



The bridge to possible





Cisco RF Innovations

Jiri Brejcha

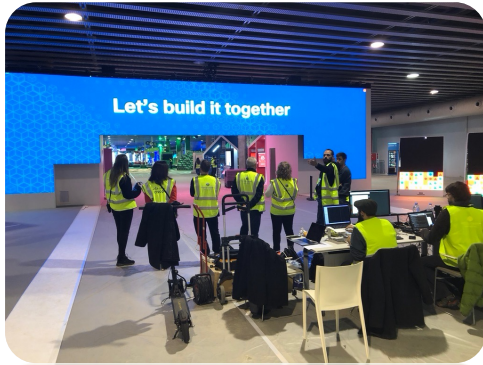
Mobility Technical Solutions Architect

November 2021

Who is Jiri?

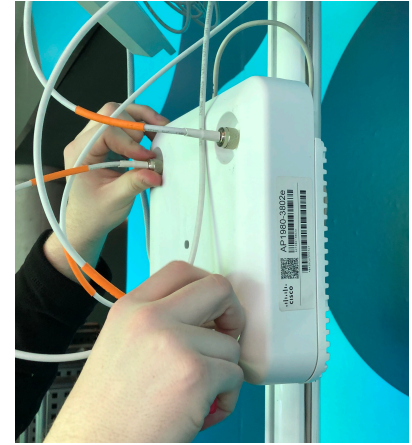
 jiribrejcha
 jibrejch@cisco.com

- Mobility Technical Solutions Architect at Cisco, based in Reading, UK
- Proud member of the Cisco Live Network Operations Center deployment team
- Passionate about mobility ranging from Wi-Fi to folding bikes;-)
- WLAN Pi development team member





Stadium and high-density large public venue design today



- Number of components required, multiple mounting points
- Plenty of room for cabling and mounting errors during installation
- Highly directional antennas
- Capacity and dual 5 GHz first, overhead deployment highly recommended
- Trained installers to avoid manual errors
- Plan around AP to AP co-channel contention





Catalyst 9104 all-in-one unit



Built-in top of the range Wi-Fi 6 AP

Concurrent tri-radio
Slot 0: 2.4 GHz 4x4:4
Slot 1: 5 GHz 4x4:4
Slot 2: 5 GHz 4x4:4

Dedicated IoT radio

Dedicated RF spectrum radio and RF ASIC, CleanAir

Full functionality with 802.3at/PoE+

Get the
resiliency.



C-ANT9104
next to
AIR-ANT2513P4M-N



Catalyst 9104 all-in-one unit changes the game

Self-identifying antennas

Single DART antenna connector, previously 16x N-type/RP-TNC connections were needed



Built-in Catalyst 9130 Wi-Fi 6 AP

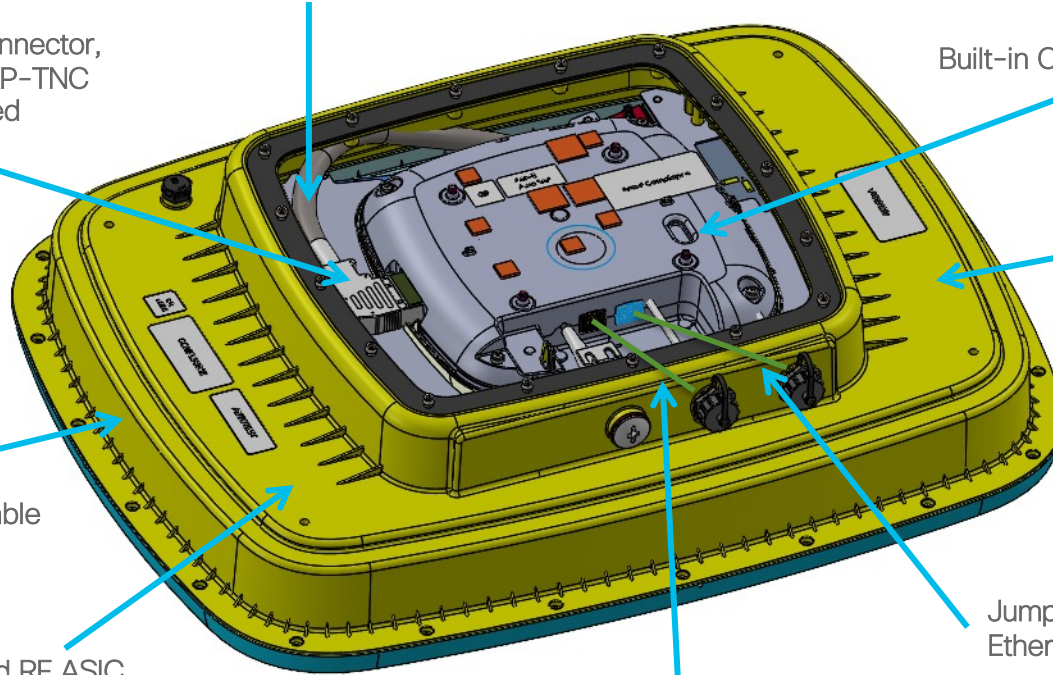
Second 5 GHz 4x4 antenna configurable antenna array

First 5 GHz 4x4 configurable antenna array

2.4 GHz 4x4, BLE and RF ASIC antennas

Jumper to 5 Gbps multigigabit Ethernet port

Jumper to Console port



Benefits of the Catalyst 9104 all-in-one unit

Easy to deploy

Beam switching

Integrated all-in-one unit

More cost-effective

Beam steering

Outdoor-rated

Ultra high density solution

Ideal for many environments

Flexible by design

Self-identifying antennas

Long range

High-gain low side lobe antenna

Aesthetically pleasing

Smaller than previous generation

Easy to deploy

- Ships as a fully assembled outdoor unit
- All-in-one AP, antennas and enclosure design
- No room for installation error, single cable to connect

1. Attach the arm
2. Mount the unit
3. Connect Ethernet cable
4. Configure antennas



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Smaller physical footprint

Long range



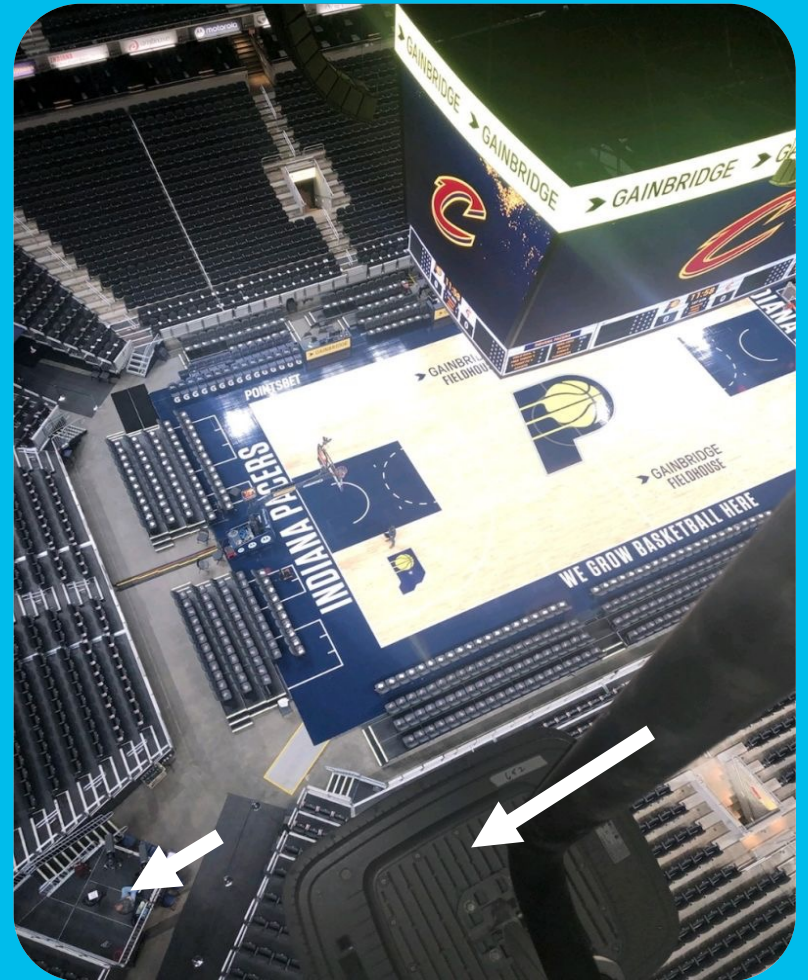
Kaue Colaneri · 1st

Mobility Architect | CCIE Wireless at LogicalisUS

2w · 🌐

140+ ft away and getting -52dBm... This fella is strong!

43 m



Long range

iPhone SE 2nd generation client

- 5 GHz channel 100, width 20 MHz, PL1
- Beam configuration: Narrow 0°
- MCS 7
- iperf3 TCP throughput: 110 Mbps
- AP heard client: -68 dBm
- Client heard AP: -70 dBm
- Distance: 72 m / 236 ft



Refer to Cisco documentation for official design and deployment guidance.

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Beam switching and Beam steering

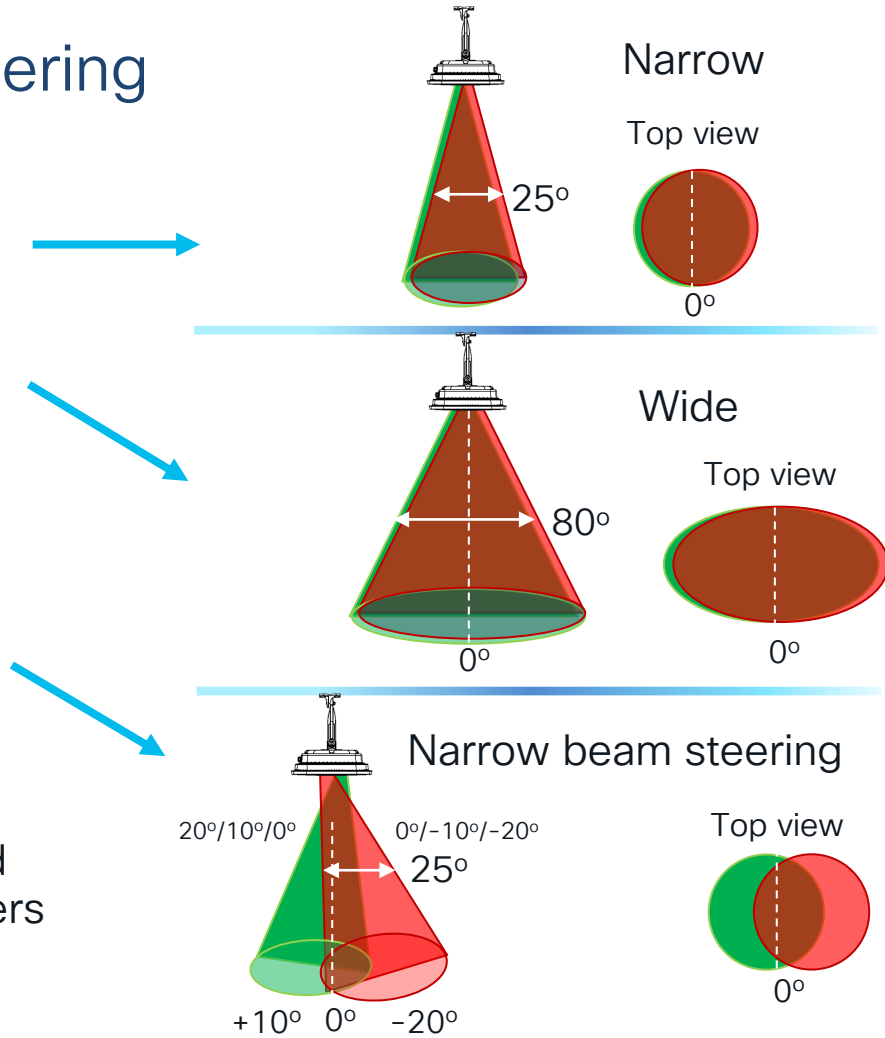
Beam switching

- Narrow 25° beams - dual 4x4 5 GHz, gain 10 dBi
- Wide 80° x 25° beams - dual 4x4 5 GHz, gain 8 dBi
- Fixed 2.4 GHz 75° x 85°

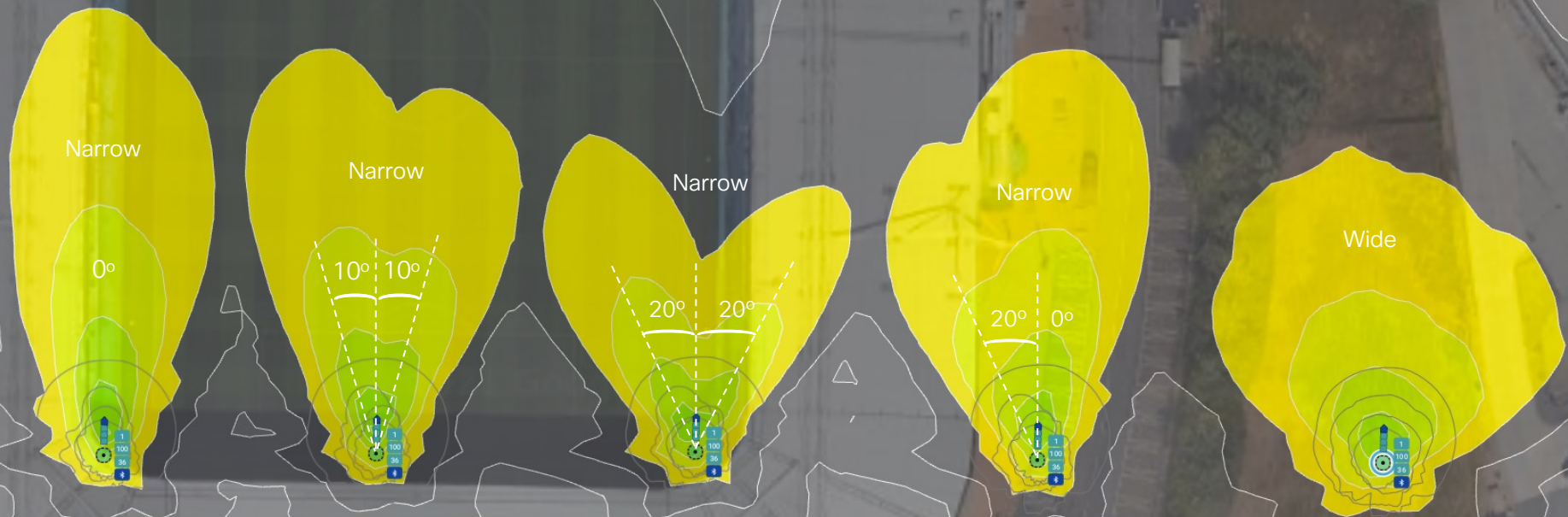
Beam steering

- Electronically steerable beams - each Narrow beam can independently steer by 10° or 20° off center, gain 10 dBi

All beam configurations done in software and centrally managed by Catalyst 9800 controllers



One product, many software beam configurations!



Ekahau Pro Mobile Device View enabled

For illustration purposes only. Tx power set to 25 mW.

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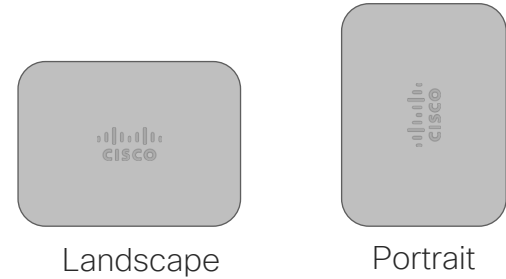
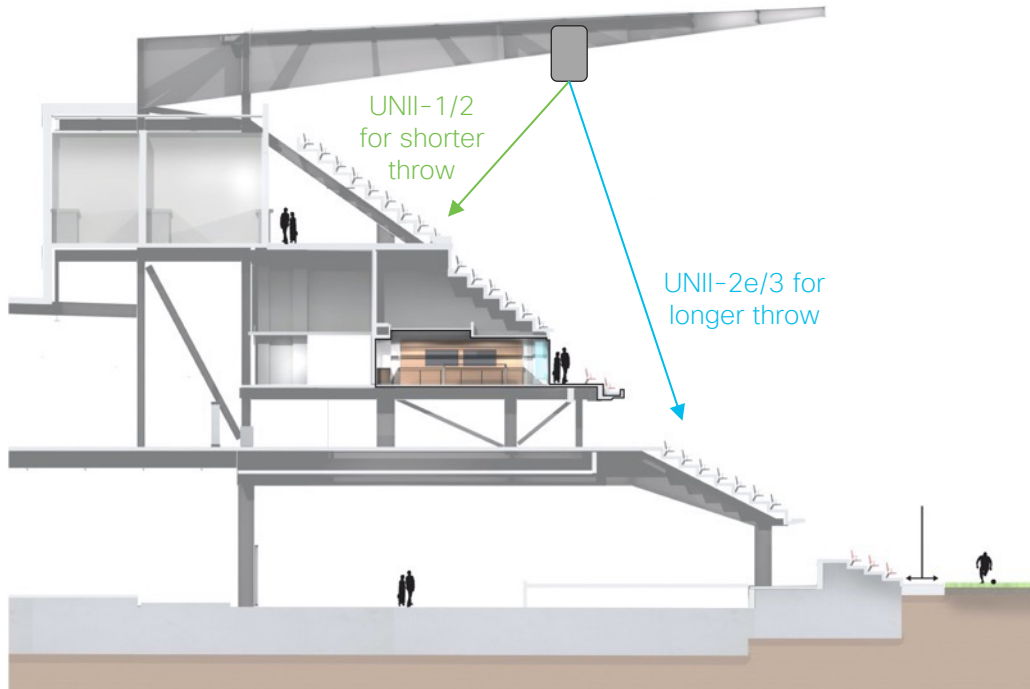
Long range

High-gain low side lobe antenna

Aesthetically pleasing

Smaller physical footprint

Portrait mode example



Two installation approaches to take advantage of 5GHz spectrum differences

Portrait Mode

- Slot position matters
- UNII-1/2 has lower max EIRP
- UNII-2e/3 has more channels and higher EIRP

C-ANT9104 radios:

- Slot 0 = 2.4 GHz
- Slot 1 = 5 GHz UNII-2e/3
- Slot 2 = 5 GHz UNII-1/2

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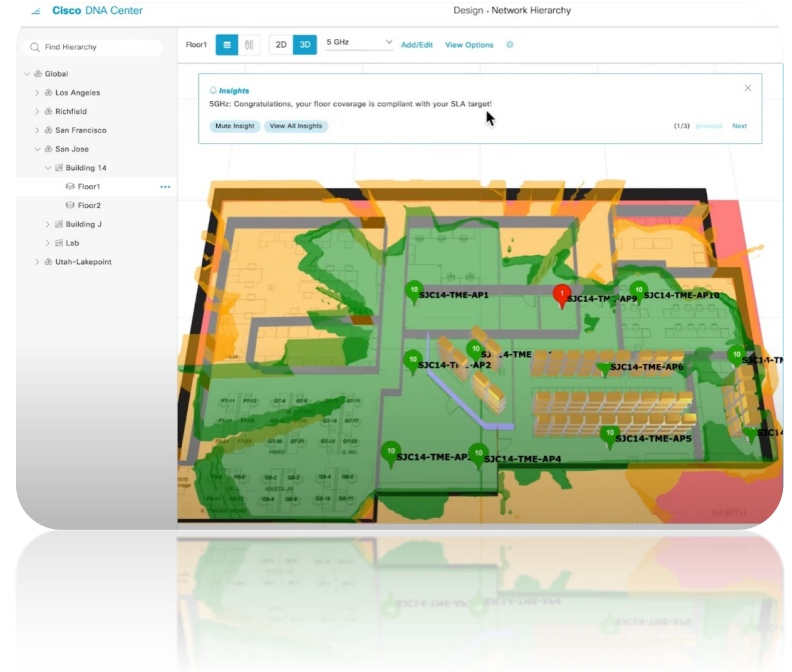
Smaller physical footprint

Where to deploy?

Designed to satisfy high-density and long range dynamic RF requirements:

- Stadiums, arenas, convention centres, auditoriums, events, warehouses, higher education including outdoor areas
- Ideal for high-ceiling and temporary installations
- Venues with dynamic needs and configurations (concert, exhibition, sports, conference)







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