



## WBA ROADMAP OF ACTIVITIES 2021

PROGRAMS & PROJECTS OVERVIEW

WBA's vision is to lead the development of  
***“Seamless and interoperable services experience on Wi-Fi within the global wireless ecosystem”***

- Enable collaboration among service providers, technology companies and the organizations in the industry who share the vision
- Undertake programs and activities to address business and technical issues and opportunities for the member companies



## WORKGROUPS

1	5G Work Group	Project Team-1
2	NextGen Work Group	Project Team-2
3	IoT Work Group	Project Team-3
4	Testing Work Group	Project Team-3
5	Roaming Work Group	
6	Policy Work Group	
7	Market Work Group	
		◆
		Project Team-n

## Strategic

CTO Group – Innovation Forum	OpenRoaming™	Connected City Advisory Board
---------------------------------	--------------	----------------------------------

Established  
**in 2003**

100+ MEMBERSHIP  
**COMMUNITY**

PROJECTS &  
**PROGRAMS**

2 ANNUAL  
**EVENTS**

PROMOTION AND  
**GO-TO-MARKET**

THOUGHT LEADERSHIP &  
**MARKET RESEARCH**



## BOARD MEMBERS



## MEMBERS



## WBA WORK GROUPS & PROJECTS





## 5G WORK GROUP



Chair: **Jim Sturges - AT&T**



Co-Chair: **Binita Gupta - Intel**



Co-Chair: **Florin Baboescu – Broadcom**



Co-Chair: **Mark Grayson - Cisco**

## BACKGROUND & INDUSTRY CHALLENGES

- Evaluate potential optimization of 5G and Wi-Fi convergence architecture with collocated deployments of 5G access and Wi-Fi access networks
- Examine management/control for 5G and Wi-Fi access networks and devices from a single management entity for 1) operational benefits and 2) simplify device management
- Identify roaming use cases between 5G and Wi-Fi within and across private 5G networks
- Analyze how the enterprise Wi-Fi segmentation and 5G slicing come together in private network deployments
- Within a 5G context, analyze how managed QoS can be provided over Wi-Fi for Time Sensitive Networking applications

## BUSINESS OPPORTUNITIES & BENEFITS

- Analyze business opportunities & challenges for Wi-Fi and 5G convergence in private 5G networks
- Provide deployment guidelines for converged Wi-Fi and 5G deployments in private 5G networks
- Collaborate and liaise with industry standards bodies (3GPP, IEEE, Wi-Fi Alliance, NGMN, GSMA, ETSI)
- Explore potential trials and compliance for Wi-Fi and 5G convergence in private 5G networks

## EXPECTED DELIVERABLES

- Address co-existence of MEC (Multi-Access Edge Computing) traffic management and the traffic management (ATSSS) within the 5G Core
- Evaluate if any enhancements are needed to ETSI MEC WLAN APIs or ETSI MEC Location APIs to support Wi-Fi access in private 5G networks
- Address how IEEE 802.1 TSN standards (such as 802.1AS, 802.1Qbv) can be supported over the converged
- Industry guidelines and requirements for optimal deployments

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **5G & Wi-Fi RAN Convergence** >

**RAN Convergence 2020 Whitepaper** >

**WBA & NGMN RAN Convergence 2019** >

**Unlicensed Integration with 5G Networks** >

2021 Project Kick off

Work Output







## IOT WORK GROUP



Chair: **Sandeep Agrawal - C-DOT**



Co-Chair: **Wael Guibene - Charter Communications**



Co-Chair: **Bahar Sadeghi - Intel**

## BACKGROUND & INDUSTRY CHALLENGES

- The global industrial IoT (IIoT) market is expected to exceed USD 750B by 2020, growing at a CAGR of ~23% from 2017 to 2023. As part of the industrial IoT (IIoT) including Industry 4.0 and Connected Factory (CF) transformation, wireless connectivity is estimated to become an integral ingredient growing at the fastest rate with a CAGR of over 25%
- Wi-Fi is the most prevalent wireless technology in industrial environments providing access to mobile employees and contractors as well as access to mobile automation and control devices and applications
- However, there are wide range of applications with latency and reliability requirements unmet with existing wireless capabilities; hence, the footprint of wireless solutions in manufacturing for automation applications has been limited due to the challenge of meeting the stringent latency and reliability requirements

## BUSINESS OPPORTUNITIES & BENEFITS

- Identify Wi-Fi 6/6E enterprise use cases which require high determinism and low latency
- Leverage Wi-Fi 6/6E new features which result in improved performance and make Wi-Fi 6/6E specifically applicable to IIoT networks and applications
- Wi-Fi 6E introduces operation in greenfield 6 GHz band that can be used to meet the majority of the stringent low latency requirements of IIoT usage

## EXPECTED DELIVERABLES

- Industry guidelines for Wi-Fi 6 & Wi-Fi 6E deployment in industrial environments, IIoT and enterprise scenarios
- Demonstrate high quality Wi-Fi use for high determinism enterprise applications and showcasing Wi-Fi 6/6E features pertaining to IIoT
- Develop and execute trials based on the identified key scenarios; Aggregate and analyze the trial to provide recommendations for IIoT and enterprise application

## LEADING PARTICIPANTS











## RELEVANT PROJECTS

Understand more about  
Wi-Fi 6 for Industrial IoT



Wi-Fi 6 Trials Report



Wi-Fi & LoRaWAN  
Trials Report



Connected Vehicle



### Project Leaders

Leader: Bahar Sadeghi  
Intel

Co-Leader: Malcom Smith  
Cisco

2021 Project Kick off

Whitepaper

Trial Report





## BACKGROUND & INDUSTRY CHALLENGES

- There are more than 3 billion people around the world who live in rural areas and remain digitally unconnected
- Wi-Fi is considered as the most suitable technology to provide digital connectivity in rural areas.
- However, there are many factors specific to rural areas which must be considered when defining Rural Wi-Fi architecture and deployments if Wi-Fi is to be used as a robust, efficient, and affordable access technology in these areas
- With high CAPEX and OPEX of deploying cellular network in rural areas, operators are exploring the most efficient ways to create sustainable business models by providing Wireless services with positive ROI

## BUSINESS OPPORTUNITIES & BENEFITS

- There is a strong business case for the Wi-Fi industry to connect the unconnected via Wi-Fi technology
- Enable affordable internet access to bridge the digital divide in communities and cities around the world and by contributing significant economic value to the global economy

## EXPECTED DELIVERABLES

- Provide industry guidelines and best practices for Wi-Fi deployment scenario in rural area
- Identify challenges and gaps in existing Wi-Fi deployment strategy, enterprise architecture and guidelines
- Recommendations on sustainable business model

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about Rural Wi-Fi



Wi-Fi 6 Trials Report



Wi-Fi & LoRaWAN Trials Report



Connected Vehicle



2021

Project Kick off



## BACKGROUND & INDUSTRY CHALLENGES

- Virtual and Augmented Reality is one of the fastest growing technology segments today and is projected to exceed a market size of \$100B by 2025. Numerous major OEMs have entered the AR/VR market, including Amazon, Microsoft, Samsung, Apple, Facebook, and Google. In addition, numerous major operators have AR/VR campaigns and assets, including DT, AT&T, BT and Comcast
- The future of augmented reality will change our lives in more ways than you can imagine
- Driven by advances in computer vision, AI and cloud computing, tomorrow's augmented reality (AR) will transform everything from travel to real estate, healthcare to education
- The new generations of Wi-Fi may benefit from an early identification and definition of the optimal network requirements / architecture for delivering AR/VR over Wi-Fi 6E and/or Wi-Fi 7 & 5G on a converged context

## BUSINESS OPPORTUNITIES & BENEFITS

- Address and identify the significant intersection between wireless technologies and AR/VR devices, ranging from simple connectivity to enable services on mobile devices, to high throughput and low latency that supports human interface with light head-mounted devices like AR glasses
- WBA will bring together operators, OEMs and silicon providers developing products AR/VR
- Identify the opportunity to demonstrate key new AR/VR features through WBA's unique Wi-Fi trials program across verticals

## EXPECTED DELIVERABLES

- Evaluate how wireless technologies can enable unique and high-value AR/VR applications
- Examine the viability of enabling new wireless AR/VR technologies
- Provide trial use cases such as multi-party trials and demos showing these technologies
- Provide industry guideline for the foundational network requirements that need to be addressed to support massive AR/VR use cases across verticals

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
**AR & VR - Requirements**



**Wi-Fi 6 Trials Report**



**Wi-Fi 6E Trials**



**Wi-Fi 6 for Industrial IoT**





## NEXTGEN WORK GROUP



Chair: **Kishore Raja - Boingo Wireless**



Co-Chair: **Necati Canpolat – Intel**



Co-Chair: **Steve Dyett - BT**

## BACKGROUND & INDUSTRY CHALLENGES

- In 2020, WBA announced the conclusion of first Wi-Fi 6 trial deployments across diverse markets with wider channels up, enabling nearly three times faster gigabit data rates
- Wi-Fi 6 is also now proven to deliver better reliability, lower latency, more deterministic behaviour, and better network efficiency, especially in environments with many connected devices
- Wi-Fi 6 will help with congestion problems, increase densification of the network – helping to connect more devices, and enable new use cases
- WBA is championing a global Wi-Fi 6/6E program to ensure that industry needs are addressed as Wi-Fi 6 and 5G standards are ratified
- WBA continues to develop and expand new trials that support Wi-Fi 6 and 6E expansion into new areas in different geographies around the world

## BUSINESS OPPORTUNITIES & BENEFITS

- Wi-Fi 6 technology would remove pain points currently caused by overcrowding on many Wi-Fi networks
- Wi-Fi 6 /6E provides more capacity than all the other Wi-Fi bands put together and deliver connections with speeds equivalent to the new advanced 5G mobile, support low-latency levels required for mobile gaming, virtual and augmented reality (VR/AR) applications, and Industry 4.0 solutions

## EXPECTED DELIVERABLES

- Conduct trials of Wi-Fi 6/6E infrastructure and services on various scenarios and verticals including, manufacturing (IoT Industry 4.0), enterprise, transportation, stadiums, residential (SFU/MDU), cities & rural areas, public venues, etc.
- Provide market data to help drive standardization and convergence within the wireless ecosystem

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **Wi-Fi 6E Trials** ➔

**Wi-Fi 6 Trials Report** ➔

**Enhanced Wi-Fi 6 Decoded** ➔

**Wi-Fi 6 Deployment Guidelines** ➔

### Project Leaders

Leader: Necati Canpolat  
**Intel**

Co-Leader: Gabriel Desjardins  
**Broadcom**

2021 Project Kick off



Wi-Fi 6E Trials  
Report

## BACKGROUND & INDUSTRY CHALLENGES

- With the rise of Multi-AP solutions and the concept of mesh networks, there is a growing demand for open interoperability in the home environment, which escalates further with the introduction of the IoT devices
- This project will define a set of performance metrics and subsequent test plans which will be collected from a group of operators' live use cases, conducted in a real operating environment
- These range from enhanced Wi-Fi coverage, critical diagnostic information needed by operators for remote management, dynamic KPI reporting, simple deployment per subscriber, among others

## BUSINESS OPPORTUNITIES & BENEFITS

- Tackle the challenges that have contributed to inconsistent performance in home environment Wi-Fi deployments, including a lack of uniform coverage and visibility into the in-home Wi-Fi experience
- Help operators understand the in-home transformation (including IoT) and increase customer satisfaction through a better quality of experience

## EXPECTED DELIVERABLES

- Define operator requirements and test cases under various deployment environments including Private Wi-Fi, Guest Wi-Fi and Community Wi-Fi
- Address the deployment challenges, home network security issues and define requirements with multi-AP solutions

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about In-Home Wi-Fi 

Multi-AP Trial Use Cases 

Wi-Fi Sensing Whitepaper 

In-Home Wi-Fi Guidelines 

### Project Leaders

Leader: John Bahr  
**CableLabs**

Co-Leader: Koen Van Oost  
**AirTies**

Co-Leader: Tim Twell  
**BT**



## BACKGROUND & INDUSTRY CHALLENGES

- The last year has seen significant momentum gained in the area of Wi-Fi Sensing. This year's WBA Wi-Fi Sensing project has seen a definition of KPI and test procedures focused on a home monitoring use-case, plus a successful deployment and evaluation performed by CableLabs. This year has also seen multiple new products launched in this space
- With the generation of KPIs and test procedures to evaluate them, one large gap identified during the Wi-Fi Sensing Phase 2 project, was the lack of guidelines, procedures, or recommendations for how to optimally deploy a sensing network in a home environment
- By expanding on the work performed in 2020 by the Wi-Fi Sensing group, a focus can be placed on evaluating system performance given different deployment scenarios. By evaluating the results, guidelines or recommendations can be derived

## BUSINESS OPPORTUNITIES & BENEFITS

- Evaluate motion sensing capabilities being examined within the home environment, under distinct scenarios, to fast-track deployments
- Help industry understanding better the sensing technology opportunity and accelerate go-to-market of new home solutions

## EXPECTED DELIVERABLES

- The expected deliverable is a deployment guideline document outlining recommendations on deploying a W-Fi Sensing network, based on experimental results
- In addition, given the active work being done by IEEE, this group would like to openly contribute any information deemed relevant. This could include targeted deployment use-cases, measurement results, or desired functionality of which standard support can help improve

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **Wi-Fi Sensing**

**Wi-Fi 6 Deployment Guidelines**

**Enhanced Wi-Fi 6 Decoded**

**In-Home Wi-Fi Industry Guidelines**

### Project Leaders

Leader: Chris Beg  
**Cognitive Systems**

Co-Leader: Sandeep Agrawal  
**C-DOT**

Co-Leader: Suresh Parathi  
**Comcast**

Co-Leader: Michel Allegue  
**Aerial**





## BACKGROUND & INDUSTRY CHALLENGES

- There is lack of industry standard for scaling up Wi-Fi connectivity in transportation and it may incur high CAPEX for enterprises or service providers to build good cellular coverage and important to provide cellular independent connectivity service.
- Due to the lack of standards and guidelines for Track-Side Networks (TSN), these deployments, in most cases, end up suffering from:
- Disappointing Quality of Service and Experience
- Higher costs that are difficult to justify”
- Unpredictable in terms of cost and quality
- Uncertainty of monetization with transportation authorities due to lack of benchmarks and role models

## BUSINESS OPPORTUNITIES & BENEFITS

- The combination of experience and technology among WBA members will be instrumental in developing a set of recommendations of industry best practices, standards and guidelines for TSNs
- The recommendations from WBA will facilitate the approval and development of TSN projects, resulting in improved connectivity quality and coverage for end-users.

## EXPECTED DELIVERABLES

- Provide a set of recommendations and TSN Deployment Industry Guidelines document
- Identify relevant cases for TSN with current Wi-Fi, Wi-Fi 6/6E technologies and paving the way to adapt 5G usage for TSN.

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
**Trackside Connectivity & Spectrum**



**RAN Convergence  
Whitepaper**



**Enhanced Wi-Fi 6  
Decoded**



**Unlicensed Integration  
with 5G Networks**





## ROAMING WORK GROUP



Chair: **Erinn Hall – AT&T**



Co-Chair: **Betty Cockrell – Single Digits**

## BACKGROUND & INDUSTRY CHALLENGES

- The Roaming Work Group (RWG) is the umbrella group where all the topics related to Wi-Fi Roaming are addressed.
- RWG has weekly calls to discuss and review evolutions to the Wireless Roaming Intermediary eXchange (WRIX) specification, development of identification, interconnection, data and financial clearing of networks to help the industry in growing their Wi-Fi Roaming business ultimately.
- The latest projects include Roaming Evolution for the implementation of RadSec / PKI interconnection and WBA OpenRoaming™ Task Force to implement all terms and agreements of OpenRoaming™.

## BUSINESS OPPORTUNITIES & BENEFITS

- Introduce new opportunities on Wi-Fi Roaming business by enabling and extending available footprint across the globe
- Scale up the ecosystems and leverage synergies among operators, Wi-Fi advocates, cities and public and enterprise stakeholders

## EXPECTED DELIVERABLES

- Maintenance and evolution of the WRIX specification, along with Wi-Fi Roaming best practices
- Development of new Roaming Business and Charging Models
- Promotes compliance and best practices to the benefit of the industry players

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
**Roaming Work Group**



**Roaming Evolution**



**WBA OpenRoaming™**



**OpenRoaming for Private  
LTE/5G**



### Project Leaders

Chair: Erinn Hall  
**AT&T**

Co-Chair: Betty Cockrell  
**Single Digits**

## BACKGROUND & INDUSTRY CHALLENGES

- As the Wi-Fi roaming systems scale with increased adoption, WBA has examined options for automating aspects of WRIX security and aims to improve the standard of Wi-Fi roaming.
- This extends the benefits to different stakeholders, allowing them to generate more business and revenue in the industry
- The Roaming Evolution is a mandate to enable a WBA Public Keying Infrastructure (PKI) for automating the security of roaming partners exchanges, allowing the scalability of simplification of relations across the ecosystem.

## BUSINESS OPPORTUNITIES & BENEFITS

- Introduce new opportunities for Wi-Fi Roaming business by enabling and extending available footprint across the globe
- Scale up the ecosystems and leverage synergies among operators, Wi-Fi advocates, cities and public and enterprise stakeholders.

## EXPECTED DELIVERABLES

- Define deployment guidelines for interconnection and simplification of the user experience
- Offer PKI/RadSec platforms for simplified interconnection model of Authentication servers and Customers databases for Wi-Fi networks
- Define the standard to create a single Network ID to simplify all the process of data clearing and increase data and networks intelligence
- Establish NGH Roaming Federation, in which participants (venues, operators, cities) will be able to provide Wi-Fi Roaming by using a single Roaming Consortium OI.

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

About WBA OpenRoaming 

PKI RadSec - Operator Deployment Guidelines 

PKI RadSec – End-Entity Deployment Guidelines 

PKI Certificate Policy (Members only) 

### Project Leaders

Leader: Luther Smith  
**CableLabs**

Co-Leader: Betty Cockrell  
**Single Digits**

Co-Leader: Mark Grayson  
**Cisco**

2021 Project Closure



## BACKGROUND & INDUSTRY CHALLENGES

- In 2019, WBA launched its In-Flight Connectivity white paper which provided insight into the key drivers behind the growing demand for in-flight Wi-Fi access in airplanes. It also examined the evolving technical advancements that offer a seamless connectivity experience for customers. This paper was released prior to the launch of WBA OpenRoaming™, which aims to standardize all Wi-Fi Roaming.
- Following up on the work in 2020, the project team is focused on deploying OpenRoaming into the aviation sector, with a series of trials involving operators, satellite and infrastructure providers, as well as roaming HUBs.
- Paired with these initiatives, the WBA IFC team is also looking to dwell on the gaps of existing connectivity use cases and business models, to help the industry increasing overall usage of connectivity in airplanes.

## BUSINESS OPPORTUNITIES & BENEFITS

- Showcase how a high-quality In-flight Connectivity experience can help the industry to reduce network operational costs and enable passengers to easily and securely connect to in-flight Wi-Fi services
- Build and detail the technical enablement model for a seamless and roaming experience across the globe – OpenRoaming™
- Provide recommendations to address the market challenges, surpassed using the OpenRoaming™ business models

## EXPECTED DELIVERABLES

- Set the benchmark for the value proposition of in-flight connectivity and recommendation of monetization tactics for airlines
- Analyze technical challenges and opportunities for in-flight connectivity enablement options through prominent use cases
- Develop a set of test cases under key deployment scenarios for optimal In-flight Wi-Fi connectivity

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **In-Flight Connectivity** ➔

**WBA OpenRoaming™** ➔

**In-Flight Connectivity- Wi-Fi Deployment & Use Cases** ➔

**Wi-Fi 6 Trials Report** ➔

### Project Leaders

Leader: Angelos Mavridis

**Deutsche Telekom**

Co-Leader: Charlie Allgrove  
**Single Digits**

Co-Leader: Ed Kyte  
**Panasonic**



## BACKGROUND & INDUSTRY CHALLENGES

- With the expansion of Passpoint networks and recent launch of WBA OpenRoaming™, the landscape of identity providers is undergoing a paradigm shift
- While in the past, we would expect the identity to come from a mobile network operator (MNO), through EAP-SIM – Subscriber Identity Module -, the industry is now seeing other different stakeholders becoming identity providers and challenging the status quo
- Profiles provisioning and the prioritization and selection of Roaming Consortium Organization Identifiers (RCOIs). are the questions for service providers to offer good user experience for their costumers

## BUSINESS OPPORTUNITIES & BENEFITS

- It is important to identify a set of standardization in the way profiles and RCOIs are prioritized. A solution to this problem will allow:
  - End-user will have more control over which profile he wishes to be used
  - Identity providers will have better expectations and clarity in terms of prioritizing RCOIs within a profile
  - Access network providers will, eventually, be able to take options in terms of what profiles / RCOIs they wish to see prioritized

## EXPECTED DELIVERABLES

- Provide industry guideline and best practices for prioritization of RCOIs within a profile
- Examine on how identity providers and access network providers can prioritize profiles
- Provide standardization recommendation to be shared with device and infrastructure providers on how profile and RCOI prioritization will ideally be achieved

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about Profiles & RCOI Prioritization

WBA OpenRoaming™

WRIX Framework

WBA OpenRoaming™ Release 1 (Members Only)

2021

Project Kick Off

Whitepaper

Q1

Q2

Q3

Q4



## BACKGROUND & INDUSTRY CHALLENGES

- Private 5G network deployments are expected to ramp up significantly over the next few years in sectors like manufacturing (industrial IoT), utilities, supply chain, healthcare, transportation etc.
- With the latest developments in Wi-Fi standards with Wi-Fi 6, Wi-Fi 6E and continued evolution to Wi-Fi 7 with TSN support, the Wi-Fi technology with scheduling, lower latency, higher throughput and green field spectrum is well positioned to meet requirements for many of the industrial use cases. This has been demonstrated by the latest WBA Wi-Fi 6 Mettis trials, where Wi-Fi 6 was used to support mission critical industrial applications and use cases that were not possible with the previous Wi-Fi generations.
- Wi-Fi is incumbent technology in enterprises, and private 5G networks will be deployed along with Wi-Fi to meet wireless communication needs by leveraging capabilities and resources across both the networks

## BUSINESS OPPORTUNITIES & BENEFITS

- Private 5G networks can provide new business opportunities to enterprises to enhance services and deliver new use cases with greater level of control and flexibility.
- Private 5G networks can be deployed over licensed spectrum, shared spectrum (e.g. CBRS spectrum for 5G, dedicated private 5G spectrum in Germany) or unlicensed spectrum (with Wi-Fi and NR-U) and will be tailored for specific industry needs, creating new service opportunities that improve experiences and operations.

## EXPECTED DELIVERABLES

- Identify business opportunities, operational benefits and simplify device management for 5G and Wi-Fi access networks within private 5G enterprise deployments.
- Evaluate potential optimization of 5G and Wi-Fi convergence architecture with collocated deployments of 5G access and Wi-Fi access networks.
- Identify roaming use cases between 5G and Wi-Fi within and across private 5G networks.
- Examine spectrum related considerations and any impact of spectrum selection on the 5G and Wi-Fi interworking in private 5G networks.

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
WBA OpenRoaming™



WBA OpenRoaming™  
Release 1 (Members Only)



PKI Certificate Policy  
(Members Only)



User Engagement in  
OpenRoaming Era



### Project Leaders

Leader: Mark Grayson  
**Cisco**

Co-Leader: Betty Cockrell  
**Single Digits**

Co-Leader: Finbarr Coghlan  
**Orange**

Co-Leader: Necati Canpolat  
**Intel**

## BACKGROUND & INDUSTRY CHALLENGES

- WBA OpenRoaming™ is a roaming federation service enabling an automatic and secure Wi-Fi experience globally. With WBA OpenRoaming™, we are creating an open connectivity framework for all organizations in the wireless ecosystem to power new opportunities in the 5G era
- WBA OpenRoaming™ transforms the Wi-Fi experience for consumers and businesses and ultimately opens up opportunities for broadband and the Internet of Things (IoT) connectivity across business verticals, including retail, hospitality, education, smart cities, automotive and aviation, among many others. Devices simply connect automatically and securely on to the WBA OpenRoaming™ network

## BUSINESS OPPORTUNITIES & BENEFITS

- Creates a federation of networks and identity providers to enable automatic roaming and user onboarding on Wi-Fi
- Enable simple, secure and scalable Wi-Fi connections amongst different organizations that are part of WBA OpenRoaming™
- Based on WBA's Wireless Roaming Intermediary eXchange (WRIX) standards to scale and facilitate different business models under a harmonized framework

## EXPECTED DELIVERABLES

- Allow automatic and secure roaming between millions of networks, nationally and globally with secured interconnection and encrypted communications
- Defines an automated roaming consortium codes framework (RCOI) to support policy provision on devices and networks. Organizations that manage a Wi-Fi CERTIFIED Passpoint®-enabled network may become part of the WBA OpenRoaming™ federation

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

About WBA OpenRoaming™ ➔

Wi-Fi 6 Deployment Guidelines ➔

Wi-Fi Roaming Standard (WRIX) ➔

Carrier Wireless Services Certification (CWSC) ➔

### Project Leaders

Leader: Mark Grayson  
**Cisco**

Co-Leader: Betty Cockrell  
**Single Digits**

Co-Leader: Finbarr Coghlan  
**Orange**

Co-Leader: Necati Canpolat  
**Intel**

2021 Release 2 – Automatic Financial Settlement



# TESTING & INTEROPERABILITY WORK GROUP



Chair: **Michael Sym** – Single Digits



Co-Chair: **Erinn Hall** – AT&T



Co-Chair: **Peter Thornycroft** – Aruba Networks

## BACKGROUND & INDUSTRY CHALLENGES

- WBA published the Captive Network Portal Standards white paper which analyses captive portal behavior across operating systems, use cases for NGH/Passpoint® and identifies a set of recommendations for future features to standardize the way Captive Portals are utilized.
- The Onboarding Evolution stage focuses on improving the user experience of “captivation” and how end-users engage with captive portals in the Passpoint® era; provides recommendations on technical and business challenges; and outlines the role of captive portals for interconnecting networks, as well, in a Federated ecosystem.
- During 2020, the team has launched a second delivered focused on how captivation will evolve during an OpenRoaming Era.

## BUSINESS OPPORTUNITIES & BENEFITS

- Provide industry guidelines to enhance user experience with seamless, automatic and secure Wi-Fi connection via captive portals
- Address technical challenges and identify business strategies to engage with users via the captive portals to analyze user behavior, simplify the Wi-Fi roaming experience and generate insight of different monetization tactics

## EXPECTED DELIVERABLES

- Provide Captive Portal deployment guidelines with particular emphasis on user experience across operating systems
- Encompass different onboarding methodologies that are used with different economic outcomes and assess how the captive portal will evolve in each one of them, as Passpoint® and a Global Federation comes into the scene

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **Captive Portal** ➔

Access **HERE** the **Device Behavior Database** ➔

**Captive Portal Network Standards for Wi-Fi** ➔

**User Engagement in OpenRoaming™ Era** ➔

### Project Leaders

Leader: Ilya Volynkin  
**Maxima Telecom**

Co-Leader: Chris Spencer  
**GlobalReach**

Co-Leader: Alex Meub  
**Eleven Software**

2021 Guidelines Project Closure



## BACKGROUND & INDUSTRY CHALLENGES

- To provide solutions that enable mobile devices to keep their permanent subscriber identity (IMSI) private when using SIM authentication methods
- EAP methods are mostly used by wireless carriers and operators who want to take advantage of Wi-Fi capabilities for their SIM subscribers alongside or instead of licensed mobile radio service; in service-environments such as sports or shopping venues; underground locations; and to improve the overall experience for end-users when Wi-Fi and mobile services are combined for the SIM subscriber's benefit. Passpoint enables the cellular carrier to offload data by providing a means to have an automated connection to available Wi-Fi providers

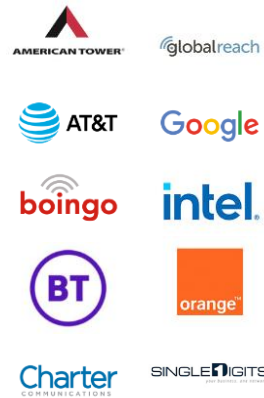
## BUSINESS OPPORTUNITIES & BENEFITS

- Standardization for seamless, private and secure access for SIM-based devices onto to Wi-Fi
- Provide clear guidelines to ensure that service providers can deploy secure and interoperable Wi-Fi services with confidence

## EXPECTED DELIVERABLES

- Joint collaboration between operators and vendors to formulate the best practice on security policy and privacy protection on SIM based devices
- Develop guidelines and compliance program to guarantee broad industry deployment and alignment
- Work with Wi-Fi Alliance and 3GPP to promote the adoption of potential solutions

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **IMSI Privacy Protection**



**Wi-Fi Roaming Standards**



**Roaming Evolution**



**Security & Identity Privacy**



### Project Leaders

Leader: Hai Shalom  
**Google**

Co-Leader: Michael Sym  
**Single Digits**

Co-Leader: Paul Hancock  
**AT&T**

2021      Specification      Certification Assessment



## BACKGROUND & INDUSTRY CHALLENGES

- Many Wi-Fi networks have until now relied on the original permanence of device MAC addresses to facilitate access to or management of the network. This permanence is actively being removed and can no longer be relied upon.
- Without a new way to identify devices on Wi-Fi networks, the networks will cease to be either as manageable or as functional as they were. This will have customer experience impacts as well as financial ones.
- The main objective is to promote the removal of reliance on a persistent Wi-Fi MAC from Wi-Fi networks by identifying long-term solutions for stable, private, network-specific identifiers that are appropriate for the use to which they are put.

## BUSINESS OPPORTUNITIES & BENEFITS

- The project will identify the requirements for device identifiers for network access and management, examine the currently available identification mechanisms and information and make recommendations as to how device identification should be performed and used for network management.
- Such solutions should help network access identification standardization across different verticals, namely throughout the home, the enterprise and the public domains.

## EXPECTED DELIVERABLES

- The project would produce a technical paper promoting best practice, and where necessary provide rationale, business- and use-case information to other standards bodies to assist their activities.
- The success or otherwise of the project will be measured against the disruption of services that users experience during the transition to per-session MAC randomization of client devices.

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about **Wi-Fi & Devices Identification** ➔

**Wi-Fi 6 Deployment Guidelines** ➔

**Enhanced Wi-Fi 6 Decoded** ➔

**In-Home Wi-Fi Industry Guidelines** ➔

### Project Leaders

Leader: Tim Twell  
**BT**

Co-Leader: Luther Smith  
**CableLabs**

Co-Leader: Ilya Volynkin  
**Maxima Telecom**







## POLICY WORK GROUP



Chair: **Burhan Masood - Broadcom**



Co-Chair: **Brian Josef - Comcast**

## BACKGROUND & INDUSTRY CHALLENGES

- The objective of WBA's Policy & Regulatory Affairs Work Group is to track global trends and relevant policy & spectrum issues that are of concern to the WBA membership.
- The Work Group will coordinate Wi-Fi advocacy efforts across membership, cities, regions and regulators globally.
- To provide and issue industry guidelines and white papers that outline recommendations to regulators and authorities in respect to various spectrum ranges, worldwide bands allocation and public consultation consensus and responses

## BUSINESS OPPORTUNITIES & BENEFITS

- Work closely with WBA members and regulatory bodies for improved Wi-Fi (more spectrum, better security, user experience, Passpoint® & Roaming)
- Validate business opportunities of new Wi-Fi generations working in new spectrum brands and work with regulators globally
- Embrace the benefits of WBA OpenRoaming™ to support user authentication and address regulatory requirements for user identification issues

## EXPECTED DELIVERABLES

### 6 GHz band harmonization

- US FCC 6 GHz FNPRM ruling gaps coverage
- Client-to-client communication
- Successful advocacy with regional leaders in Asia, and South America
- Strategy for upper 6 GHz band in EU

### OpenRoaming™ and Passpoint® collaboration strategy

- 911 emergency calling over Wi-Fi trial

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
**Policy Work Group**



**Wi-Fi 6 Deployment  
Guidelines**



**Wi-Fi 6E Trials**



**Global Implication for  
Wi-Fi 6 & 6GHz**



### Work Group Leaders

Chair: Burhan Masood  
**Broadcom**

Co-Chair: Brian Josef  
**Comcast**



## MARKET WORK GROUP



Chair: **Melody Eclavea – AT&T**



Co-Chair: **Melody Walker – Boingo Wireless**



Co-Chair: **Gabriel Desjardins - Broadcom**

**Supported by WBA Marketing**



**SARAH KOLMER**  
Director of Marketing & PR



**ALICE LAI**  
Senior Marketing Manager



**BRYAN SMITH**  
Content Manager

## BACKGROUND & INDUSTRY CHALLENGES

- WBA's Market Work Group is comprised of a team of professional marketers from WBA member companies.
- The team aims to develop and align the various marketing activities carried out by the WBA, including but not limited to general marketing, event marketing, and thought leadership with an overall goal of accelerating marketing and business opportunities.

## BUSINESS OPPORTUNITIES & BENEFITS

- Work closely with WBA members and partners to enable marketing and business opportunities.
- Promote the works of the Alliance members which address business & technical issues, as well as opportunities for member companies.
- Promote effective marketing channels for members to increase their influence in the industry.
- Work closely with media, journalists, research and analysts to strengthen and communicate all the potentials and benefits of Wi-Fi.

## EXPECTED DELIVERABLES

- Strengthen branding positioning – ensure success of the Alliance and other initiatives reflects on the WBA brands and sub-brands
- Continue to enhance WBA's members leadership position as the 'voice of Wi-Fi'
- Drive the engagement among exiting members and followers.

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Current Members



WBA Programs & Projects



Wireless Global Congress



Industry Awards



### Work Group Leaders

Chair: Melody Eclavea  
**AT&T**

Co-Leader: Melody Walker  
**Boingo Wireless**

Co-Leader: Gabriel Desjardins  
**Broadcom**

## BACKGROUND & INDUSTRY CHALLENGES

- WBA OpenRoaming creates the framework to connect billions of users and devices to millions of Wi-Fi networks globally.
- With OpenRoaming the WBA is acting as a centralized policy authority enabling an ecosystem for identity providers and Wi-Fi network providers to work together and deliver an automatic and secure Wi-Fi experience to millions of users.
- WBA OpenRoaming enables companies to accelerate and scale Wi-Fi roaming relationships. Enabled networks can automatically onboard users securely leveraging established identity providers such as operators, cloud IDs and loyalty memberships; bridging the gap between Wi-Fi and cellular networks.
- This sub-group aims to define the market opportunity and requirements for OpenRoaming™ from business and marketing perspective in order to enable effective technical deployment addressing the business needs.

## BUSINESS OPPORTUNITIES & BENEFITS

- Address market and motivation of OpenRoaming
- Define business model and go to market strategy
- Define use cases, priorities and business requirements for technical implementation
- Define scope of interoperability certifications

## EXPECTED DELIVERABLES

- Create a clear set of requirements and prioritize them based on business-critical elements and addressable market
- Set within the market opportunity, the competition, risks and dependencies
- Hand over the technical work-groups to define the solutions and delivery

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

WBA OpenRoaming™



How it works?



Benefits



FAQ



## BACKGROUND & INDUSTRY CHALLENGES

- Carrier Wireless Service Certification (CWSC) program allows carriers and vendors to independently test and certify devices.
- The program utilizes WBA Authorised Test Labs, working with Members and their partners to simulate end customer usability in a real network environment to ensure that devices are ready for worldwide commercial deployments, reducing customer support time for carriers and time to market for vendors.
- WBA Certification is expanding the testing opportunities to services such as network interoperability, roaming, offload and captive portal behavior

## BUSINESS OPPORTUNITIES & BENEFITS

- WBA has launched its Certification Program starting with the Carrier Wireless Services Certification (CWSC) testing for members and sponsored partners.
- CWSC provides unprecedented capabilities to test the end-to-end wireless ecosystem to guarantee that the service operation and user experience is consistent across real life networks

## EXPECTED DELIVERABLES

- Joint collaboration between operators and vendors to develop a compliance program to guarantee broad industry deployment and alignment
- Maintain a current set of equipment to get used in certification
- Evaluate and monitor the Authorized Test Labs
- Work with Wi-Fi Alliance and 3GPP to promote the adoption of potential solutions

## LEADING PARTICIPANTS



## RELEVANT PROJECTS

Understand more about  
**CWSC**



**Wi-Fi Roaming  
Standards**



**Roaming Evolution**



**WBA OpenRoaming™**



### Project Leader

**Ilya Volynkin**  
Maxima Telecom

### Authorized Test Labs (ATLs)

**KYRIO**

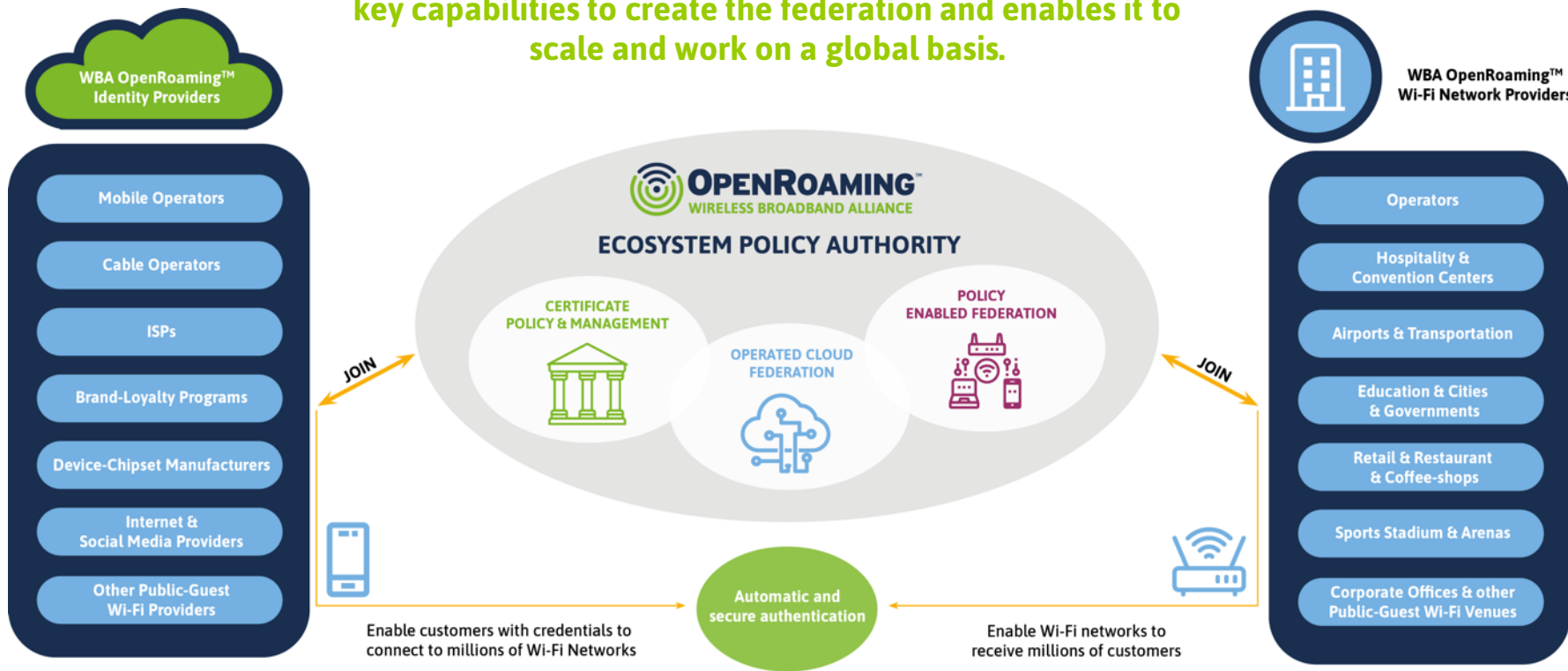
**GRL**



# WBA OpenRoaming™ Federation

[www.openroaming.org](http://www.openroaming.org)




**WBA OpenRoaming™ is a framework that brings together key capabilities to create the federation and enables it to scale and work on a global basis.**



**WBA OpenRoaming™ is based on a set of business and technical components that enables the function of the roaming federation**



WBA OpenRoaming™ is a roaming federation service enabling an automatic and secure Wi-Fi experience globally. With WBA OpenRoaming™, we are creating an open connectivity framework for all organizations in the wireless ecosystem to power new opportunities in the 5G era. It encompasses three key elements:

WBA OpenRoaming™ Dimensions	WBA OpenRoaming™ Components & Standard & Technical specs
 <p><b>Cybersecurity Service</b></p>	<ul style="list-style-type: none"> <li>• Manages secure public keying infrastructure (PKI) / RadSec Technology for certificates policy, management and broker services</li> <li>• Supports dynamic &amp; static interconnection technologies</li> </ul>
 <p><b>Cloud Federation</b></p>	<ul style="list-style-type: none"> <li>• Operates centralized federation policies and global identifiers for Wi-Fi networks &amp; identity providers</li> <li>• WBA unique Wi-Fi network identifier (WBAID) for federation partners</li> <li>• Wireless Roaming Intermediary eXchange (WRIX) standard enables roaming services harmonization and multiple business models</li> </ul>
 <p><b>Network Automation</b></p>	<ul style="list-style-type: none"> <li>• Manages automated roaming consortium codes and policy provisioning mechanisms</li> <li>• Utilizes Passpoint® technology</li> </ul>



## Growing Ecosystem Brokers / Identity Providers



## Flagship Trials

9,000 Municipalities across Europe with multiple vendors



6 Spanish Cities, including Barcelona and Valencia, Wiongo and Cisco



Japan Cities with Cityroom and multiple vendors

- +2 Top Level Ecosystem Brokers (I-CA)
- +3 Infrastructure Vendor OEM
- +10 Identity Providers
- +500 Certificates (networks) issued

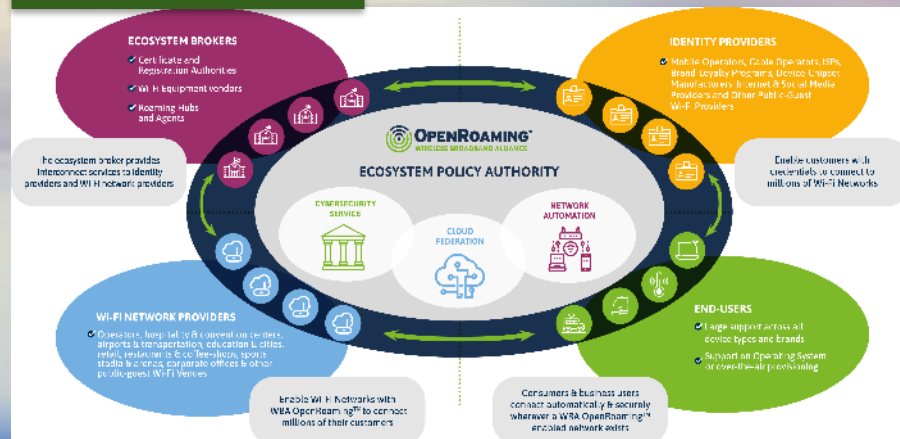
## WI-FI 6 & 6E



## 5G & WI-FI RAN CONVERGENCE



## OPENROAMING™



## WBA RELEASES



View the latest white papers - Go to the Resource Centre now: [wballiance.com/resources/wba-white-papers](http://wballiance.com/resources/wba-white-papers)

## WBA CERTIFICATION



TO VIEW THE CWSC VIDEO scan the QR code or go to [www.wballiance.com/certification](http://www.wballiance.com/certification)

## PARTNERS





**+20 Trials** across the globe  
on **Wi-Fi 6** and **Wi-Fi 6E**

**Join the trials** to accelerate  
**Wi-Fi 6 & Wi-Fi 6E** adoption

**Coordinated trials execution with reporting across use cases**

### Entertainment (Stadia)



### Transportation



### Residential (Single and multi units)



### Industrial



### Smart Villages/ Last mile



### Smart Cities (Outdoor)





## ARE YOU IN?

Learn more at [WBA extranet](#) or contact the PMO at [pmo@wballiance.com](mailto:pmo@wballiance.com)



**BRUNO TOMAS**

**Director  
Programs & PMO**



**PEDRO MOUTA**

**Manager –  
Program Management Office**

