



The bridge to possible

Mining in a multi access wireless environment

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BRKIOT-2035

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Agenda

- Introduction
- Understanding the difficulties in the current environment
- Multi access wireless
- Understanding the limitations
- Matching the right wireless for the application's needs
- Conclusion

Understanding the difficulties in the current environment



Cisco's Role in Digitization




Complexity

Most

deployments are brownfield
Multiple systems talking
different protocols
Need for retrofit
& Compliances

Cisco proven designs working
with multiple vendors



Security

35%

customers cite security
as top barrier to IoT creating a
massive expansion of
the threat surface

Cisco provides visibility in
both the IT and the OT space



Scalability

60%

of IoT initiatives stall
at the proof of
concept stage, making the
resource intensive with no
return on the investment

Cisco's Validated designs are
repeatable and scalable

Mining digital business imperatives

Improve Operations

Autonomous fleet / Remote command / predictive maintenance



Reduce Risk

With advanced cyber security protecting production assets



Increase Safety

Monitoring and control from safe remote locations



Digital Mining Ready for Business

Why Cisco in mining?

Technology agnostic solutions:



Award winning Industrial Infrastructure

Cisco is the Industry Leader in IoT with industry award winning Industrial wired and wireless networking and security products for all aspects of mining operations



Leading the way in IT/OT convergence

Cisco is uniquely positioned to unite IT and OT and drive digital initiatives in mining with Cisco's network foundation that is interoperable, open, standards-based and delivered using the same software familiar to the enterprise



Zero Trust Security

Building a Zero Trust security architecture that extends workforce, workload, workplace security into the industrial domain.



Cisco Validated Design

Comprehensively tested with CAT and Sandvik
Reduce risk, time and cost to deploy
Blueprints for success



Multi Access wireless strategy

Cisco's Multi Access wireless Solutions provide unmatched flexibility for deploying a variety of wireless technology across mining operations supporting both open pit and underground operations



Industry 4.0

Larger Cisco vision and assets - Security, Edge Compute, Automation - that enable success of industry 4.0 initiatives



LTE/5G Open vRAN

Vision of LTE/5G and where an Interoperable Core Network is the Key for enabling new use cases adopting an open multivendor fit for purpose radio



Cisco Partner Ecosystem

Mine operators gain access to an ecosystem of industrial partners. Cisco works closely with software providers, systems integrators, and industry technology vendors



<https://www.cisco.com/c/en/us/solutions/enterprise/design-zone-industry-solutions/index.html#~all-industries-guides>

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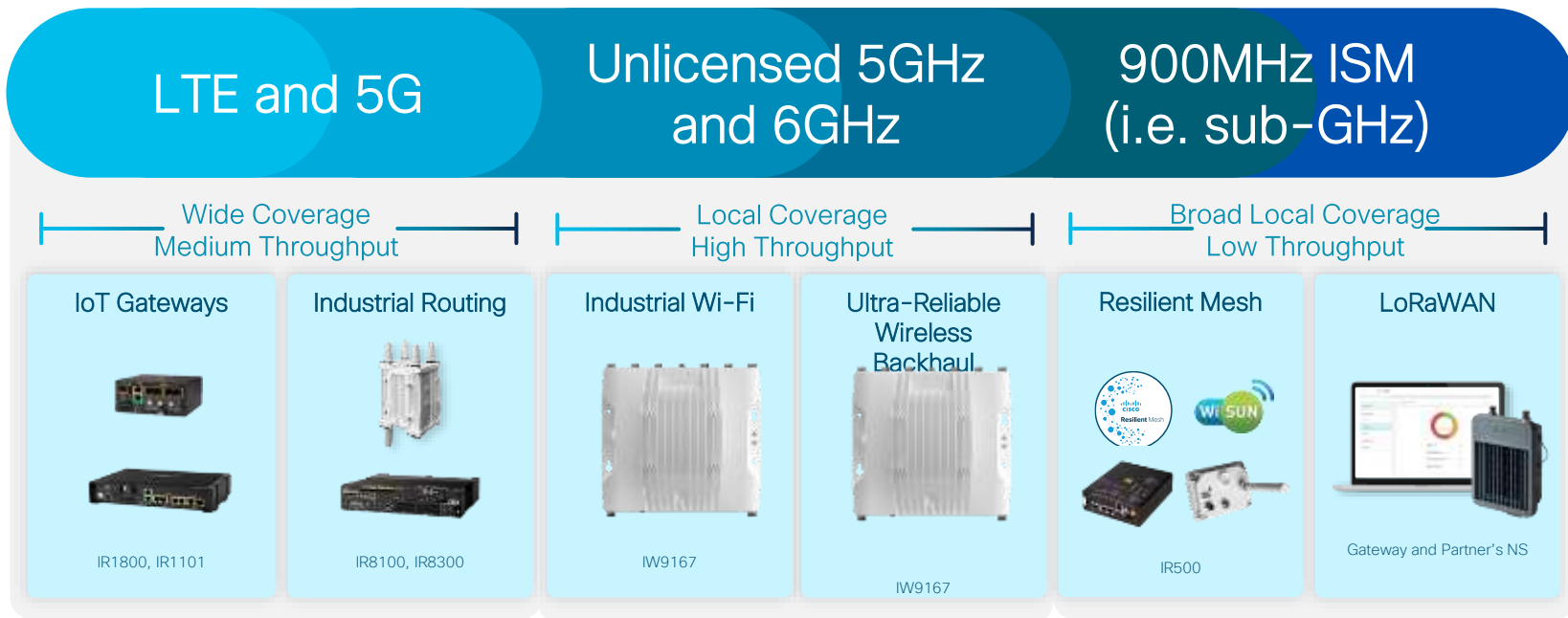
Cisco
Validated
Design



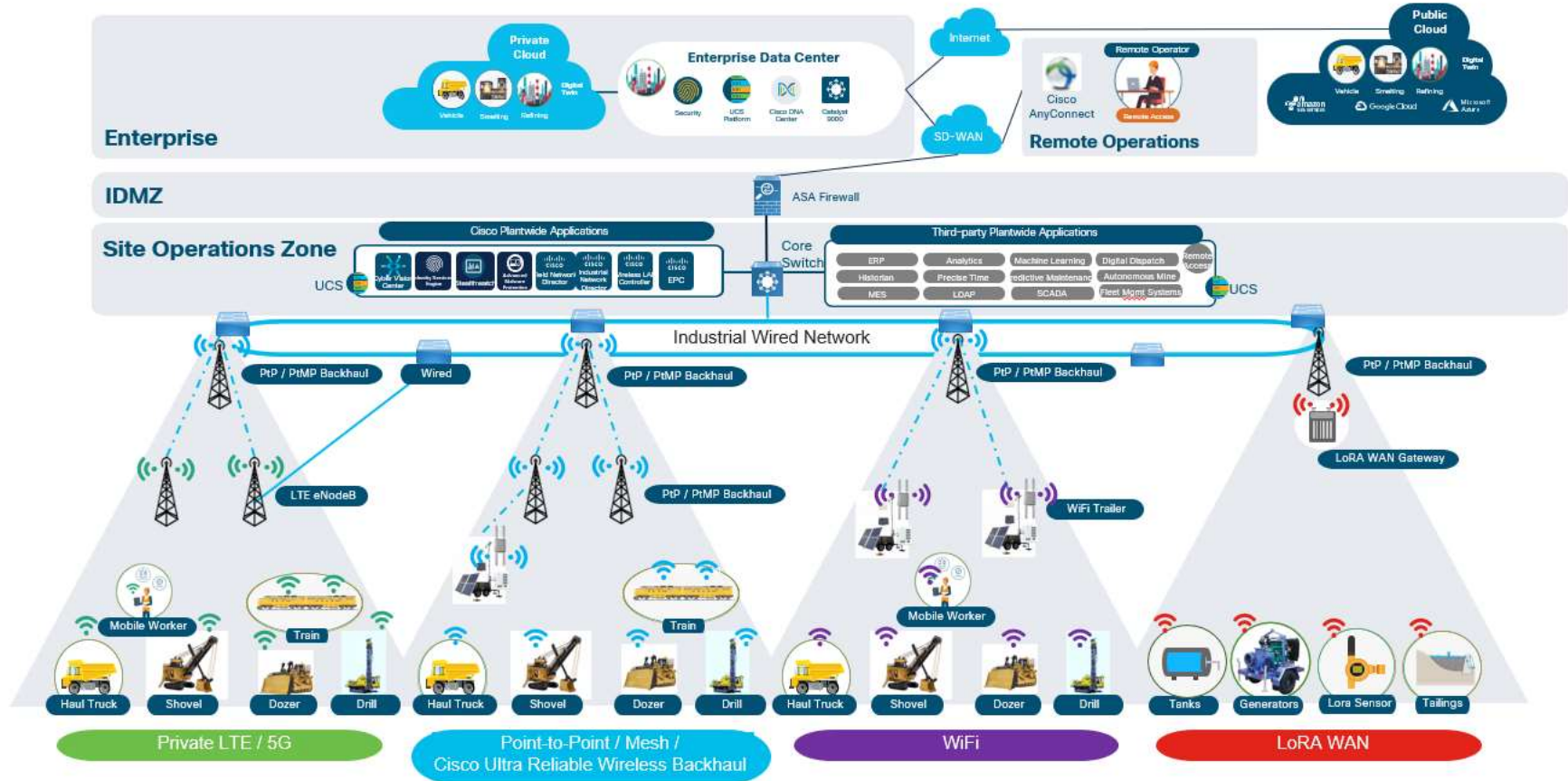
Multi access wireless

Cisco's Evolving Wireless Portfolio

All the technologies you need for reliable, secure connectivity in terminals



Multi-Access for Mining



Cisco Catalyst 6E Industrial Wireless Portfolio



IW9165E



IW9165D



IW9167E

Application	Wireless client for mobile assets	Wireless backhaul for fixed and mobile assets	Wireless backhaul for fixed and mobile assets
Radio	2 x 802.11ax radios (5GHz, 5/6GHz)	2 x 802.11ax radios (5GHz, 5/6GHz)	3 x 802.11ax radios (2.4GHz, 5GHz, 5/6GHz)
Antenna	4 x RP-SMA	Built-in 15dBi directional plus 2 x N-Type (f)	8 x N-Type (f)
Modulation	2x2 MIMO	2x2 MIMO	4x4 MIMO
Wireless Mode	WGB or URWB	URWB	Wi-Fi, WGB, URWB
Ethernet	1 x 2.5Gbps + 1 x 1Gbps RJ45 Optional M12 adapter	1 x 2.5Gbps + 1 x 1Gbps RJ45 Optional M12 adapters	1 x 5Gbps RJ45 + 1 x SFP+ Optional M12 adapters
Expendability	BLE, GNSS, GPIO	BLE, GNSS	BLE, GNSS
Certifications	IP30, EN50155 -20C to +50C	IP67 -50C to +75C	IP67, EN50155 -50C to +75C
Dimensions	15.2 x 12.4 x 4.3 cm	18.3 x 18.0 x 9.1 cm	28.7 x 26.7 x 7.1 cm

6 GHz is the biggest Wi-Fi spectrum expansion ever

Band Channels Bandwidth

2.4 GHz

3

20 MHz



1

40 MHz



60 MHz of spectrum and
3x 20-MHz channels

5 GHz

25

20 MHz



12

40 MHz



6

80 MHz



2

160 MHz



500 MHz of spectrum and
25x 20-MHz channels

6 GHz

59

20 MHz



29

40 MHz



14

80 MHz



7

160 MHz



1200 MHz of
spectrum and
59x 20-MHz
channels in US

500 MHz of
spectrum in EU

IRM-1800-M12KIT

M12 Conversion Kit for IR1800 Series



Designed for Railways, fleet and mobile use cases



Acts to make any IR1800 SKU IP54 rated along with the IP54 back plate



Made of die cast aluminum. Paint and texture matches IR1800 chassis

Includes:



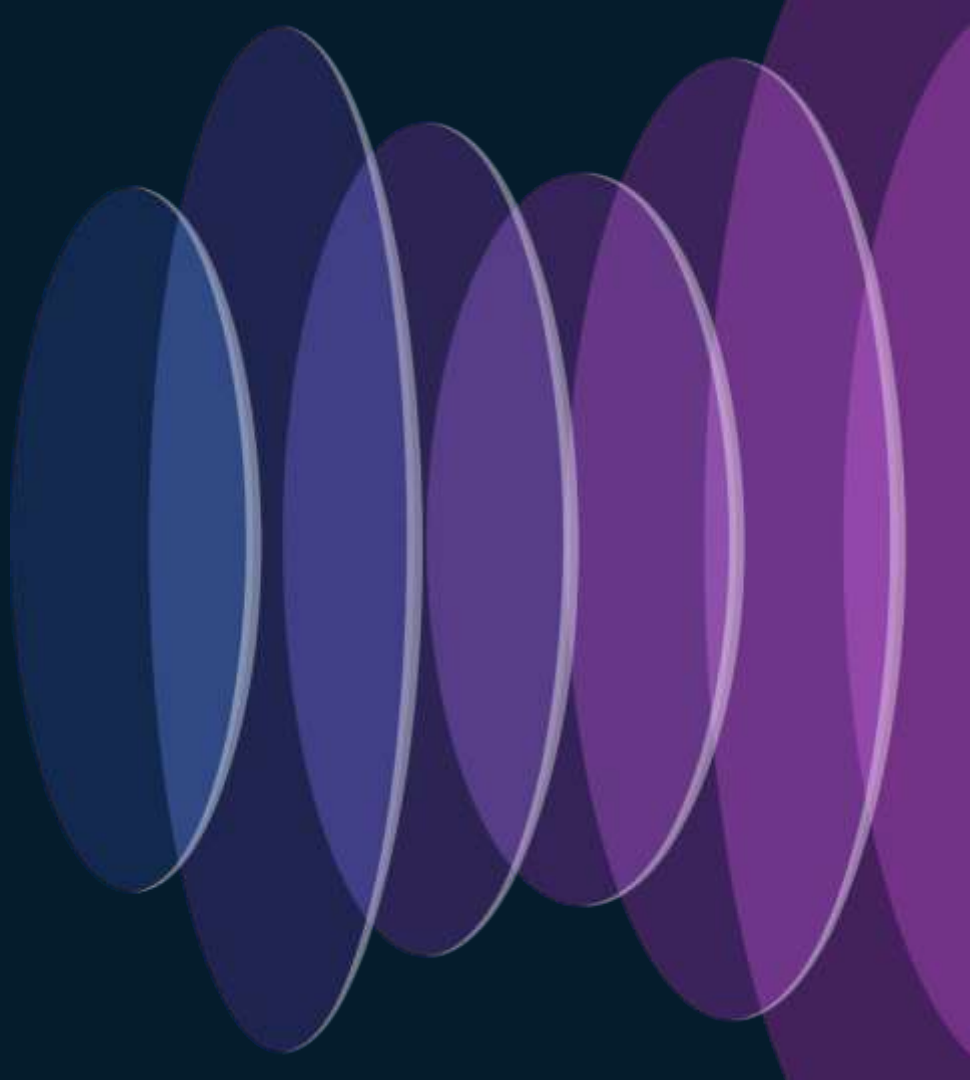
- 1 M12 GE Copper Uplink
- 4 M12 GE LAN Ports
- 1 RS232/485* M12 port
- 1 GPS / GNSS SMA connector
- 1 M12 T-code power / CANBUS connector



Form Factor is same as IR1800

- IR1800: 11.04 x 7.12 x 2.18 in
- With M12 Kit: 11.04 x 9.67 x 2.18 in

Understanding the limitations



Wireless limits – Frequency – Power – Bandwidth

Low Power Wide Area Wireless (LPWA)

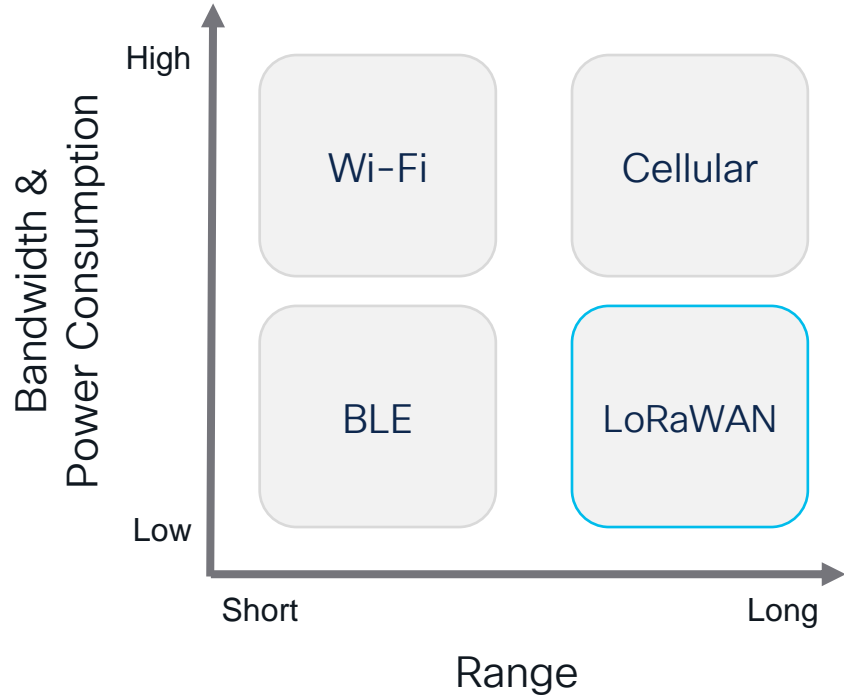
Fills the gaps from other wireless technologies

WiFi

Medium range, high throughput
unlicensed spectrum

Cellular

Long range, medium throughput
licensed spectrum



What is LoRaWAN?



Unlicensed Spectrum

- Global ISM band, 868/915MHz
- Scalable, low-cost deployments



Long Distance Coverage

- Up to 15 kms in rural area
- Connect thousands of devices



Low Data Rate

- 300 bps to 5.5 kbps
- Adaptive per distance



Low Power Consumption

- Battery powered endpoint
- Up to 10 years lifetime



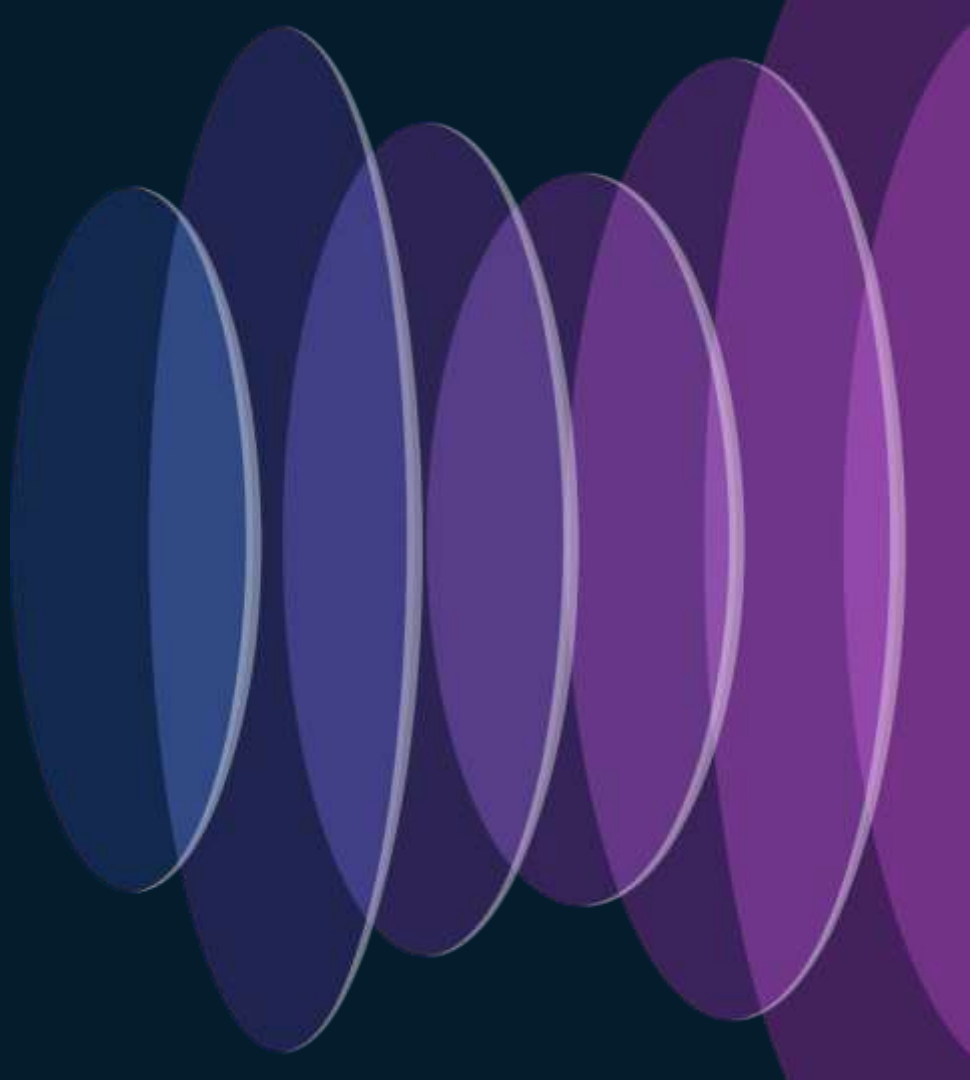
A wireless technology
for long range and low
power consumption

- OVER 80% OF MINING ACCIDENTS OCCUR UNDERGROUND DUE TO COMMUNICATION BREAKDOWNS
- THE MAJORITY OF UNDERGROUND MINES LACK RELIABLE COMMUNICATION NETWORKS
- 95% OF UNDERGROUND MINES DON'T KNOW WHAT'S HAPPENING UNDERGROUND AT ALL TIMES
- NAVIGATING THROUGH SEISMIC EVENTS AND COMMUNICATION DEAD ZONES IS THE DAILY REALITY OF UNDERGROUND MINING
- THE AVERAGE COST OF A MINING ACCIDENT EXCEEDS \$15 MILLION
- THE GLOBAL MINING INDUSTRY LOSES \$180 BILLION ANNUALLY DUE TO DOWNTIME
- THE MINING INDUSTRY HAS A HIGH FATALITY RATE, WITH AN AVERAGE OF 9 WORKERS DYING EACH YEAR

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Matching the
right wireless for
the application's
needs



Know your application needs



- Long battery life
- Low latency
- High bandwidth
- Fast roaming
- Large number of connected clients
- Range needed
- Low power
- Intrinsically safe



Integrated Remote Operations Center

Challenge

- Limited expert resources to leverage across multiple facilities
- Limited standardization between facilities
- Increasingly difficult recruitment of new field workers
- Limited cross functional collaboration

Solution

- Cisco and their partner industrial systems provide remote operating capabilities with visibility to metrics for planning and reporting purposes

Result

- Ability to leverage expertise across multiple sites without increased travel
- Increased standardization between facilities
- Broader recruitment pool in major centers
- Increased cross functional collaboration

Why we stay safe!!!!!!!!!!!!!!





The bridge to possible

Thank you

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