

www.openroaming.org

DEPLOYMENT SUCCESS STORIES

1. WBA OpenRoaming™ Overview & European Project Context

2. Live Deployments in Tervuren and Oostkamp

- Welcome address: City of Tervuren - Denis Rondelé
- IT Integrator perspective & demo: CityMesh - Ivan Kusseneers
- Vendor OEM perspective: CommScope - Rajesh Pazhyannur, Deepak Triphati, David Lee
- Broker perspective: Aptilo Networks - Jonas Bjorklund, Jonas Anden

3. Live Deployment in Chaudfontaine and Olne

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4. Wrap-up and Next steps



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

Objectives:

- ❖ Massify Wi-Fi Interoperability & Roaming with OpenRoaming
- ❖ Accelerate Next Gen Wi-Fi Networks with Wi-Fi 6, 6 GHz Multi-AP, QoS
- ❖ Lead the Convergence / Coexistence of Wi-Fi with the Wireless Ecosystem



1

Guidelines & Standards

Setting the scene, requirements and creating specifications

2

Testing & Interoperability

Creating test plans to showcase the technology capabilities

3

End-to-End Trials

Running field trials / proof the concept on real world environment

4

Certification

Addressing gaps and helping the industry maximizing business opportunities

Established
in 2003

120+ MEMBERSHIP
COMMUNITY

PROJECTS &
PROGRAMS

ANNUAL
EVENTS

PROMOTION AND
GO-TO-MARKET

THOUGHT LEADERSHIP &
MARKET RESEARCH



Secure Access



How to be sure Wi-Fi is secure?

User Experience



How to solve the pain of connecting to Wi-Fi?

UNSECURE FRAGMENTED EXPERIENCE

Yellow paper passwords



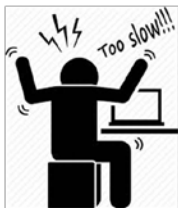
Share passwords



Open Access



Quality of Service



How to guarantee the Wi-Fi has quality?

Deployment



How to have good coverage and capacity?

TRY TO SOLVE IT IN ISOLATION

Ask to register



Use Social Media



Username/Password



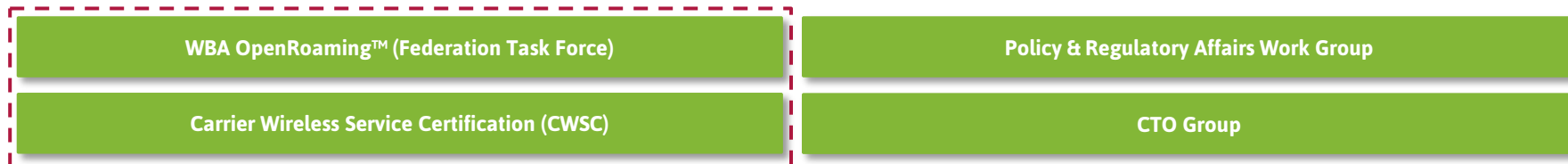
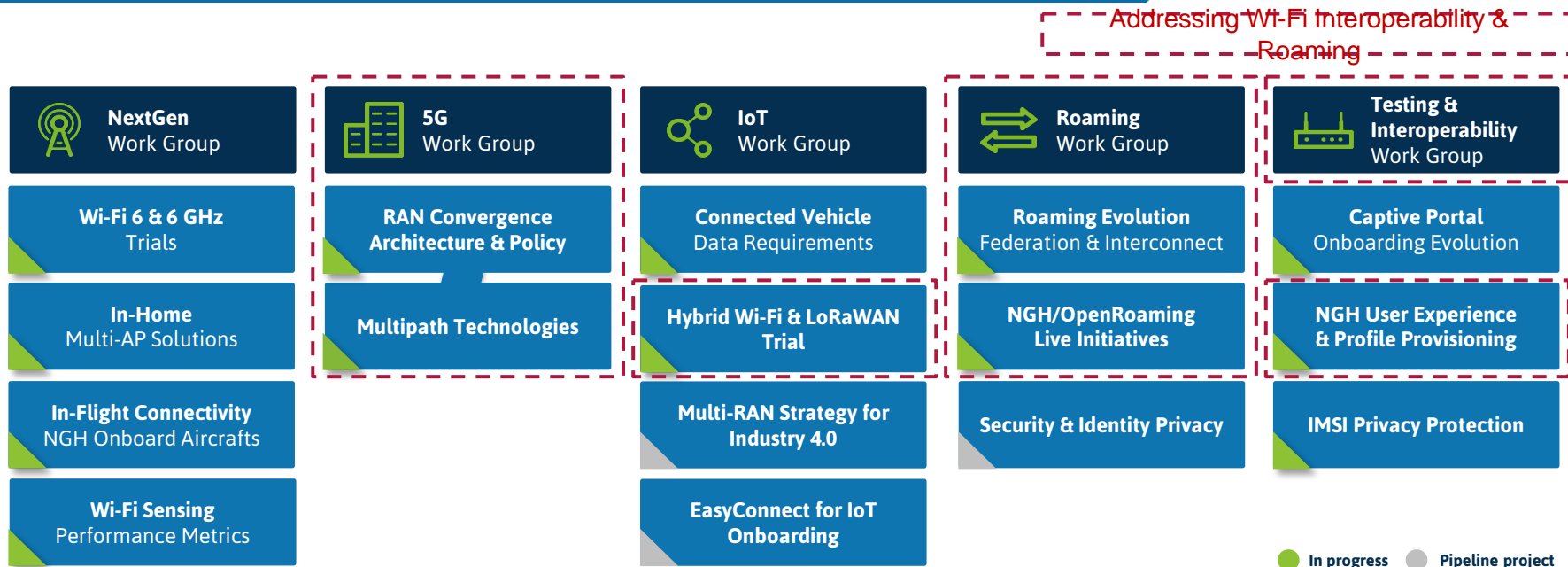
OTP Password



**Time to turn the page and make Public-Guest
Wi-Fi simple and secure to all**

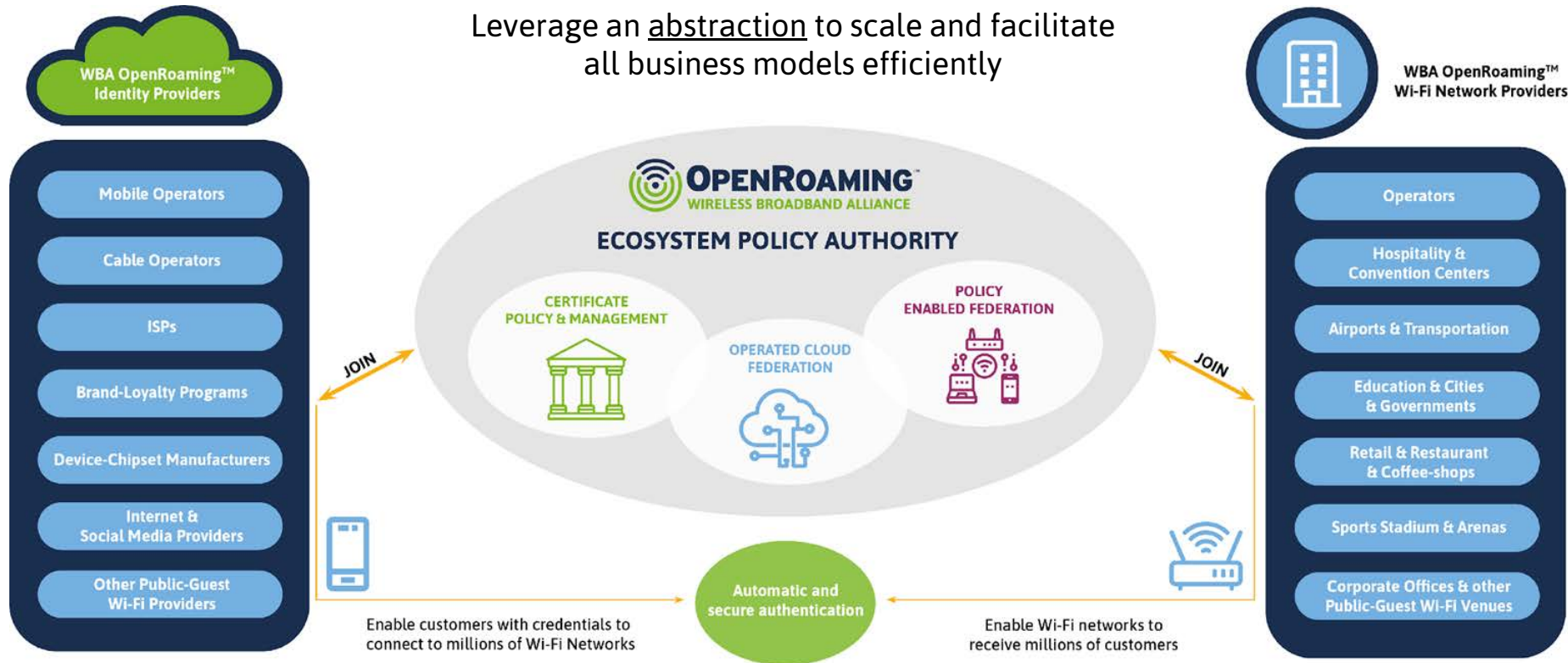


PROGRAMS AND PROJECTS ROADMAP



HOW DOES OPENROAMING™ WORK?

Leverage an abstraction to scale and facilitate
all business models efficiently






WBA is building a consortium of identity & network providers to enable seamless roaming & onboarding



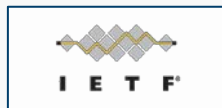
WBA OpenRoaming
goal is to

**standardize all Wi-Fi
onboarding and
roaming**

on either settled or
settlement free
networks

| WBA OpenRoaming™ Dimensions | WBA OpenRoaming™ Components |
|--|--|
| <p>Cybersecurity Service</p>  A blue icon of a building with a grid of windows and a small entrance. | <ul style="list-style-type: none">• Manages secure public key infrastructure (PKI) for certificates policy, management and broker services• Supports dynamic & static interconnection technologies |
| <p>Cloud Federation</p>  A purple icon of a cloud with circuitry and nodes inside. | <ul style="list-style-type: none">• Operates centralized federation policies and global identifiers for Wi-Fi networks & identity providers• WBA unique Wi-Fi network identifier (WBAID) for federation partners• Wireless Roaming Intermediary eXchange (WRIX) standard enables roaming services harmonization and multiple business models |
| <p>Network Automation</p>  A green icon of a Wi-Fi signal with three curved lines and a central dot. | <ul style="list-style-type: none">• Manages automated roaming consortium codes and policy provisioning mechanisms• Utilizes Passpoint® technology |

OpenRoaming legal framework enables compliance with GDPR by having to sign privacy policy & end user terms



WBAID is now listed as an Operator Namespace Identifier for Radius Attribute 126

| Identifier | Token | Contact |
|------------|------------|---|
| 0x00-0x29 | Reserved | |
| 0x30 | TADIG | TD.13 Coordinator (td13 at gsm.org) |
| 0x31 | REALM | IETF O&M Area Directors (ops-ads at ietf.org) |
| 0x32 | E212 | ITU Director (tsbdir at itu.int) |
| 0x33 | ICC | ITU Director (tsbdir at itu.int) |
| 0x34 | WBAID | WBA Director (pmo@wballiance.com) |
| 0x35-0xFE | Unassigned | |
| 0xFF | Reserved | |

<https://www.iana.org/assignments/radius-types/radius-types.xhtml#radius-types-19>

ROAMING WORLD



Standard



Compatible



Scalable

Wi-Fi Roaming

Roaming
Interconnection
Guidelines (WRIX)

Unique Network
ID (WBAID)

Mandatory for Wi-Fi
Roaming services

Mandatory for Wi-Fi Roaming services (2020+)

(exchanges, billing, legal, lawful interception, analytics)

Roaming
Hubs, Agents,
Aggregators

Operators,
Venues, Cities

Infrastructure
Vendors

GLOBAL ARCHITECTURE



Phase 1 Trial Complete

Other OpenRoaming Wi-Fi Networks
(SSID broadcasting OpenRoaming RCOI and interconnect with Dynamic DNS Radsec)

European Municipalities
(SSID broadcasting OpenRoaming RCOI)



RadSec and
DPD enabled



RadSec
enabled
DPD PoC



RadSec
enabled
DPD PoC



OpenRoaming Connector
Dynamic DNS (DPD)
Radsec Certificate

Ecosystem Broker
(Cloud AAA
Issuing ICA)

OR Cloud
Federation

Ecosystem Broker
(Cloud AAA –
RadSec server
Issuing ICA)



Radius
Aggregation
(RadSec client)

Radius
Aggregation
(RadSec client)

Universities

Hotels

Internet Players

Device Vendors

Operators

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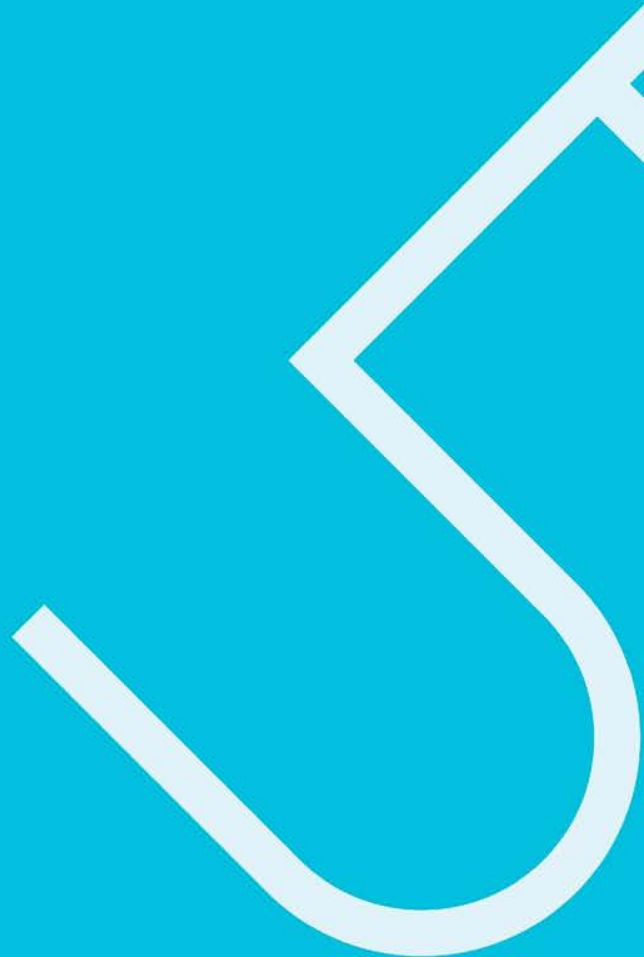
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4. Wrap-up and Next steps

Welcome Address: City of Tervuren – Denis Rondelé



<https://www.tervuren.be/>



Wifi4EU project city of Tervuren

- **Project started early 2019 with partner Citymesh (3 sites)**
- **Currently Tervuren is offering free wifi in almost all public buildings (7 sites)**
- **New sites are currently evaluated**
- **Tervuren has 109 different nationalities**
 - **Close to EU headquarters**
 - **Embassy personnel**
- **OpenRoaming allowing seamless and secure connectivity**

IT Integrator perspective: CityMesh - Ivan Kusseneers

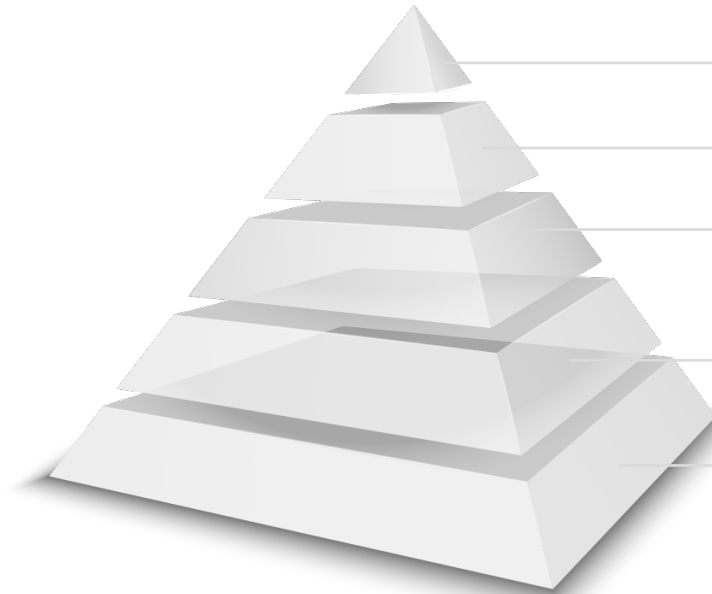
Since 2006, Citymesh has made connectivity into a form of art. We design, install and maintain high performance and high density networks in Belgium. In addition to that we also provide innovative solutions in over-the-top and As-A-Service models.

Our focus remains to be innovative engineering, thus defining the market



CITYMESH

the art of connectivity

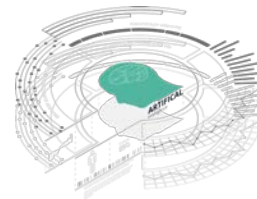


OUR VALUES

- 1 Sharp
- 2 Next Level
- 3 Innovative Engineering
- 4 State of the Art
- 5 In All Fairness

The background of the image is a complex, glowing green circuit board. The circuitry is dense and intricate, with many lines and components visible. The word "TECHNOLOGY" is written in a white, serif font across the upper portion of the image. The overall color scheme is dark green and black, with the circuitry glowing in a vibrant green. The word "TECHNOLOGY" is centered horizontally and is the most prominent text element.

TECHNOLOGY



Pioneer

Wireless Specialist - no 1 in Belgium

Unique technology

Unique spectrum

Operator

Over the top solutions

In house built platforms and tools

Strong partnerships



MARKETS





GOVERNMENT

Since the very conception of Citymesh, we have been creating Smart City Solutions.

WiFi4EU is core business :
50 vouchers converted
Lots more to come



WiFiLAB

WiFiLab is Citymesh's online WiFi management platform .
Aggregating carefully obtained data via interconnected applications in one transparent platform .

Cloud based, cloud controlled,
calculated on the edge.





THE CITYMESH WAY

We believe - in all fairness - in
a truly different approach
and open systems.

Co-creation
People centric
Third party integration
NO vendor lock-ins
Respecting standards & existing environments

LEAD THE WAY

Our partnership starts here! Contact our team of network professionals and tell pitch us your goals. Together we'll select the best possible solutions to get your connectivity to the next level.

IVAN KUSSENEERS

MARKET MANAGER

Smart Cities & Public

+32 472 88 62 96

ivan.kusseneers@citymesh.com



Vendor OEM perspective: CommScope - Rajesh Pazhyannur



OpenRoaming in Tervuren

Rajesh Pazhyannur, CTO Ruckus



IoT



W-Fi



DAS



Small Cell



Private

CommScope in the Enterprise



Copper



Switch



Fiber



Automated
Infrastructure
Management

RUCKUS® Networking Portfolio

Software
& SaaS

Security & Policy



Cloudpath Enrollment
System

Network Reporting



SCI

Service Assurance



RUCKUS Analytics

Location



SPoT

Control &
Management

Physical Appliance



SmartZone
ZoneDirector

Virtual Appliance



SmartZone

Cloud-managed



RUCKUS Cloud
RUCKUS CBRS

Controller-less



RUCKUS Unleashed

IoT



RUCKUS IoT Controller

Switches

Access



ICX
7150



ICX
7250

Aggregation



ICX 7450



ICX 7650



ICX 7750

Core



ICX 7850

Access
Points

Outdoor



T, P Series

Indoor



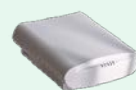
R Series

Specialty



H, C, M, E Series

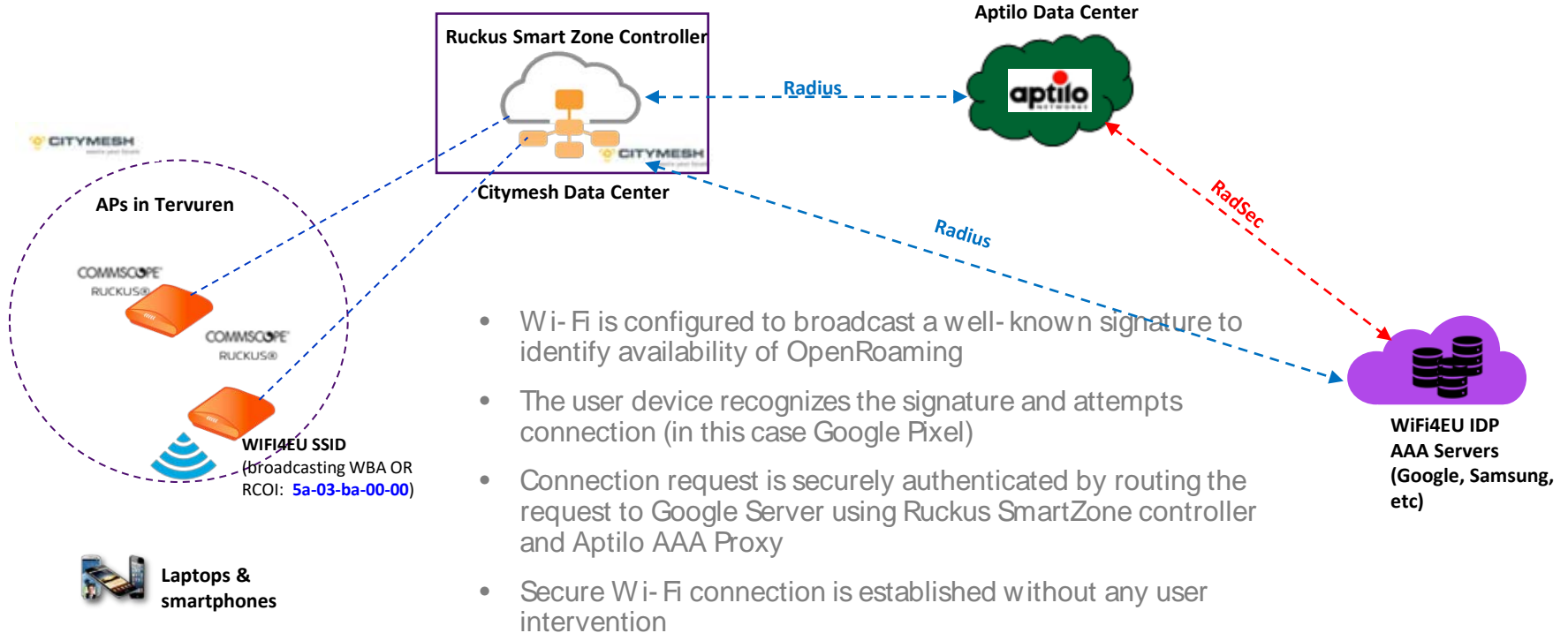
LTE



Q Series

Professional & Education Services | Premium Support

OpenRoaming Deployment in Tervuren



Broker perspective: Atilo Networks - Jonas Bjorklund

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

SOME OF OUR DEPLOYMENTS....

Selected Enterprise Customers by Verticals

| Industrials | Healthcare | Hotels | Airports | Venues | Smart City |
|---|---|---|---|--|---|
|    |    |    |    |    |    |

Selected Operator Customers

| | | | |
|---|---|--|--|
|      |        |           |           |
|---|---|--|--|



200+ Million people powered by Wi-Fi daily



100+ Operator installations



Thousands of verticals



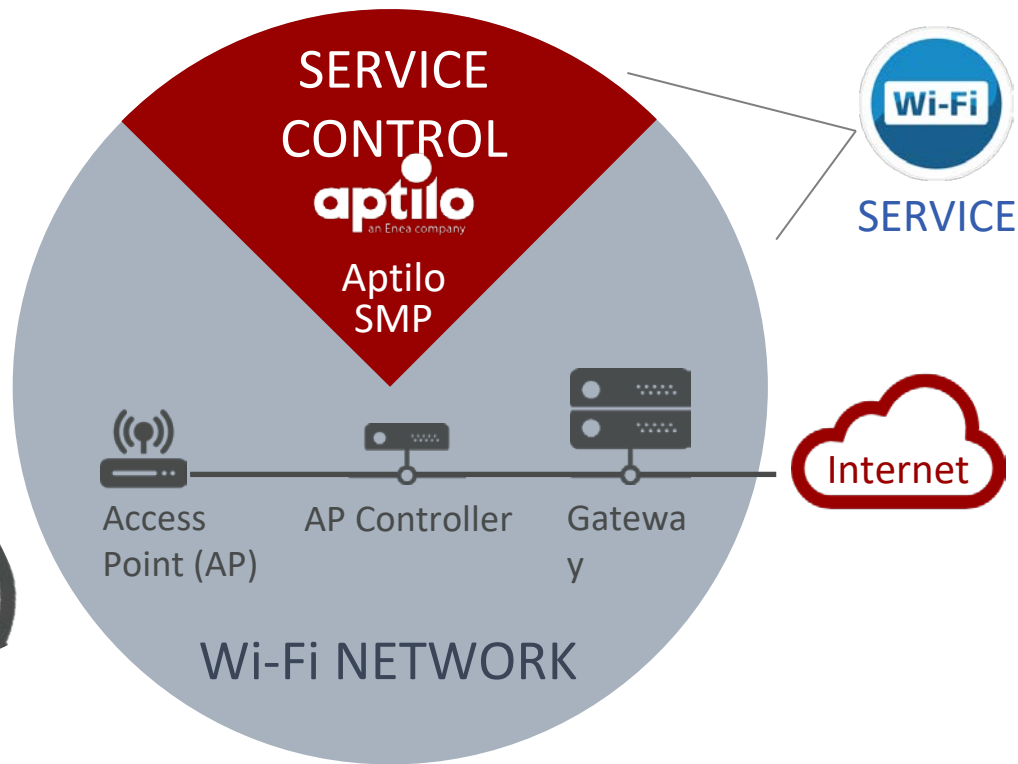
75+ Countries



6+ year average customer relation

APTILO TURNS WI-FI INTO A SERVICE

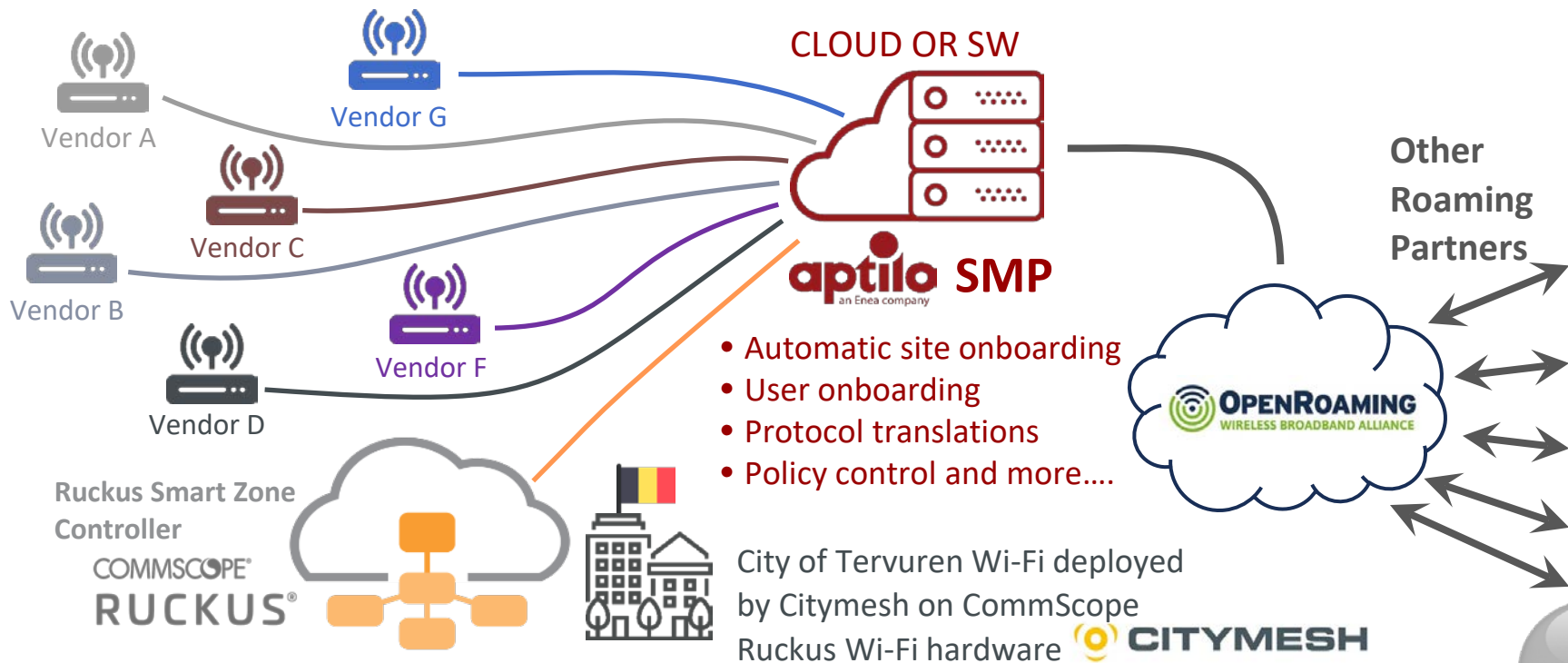
- Access Control
- Policy Control
- Charging of users
- Captive Portals
- Analytics
- Multitenancy



MAKING MULTI-VENDOR WI-FI SCALE

THE ROLE OF APTILO SMP™ IN THE OPENROAMING DEPLOYMENT IN TERVUREN

Wi-Fi networks/sites with different
Wi-Fi Access Point brands



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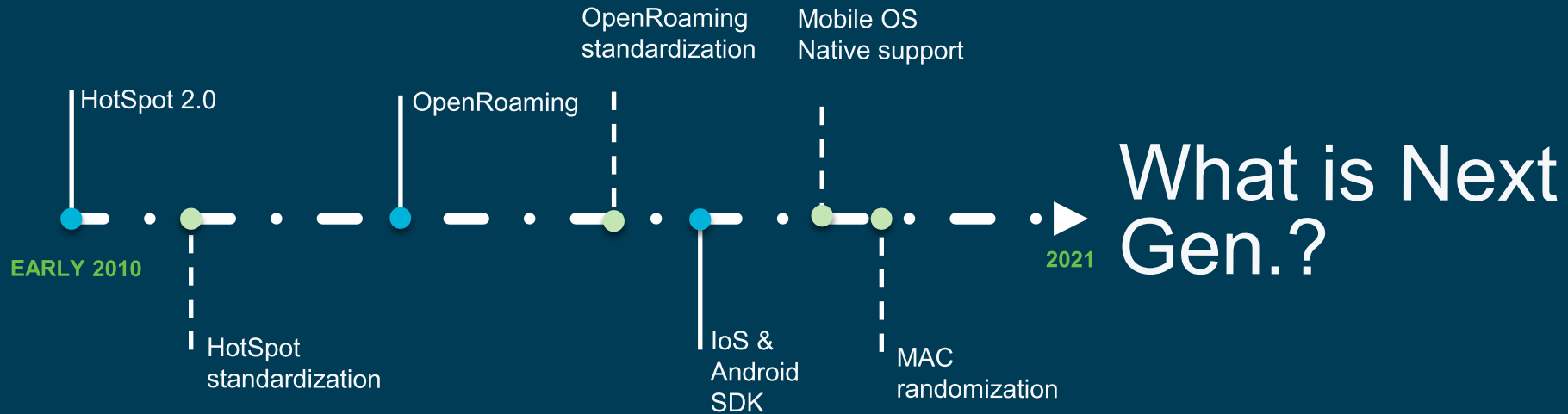
4. Wrap-up and Next steps

Welcome Address: Mayor City of Olne Mr Cédric Halin



Vendor OEM perspective: Cisco - Bart Brinckman, Mark Grayson

Cisco has a history of pioneering innovations in Wi-Fi onboarding.



● Cisco Technology

● Industry Events

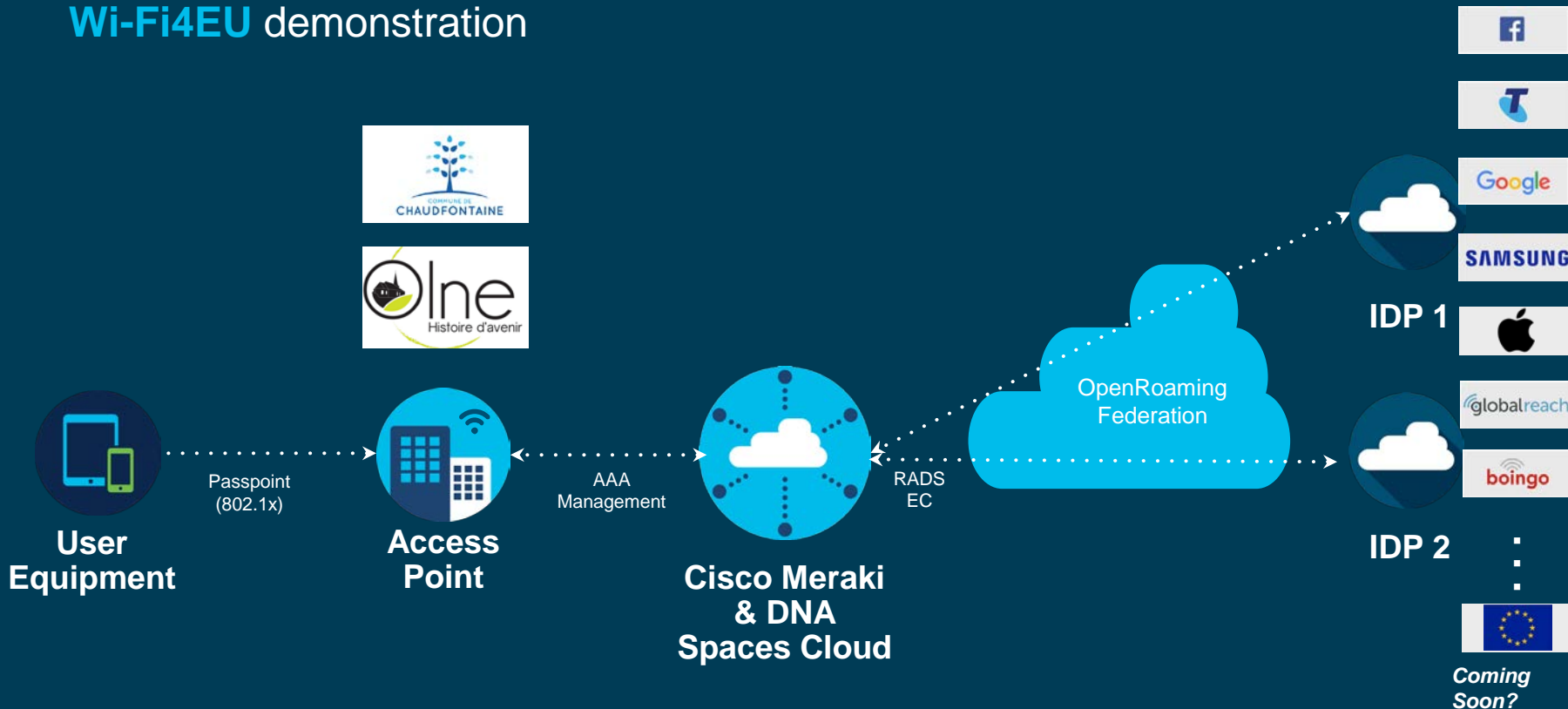
We've : **Invented**, **Standardized** & **Adopted**

all these industry standards to bring you a
Next Gen. Onboarding Experience



- 1 Seamless Onboarding & User Insights ▶
- 2 Enhance carrier indoor coverage with WiFi ▶
- 3 Simplified & secure Enterprise onboarding ▶
- 4 Customer Acquisition & Loyalty experience ▶
- 5 Automated IoT onboarding ▶

Wi-Fi4EU demonstration



IT Integrator perspective & demo: Sebastien Marchal



“WIN provides public Wifi solutions that offer end users an optimal experience.

The integration of OpenRoaming is an innovation that we wanted to be part of to provide flexible, transparent and more secure authentication to the end users.”

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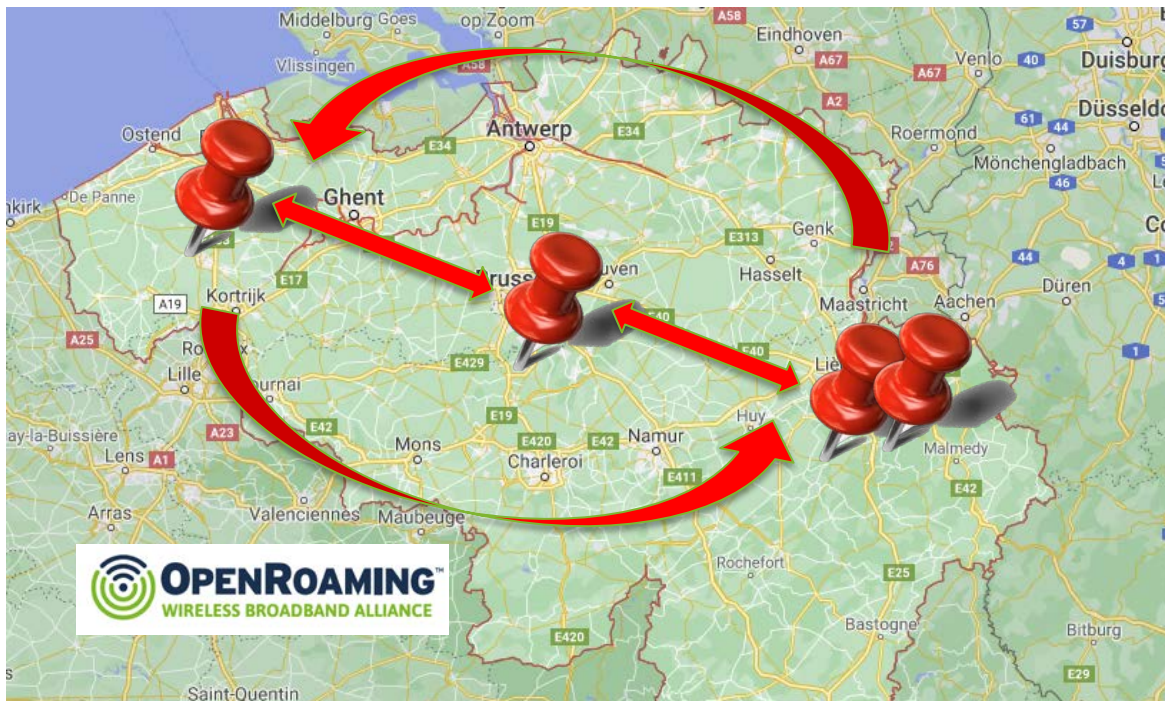
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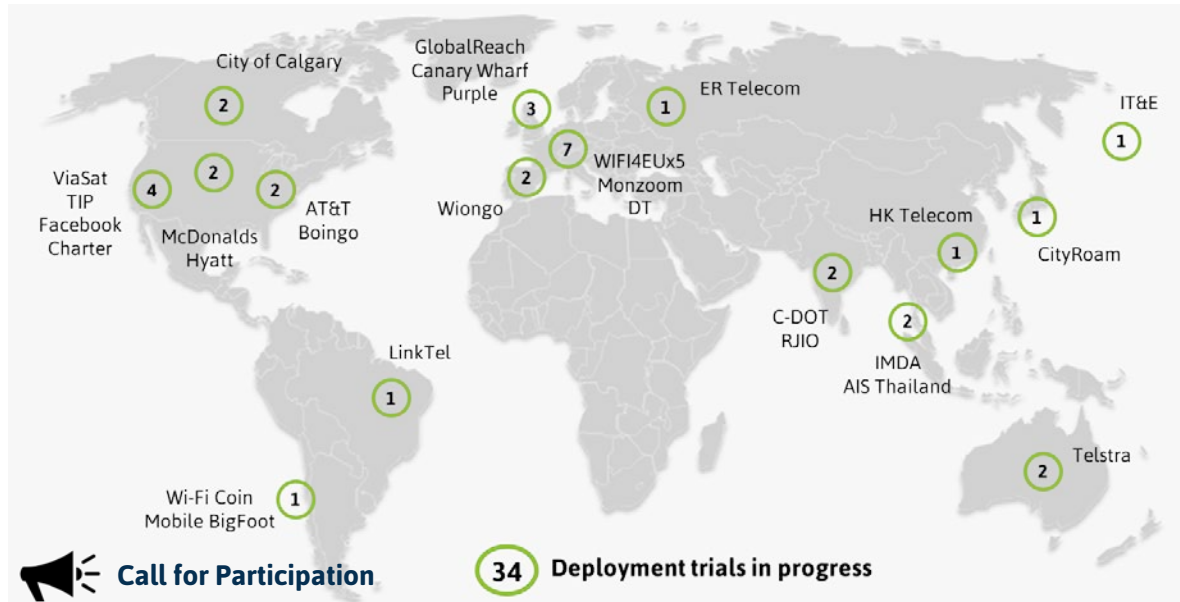
4. Wrap-up and Next steps

End game: Seamless and secure roaming across different municipalities, with fast and reliable authentication



Project milestones:

- ✓ Enabling 4 different municipalities in Belgium with different mix of vendor OEM, IT integrators, brokers involved in each scenario
- ✓ User onboarding simple and straightforward:
 - ✓ off the shelf profile available from device and operating system vendors, e.g. Samsung, Google)
 - ✓ Onboarding portal possibility for local credentials
- ✓ System stability and interoperability with any Wi-Fi networks



Flagship Deployments



Grow to 9,000
Municipalities
across Europe with
multiple vendors



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



Japan Cities with
Cityroam and
multiple vendors

Growing Ecosystem Brokers / Identity Providers



COMMScope



SINGLE DIGITS



SAMSUNG



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

OpenRoaming workshop follow-up:

- ❖ WBA to address any feedback & questions
- ❖ Invitation to OpenRoaming proof of concept & trials
- ❖ Continue outlining working items and timeline for integration/interworking of OpenRoaming with other city, enterprise, carrier networks & federations in Europe

contact: pmo@wballiance.com

One Global Wi-Fi Network

VISION: Provide Automatic & Secure Wi-Fi Everywhere to Everyone

MISSION: Create an open framework for all types of players to develop their Wi-Fi services and business



STEP 1



Sign up for WBA OpenRoaming™
(Inclusive for WBA Members)

STEP 2



Adopt the WBA OpenRoaming™ framework and standards

STEP 3



Choose the interconnect model and technologies

STEP 4



Select your business model and partners that are members of WBA OpenRoaming™

STEP 5



Configure your network and/or customer devices

STEP 6



You are now part of the WBA OpenRoaming™ brand and are ready to ROAM! **Congratulations!**



OpenRoaming r1 launched

<https://wballiance.com/openroaming/join>



Thank you

<https://wballiance.com/wba-openroaming-opens-the-door-to-create-one-global-wi-fi-network>

<http://openroaming.org>

Engage on projects what we do | PMO contact: pmo@wballiance.com