

19 JAN - 8 FEB, 2021
ASIA TELECOM SUMMIT

Next Gen WiFi & IoT

Tiago Rodrigues
8th Feb 2021

#WGC | #wifirevolution | #lovewifi | #openroaming





Moderator Introduction & Welcome

TIAGO RODRIGUES

CEO, Wireless Broadband Alliance





ASIA TELECOM SUMMIT

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Asia Telecom Summit

Full Program Agenda

3rd – 4th February – WBA Members Only Working Sessions

Start time: 10:00 ET; 07:00 PT; 23:00 Singapore; 15:00 GMT

4th February – WBA Members Only Working Sessions **Briefing for Asia-based members**

Start Time: 08:30 PST / 11:30 EST; 16:30 BST / 17:30 CET

ASIA TELECOM SUMMIT OPEN CONFERENCE

Start time 16:00 Singapore; 08:00 GMT; 03:00 ET; 00:00 PT

Tuesday 19th January

WBA Executive
Plenary



Wednesday 27th January

OpenRoaming:
Transforming
Public & Guest
Wi-Fi



Thursday 28th January

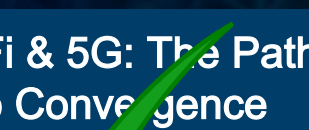
Next Generation of
Wi-Fi



Tuesday 2nd February

Wi-Fi & 5G: The Path
To Convergence

16:30PM Singapore



Wi-Fi & 5G: The Path
To Convergence

12:30 AM Singapore

Monday 8th February

Next Gen Wi-Fi
&
IoT



Next Gen Wi-Fi & IoT



Tiago Rodrigues

CEO
Wireless Broadband
Alliance



Irvind Ghai

VP Marketing
On Semiconductor



Dr. Wael Guibene

Principal Engineer &
Director - Wireless
and IoT R&D
Charter
Communications



Rémi Lorrain

Director of Programs
Global LoRaWAN
Networks Director
Semtech Corp



Next Gen Wi-Fi & IoT



Dr. Derek Peterson

CTO
Boingo Wireless



Paul Duffy

**Senior Technical
Leader and CTO**
Innovation Lab
Cisco



Johan Terve

VP Marketing
Aptilo Networks

Next Gen Wi-Fi & IoT



TODAY'S AGENDA

08:00am (GMT)	Moderator Introduction & Welcome Tiago Rodrigues, CEO - Wireless Broadband Alliance
08:05am (GMT)	Dueling Wi-Fi 6E and 5G benefits accelerate Industrial IoT Irvind Ghai, VP Marketing, ON Semiconductor
08:25am (GMT)	Introduction to the WBA & LoRaAlliance Initiative Dr. Wael Guibene, Principal Engineer II & Director - Wireless and IoT R&D, Charter Overview of the LoRa WAN[®] joint trials program Rémi Lorrain, Director of Programs/Global LoRa WAN Networks Director Convergence: The Smart Building Strategy Dr. Derek Peterson, CTO, Boingo Wireless Smart Light Pole for Smart City Applications Dr. Wael Guibene, Principal Engineer & Director - Wireless and IoT R&D, Charter LoRa WAN[®] and OpenRoaming[™] Paul Duffy, I-IoT CTO Team, Cisco
09:10am (GMT)	Q&A: Moderated Panel- How IoT is benefiting from combined Wi-Fi & LoRaWAN Deployments Dr. Wael Guibene, Principal Engineer II & Director - Wireless and IoT R&D, Charter Spectrum
09:20 am (GMT)	Zero Touch: enabling IoT with OpenRoaming Johan Terve, VP Marketing, Atilo Networks
09:40am (GMT)	Overview of the WBA 2021 IoT Programs Tiago Rodrigues, CEO - Wireless Broadband Alliance
10:00am (GMT)	Close Tiago Rodrigues, CEO - Wireless Broadband Alliance



Dueling Wi-Fi 6 and 5G Benefits Accelerate Industrial IoT

IRVIND GHAI

Vice President Marketing, On Semiconductor



FOR ENERGY EFFICIENT INNOVATIONS

THINK ON.

www.onsemi.com

Dueling Wi-Fi 6E & 5G Benefits Accelerate Industrial IoT

Irvind Ghai



IrvindG

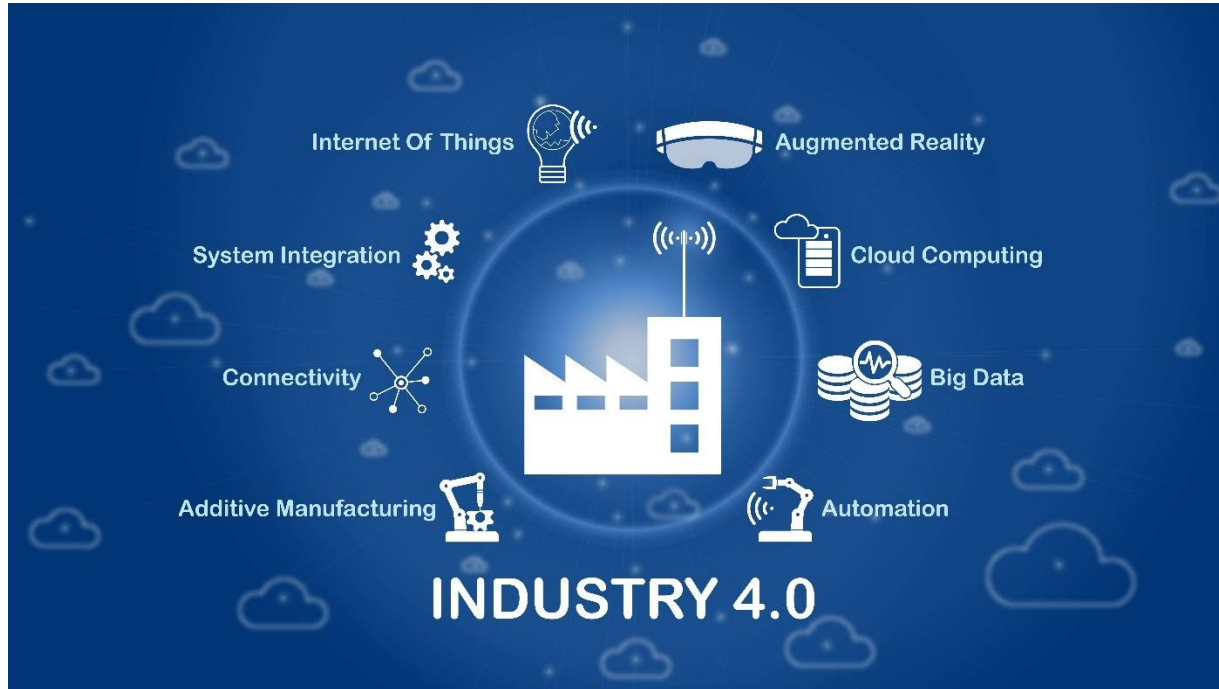


Industrial IoT Connectivity



- **Trends & Drivers**
- **Intersection of 5G & 6GHz**
- **Wi-Fi 6E Value**
 - Expanded Spectrum
 - Features & Benefits
 - Ecosystem Rollout
- **Opportunity**
 - Silicon, Software, Security & Systems
 - Coexistence: Hybrid Networks
- **Wi-Fi & 5G Benefits Aggregated...**

Industry 4.0 Trends



- **Automation**
 - Safety, Quality & Cost Optimizations
 - Digitized Workflow
 - Reduced On-site Footprint
- **Big Data/Cloud**
 - Consumer Patterns
 - Shorter Cycle Time
 - Inventory Management
- **System Integration**
 - Fixed & Proprietary ⑦ Flexibility
 - Multi-Vendor Interoperability
- **Connectivity: Ethernet ⑦ Wireless**
 - Faster Manufacturing Retooling
 - Shared Resources

IIoT Connectivity Drivers



- **M2M IIoT**
 - M2M 19% CAGR*
 - Headless Device Onboarding
- **AI/Big Data**
 - Adapt faster to Consumer Patterns
 - Inventory Management
 - Diagnostic & Service Data
- **Cost & Time Optimization**
 - AGV
 - Multi-Vendor Floor Build
 - Shared Line Equipment
 - Agile Factory, Retooling, Inventory Management



- Bloomberg, 10/31/2020
- Alibaba' Xunxi "Fast Rhino"

* Courtesy Cisco Annual Internet Report

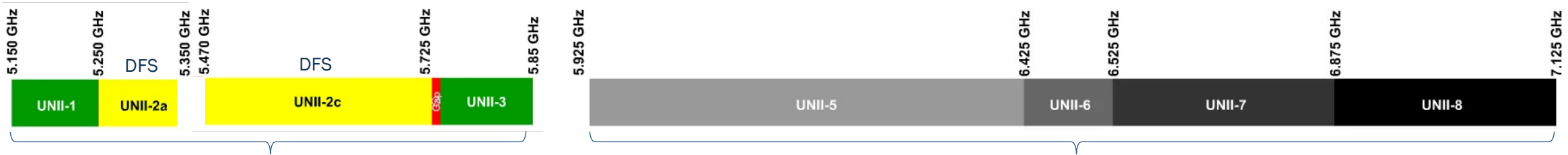
IIoT: Intersection of 5G & 6GHz Benefits



* Scharfsinn/Shutterstock.com

- **Industrial IoT Wireless Attributes**
 - Determinism/Reliability
 - Scalability
 - Operate in Hybrid Network Environment
- **5G**
 - Mobile Data/Broadband Heritage
 - Stack & Spectrum: licensed advantage
 - 5G offers low latency in licensed bands
 - 5G private networks business models
- **Wi-Fi**
 - Home/Enterprise Heritage
 - Stack & Spectrum: unlicensed advantage
 - Wi-Fi 6 OFDMA, scheduling enhancements
 - Integration with Ethernet
 - 5G Wi-Fi off-load model – coexistence!

6GHz Unlicensed Band Further Expands Wi-Fi



5GHz (existing spectrum)

6GHz will triple US available Wi-Fi spectrum


	Existing 2.4GHz (Wi-Fi 6 & below)	Existing 5GHz (Wi-Fi 6 & below)	6GHz (Wi-Fi 6 and beyond)
Total Spectrum	80MHz	500MHz	1200MHz
20/40MHz channel	3 / 1	25 / 12	59 / 29
80/160MHz channel		6 / 2	14 / 7
320MHz channel			3
Max data rate	1.1 Gbps (11ax)	10 Gbps (11ax)	20 Gbps (11ax+, 320MHz); >30 Gbps (11be, 320MHz)
Link Quality	Severely Congested	Increasingly Congested	2-3x more available channels No Legacy Wi-Fi interference Scalable to next generation Wi-Fi (11be and beyond)




Wi-Fi 6E Optimizes Industrial IoT

Wi-Fi 6E brings Wi-Fi® into 6 GHz

Features

 More, contiguous spectrum
6 GHz

 Wider channels
80
160 MHz

 Less interference

Benefits

 Gigabit speeds

 Extremely low latency

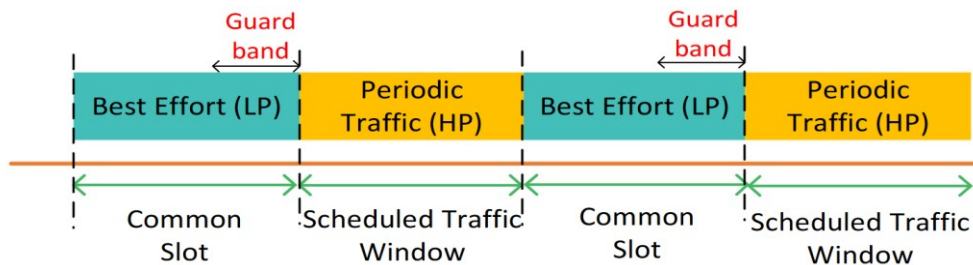
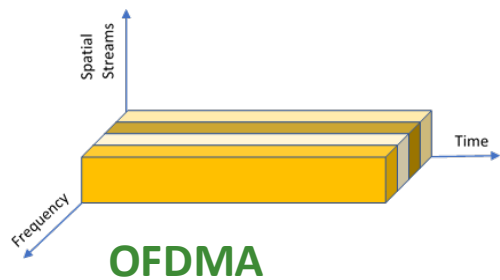
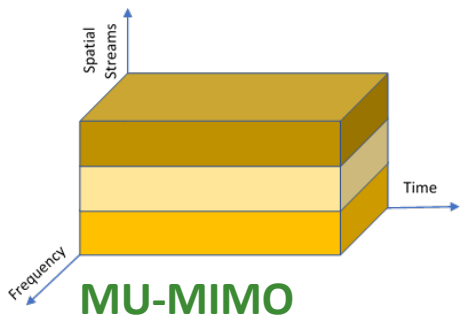
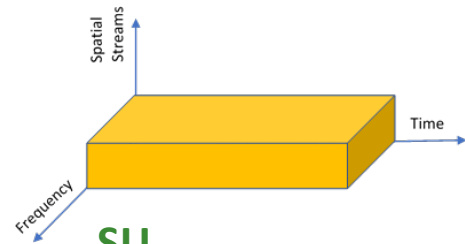
 High capacity

* Wi-Fi Alliance



- **Capacity & Speed – Data Intensive Transfers**
 - 6GHz Spectrum
 - More 160MHz channels
 - MU-MIMO
- **Congestion & Latency – Time Sensitive Apps**
 - OFDMA
 - Scheduling & less channel contention
 - 6GHz helps reduce management clutter
 - 6GHz will avoid legacy clients
- **Range & Power – Maximize Battery**
 - Target Wait Time (TWT)
 - 6GHz low power Wi-Fi (VLP)
 - Additional Radios (e.g. Zigbee Coexistence)

Features That Make A Difference...

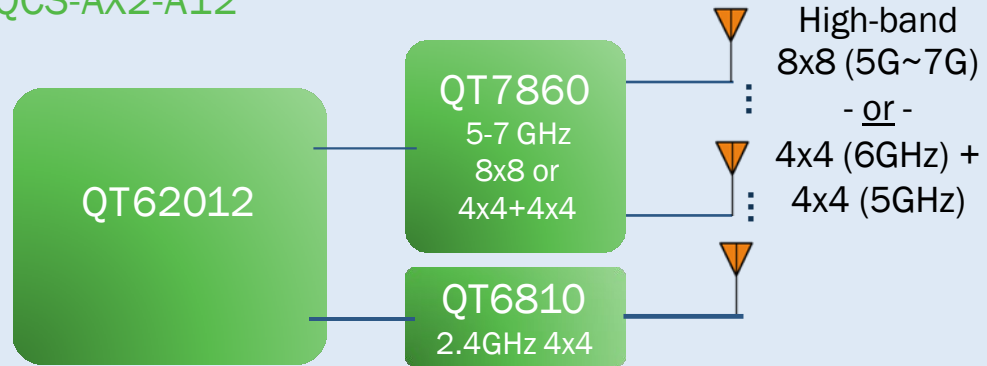


Time Sensitive Networking

- **Reduced Management Clutter**
- **Enterprise ⑦ 160MHz**
 - 6GHz Frequency Reuse
 - Headless Device Onboarding (Key for M2M IIoT)
- **MU-MIMO**
 - Multiple Devices Supported Simultaneously
 - Both Uplink & Downlink
- **OFDMA**
 - Simultaneous Channel Usage
 - Scheduling
- **TSN Development Ongoing**
 - 802.Qbv Enhancements for Scheduled Traffic
 - 802.1Qbu Frame Preemption
 - For Traffic across Wired & Wireless

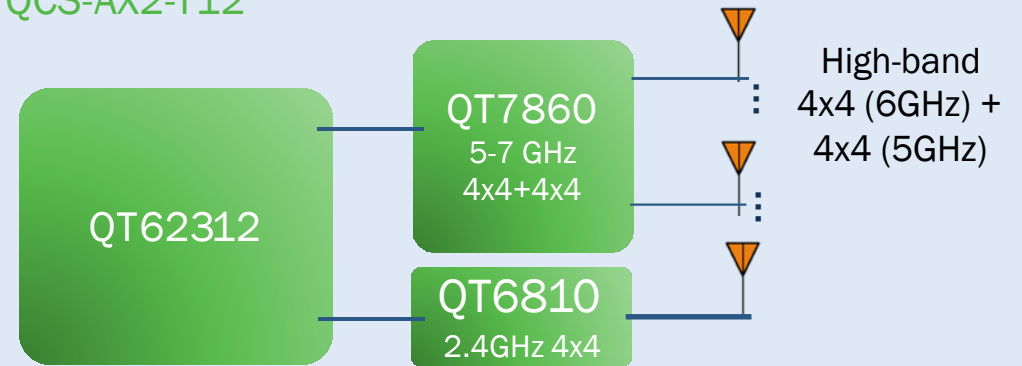
Wi-Fi 6E Infrastructure Platforms

QCS-AX2-A12



AdaptivMIMO 8x8 or 4x4 Tri-band
Router/Premium GW

QCS-AX2-T12



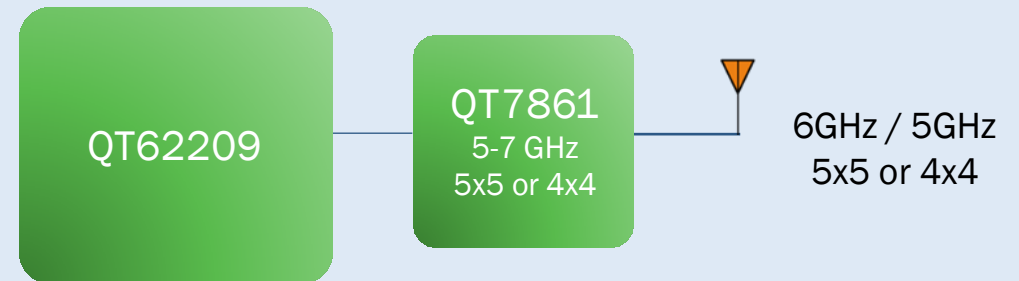
Tri-band Concurrent 4x4
Performance, Cost Effective AP/GW & Mesh

QCS-AX2-T8



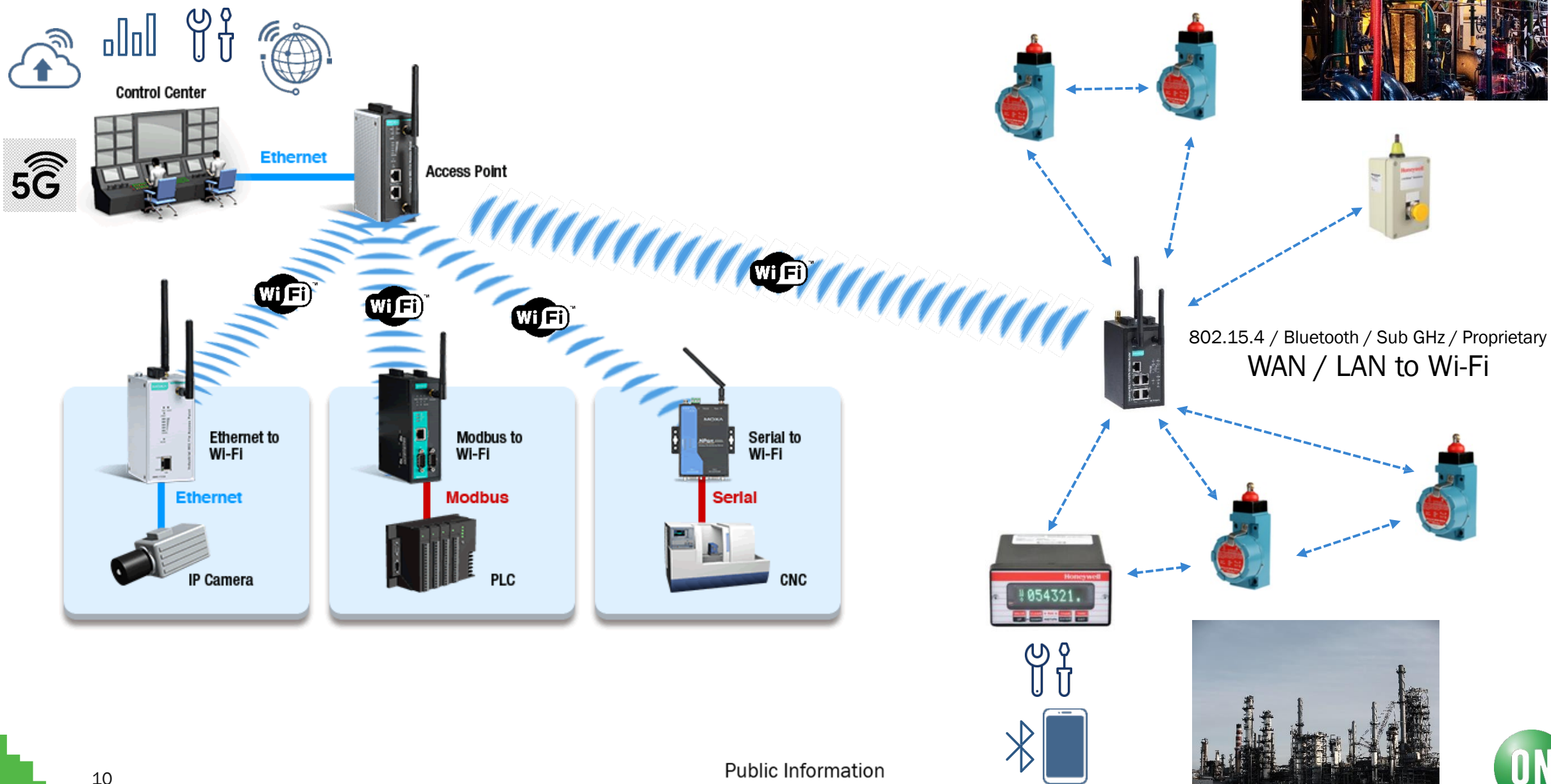
Tri-band Concurrent
Mainstream AP/GW & Mesh

QCS-AX2-S5

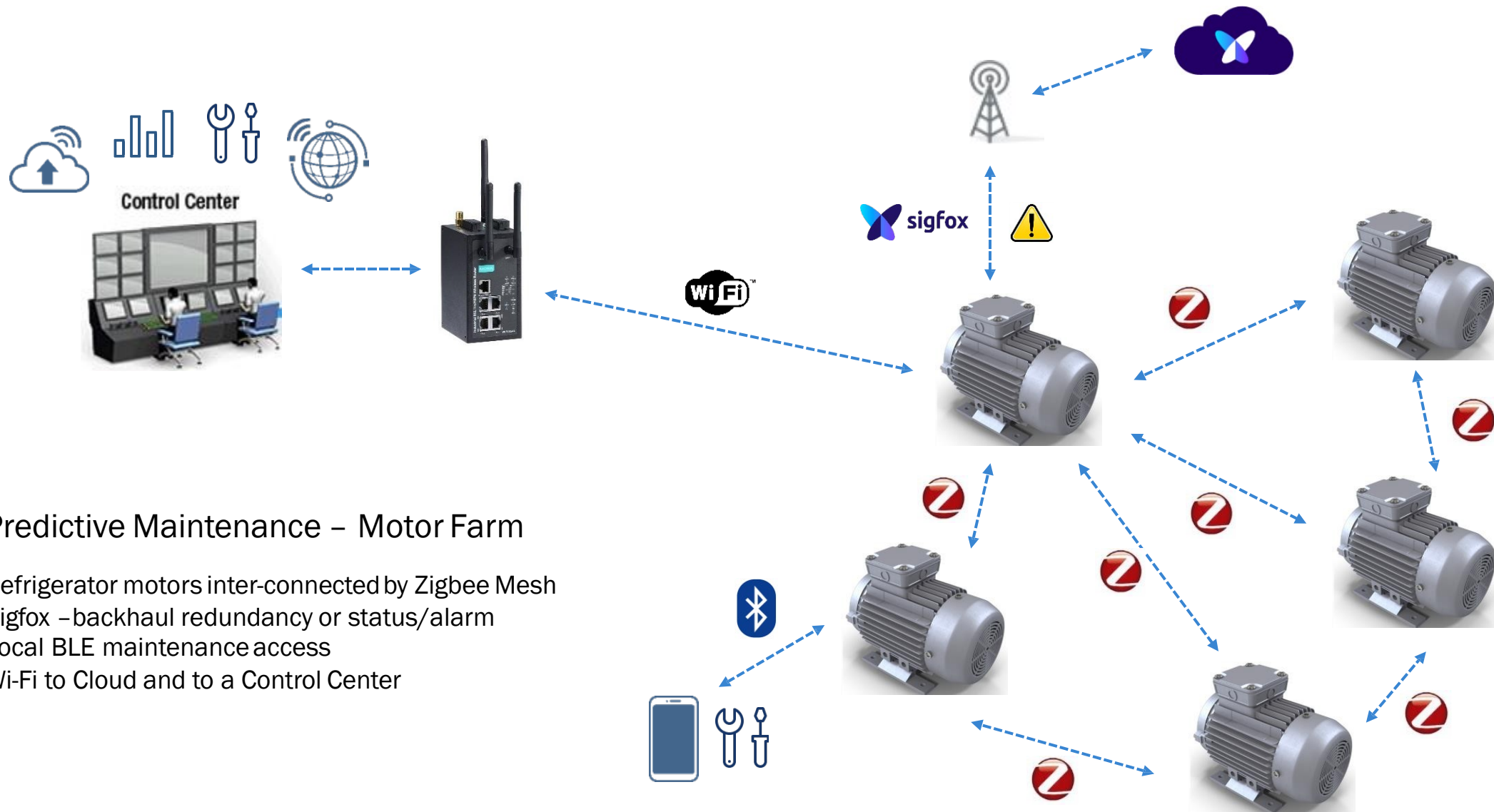


Single Band "Sidecar"
Extension of existing ecosystem into 6GHz

Hybrid Industrial Network



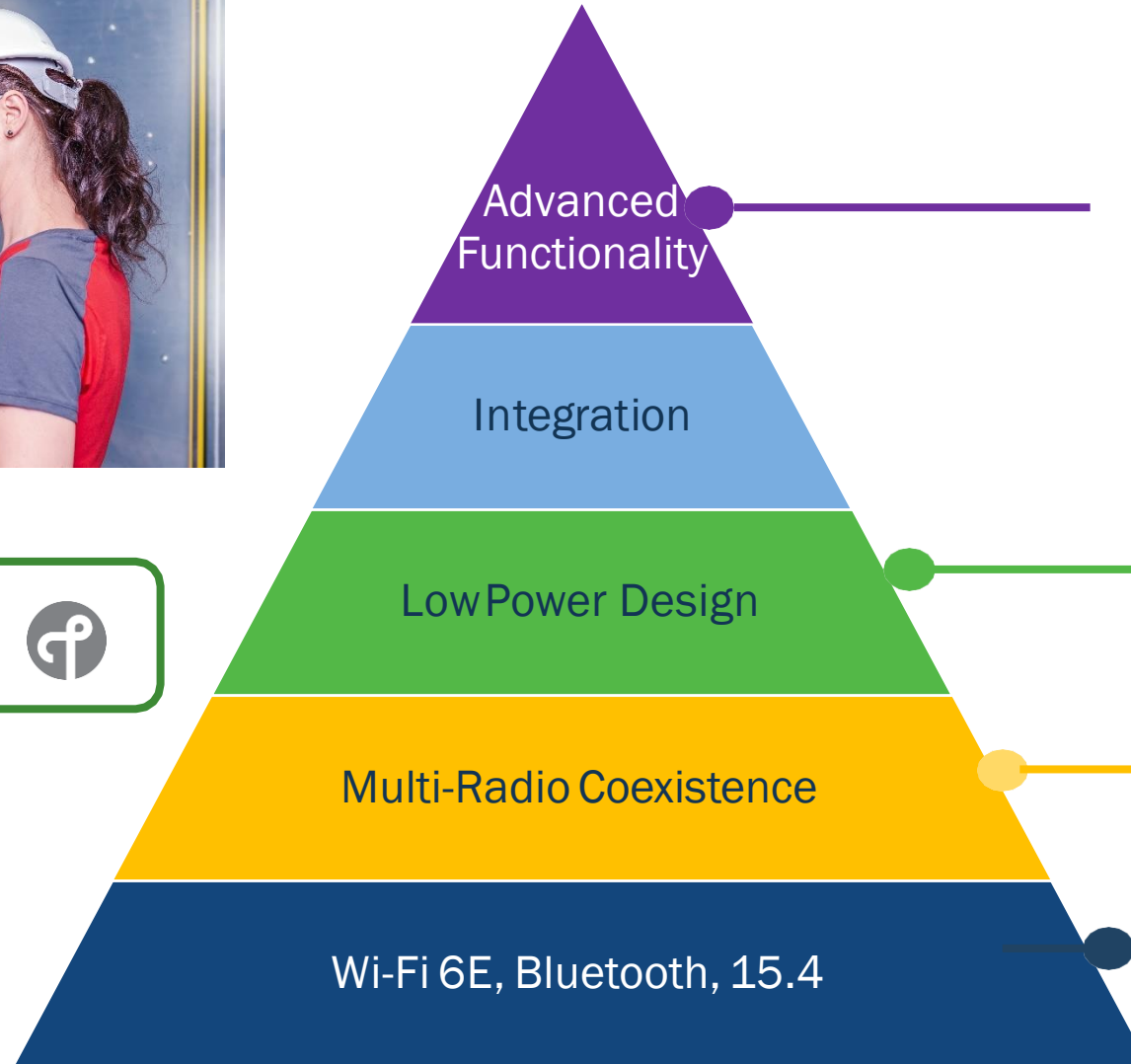
Predictive Maintenance Example



AI/Predictive Maintenance – Motor Farm

- Refrigerator motors inter-connected by Zigbee Mesh
- Sigfox – backhaul redundancy or status/alarm
- Local BLE maintenance access
- Wi-Fi to Cloud and to a Control Center

Wi-Fi 6E For IIoT



- Long Range & Location Support
- BSS Color & Preamble Puncturing Interference Avoidance
- Low-Latency – 6GHz and OFDMA
- Multi-User – MU-MIMO, OFDMA

- Lower Power/Bit with 6GHz 160MHz
- 11ax TWT

- Concurrent Wi-Fi/BT/LE/15.4
- STA/SoftAP/P2P modes

- Tri-Band 11ax
- BT, Zigbee

5G & Wi-Fi Benefits Aggregated...

- **A Hybrid Future**
 - 5G adds value in licensed spectrum
 - Wi-Fi's rich unlicensed eco-system has a \$ advantage
 - Both technologies will coexist in locally licensed spectrum
- **Wi-Fi Is Being Used Today**
 - Enterprise, Warehouses, Health Care...
 - Latency requirements meet multiple applications
 - Natural IP extension to Ethernet Networks
- **Continued Innovation**
 - Throughput continues to increase
 - TSN efforts underway
 - Wi-Fi 7 further addresses:
 - Deterministic enhancements
 - Multi link replication



Dueling Wi-Fi 6E & 5G Benefits Accelerate Industrial IoT



IrvindG



Introduction to the WBA and LoRa Alliance initiative

DR. WAEL GUIBENE

Principal Engineer II & Director - Wireless and IoT R&D, Charter Communications





Wi-Fi® & LoRaWAN® Trials

WBA Asia Telecom Summit 2021

- Panelists Presentation
- Introducing the Wi-Fi[®] & LoRaWAN[®] joint trials program
- Illustrating the use cases and results of Wi-Fi[®] and LoRaWAN[®] trials
 - Boingo use-case: Multi Family Dwelling
 - Charter use-case: Smart Light Pole
 - Cisco use-case: OpenRoaming[™] and LoRaWAN[®]
- Panel Discussion

Meet the Panelists



Wael Guibene, PhD

Charter Communications

WBA, IoT WG co-Chair
LoRa Alliance, MC Chair



Derek Peterson, PhD

Boingo Wireless

WBA CTO Group
WBA Board Co-Chair



Remi Lorrain

Semtech Corporation

WBA, Project Leader
LoRa Alliance, NOF Chair



Paul Duffy

Cisco Systems

I-IoT CTO Team



Overview of the Wi-Fi & LoRa WAN joint trials program

RÉMI LORRAIN

Director of Programs/Global LoRa WAN Networks Director, LoRa Alliance





Introducing the Wi-Fi® & LoRaWAN® joint trials program

Remi Lorrain, Semtech



- Multi-Radio Access Network Strategy has become obvious on IoT Market
- Wi-Fi® & LoRaWAN® Leading license exempt standards can cover most of massive IoT use cases
- Demonstrate the vision through real use cases implementation

Wi-Fi® & LoRaWAN® Deployment Synergies launched the white paper series



Wi-Fi & LoRaWAN Deployment Synergies

IoT Work Group

Main Objective

Expand on business opportunities and use cases deriving from combining Wi-Fi with LoRaWAN, in a first Joint Task Force between WBA and LoRa Alliance.

Outcome & Next Steps

Prepare the knowledge base in terms of technological use cases to drive a practical field trial in 2020.

Leadership Team



Project Leader & Chief Editor
Rémi Lorrain - Semtech



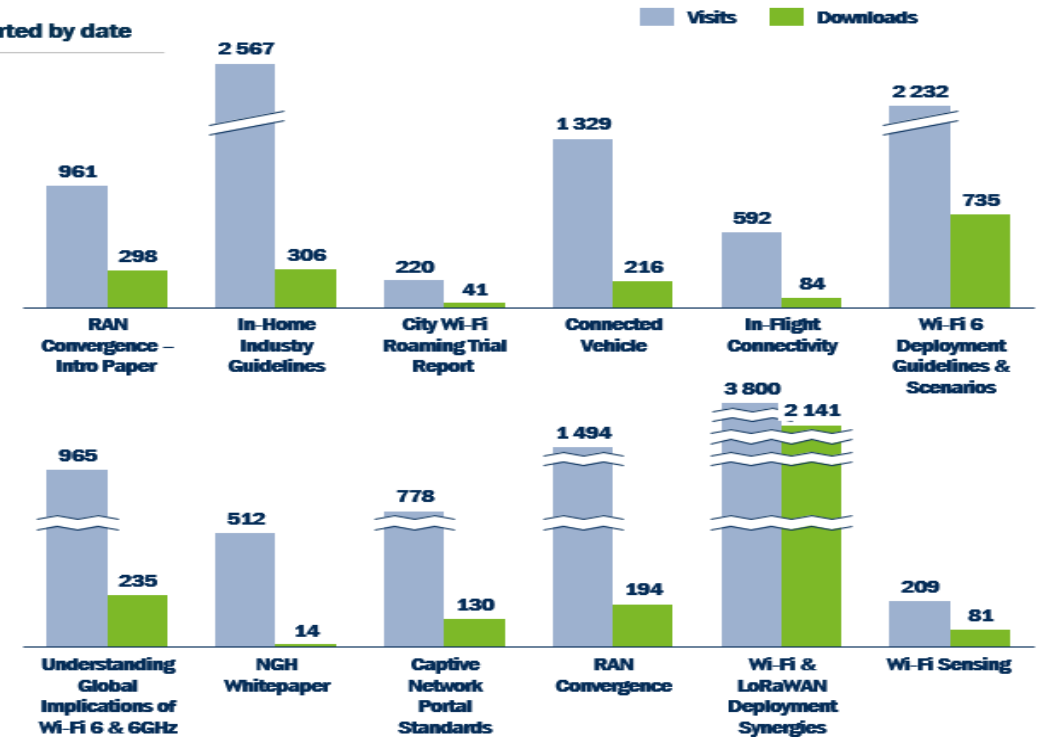
Project Co-Leader
Dan Klaeren - Syniverse



Project Co-Leader
Steve Dyett - BT



Sorted by date



Wi-Fi & LoRaWAN Deployment Synergies white paper

Published in September 2019

Strong impact: 25 companies, 2500+ downloads in a quarter

Decision to follow-up on practical work focused on Wi-Fi and LoRaWAN trials

Wi-Fi® & LoRaWAN® Trials obvious next step



PROJECT DESCRIPTION

WBA and LoRa Alliance® jointly published the [Wi-Fi & LoRaWAN Deployment Synergies white paper](#) which illustrates new business opportunities for mobile operators, operators in the unlicensed spectrum, enterprises, cities, and other key Internet of Things (IoT) market players with Wi-Fi networks to support critical IoT.

Going forward, a joint collaboration between WBA and the LoRa Alliance will develop **Hybrid Trials with Wi-Fi and LoRaWAN** incorporating multiple Proofs of Concept (POC).

Published in November 2020

BUSINESS OBJECTIVES

- Show evidence on how hybrid connectivity radio options bring business value
- Show real IoT use case implementations combining Wi-Fi and LoRaWAN
- Provide contact information for any interested party to reach-out to contributing companies

TARGET OUTCOMES

- Conduct trials in real world test cases explaining the practicalities of Multi - RAN strategy, and show clear examples of return on investment
- Provide straight forward summary (one page per use case model) focusing on business value

LEADING PARTICIPANTS



space
Lacuna

SKYHOOK®



+ RELEVANT LINKS

Wi-Fi & LoRaWAN®
Deployment Synergies



Wi-Fi 6
Deployment Guidelines



IoT Interoperability:
Dynamic Roaming



IoT New Vertical
Value Chains



Project Leaders

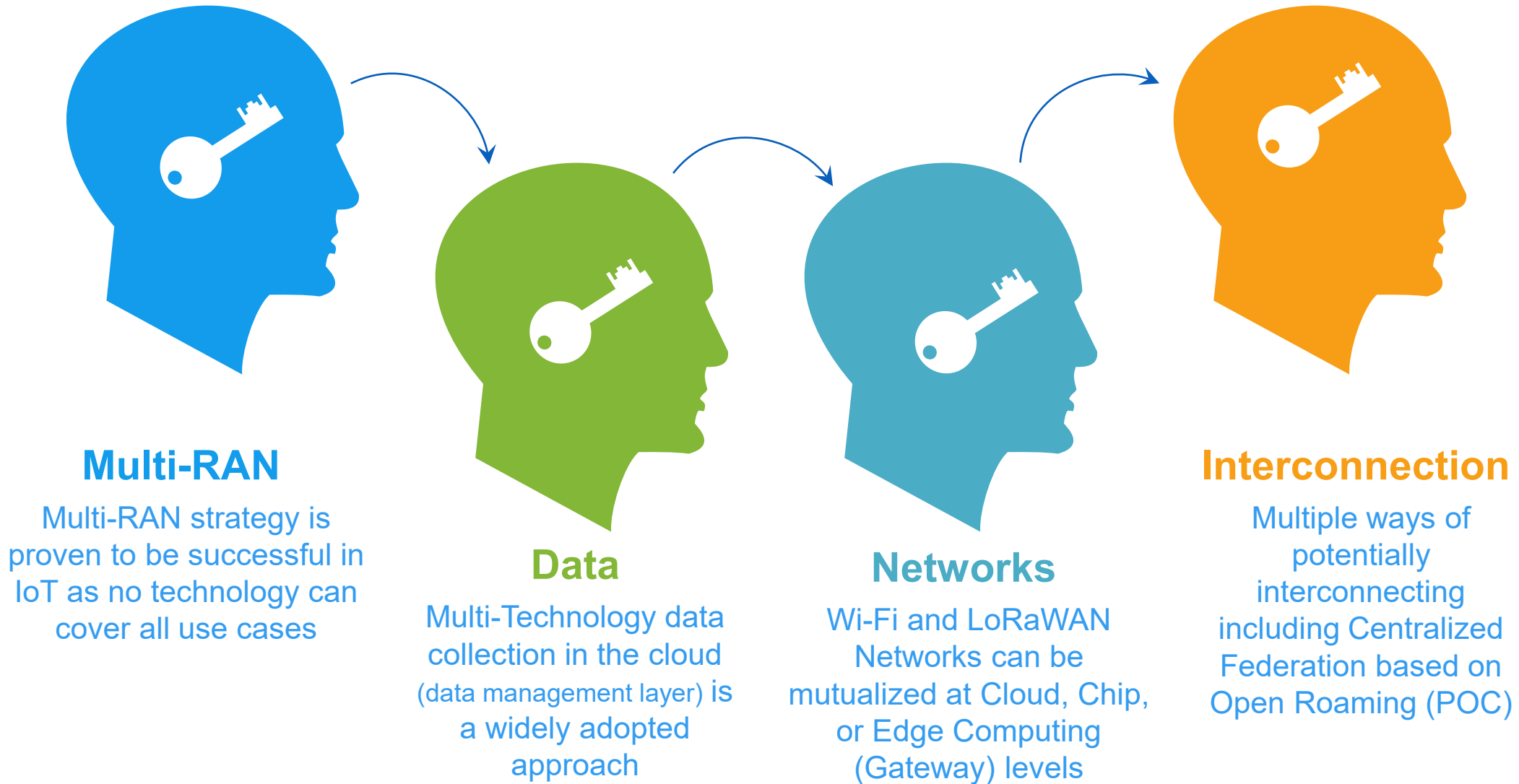
Leader: Rémi Lorrain
Semtech



Co-Leader: Wael Guibene
Charter

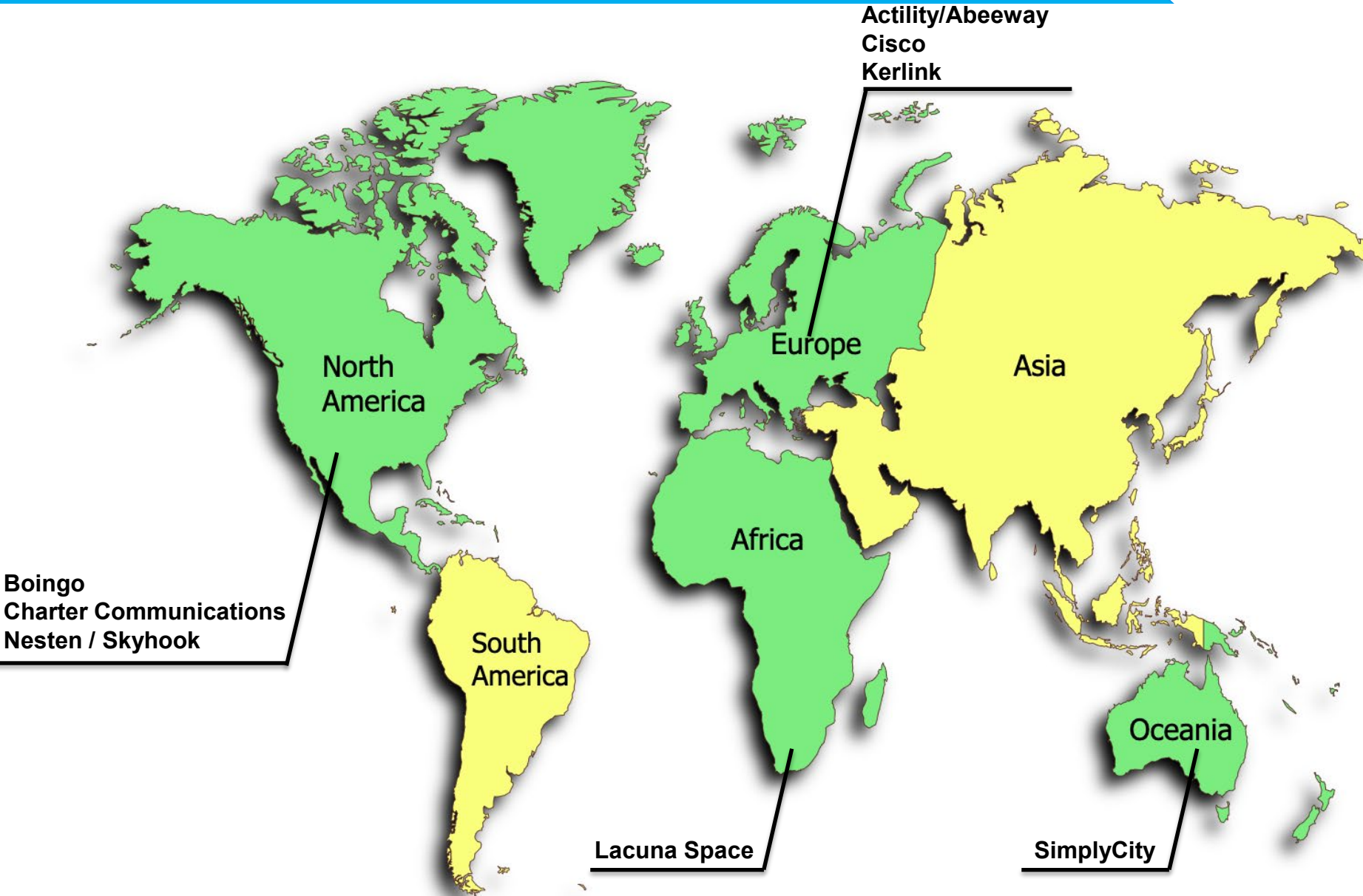


Wi-Fi® & LoRaWAN® Trials Findings



Diversity of applications

Trials geographic span



Applications:

- Smart Cities
- IIoT/ Automotive
- Smart Buildings
- OpenRoaming
- Retail
- Location Services
- Endangered species protection

Wi-Fi® & LoRaWAN® Trials NEXT STEPS



2021

Wi-Fi® & LoRaWAN® Trial V2

Nov
2020

Wi-Fi® & LoRaWAN® Trials

11 contributors from
WBA and LoRa Alliance®

Sept 2019

Wi-Fi® & LoRaWAN®
Deployment Synergies

Thank You



Remi Lorrain

Global LoRaWAN Networks Director

Rlorrain@Semtech.com





Convergence: The Smart Building Strategy

DR. DEREK PETERSON

CTO, Boingo Wireless





Convergence: The Smart Building Strategy

Dr. Derek Peterson, Boingo CTO



WORLD CLASS WIRELESS FOR THE WORLD'S PREMIER PROPERTIES

Boingo delivers
unparalleled **managed wireless
services** at iconic venues
serving more than

▶ 1 ◀
**BILLION
CONSUMERS
ANNUALLY**

Applying the right **spectrum, technology** and **deployment** to connect people and things.

LoRaWAN **5G** mmWave **CBRS** **EDGE**
Wi-Fi 6E **PROPERTY** **LAA**
HaLow **LTE** **Passpoint**
5G-NRU

Connectivity Trend: Always-On



Residents wants



Everywhere
Always-ON



Personal IoT
Always-ON
Full Control



Amenity IoT
Always-ON
Full Control

Property wants



Facility IoT
Always-ON
Full Control



Amenity IoT
Always-ON
Variable Control

IoT needs



Connectivity
Always-ON

CONNECTING SENSORS EVERYWHERE

SENSORS

- Leak detection
- Temperature
- Humidity
- Carbon monoxide

EVERYWHERE

- Battery operated
- Difficult to reach places
- HVAC rooms
- Parking garages

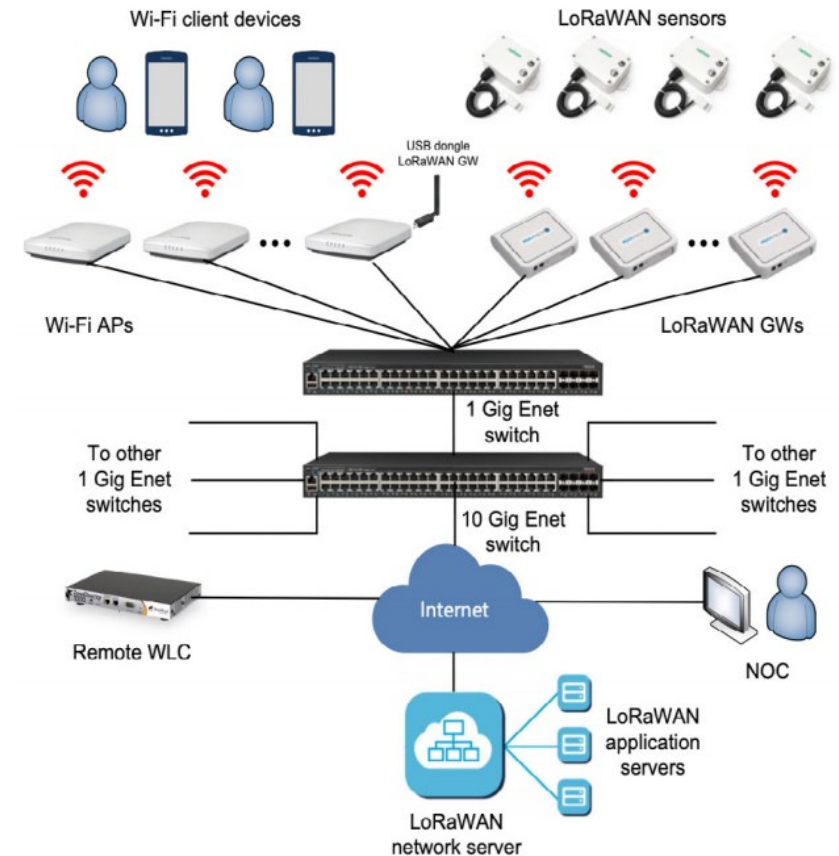
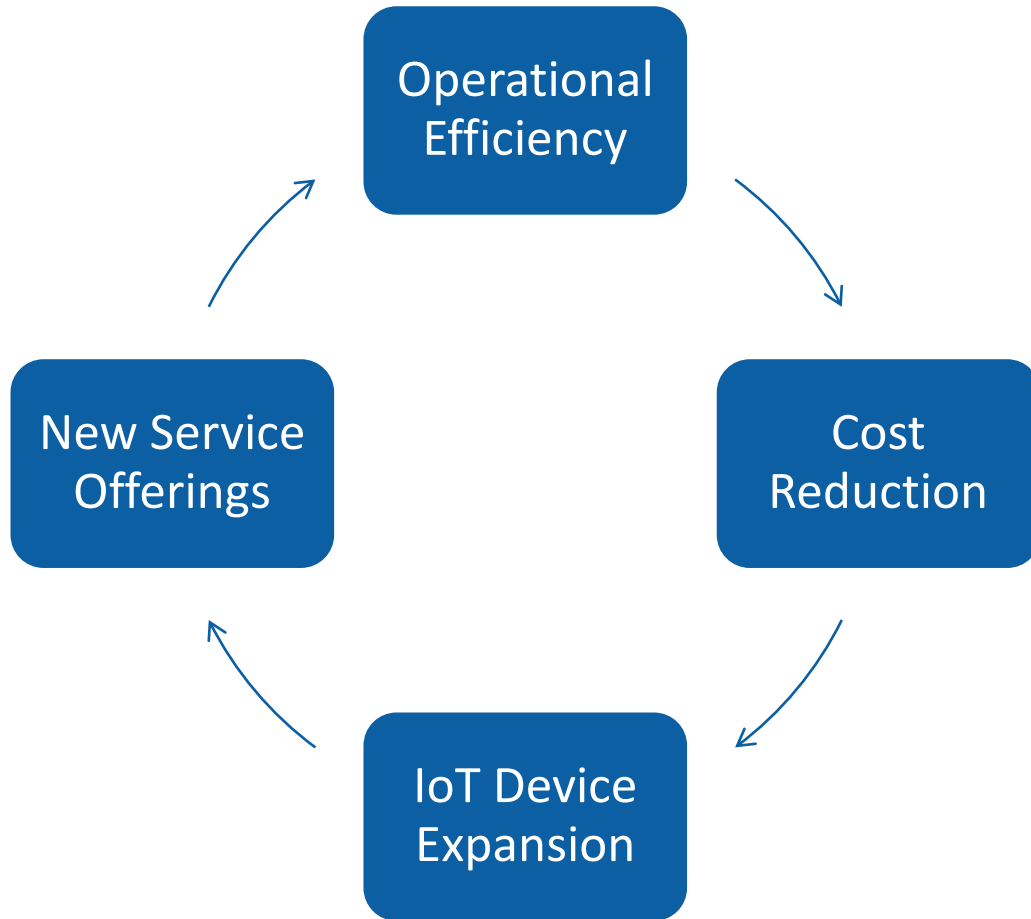


Figure 1 Wi-Fi & LoRaWAN network architecture for multifamily property

A Win-Win-Win Environment



Thank You



Dr. Derek Peterson
CTO, Boingo Wireless
dpeterson@boingo.com





Smart Light Pole for Smart City Applications

DR. WAEL GUIBENE

Principal Engineer II & Director - Wireless and IoT R&D, Charter Communications

The Charter Communications logo, consisting of the word "Charter" in a large, blue, sans-serif font, with the word "COMMUNICATIONS" in a smaller, blue, sans-serif font directly below it.

Charter
COMMUNICATIONS



Smart Light Pole for Smart City Applications

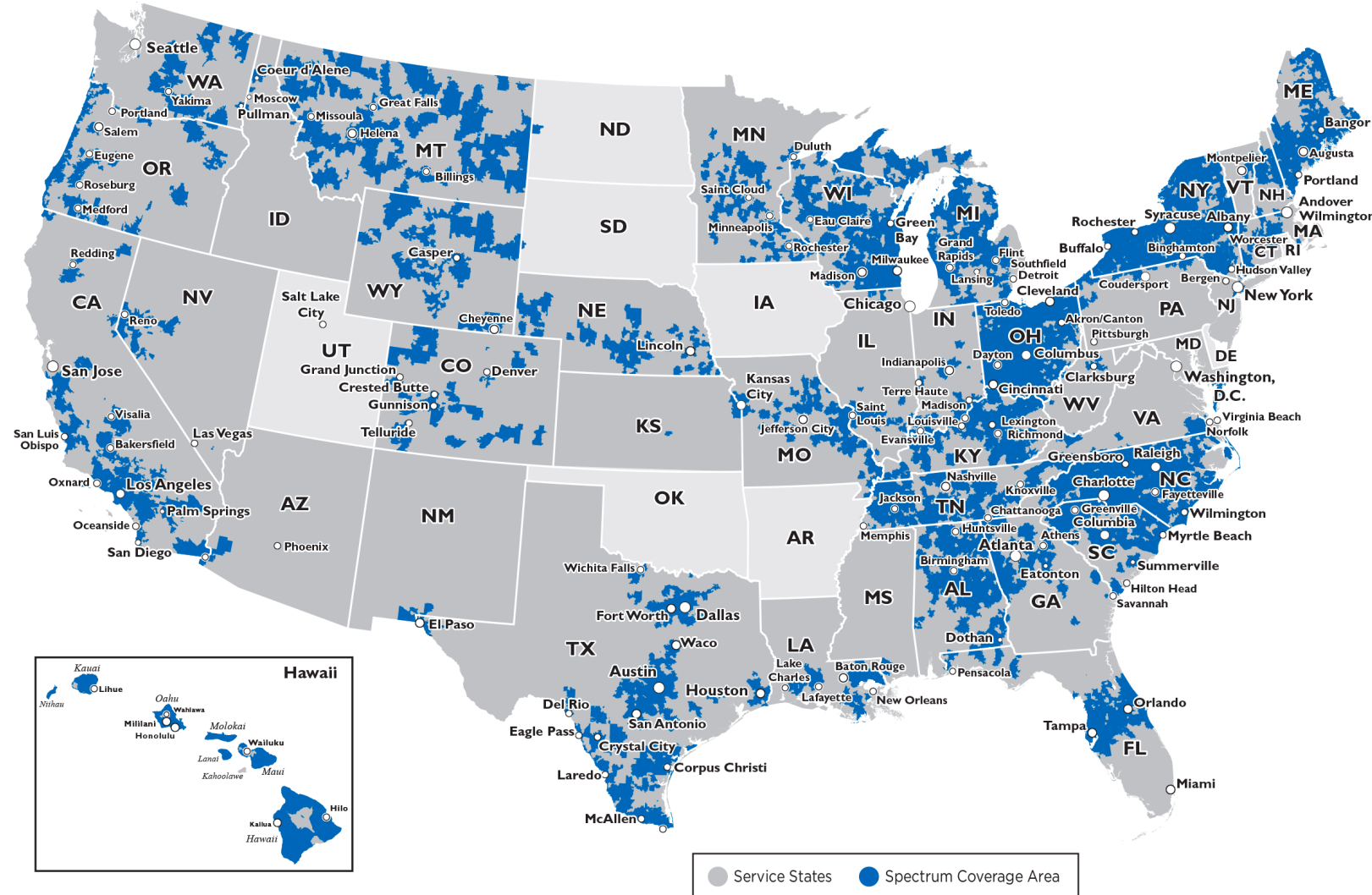
Dr. Wael Guibene, Charter



About Charter Communications



- Charter Communications is a major American telecommunications and mass media company that offers its services to consumers and businesses under the branding of Spectrum
 - **41 States Coverage**
 - **Spectrum: 30+ Million house-holds connected**
 - **Spectrum Mobile: 2+ Million subscriptions**
 - **Spectrum Enterprise**
 - **Spectrum Reach**
 - **Spectrum Networks**



Smart City Solutions and Infrastructure



Digital Services & Economic Development

- Connected communities
- Digital government
- Open data & civic engagement
- Smart kiosks
- Digital twin

Utilities & Infrastructure

- Smart lighting
- Smart waste management
- Smart water management
- Smart grid
- Smart building, venue, & campus
- Asset tracking & remote monitoring

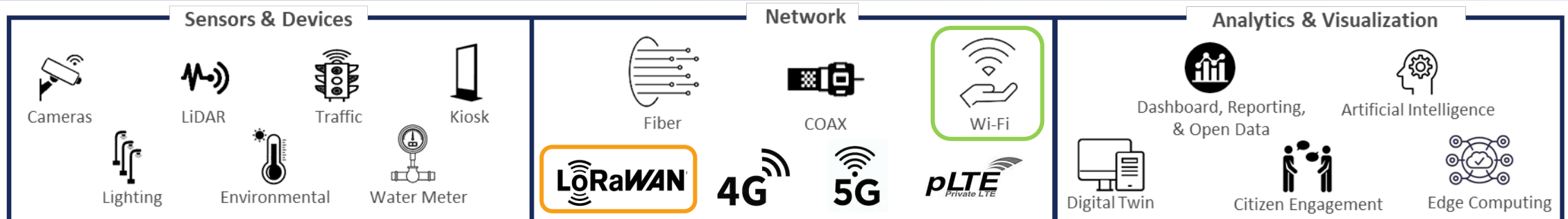
Intelligent Transportation

- Intelligent traffic management
- Connected vehicles
- Autonomous vehicles
- Smart parking
- Fleet management

Public Safety

- Video analytics
- Critical infrastructure monitoring
- Situational awareness
- Police wearables
- Environmental monitoring
- Drone monitoring
- Emergency management

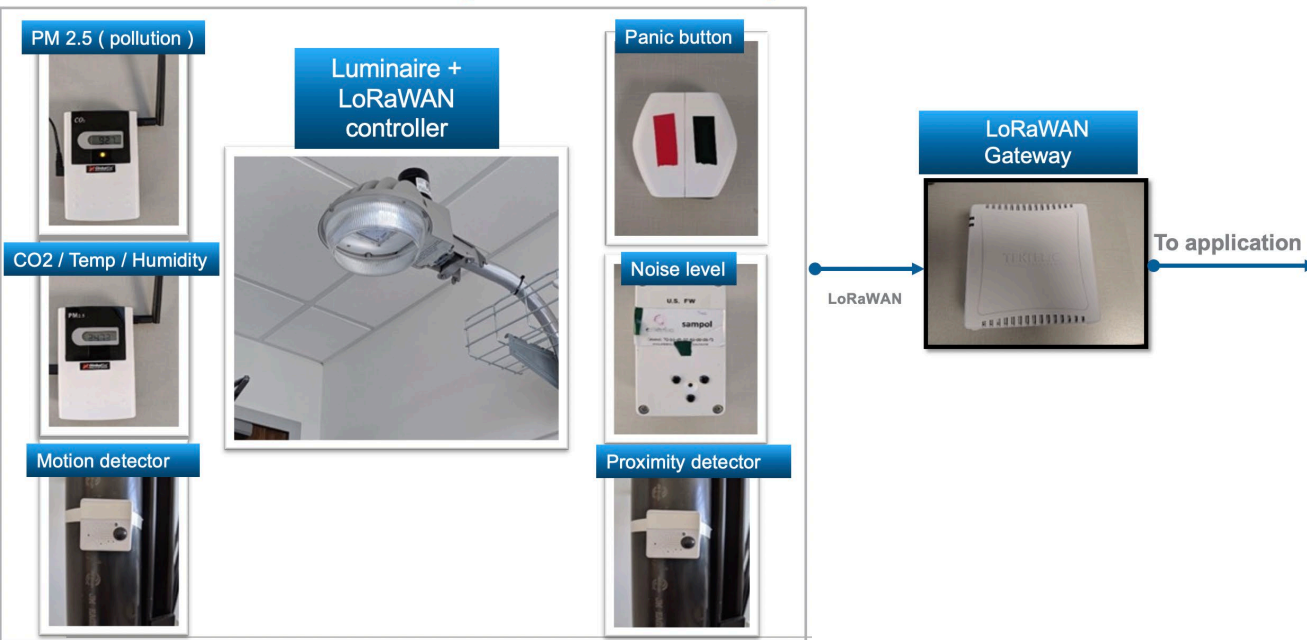
Smart City Infrastructure



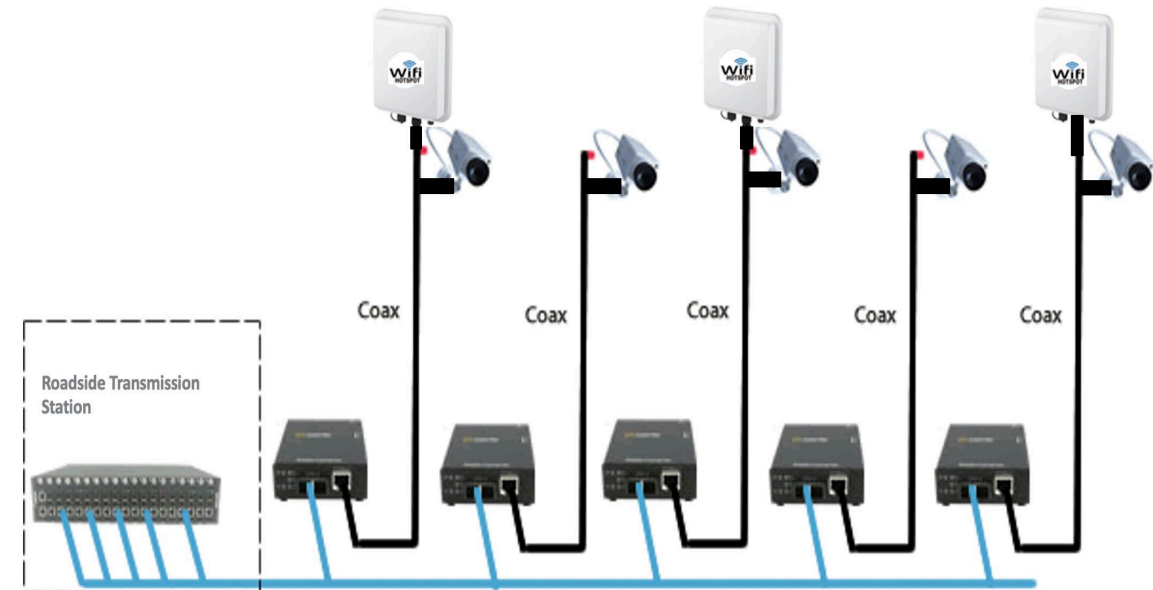
Smart Light Pole: Beyond the Luminaire



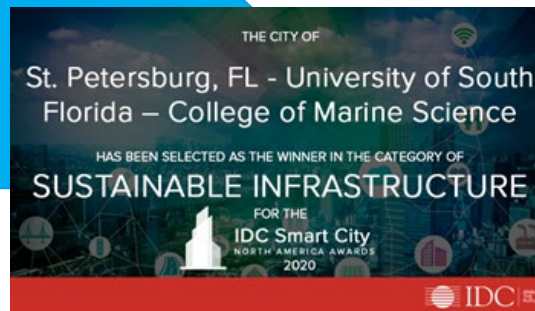
Smart Light Pole LoRaWAN Sub-system



Smart Light Pole WiFi Sub-system



Case Study: St. Petersburg, Florida



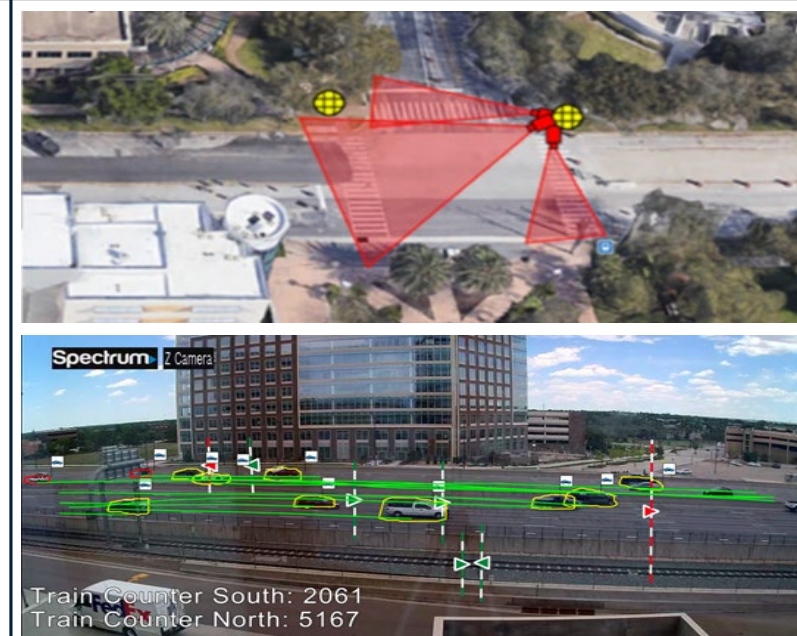
Smart Lighting

- Light Controller
- Sensors: Temp, Humidity, CO2, PM2.5, proximity
- Panic Button
- Security Camera(s)
- Public WiFi



Marine Science: Guardians of the Gulf

- Underwater Cameras
- Artificial reef with "Fishial Recognition"
- Youth engagement working with local Boys and Girls Club



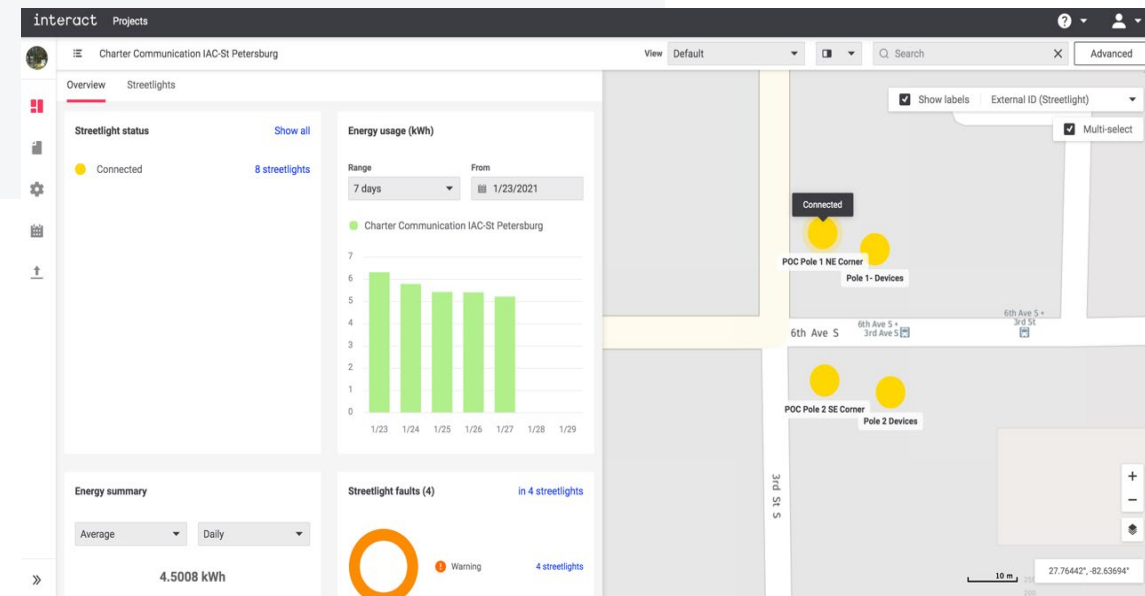
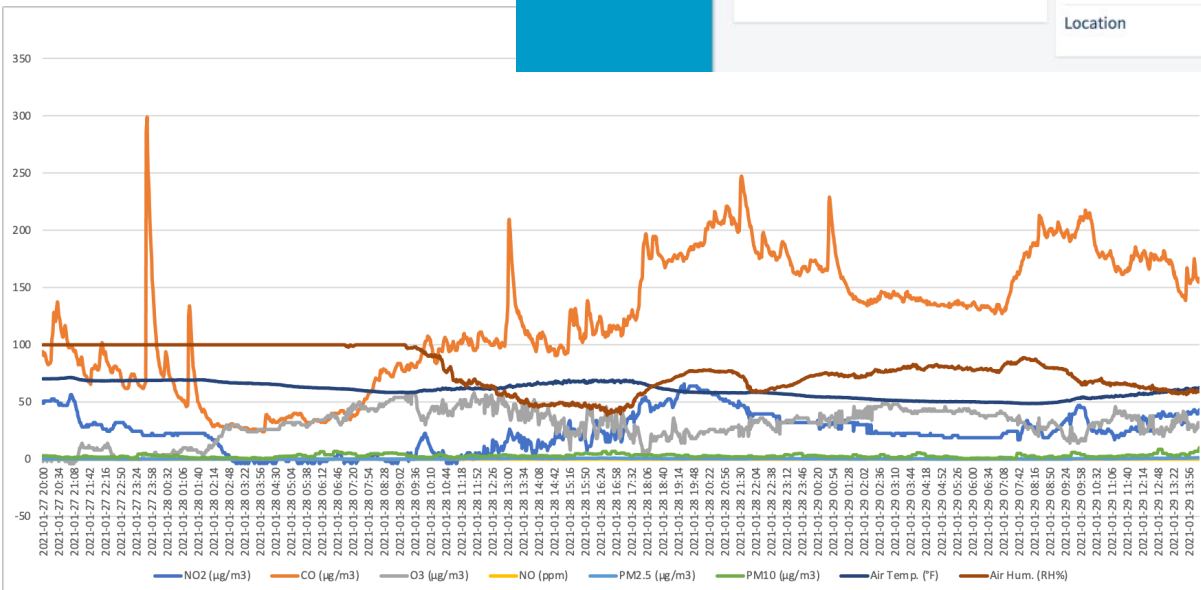
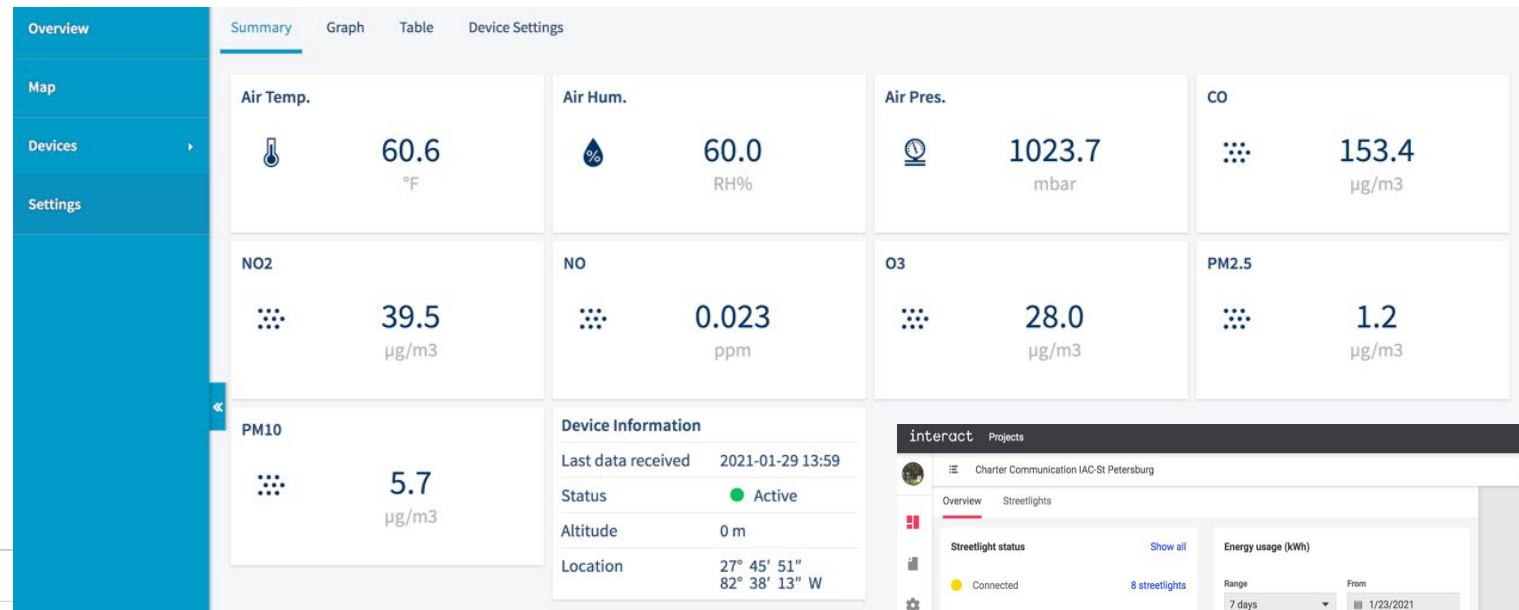
Smart Intersection

- Pedestrian and vehicular count & direction monitoring
- Video analytics and data collection

Smart City and The Light Pole..



Convergence at the Presentation Layer (Cloud)



Thank You



Dr. Wael Guibene

Director, Wireless, IoT - R&D

Wael.Guibene@charter.com





LoRa WAN[®] and OpenRoaming[™]

PAUL DUFFY

I-IoT CTO Team, Cisco





OpenRoaming™ and LoRaWAN®

Paul Duffy, Cisco I-IoT CTO Team



Roaming Challenges



Things cannot **roam seamlessly** across **public/private** networks



Secure **discovery** of assets and **communications across spectrum** are limited



Identity and **location** data are **siloed** and highly fragmented



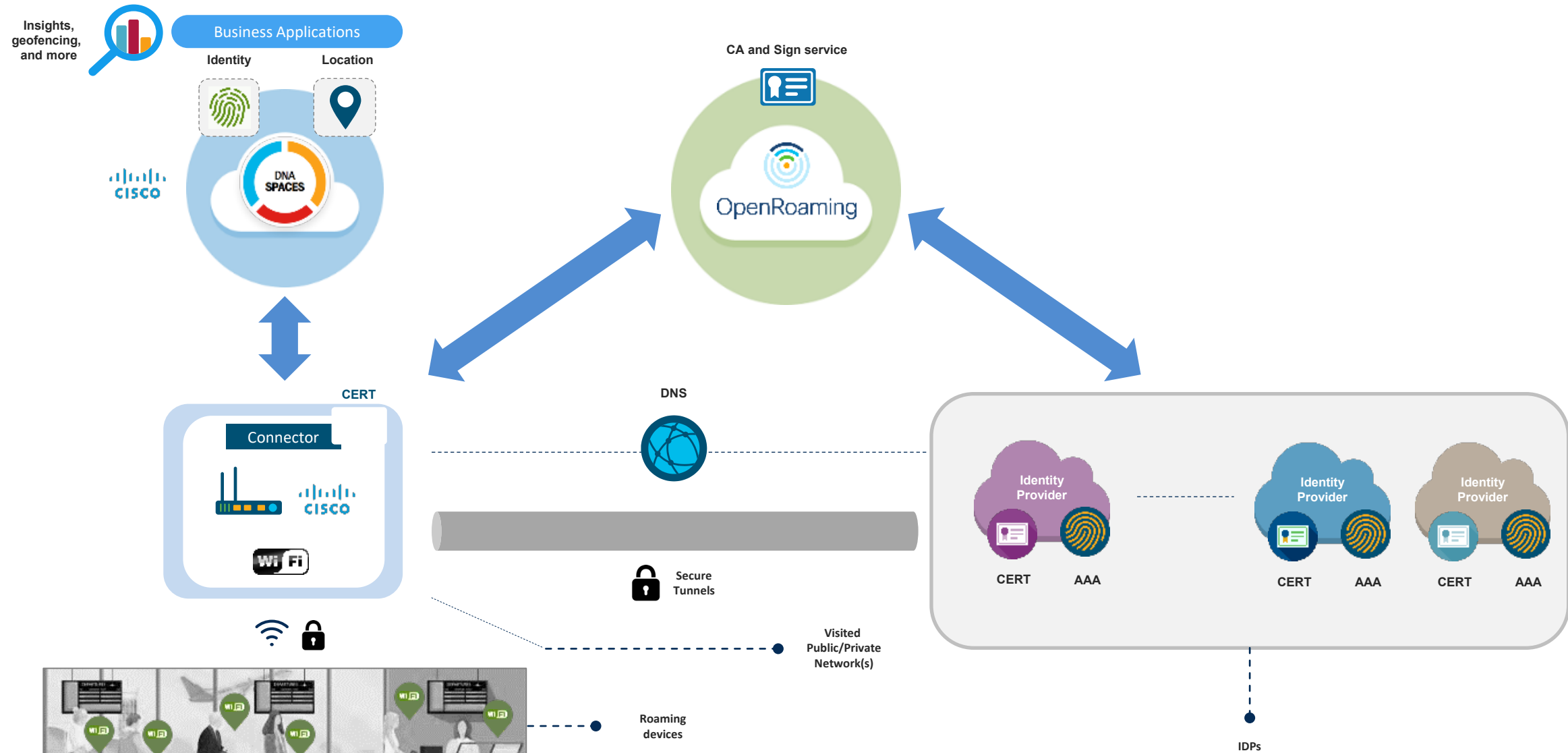
Multi-RAN trend but enterprises lack a **consolidated view** on what attaches to their networks



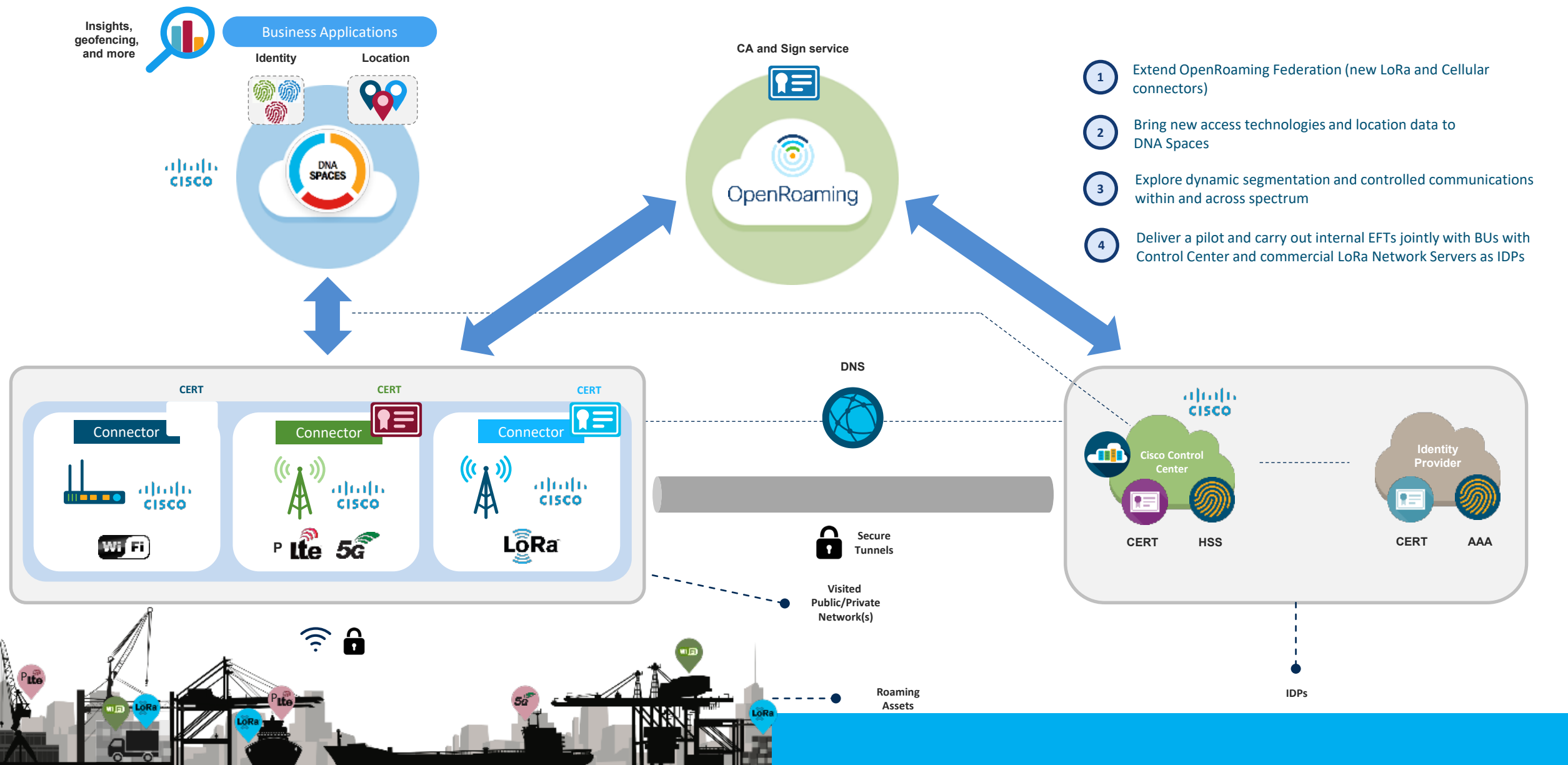
ART aims at addressing these challenges horizontally by prototyping and extending existing capabilities



OpenRoaming Today (WiFi Centric)



OpenRoaming for Extended for Multi RAN/IIoTT



Field Trial: OpenRoaming for LoRaWAN



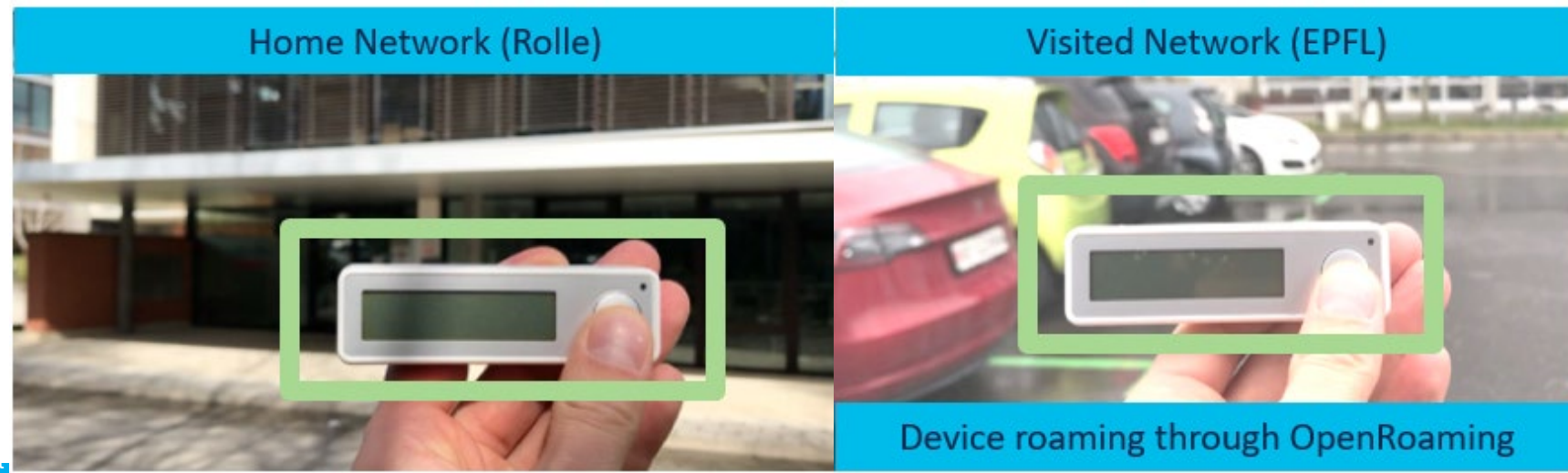
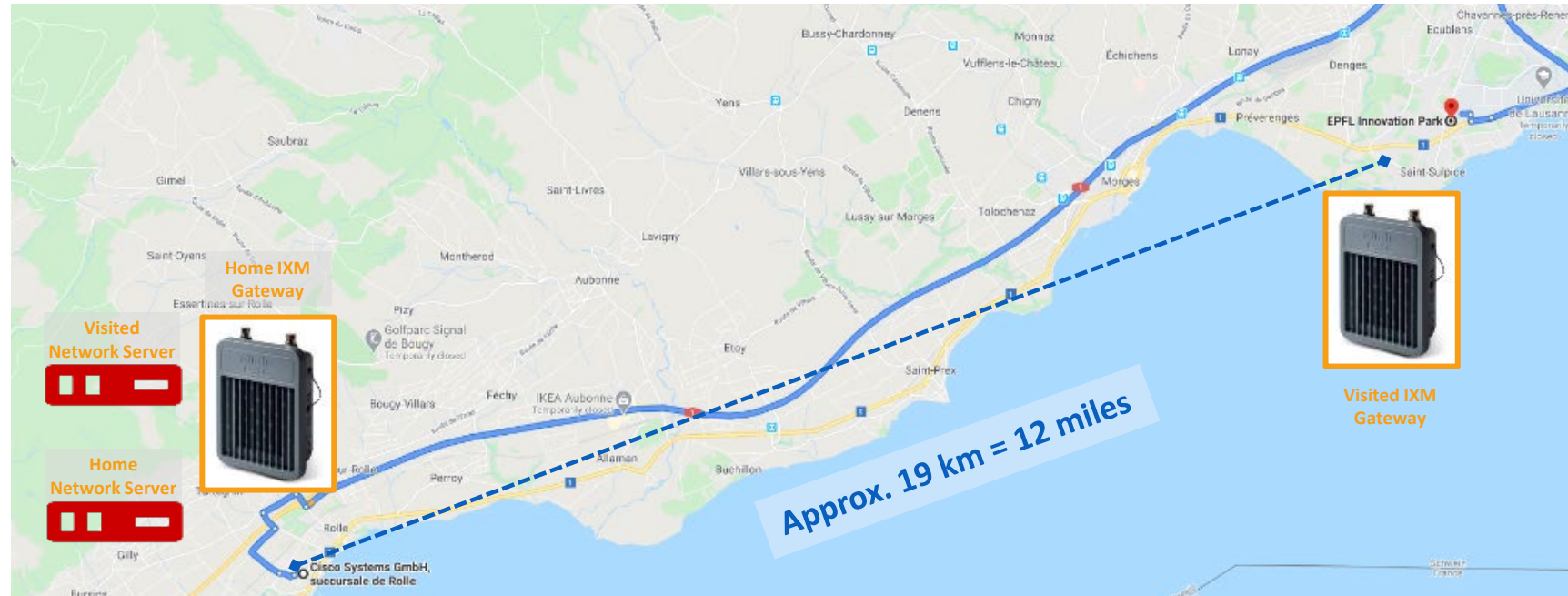
Initial tests in the field between 2 Cisco locations in Switzerland

- Cisco office in Rolle
- Cisco office in EPFL's Innovation Park

Based on dynamic DNS resolution and tunneling through the new LoRa connectors



**1st ever dynamic peering
and seamless roaming for LoRaWAN**



Thank You



Paul Duffy
Industrial IoT CTO Team
Paduffy@Cisco.com



Panel Discussion



Wael Guibene, PhD

Charter Communications

WBA, IoT WG co-Chair
LoRa Alliance, MC Chair



Derek Peterson, PhD

Boingo Wireless

WBA CTO Group
WBA Board Co-Chair



Remi Lorrain

Semtech Corporation

WBA, Project Leader
LoRa Alliance, NOF Chair



Paul Duffy

Cisco Systems

I-IoT CTO Team



Wi-Fi® & LoRa WAN® Trials Session

DR. WAEL GUIBENE

Principal Engineer II &
Director - Wireless and IoT R&D
Charter

RÉMI LORRAIN

Director of Programs/Global
LoRa WAN Networks Director
LoRa Alliance

DR. DEREK PETERSON

CTO
Boingo Wireless

PAUL DUFFY

I-IoT CTO Team
Cisco

The logo for Charter Communications, with the word 'Charter' in a large, blue, sans-serif font and 'COMMUNICATIONS' in a smaller, blue, sans-serif font below it.

The logo for SEMTECH, featuring a stylized green 'S' icon to the left of the word 'SEMTECH' in a bold, black, sans-serif font.

The logo for boingo, featuring a grey Wi-Fi signal icon above the word 'boingo' in a red, lowercase, sans-serif font.

The logo for Cisco, featuring a blue icon of vertical bars of varying heights above the word 'CISCO' in a blue, sans-serif font.



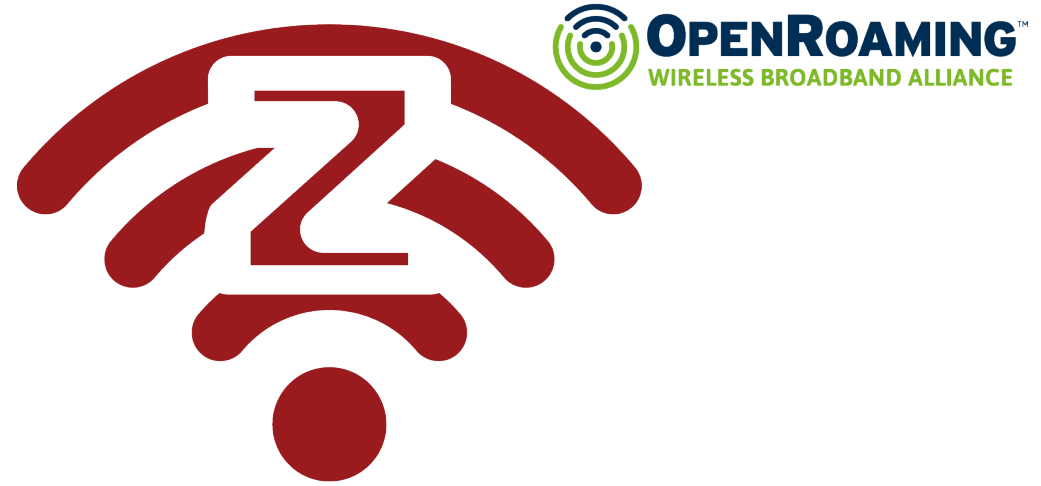
Zero Touch: Enabling IoT with OpenRoaming

JOHAN TERVE

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Step Up Your Wi-Fi and IoT.



Zero-touch Wi-Fi IoT raised to the power of OpenRoaming



ZERO TOUCH: ENABLING IOT WITH
OPENROAMING

JOHAN TERVE, VP MARKETING

APTILO NETWORKS [EST. 2001]



WORLDS #1

PROVIDER OF WI-FI SERVICE MANAGEMENT
FOR LARGE SCALE WI-FI DEPLOYMENTS



+200 MILLION
PEOPLE POWERED WITH WI-FI



+100
CARRIER WI-FI CUSTOMERS



+75
COUNTRIES

THE WI-FI IOT ON-BOARDING CHALLENGE

Data Network



ONBOARDING

All existing onboarding are manual



-OR-



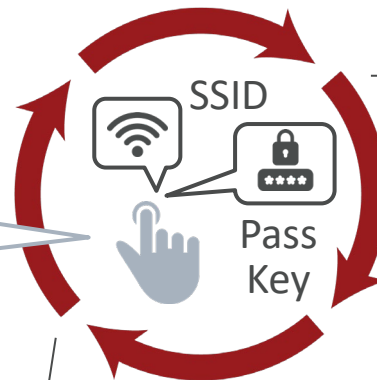
-OR-



Admin Joe



Manual on-boarding to Wi-Fi



Repeat for every device



Device 1 n

NEW



Do it all over again !

1 min/device



Takes two man-days for 1000 devices!

THIS WILL NOT SCALE!

SOLVING WI-FI IOT ONBOARDING CHALLENGES



Devices on IoT platform



Secure identity with device certificate



Manual Wi-Fi onboarding



Secure & Seamless Wi-Fi

X.509 Client
certificate

Utilizes **existing**
certificates used
by IoT Platform

PUBLIC CLOUD

IoT
Platform

Zero-touch Wi-Fi
IoT Service

EAP-TLS
802.1x

GROWING IOT DEVICE SUPPORT



Standards-based

Or OpenRoaming HS 2.0

Try to Connect to
SSID or HS 2.0 service



Only need to enable **ZeroTouchIoT**

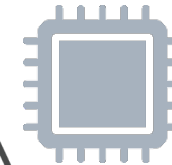
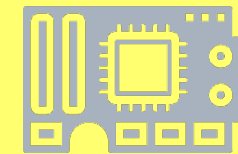
Growing IoT Device support due to
Aptilo's cooperation with Wi-Fi
module vendors and developers

Vendors

Developers

Wi-Fi modules

Chip-sets



SDATAWAY SA
Live demo
Coffee Machine

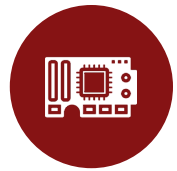


*Zero-touch is an initiative from Aptilo
and AWS , there are no patents!
We encourage the industry to follow suit!*

PROVEN BY APTILO AND PARTNERS



Proven with AWS IoT Core



Support in Espressif ESP32



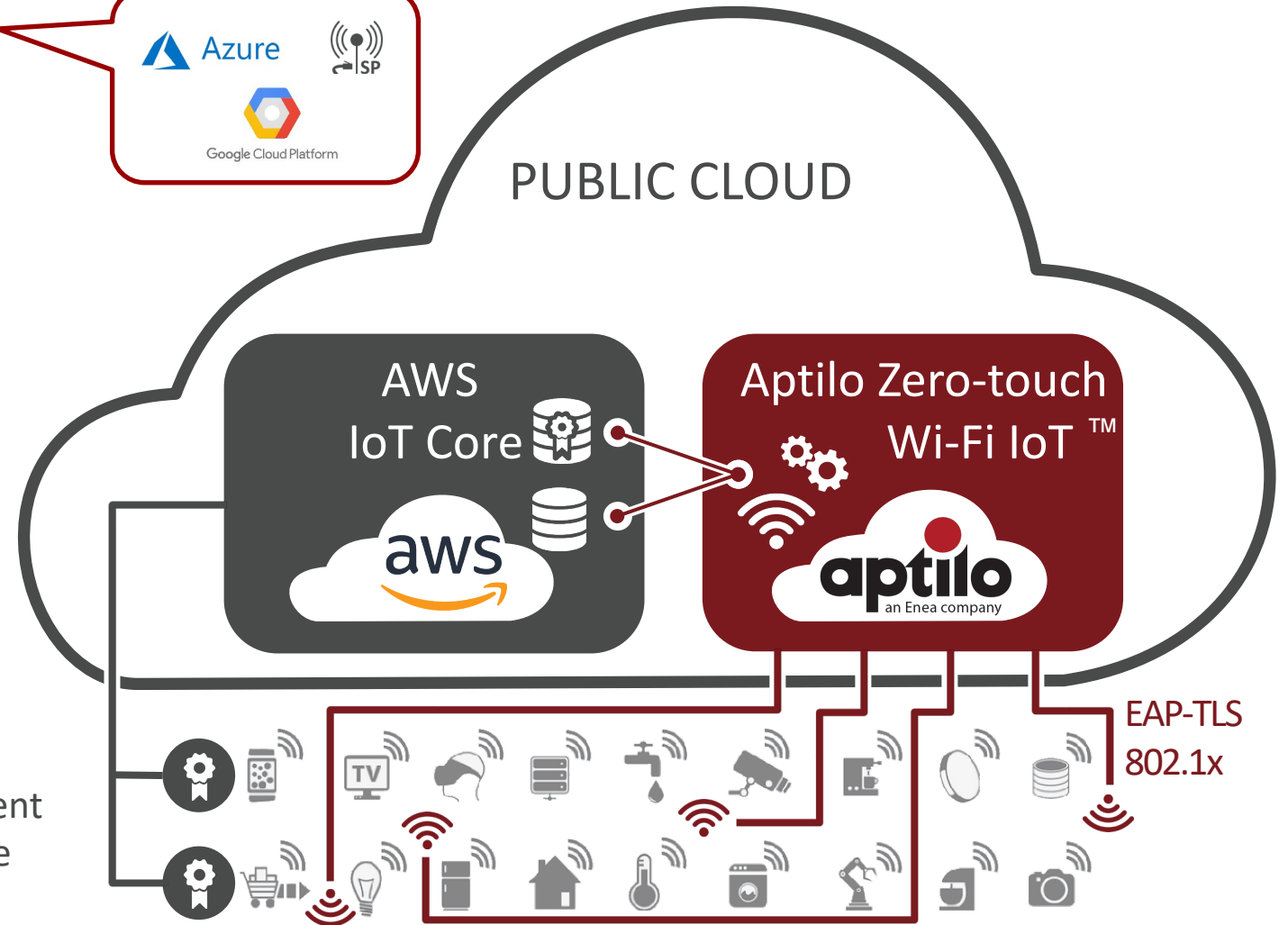
Proven live in IoT devices



Same approach



X.509 Client
certificate



AAA POTENTIAL
IDENTITY PROVIDER



Issues
OpenRoaming
Certificate



Without mutual relationship,
any Wi-Fi network provider
can **authenticate users**, based
on their *username realm*,
with any identity provider.

AAA servers connect using
DNS-based Dynamic Peer
Discovery and RadSec



Connects
through
Passpoint™



user-1@vendor-x.com

Handset
Brands



Galaxy S9 ->
Google Pixel
with Android 11



Public
Wi-Fi



user-2@operator-y.com



Public
transport



Hotel



Shopping



Hospital




Enterprise



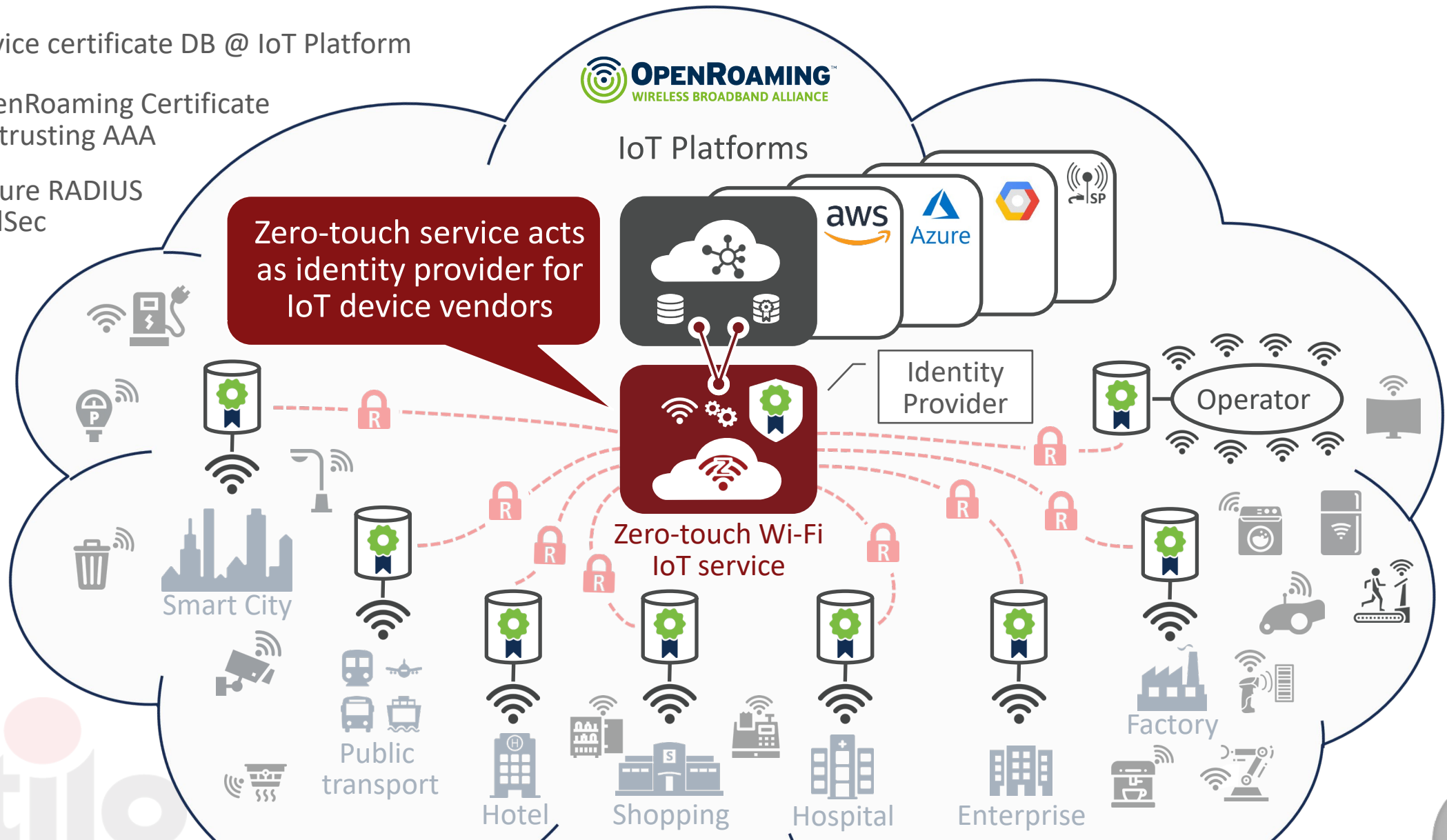
Factory

ZERO-TOUCH IOT AND OPENROAMING

 Device certificate DB @ IoT Platform

 OpenRoaming Certificate for trusting AAA

 Secure RADIUS RadSec

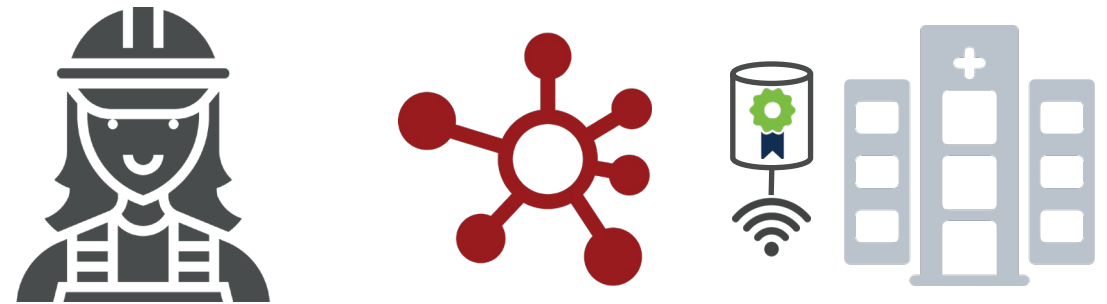




A WORLD OF OPPORTUNITIES!



Guests bring their devices to hotel



Healthcare - IoT devices from many vendors



Cars connecting @ different locations



Operator-managed home Wi-Fi



Step Up Your Wi-Fi and IoT.



DO YOU SEE THE VISION ?

Thank-you!

<https://www.aptilo.com>





WBA IoT Program 2021

TIAGO RODRIGUES

CEO, WIRELESS BROADBAND ALLIANCE

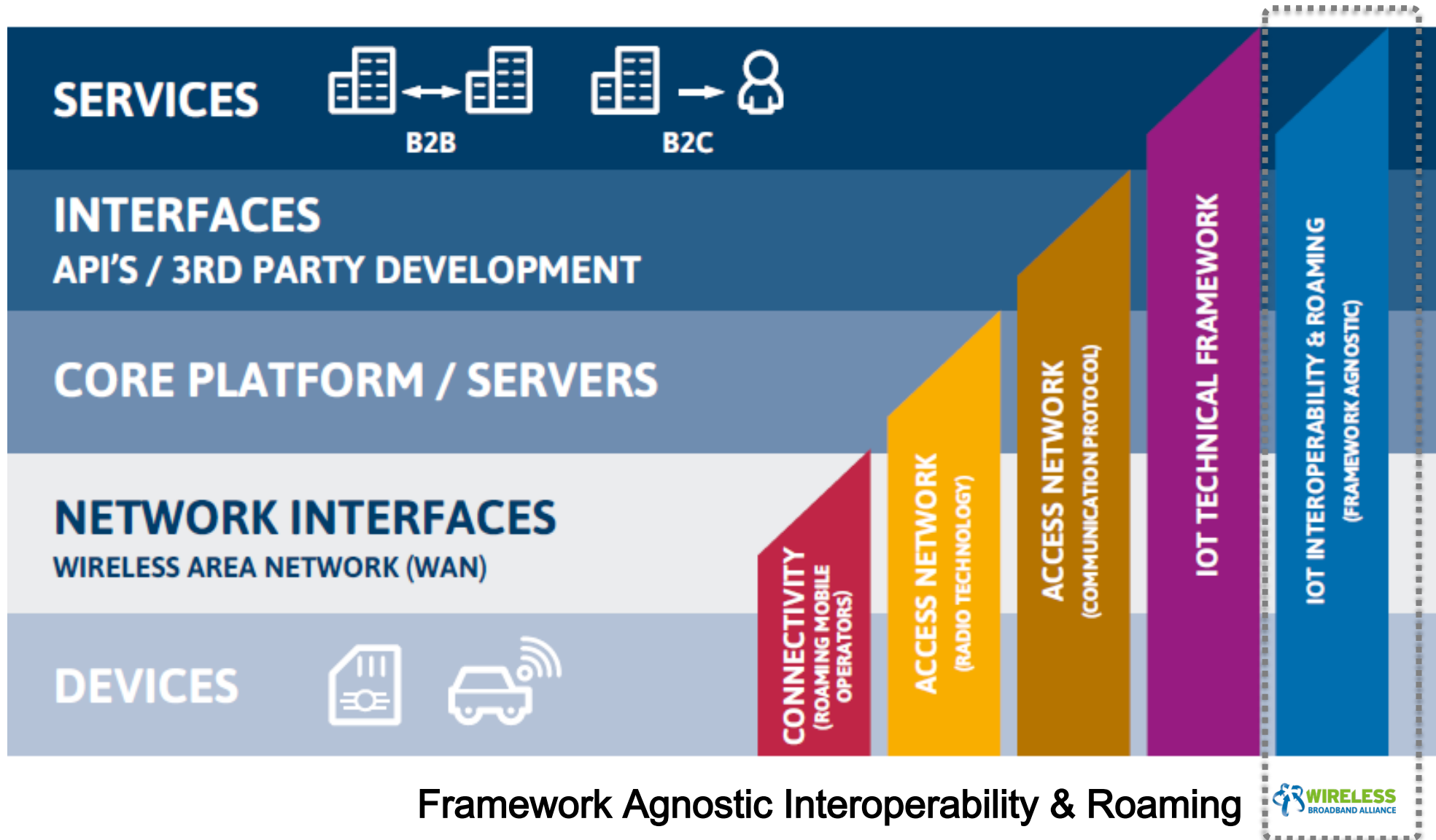




WBA IOT WORK GROUP

Call for Participation

February 2021



Framework Agnostic Interoperability & Roaming

Internet of Things

New Vertical Value Chains & Interoperability

IoT Interoperability

Dynamic Roaming



Source: WBA IoT Workgroup
Author(s): WBA Members
Issue date: 22 May 2018
Document status: Final



The Connected Vehicle

Understanding the Wi-Fi Opportunities and Use Cases



Source: Wireless Broadband Alliance
Author(s): WBA IoT Work Group
Issue date: May 2019
Document status: Final 1.0

Wi-Fi Opportunities for Connected Vehicles

Demand for Data and Multi-Access Edge Computing



Source: Wireless Broadband Alliance
Author(s): WBA Connected Vehicle Group
Issue date: October 2020
Document status: Final 1.0



Wi-Fi & LoRaWAN® Deployment Synergies

Expand addressable use cases for the Internet of Things



Wi-Fi & LoRaWAN® trials

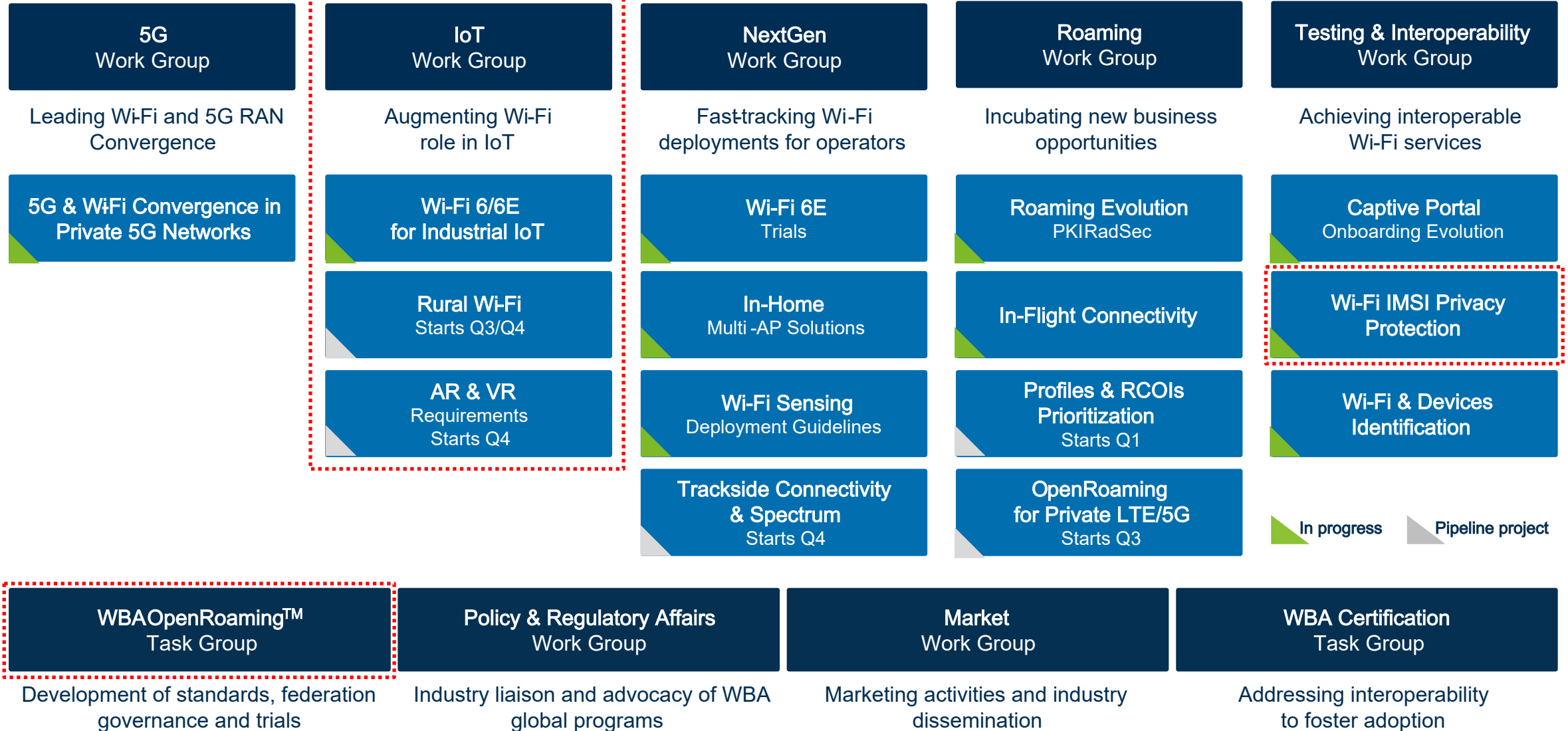
An overview of use cases across regions
combining two powerful technologies

Source: Wireless Broadband Alliance
and LoRa Alliance®
Author(s): LoRa Alliance &
WBA IoT Work Group
Issue Date: November 2020
Version: 1.0
Document status: Final

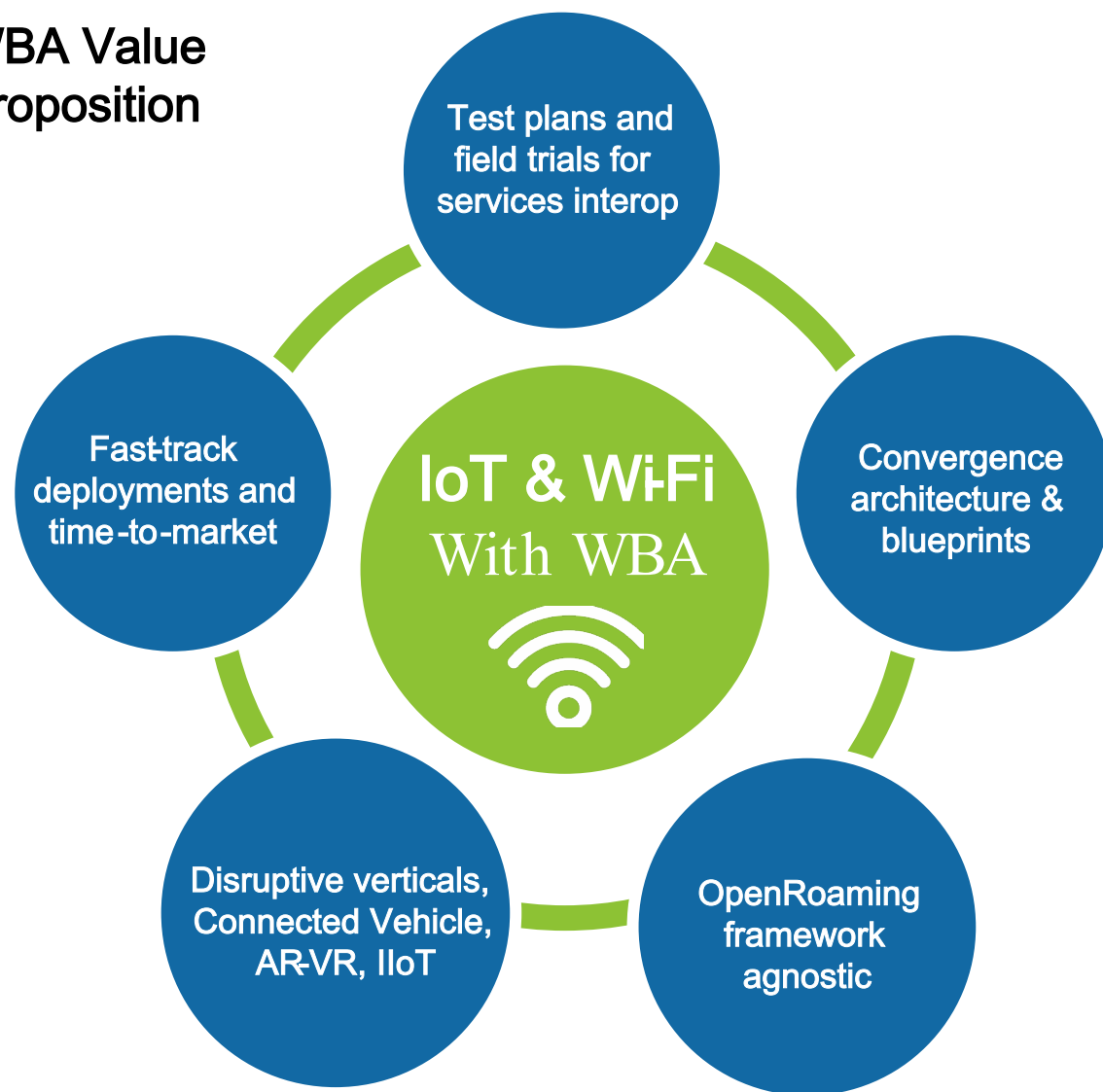
WBA Roadmap 2021



WBA WORK GROUPS & PROJECTS



WBA Value Proposition



non-exhaustive

Leading Participants on WBA IoT Programs



IOT
WORKGROUP

CONNECTED VEHICLE	MULTI-RAN STRATEGY FOR INDUSTRY 4.0	HYBRID WI-FI & LORAWAN TRIAL	EASYCONNECT FOR IOT ONBOARDING
IOT INTEROPERABILITY AND ROAMING			

Join us!



THANK YOU

WBA PMO

Engage on projects via [WBA extranet](#) | PMO contact: pmo@wballiance.com



WI-FI CONNECTS THE WORLD

Creating new possibilities in a virtual society

Thank you to our sponsors





THANKS FOR ATTENDING ASIA TELECOM SUMMIT 2021

Next event:

**WIRELESS GLOBAL CONGRESS
SUMMER 2021**

wirelessglobalcongress.com/register-your-interest-for-2021-events

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