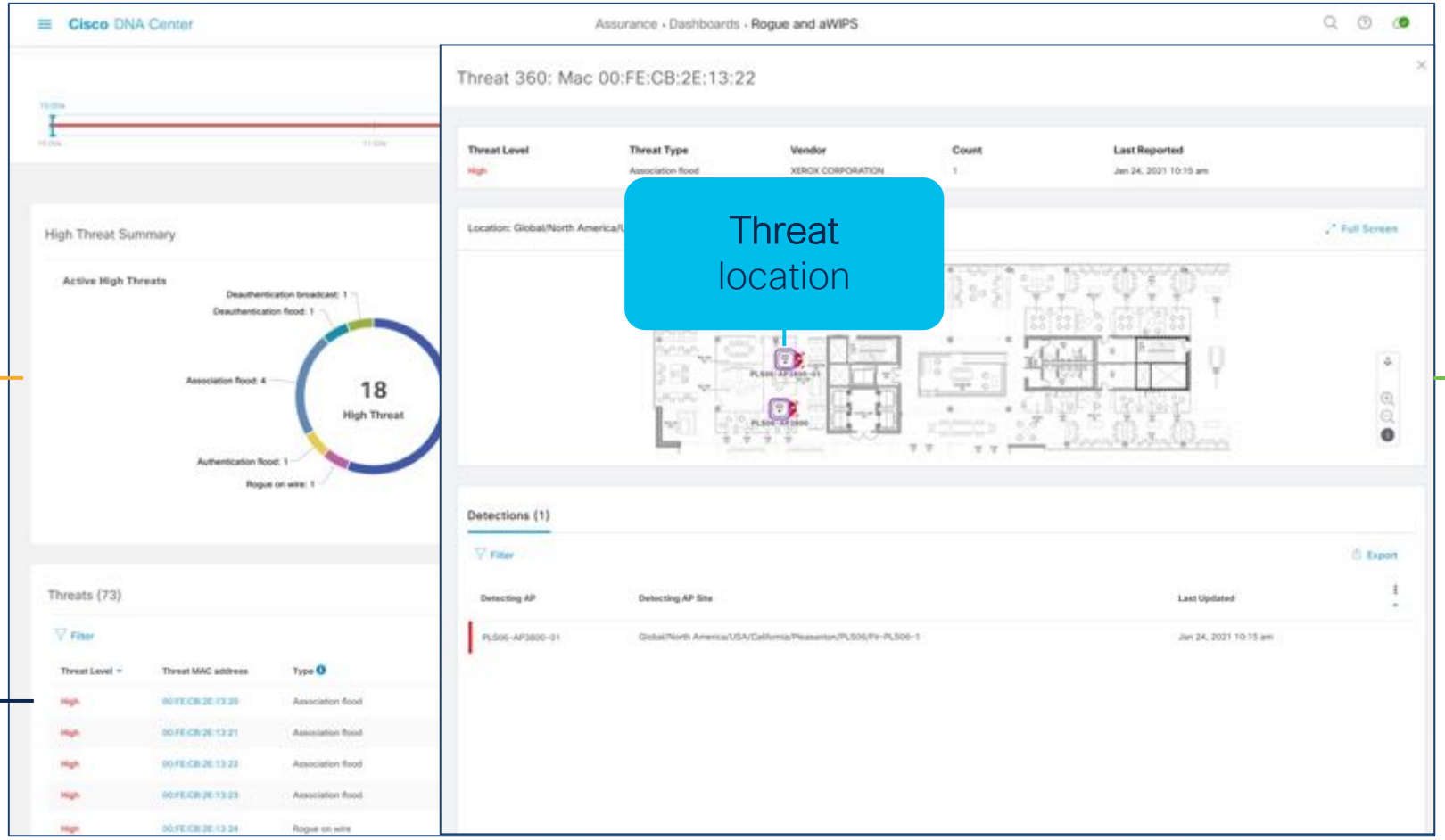
View unencrypted 6-GHz data packets 3

2 Download packets



Rogue management and aWIPS on Wi-Fi 6E

Abolish your 6-GHz network vulnerabilities



High threats by category

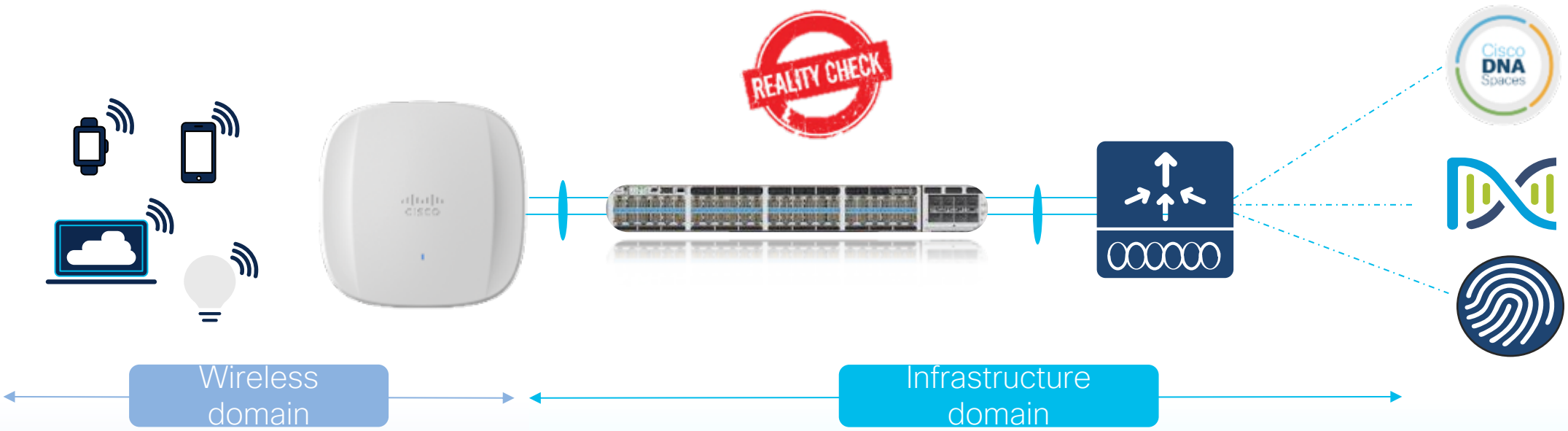
Threat location

Threat count trend

Threat level details

Migration and deployment tips

are you ready for 6E?



- ✓ Regulatory domains
- ✓ Client adoption
- ✓ 6GHz Only Indoor (LPI AP)
- ✓ Upgrade areas?
- ✓ And more…

- ✓ Increased PoE requirement > switch power budget
- ✓ Wi-Fi Higher speed > mGig port upgrade
- ✓ Dual port LAG > increased port density
- ✓ Translate Wi-Fi 6E better security to network segmentation
- ✓ And more…

Catalyst 9136I Power over Ethernet default configurations

Input power	Number of spatial streams	2.4-GHz radio (slot 0)	Primary 5-GHz radio (slot 1)	Secondary 5-GHz radio (slot 2)	6-GHz radio (slot 3)	mGig PHY 0 link speed	mGig PHY 1 link speed	USB	AI/ML-driven scanning radio	IoT Radio	Environmental Sensors	Max power draw
802.3bt (Cisco UPOE®)	16	4x4	8x8 or Dual 4x4		4x4	5G	5G	Yes/9W	Y	Y	Y	47.3W
802.3at (PoE+)	8	2x2	2x2	Disabled	4x4	2.5G	Disabled	Disabled	Y	Y	Y	24.4W
802.3af (PoE)	0	Disabled	Disabled		Disabled	1Gig	Disabled	Disabled	Y	Y	Y	14W

Note:
1. Slot 2 can operate only together with slot 1 in 8x8 mode. Independent Slot 2 operation is not supported until a future software release.
2. AIR-PWRINJ7 is the 9136I's official 802.3bt power injector.

DNA Spaces integration

Catalyst 9136I has three built-in environmental sensors with full Cisco DNA Spaces integration in Release 17.8.1

Air quality

The built-in Gas Sensor Module will enable the reading of Total Volatile Organic Compound (TVOC) concentration and Indoor Air Quality (IAQ) rating.

Humidity

The built-in module is a fully calibrated sensor with the ability to measure the humidity in the air.

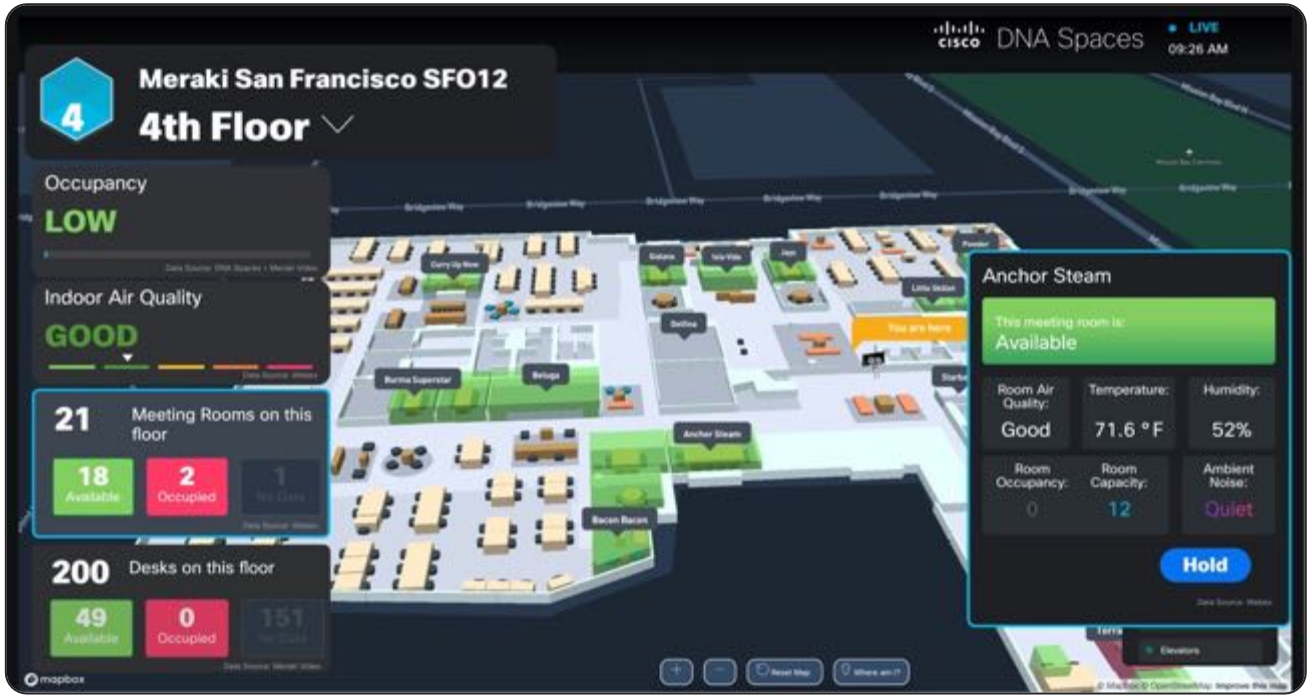
Temperature

The built-in module can also capture the temperature to provide a reading of the environment remotely.

Note: The temperature generated by the AP will be considered during temperature and IAQ readings.

IoT enhanced hybrid work experience

Catalyst 9136I integrates with Cisco DNA Spaces for back-to-office use cases



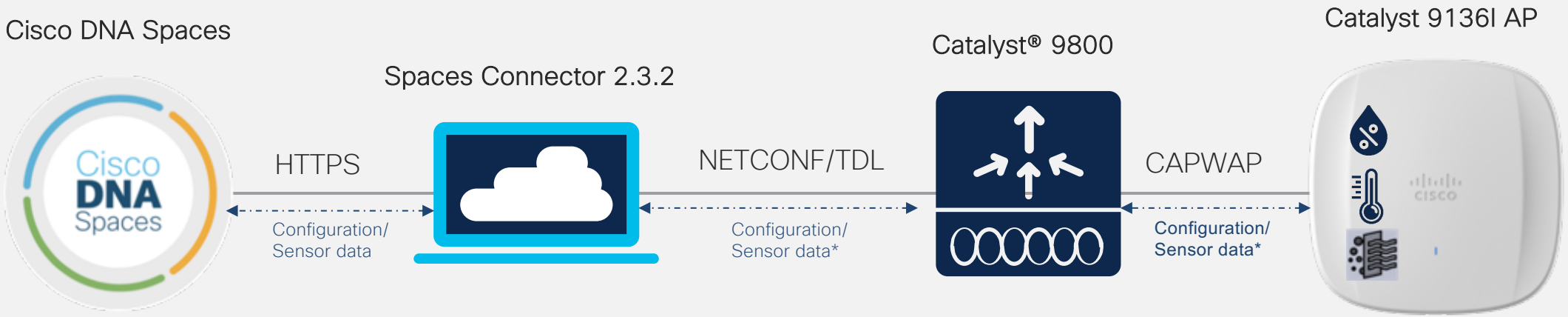
Cisco DNA Spaces will support rich maps for an immersive experience

Network experience and BLE IoT integration to drive business outcomes

Catalyst® 9136I has built-in environmental sensors that feed Cisco DNA Spaces data

Note: Initial concept, target availability May FY22

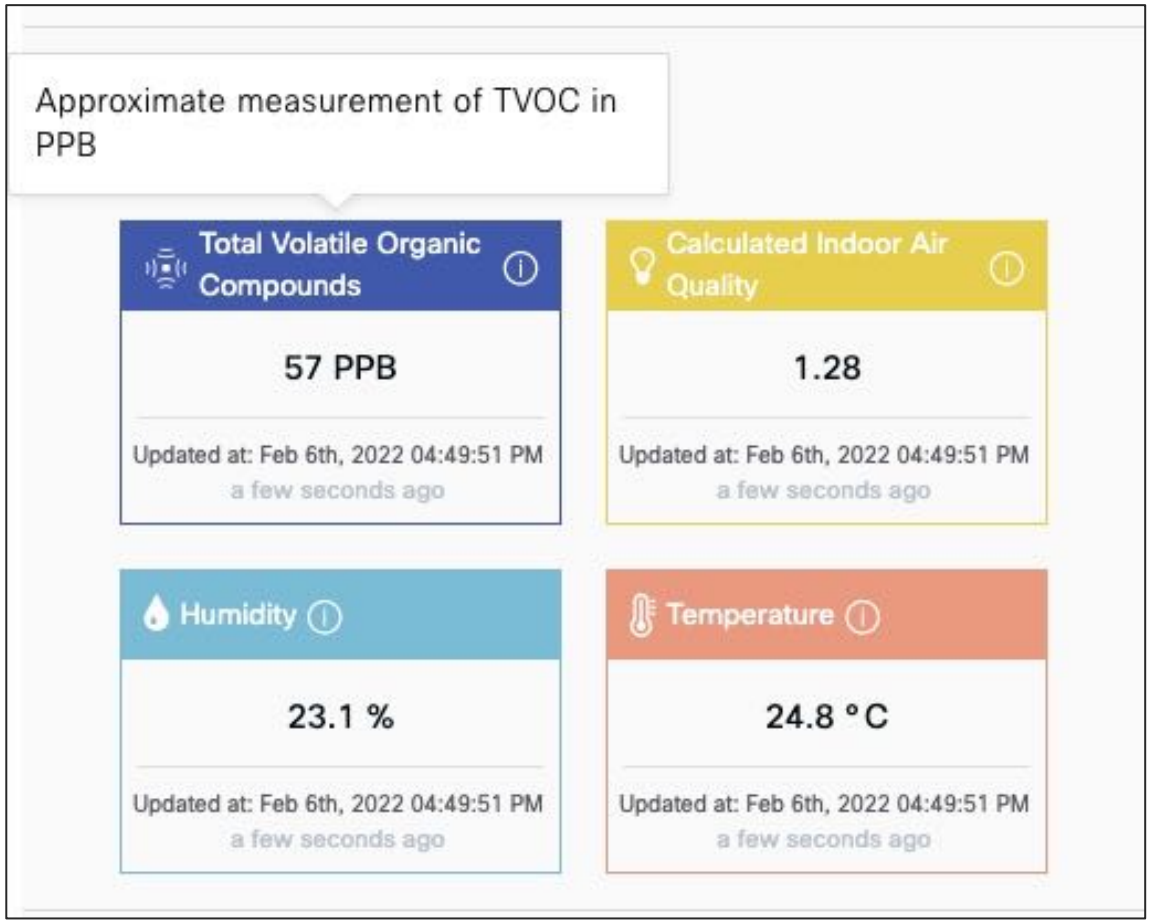
Topology of the Catalyst 9136I's environmental sensors with Cisco DNA Spaces



(*) Sensor data is sent to C9800 via CAPWAP, Spaces Connector subscribes to the Yang models and get the data via telemetry, then sends to the data to DNAS Cloud via the HTTPs tunnel where is shown in the Dashboard

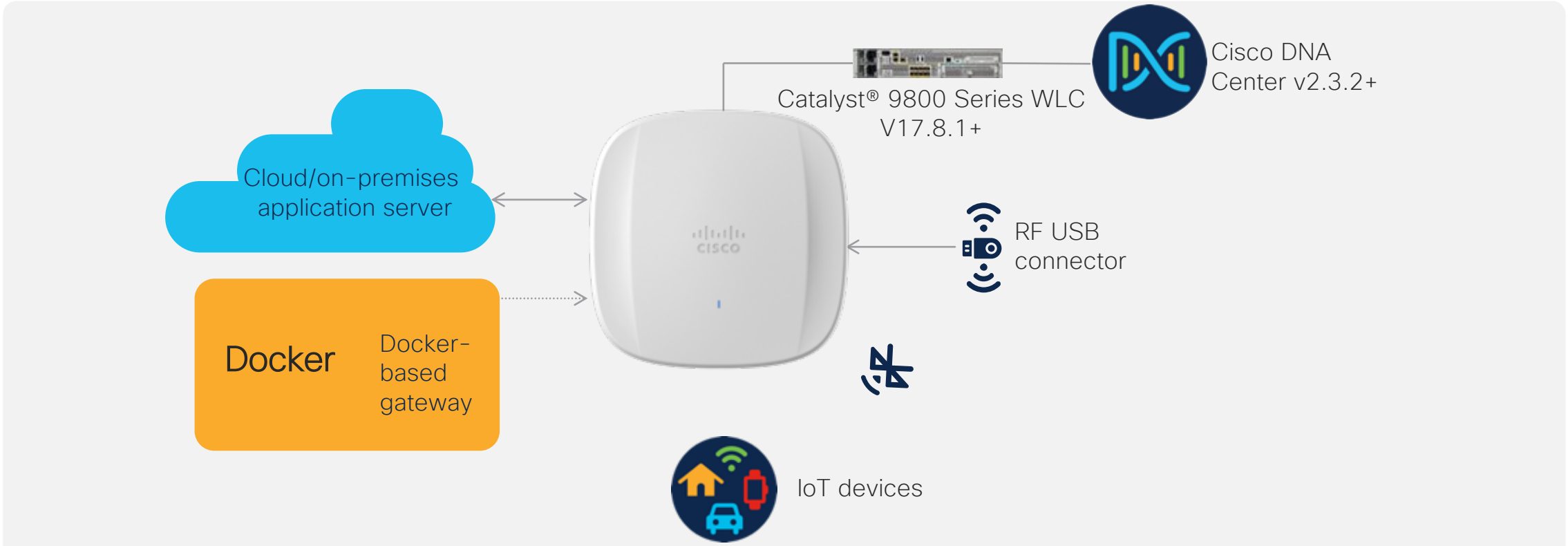
Supports all AP modes: Local, FlexConnect, Fabric, monitor, sniffer

Catalyst 9136I has three built-in environmental sensors with full Cisco DNA Spaces integration in Release 17.8.1



Note: Mockup is subject to change

Catalyst 9136 fully supports application hosting
for an enterprise wireless IoT experience starting 17.8.1



Cisco DNA Center for application management

USB power output is now 9W (compared to 4.5W in prior gen)

New application hosting partners coming soon

Electronic shelf label
Retail management

ses imagotag

SOLUM
Solution provider.

Asset tracking
Building management

UWINLOC

pozyx

WIREPAS

Honeywell

EnOcean
Self-powered IoT

MYSPHERA

wipelot

MESHTECH

Patient tracking
Medical management

PHILIPS

leitwert.

Software solution compatibility

Access point software stack
Software support matrix (minimum support)

Access points	Cisco IOS® XE	AireOS	Cisco DNA Center	Cisco Prime®	CMX	Cisco DNA Spaces	ISE
Catalyst® 9136I	17.7.1	N/A	2.3.2	3.10	10.6.3-75	2.3.2 Connector	2.6
Catalyst 9130AXE	17.1.1	8.10MR1	1.3.2	3.7	10.6.2	2.3.2 Connector	2.3 2.4 2.6
Catalyst 9130AXI	16.12.1s with AP DP	8.10	1.3.1.2	3.7	10.6.2	2.3.2 Connector	2.3 2.4 2.6
Catalyst 9120AXE, 9120AXP	16.12.2	8.10	1.3.2	3.7	10.6.2	2.3.2 Connector	2.3 2.4 2.6
Catalyst 9115AX, 9120AXI	16.12.1s	8.9.111	1.3.1.2	3.7	10.6.2	2.3.2 Connector	2.3 2.4 2.5
Catalyst 9105AX Series	17.3	8.10 (MR3)	2.1.2.0	3.9	10.6.2 (MR2)	2.3.2 Connector	2.4 2.6 2.7
Wave 2 access points	16.12.1s	8.5MR5	1.3.1.2	3.7	10.6.2	2.3.2 Connector	2.3 2.4 2.6

Wi-Fi 6E Key takeaways…

Wi-Fi 6E is an exciting new chapter in the Wi-Fi success story, it's a new standard, new frequency band and it will a journey to adopt. Wi-Fi 6 is here today and still very relevant for your customers

Why Wi-Fi 6E? Learn how to articulate the reasons and the advantages for the 6 GHz band and the importance to deliver it with **#NoCompromise**

The Catalyst 9136 is the best-in-class Wi-Fi 6E Enterprise AP and integrated Catalyst Stack, delivers the full benefits of the Cisco Secure Access Innovations

Fragen?

OUTLOOK Upcoming Virtual Espresso

- Blog: http://cs.co/vEspresso
- Topics:
  - 18.05.2022: Secure Network Analytics

dankä villmal
grazie mille
merci beaucoup
grazia fitg
thank you