The bridge to possible

How Cisco addresses Reliability within Industrial Wireless Networks Thanks to the Cisco's IoT Wireless Products

Alice Masini, Product Manager

Cisco Live!

BRKIOT-2774

Welcome to the BRKIOT-2774 Session

Asking questions is important!

Don’t miss the Meet the Speaker Session

Today @ 3.40PM- 4.20PM

cisco Live!

Cisco Webex App

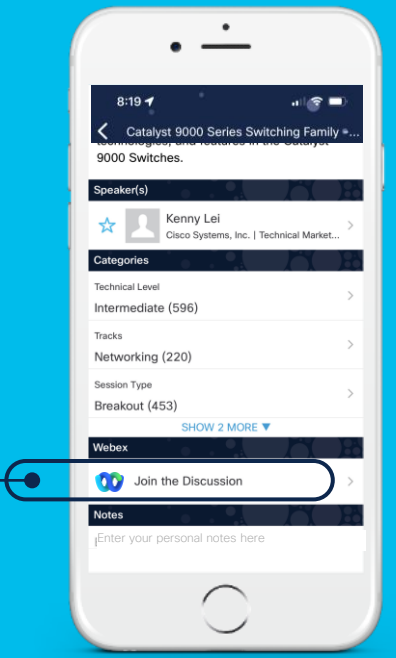
Questions?

Use Cisco Webex App to chat
with the speaker after the session

How

1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install the Webex App or go directly to the Webex space
4. Enter messages/questions in the Webex space

Webex spaces will be moderated until February 24, 2023.



“Reliability is the key for industrial wireless automation”

Agenda

- Introduction
- WiFi6/6E Reliability focus
- Cisco URWB and Multipath Operation Protocol (MPO)
- MPO Results and Use Cases
- Products and Deliverables Timeline
- Wrap up and Call to Action

Learning Objectives

At the end of this session, you should be able to:

- Understand basics of reliability in industrial wireless networks
- Get the improvements WiFi6/6E brings for reliability
- Understand principles of MPO technology, and how it applies to reliability
- Understand which Cisco products provide ultra-reliable wireless connectivity

Manufacturing

Warehouse

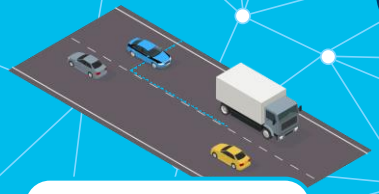
Gas Station / Kiosk

Oil and Gas

Utilities

Industry 4.0 requires a future of better wireless connectivity

Parking Lot

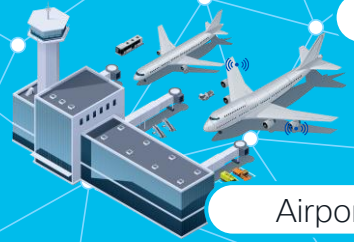


Roadways

Distribution Center

Fleet

Seaport



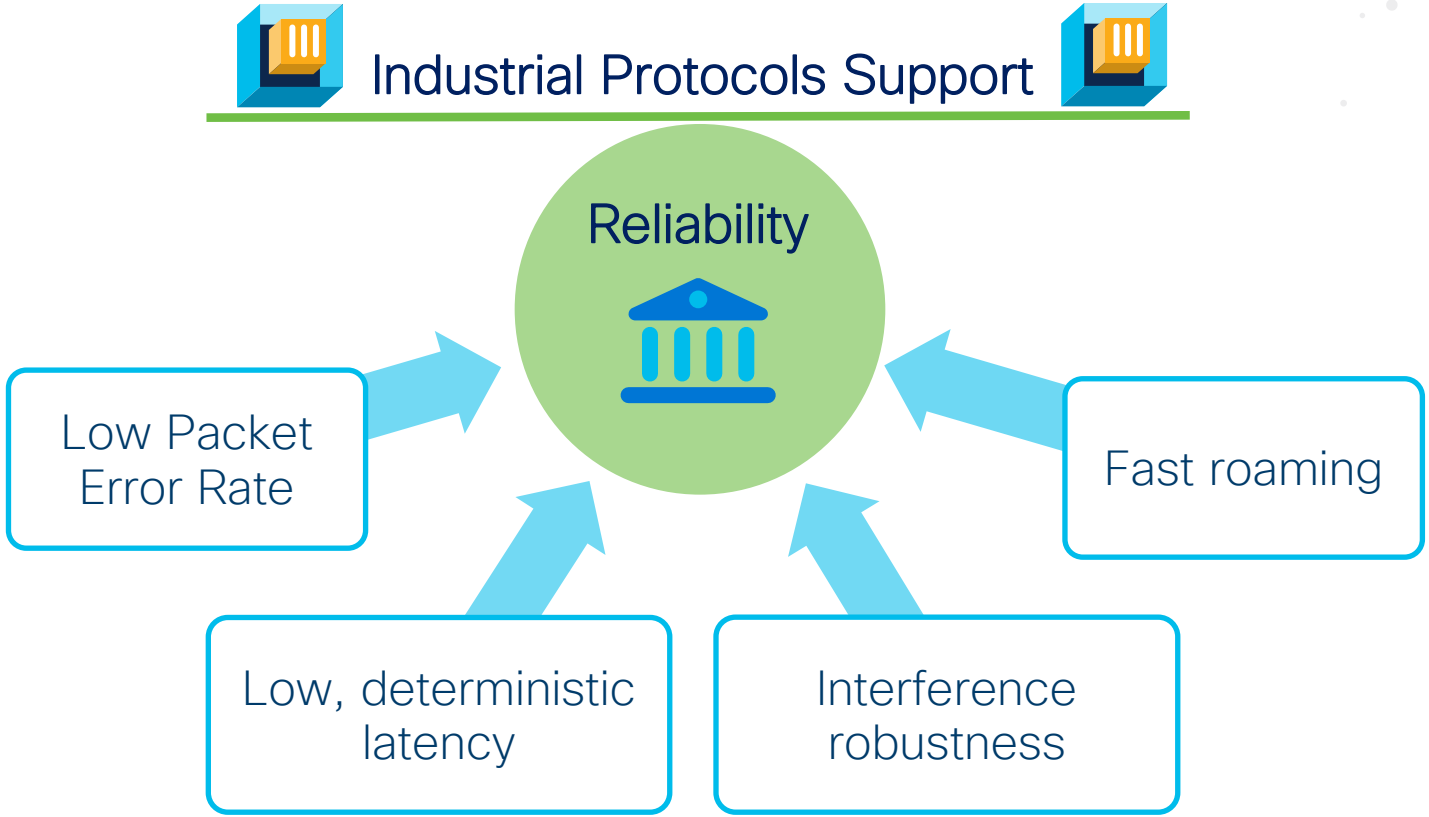
Airport

Why a better wireless connectivity?

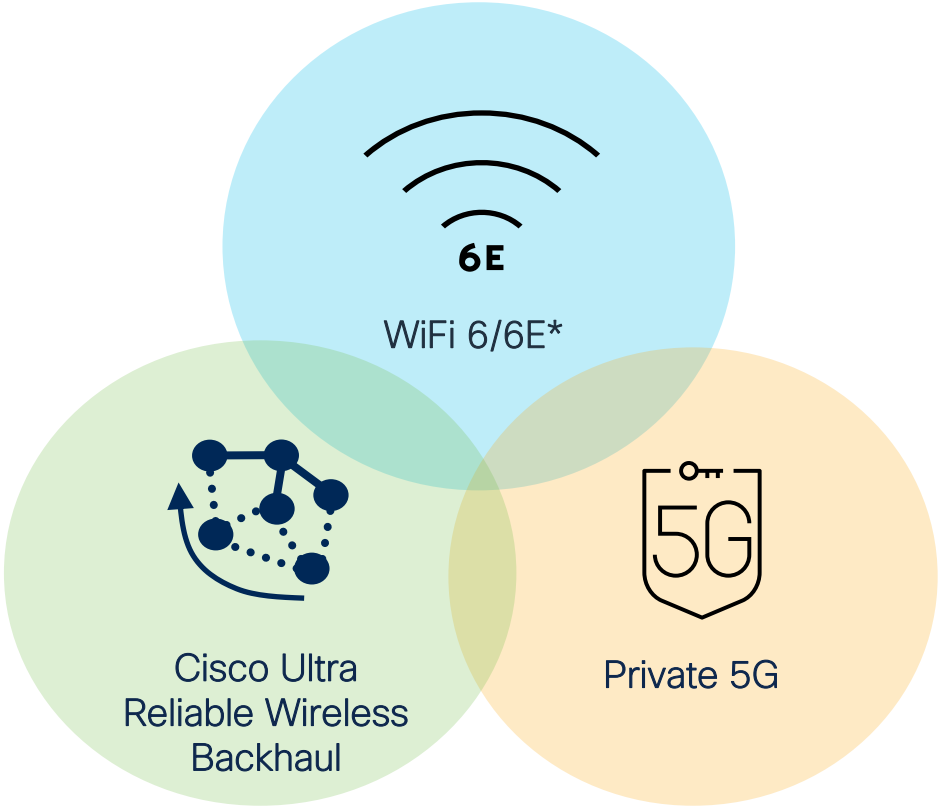
- The adoption of wireless connectivity quickly increasing in the Industry
- More demanding use cases for wireless
- More mission-critical applications to support, even simultaneously
- More competition for spectrum in deployments

What really makes it better?

4 Pillars of Reliability



All for one, one for all!



*available depending on local regulation

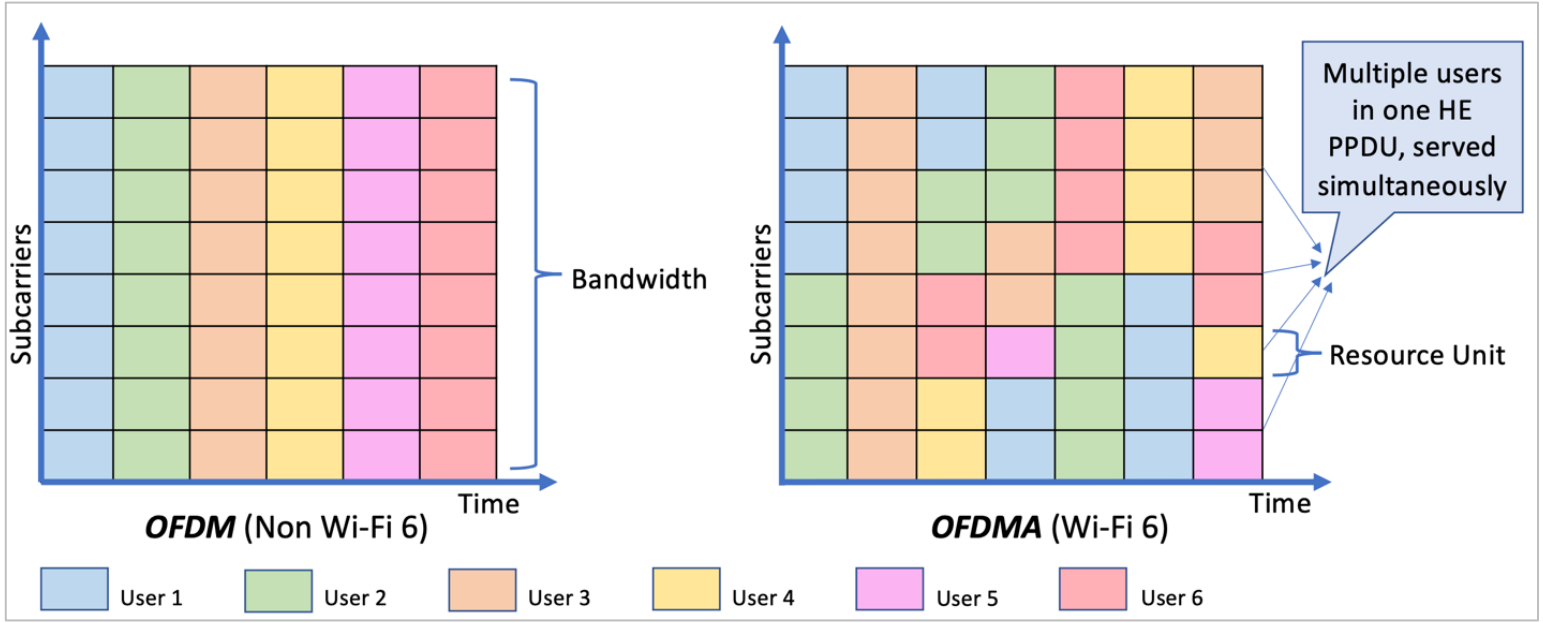
All for one, one for all!

*available depending on local regulation

WiFi6/6E

Reliability focus

Orthogonal Frequency Division Multiple Access

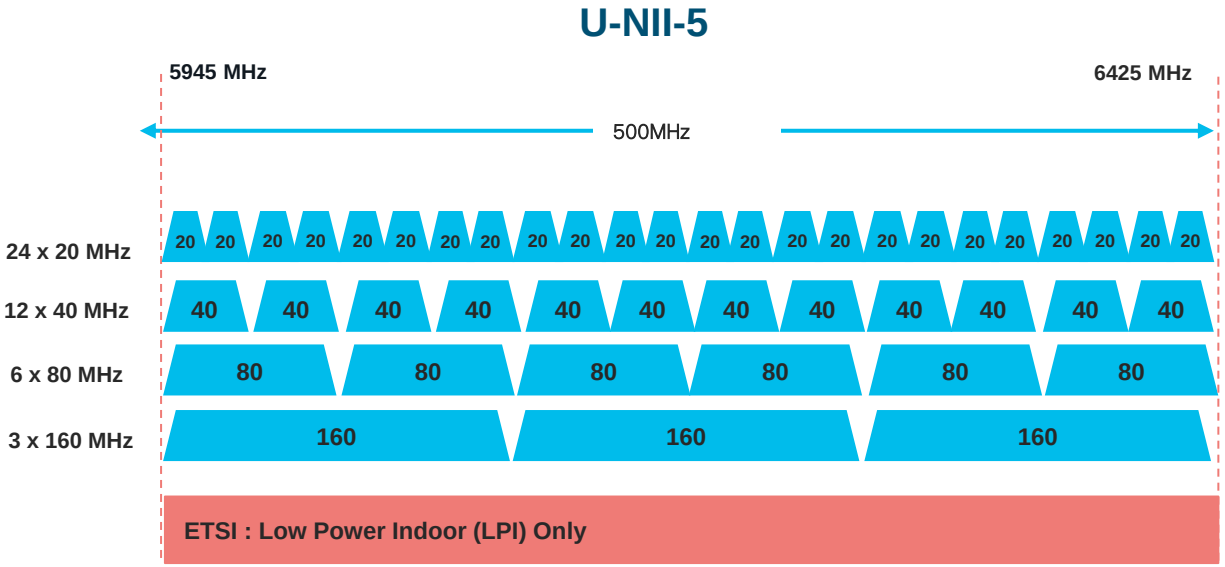


Increase efficiency

Reduce latency

The game changer in the spectrum availability

6E Spectrum allocation – ETSI Regulation

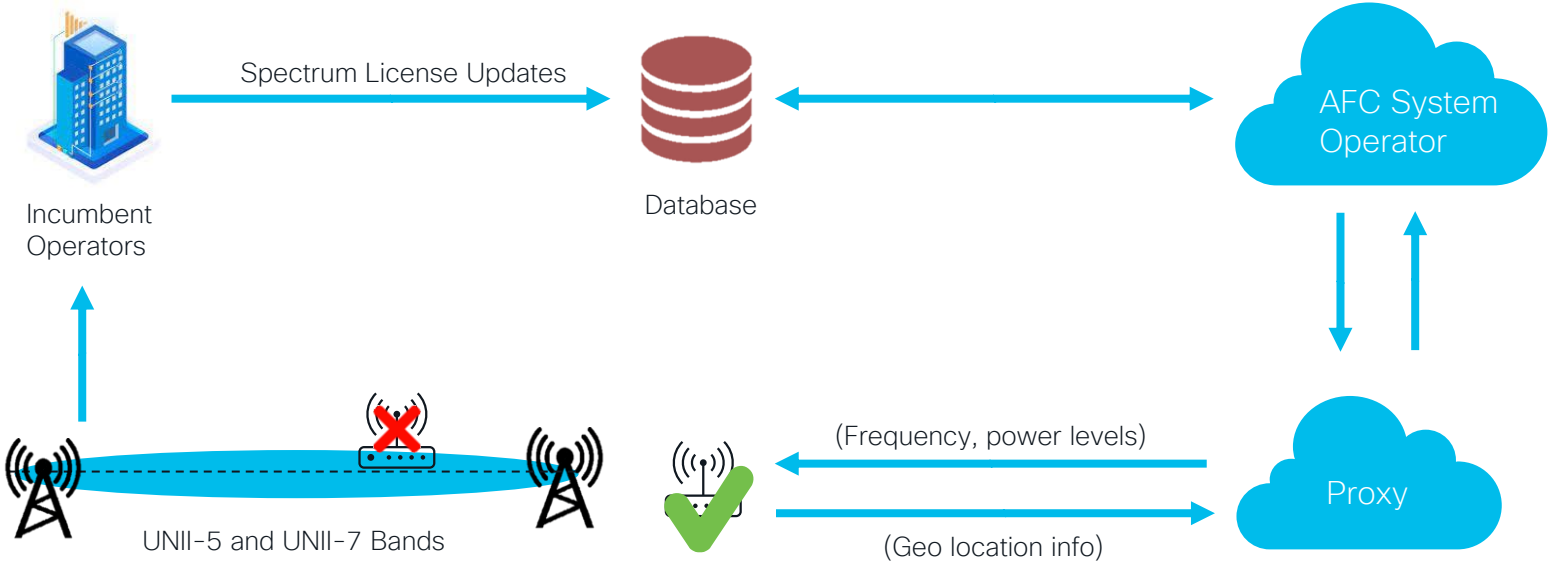


- Less interference
- Higher density
- Higher throughput

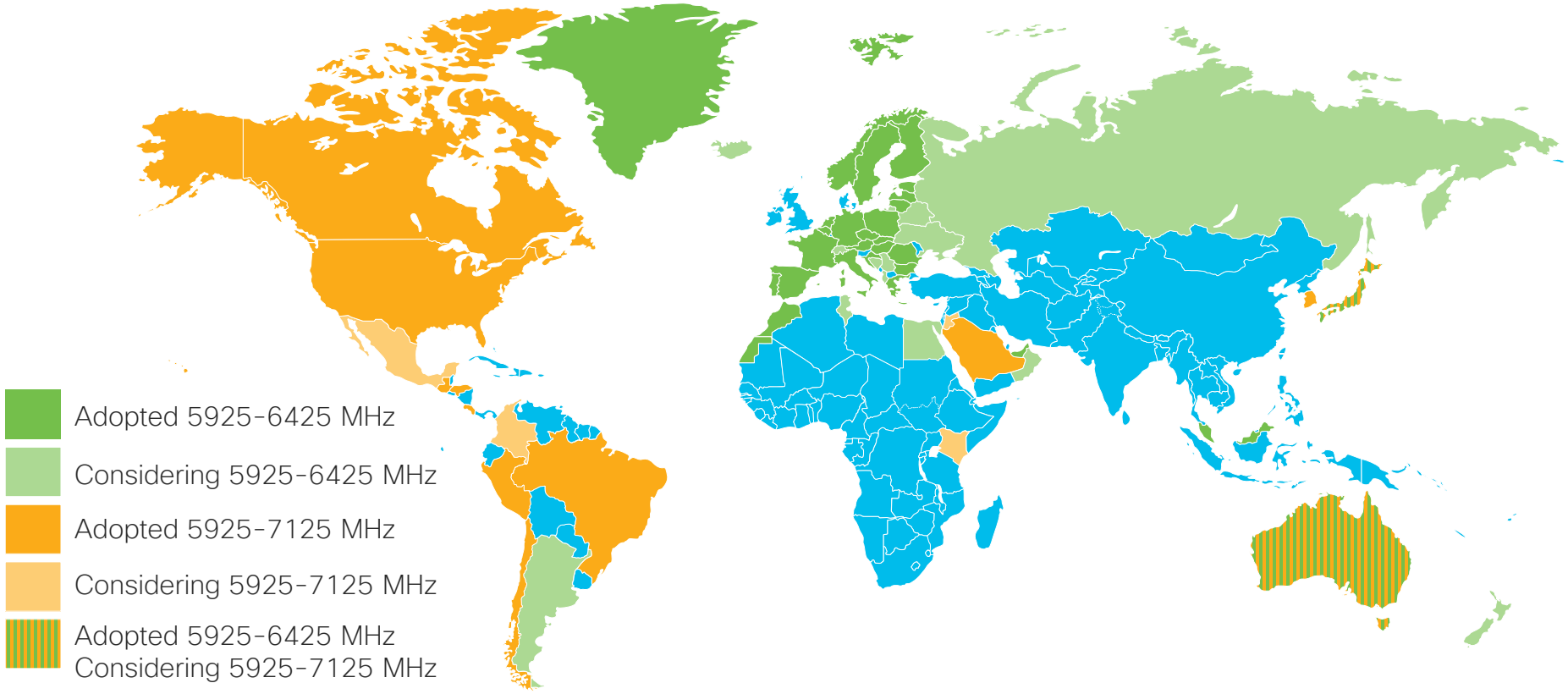
AFC Required for Standard Power devices

Automated Frequency Coordination (AFC)

- Standard-power devices are required to check an automated frequency coordination (AFC) system prior to operating to avoid causing harmful interference to incumbent operations.



Countries enabling Wi-Fi 6E



cisco Live!

What's new on Cisco Industrial WiFi6/6E products

CleanAir Pro

- Extends benefit of CleanAir to 6GHz
- Multi-radio architecture
- Interference mitigation
- Improved frequency switch-off during DFS events

Fast Roaming (802.11v)

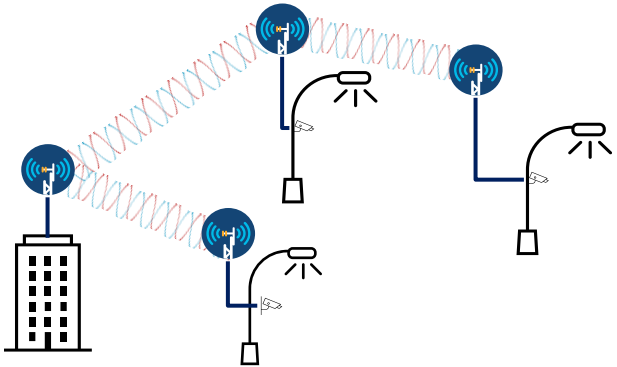
- Support for mobility use cases

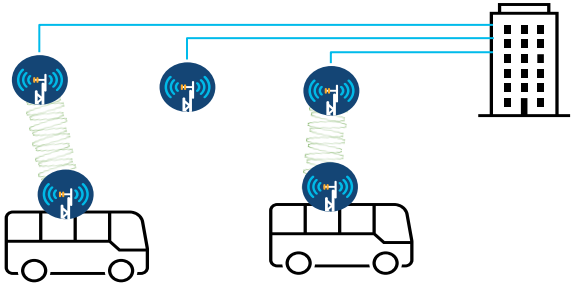
Cisco Ultra-Reliable Wireless Backhaul

Multipath Operation Protocol

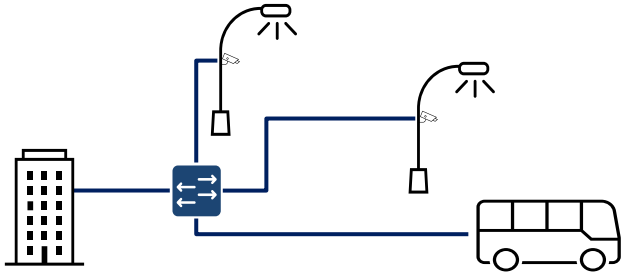
What is Cisco URWB?

- It is an overlay technology that emulates a virtual switch over wireless links
- Relays on 802.11 chipset, so it aligns with the Wi-Fi evolution





Physical

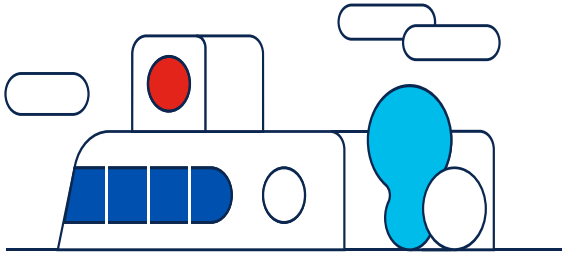


Overlay

What makes Cisco URWB Reliable

MPLS over the wireless

Low latency (<10ms)



High-speed mobility with 0ms hand-off

Seamless roaming

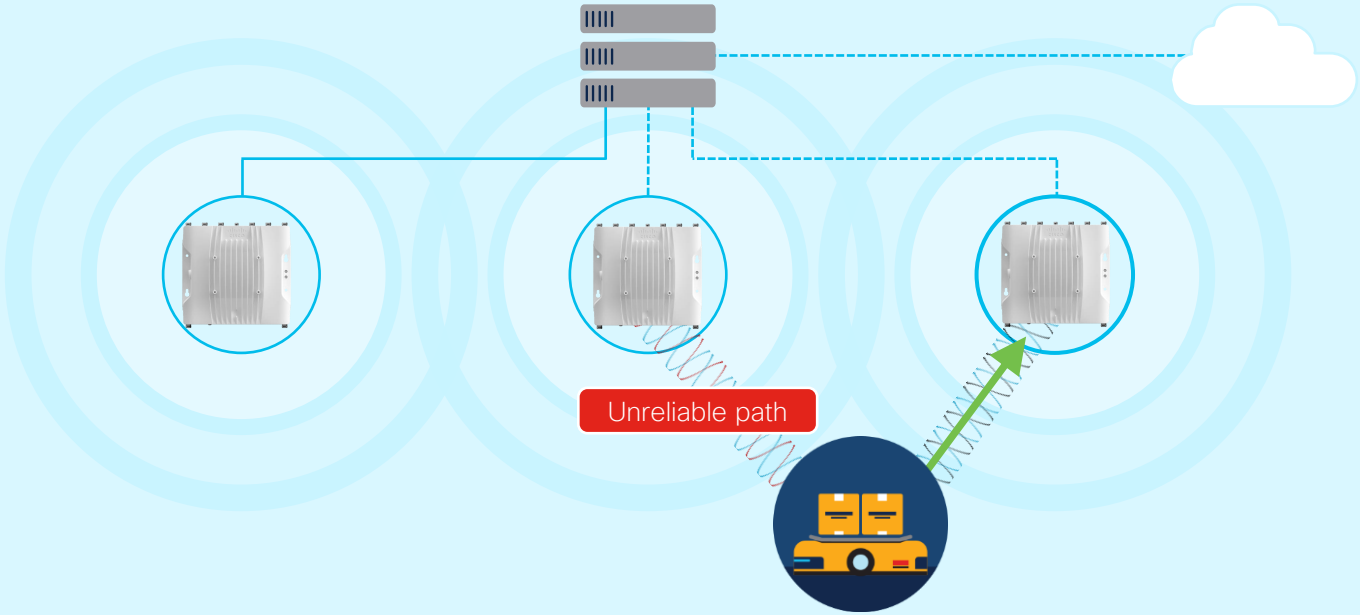
Ultra-Fast Failover

Carrier-grade availability

Reliability is the key for industrial wireless automation

What makes Cisco URWB *Ultra*-Reliable

Cisco URWB's new patented technology Multipath Operations



Duplicate high priority packets over up to 8 different paths

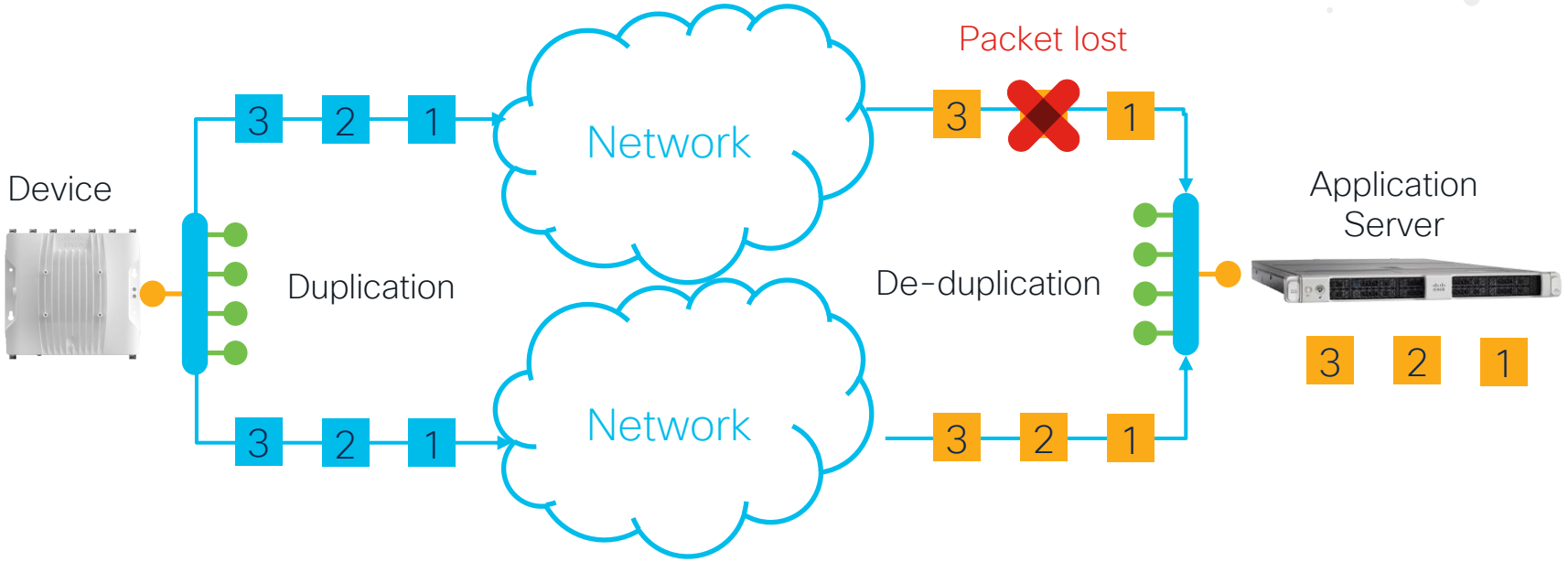
Take Advantage of the Diversity

Time Diversity
Mitigates Fading and Medium Contention

Spatial Diversity
Mitigates blockages and obstacles

Frequency Diversity
Mitigates Interference

MPO Duplication and Deduplication



Cisco Patented technology

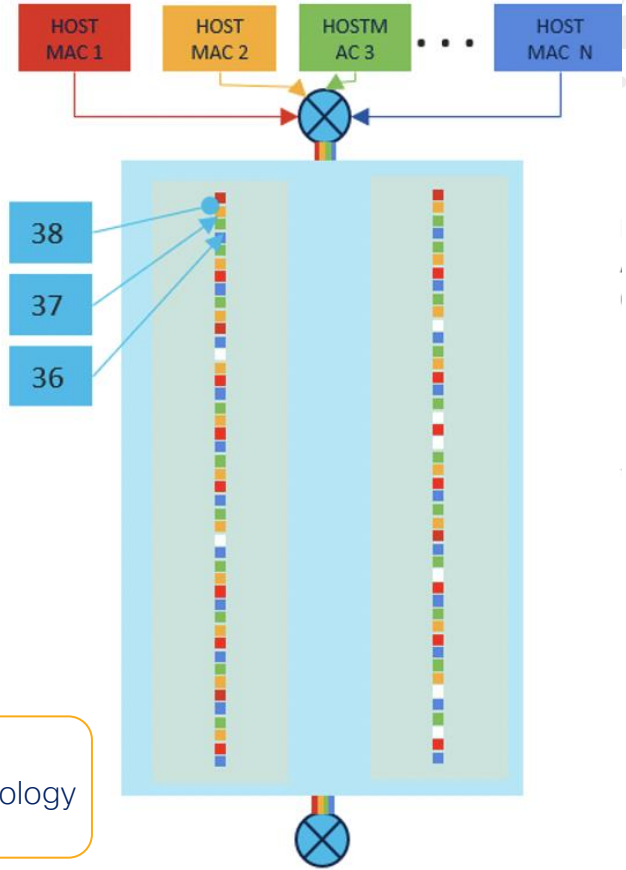
MPO Dup/Deduplication Algorithm capabilities

- Avoid additional packet delay due to buffering
- Address packet loss and asymmetric high/variable delay paths
- Eliminate duplicates, out-of-sequence packets
- Be resource efficient

MPO Dup/Deduplication Techniques

No Flow differentiation

- Traffic is classified basing on class of service
- Packets are numbered sequentially
- Packets are sent over the paths without any flow differentiation

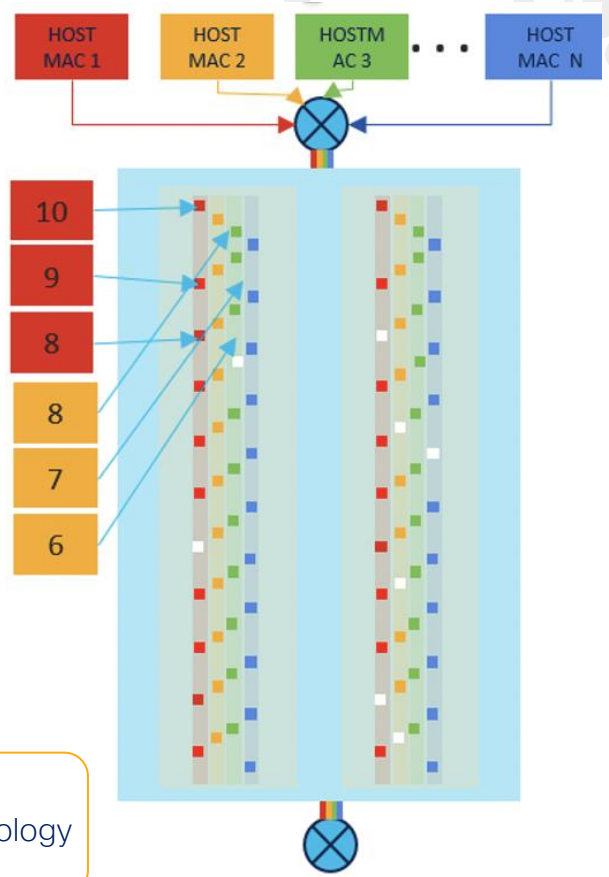


Cisco Patented technology

MPO Dup/Deduplication Techniques

Per Host technique

- Traffic is classified basing on class of service
- Packets are numbered sequentially
- Flow differentiation is based on the source mac address



Cisco Patented technology

What's different from PRP?

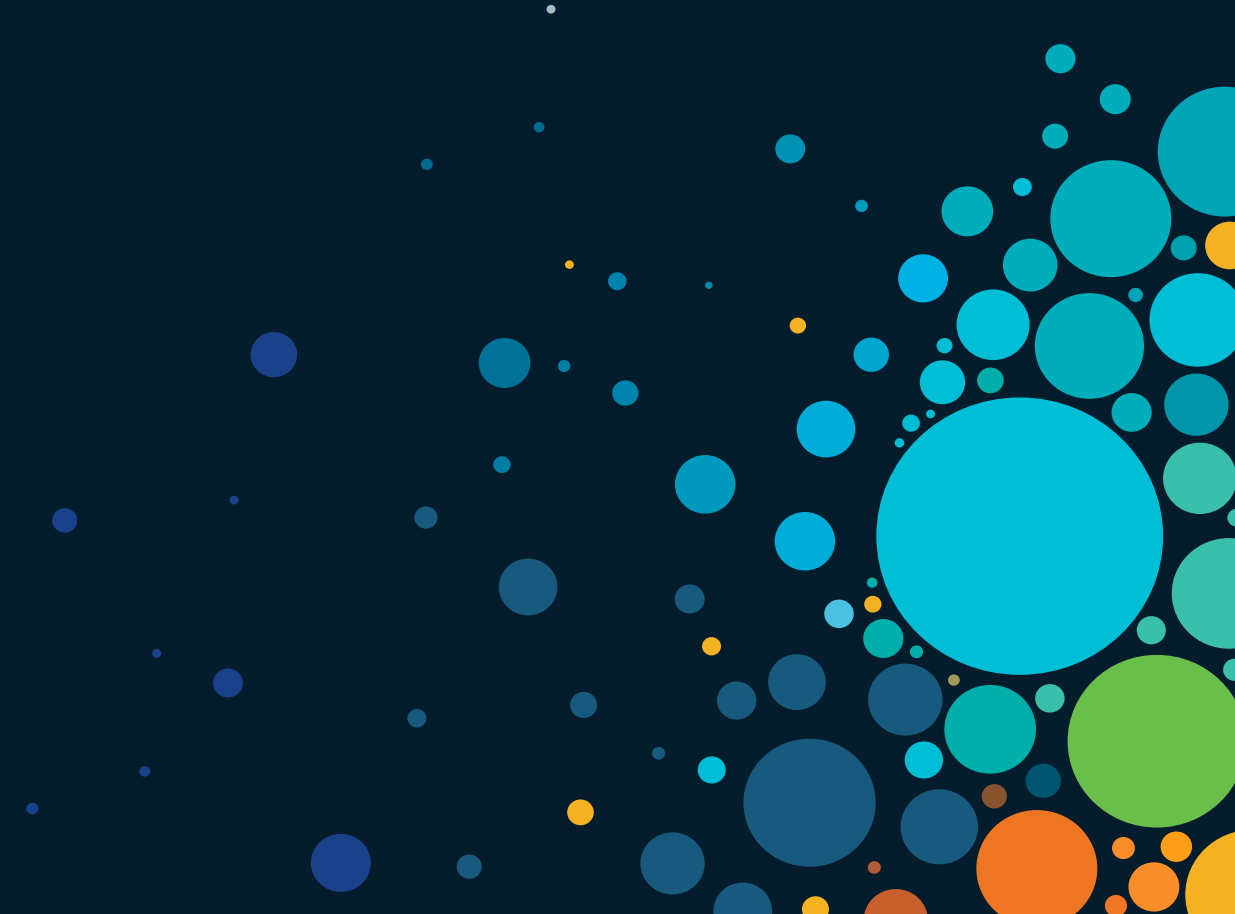
No duplication of the infrastructure required

No specific requirements for switches/routers in the network

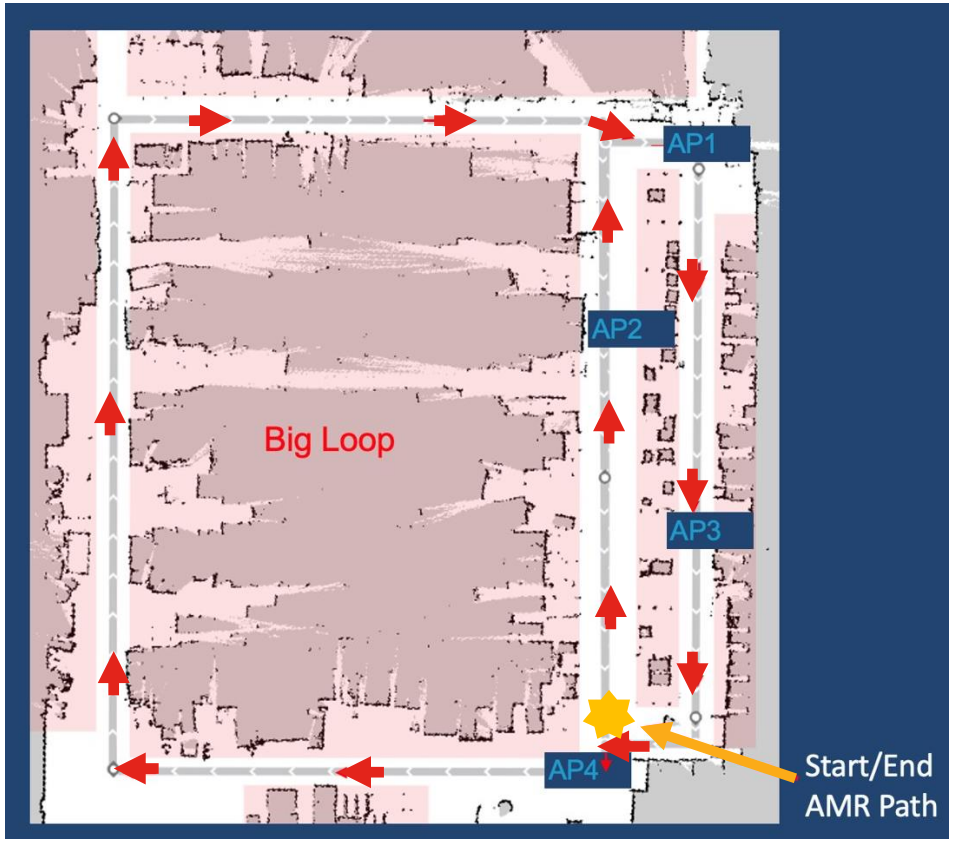
It only duplicates high-priority packets, reducing overall overhead

It only sends the duplicate packets over the wireless

MPO results



Cisco Warehouse Floor Map

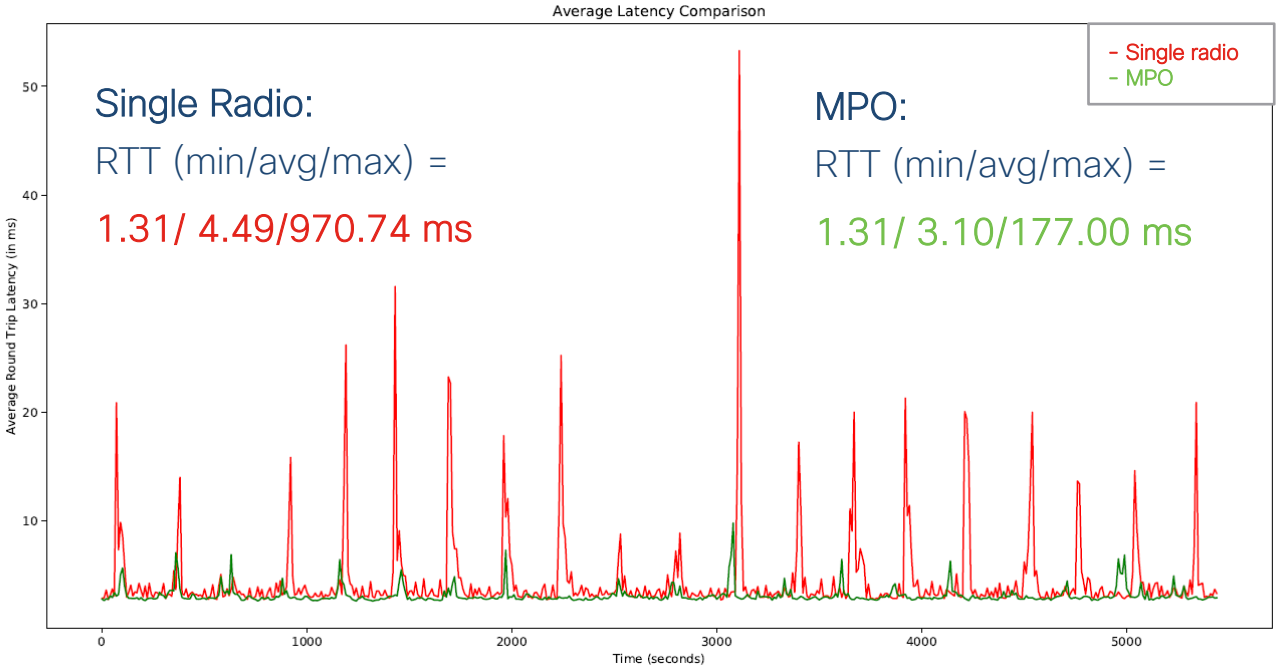


MPO Cisco Warehouse testing results

Runs with Single Radio vs MPO.

Each run was for 1.5 hours, 20 "big loops" each.

- Avg latency reduced
- Jitter reduced
- More predictable latency



MPO Cisco Warehouse testing results

Runs with Single Radio vs MPO.

Each run was for 1.5 hours, 20 "big loops" each.

Single Radio:

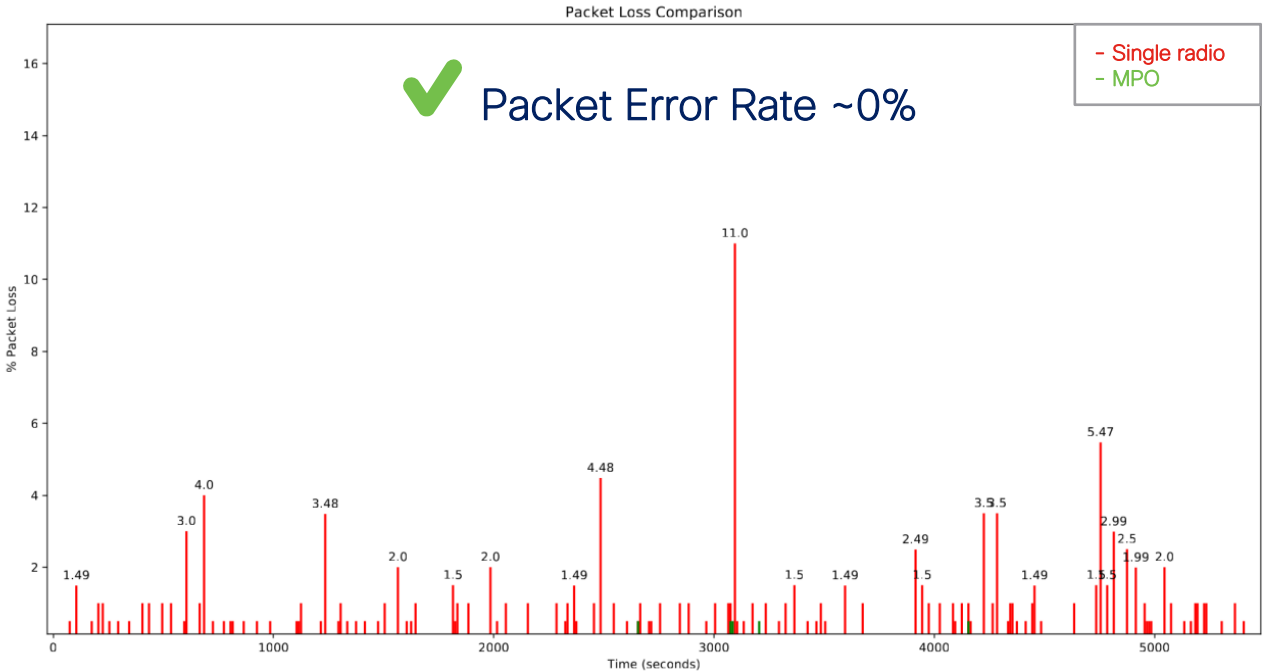
Total: sent=111248, recv=110961

lost=287, %loss=0.26

MPO:

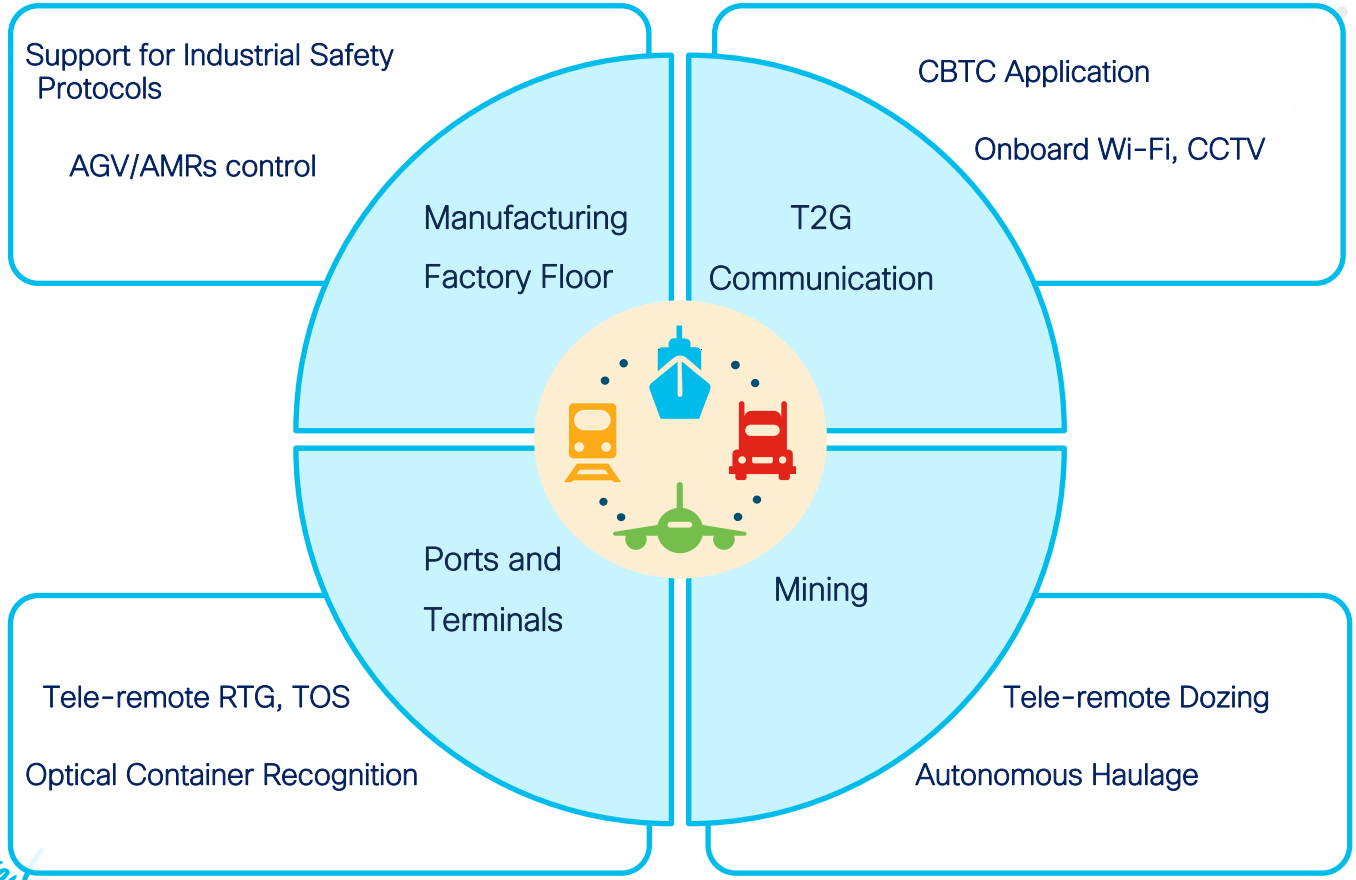
Total:sent=109224,recv=109219

lost=5, %loss=0.00



Use Cases

Benefits for multiple vertical markets



Terminal automation and digitization
Reliably & securely connect mission-critical assets

Key use cases

Terminal Operating Systems

Software system control movement and storage of cargo in/out and around a port or terminal

Autonomous and Tele-Remote

A system that enables tele-remote or fully autonomous operation of cranes.

Autonomous Horizontal Transport

Autonomous solutions for horizontal transport (e.g. AGVs or Automated Straddle Carriers)

Optical Character Recognition (OCR)

A solution for asset identification, visibility of asset condition, and process automation.

Requirements

- Ultra-low latency
- Fast handoffs
- High-throughput
- Superior reliability
- Security

Malta Freeport Terminals

Improved productivity with low-latency wireless solution

Challenge

- Needed to connect on-the-move assets for a growing container terminal
- Needed faster data speeds
- Required extremely low latency and zero packet loss over long distances

Cisco Solution

- High throughput, low latency, fast handoff, highly redundant, and reliable wireless connectivity with Cisco Ultra-reliable Wireless Backhaul

Outcomes

- Scalable connectivity that leverages existing networking equipment
- Achieved data speeds of 50 to 60 Mbps
- Low latency and zero packet loss over a 600- to 800-meter distance
- Increased network uptime from 75% to 99.99%

Products and Upcoming Deliverables

Cisco Catalyst IW9167 and IW9165 Series

Catalyst IW9167EH

Reliable wireless connectivity for any application, anywhere

Heavy-duty, Tri-radio, MIMO 4X4 industrial Access Point running WiFi6 or Cisco URWB.

NEW

Catalyst IW9165E

Mobile wireless connectivity for the most demanding industrial assets

Compact wireless client enabling industrial vehicles to connect to ultra reliable wireless networks, even when on the move.

Running WiFi6 or Cisco URWB

NEW

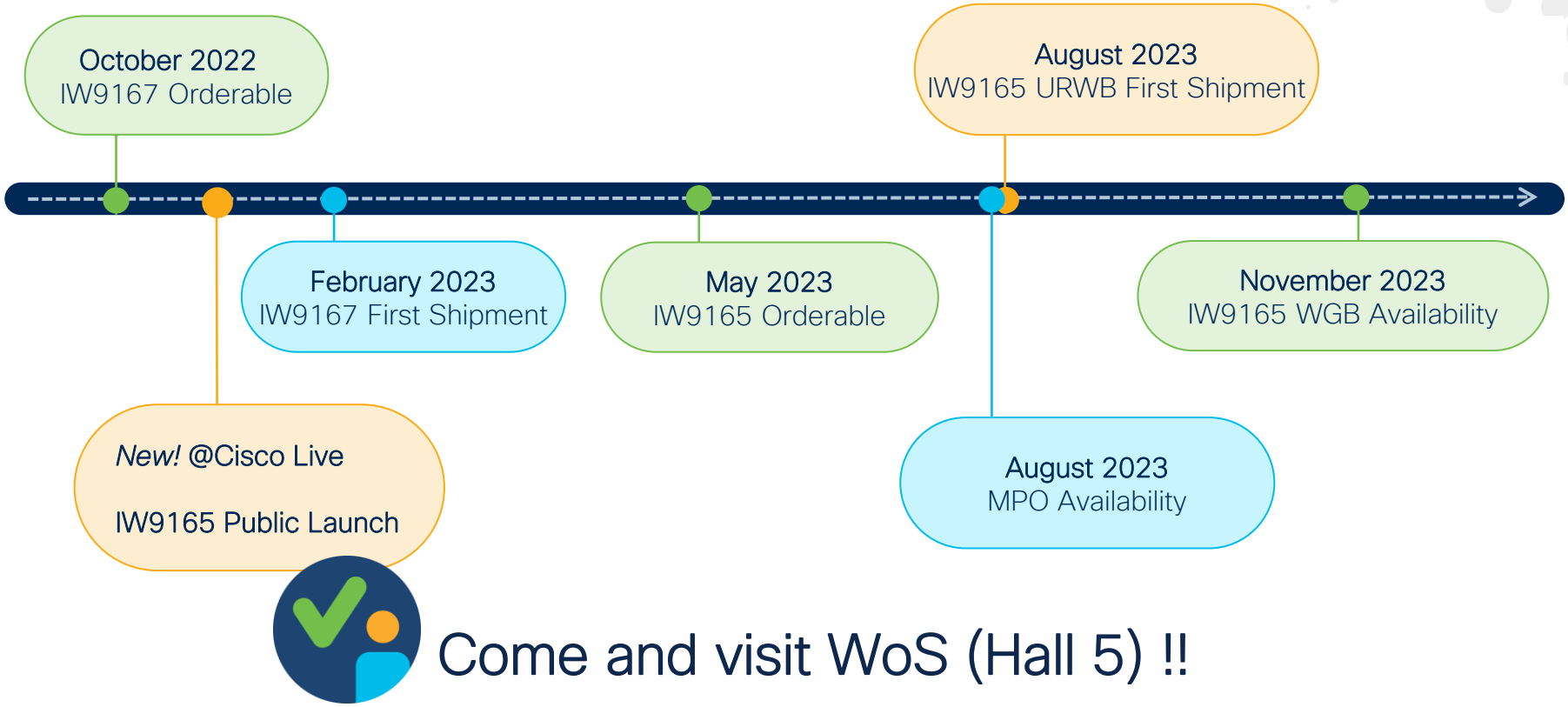
Catalyst IW9165D

Wireless backhaul that's easy to deploy for connecting fixed and mobile assets

Heavy-duty access point to easily build your wireless backbone and extend your network to fixed and mobile assets.

Running Cisco URWB

Upcoming deliverables



Come and visit WoS (Hall 5) !!

Wrap up

Takeaways

- Reliability is the key for Industrial Wireless automation
- WiFi6/6E improves reliability
- MPO is a game changer technology to support ultra-reliability
- Cisco IW products provide ultra-reliable wireless connectivity

Call to Action

- Come to the Meet the Speaker! @Tuesday, Feb 7, from 3.40PM to 4.20PM
- Visit WoS to deep dive the solution and all the new products
- Make sure you don’t lose BRKIOT-2601 “Deploying Indoor Wireless Mobility for Industry” @Wednesday, Feb 8, 8:45 AM - 10:15 AM

Complete your Session Survey

- Please complete your session survey after each session. Your feedback is important.
- Complete a minimum of 4 session surveys and the Overall Conference survey (open from Thursday) to receive your Cisco Live t-shirt.

- All surveys can be taken in the Cisco Events Mobile App or by logging in to the Session Catalog and clicking the "Attendee Dashboard" at https://www.ciscolive.com/emea/learn/sessions/session-catalog.html

Continue Your Education

Visit the Cisco Showcase for related demos.

Book your one-on-one Meet the Engineer meeting.

Attend any of the related sessions at the DevNet, Capture the Flag, and Walk-in Labs zones.

Visit the On-Demand Library for more sessions at ciscolive.com/on-demand.

The bridge to possible

Thank you


cisco Live!
ALL IN