WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

25 MAY – 8 JULY, 2021

WI-FI: POWERING INNOVATION SERIES

Creating new possibilities for Carriers, Enterprise, Cities and Things.

#WGCAmericas | #wifirevolution
#lovewifi

WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

JUNE 30, 2021

Connected Cities Get Smarter with Wi-Fi in the 5G Era

#WGCAmericas | #wifirevolution
#lovewifi

Wi-Fi Powering Innovation Series

Full Program Agenda

May 25th & 26th – WBA Members Only Working Sessions

May 27th – WBA Members Only Working Sessions: **Briefing for Asia-based members**

WI-FI POWERING INNOVATION SERIES: 08:30 PT; 1130 ET; 15:30 GMT; 23:30 Singapore

Thursday June 3rd	Thursday, June 10th	Thursday, June 17th	Thursday, June 24th	Wednesday, June 30th	Thursday, July 8th
Wi-Fi Innovations Connecting Your World – Leadership Conference	**Connecting the Wi-Fi Enabled Enterprise**	**Wireless Innovation, Operation & Customer experience – Where next for operators?**	**Wi-Fi Innovation For Hospitality**	**Connected Cities get Smarter with Wi-Fi in the 5G Era**	**Carrier Grade Wi-Fi delivering the future for the Smart Connected Home**

WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

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Welcome & Background of the Connected Communities Forum

TIAGO RODRIGUES

CEO

Wireless Broadband Alliance

WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

Connected Cities Get Smarter with Wi-Fi in the 5G Era

Tiago Rodrigues

Wireless Broadband Alliance

Jamie Cudden

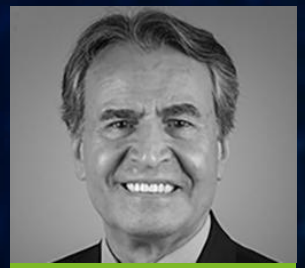
City of Dublin

Morné Erasmus

CommScope

Michael J. Zeto III

Boingo Wireless



Reza Jafari

E-Development International

Simon Vaughan

GlobalReach Technology

Clinton Vince

Dentons

Morgan O'Brien

Anterix

Blaz Vavpetic

Single Digits

Steve Namaseevayum

Wireless Broadband Alliance

Alphonso Jenkins

Former Deputy Commissioner of Telecoms for New York City

Robert Sokota

ZenFi Networks

Connected Cities Get Smarter with Wi-Fi in the 5G Era

TODAY'S AGENDA	
08:30am (Pacific time)	**Welcome & Background of Connected Communities Forum** Tiago Rodrigues, CEO, Wireless Broadband Alliance
08:45am (Pacific time)	**Smart City Dublin: Drivers for change** Jamie Cudden, Smart City Program Manager, City of Dublin
08:55am (Pacific time)	**Public Wi-Fi needs more than just a simple boost to support the inequities in the new-era digital divide** Morné Erasmus, Director, Smart Spaces, CommScope
09:10am (Pacific time)	**Innovation Through Technology: Powering Smart Communities for the Future** Michael J. Zeto III, Senior Vice President, Global Strategy and Emerging Businesses, Boingo Wireless.
09:25am (Pacific time)	**Panel Discussion** Moderator: Reza Jafari. Dublin City, CommScope, Boingo Wireless & Simon Vaughan, Chief Commercial Officer, GlobalReach Technology.
09:45am (Pacific time)	**Private Wireless Networks for Utilities** Clinton Vince, U.S. Energy Practice and Co-Chair of Global Energy Sector, Dentons; Morgan O'Brien, Executive Chairman, Anterix
10:00am (GMT)	**Partnering to Create Value in a SmartCity Ecosystem** Blaz Vavpetic, CTO Single Digits
10:15am (Pacific time)	**Future of WBA OpenRoaming & Convergence** Steve Namaseevayum, Director, Membership & Industry Alliances
10:25am (Pacific time)	**Panel Discussion** Moderator Steve Namaseevayum, Director, Membership & Industry Alliances; Blaz Vavpetic, CTO, Single Digits; Alphonso Jenkins, formerly Deputy Commissioner for Telecommunications New York City; Robert Sokota, Chief Administrative Officer, ZenFi Networks.
10:45am (Pacific time)	**Close** Steve Namaseevayum, Director, Membership and Industry Alliances, Wireless Broadband Alliance

Smart City Dublin: Drivers for Change

JAMIE CUDDEN

Smart City Lead

Dublin City Council

Smart City Dublin: Drivers for change

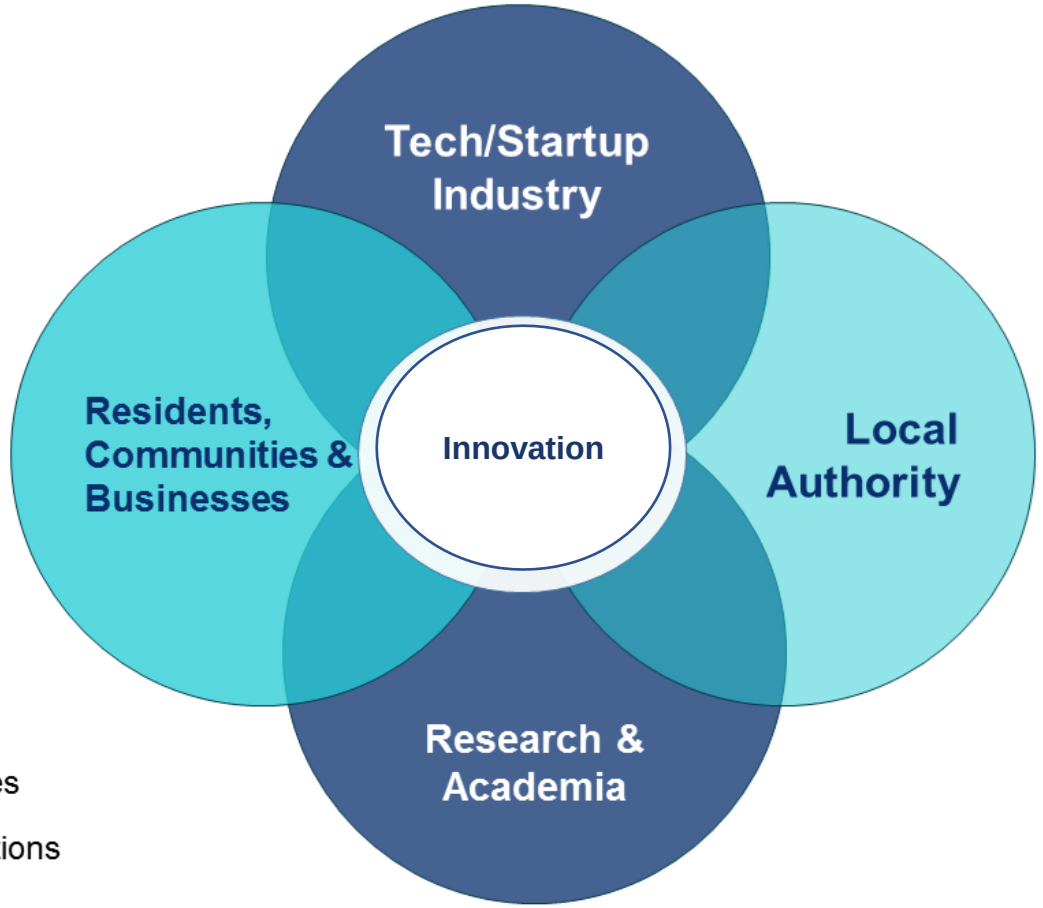
@jcudden

www.smartdublin.ie

Jamie Cudden – Smart City Lead, Dublin City Council

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

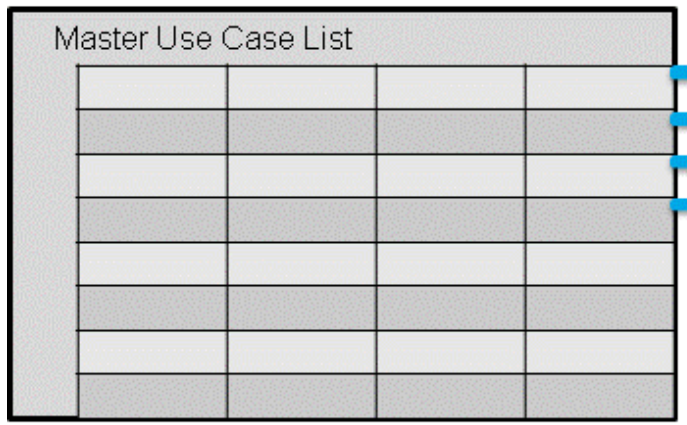
Our goal is to help future-proof Dublin by trialling and scaling innovative solutions to a wide range of local challenges



Drones
5G
IOT
Digital Twins
EDGE computing
Future Mobility
AI
Emerging Tech

Take a challenge based approach

Challenges



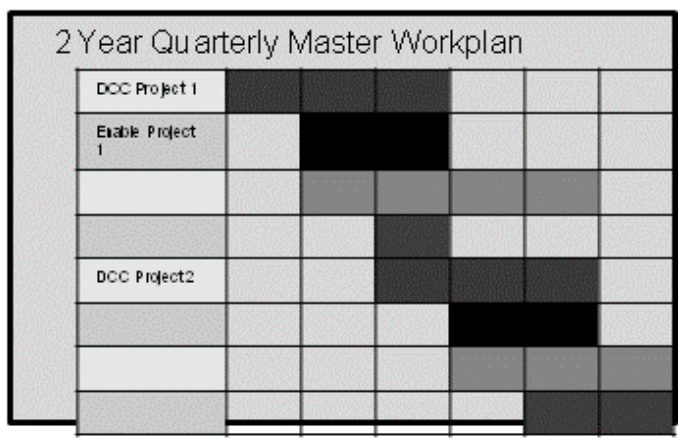
Use Case Selection and Prioritisation Process

Use Cases

Use Cases

Use Cases

Multi Year Workplan



Theme		Sub-Categories
Movement & Flows	→	Congestion, traffic, origin/destination, deliveries
Environmental	→	Water quality, air quality, noise pollution, waste
Extreme Weather	→	Flooding, snowfall etc
Sustainable Mobility	→	Walking, cycling, public transport, shared mobility, EV, MaaS
Physical Infrastructure & Assets	→	Quality of road surface, accessibility of sidewalk, mapping of assets
Energy	→	Metering, Smart grid, renewables, SECs
Vibrant Economy	→	Tourism/Events - orientation, 3Arena, CCD, CHQ, Aviva, Dublin Port Cruise
Connectivity & Networks	→	5G, 4G, LPWAN, IoT Networks, coverage gaps, network planning
Safety/Security	→	Crime, anti-social behaviour, perception of safety
Citizen Engagement / Connected Citizen	→	Citizen sensing, engagement, crowd sourcing, apps
Social	→	Skills, housing, unemployment

SMART DUBLIN

Collaboration model

Google Microsoft mastercard AT&T Deloitte. accenture

ARUP JACOBS IBM intel THE DIGITAL HUB CISCO sgi HUAWEI

Research Centres:

Insight The Programmable City ICHEC CONNECT Centre for Future Networks

lero THE IRISH SOFTWARE RESEARCH CENTRE Pervasive Nation enable connecting • communities

Higher Education:

DIT DCU UCD DUBLIN

Maynooth University National University of Ireland Maynooth Trinity College Dublin The University of Dublin

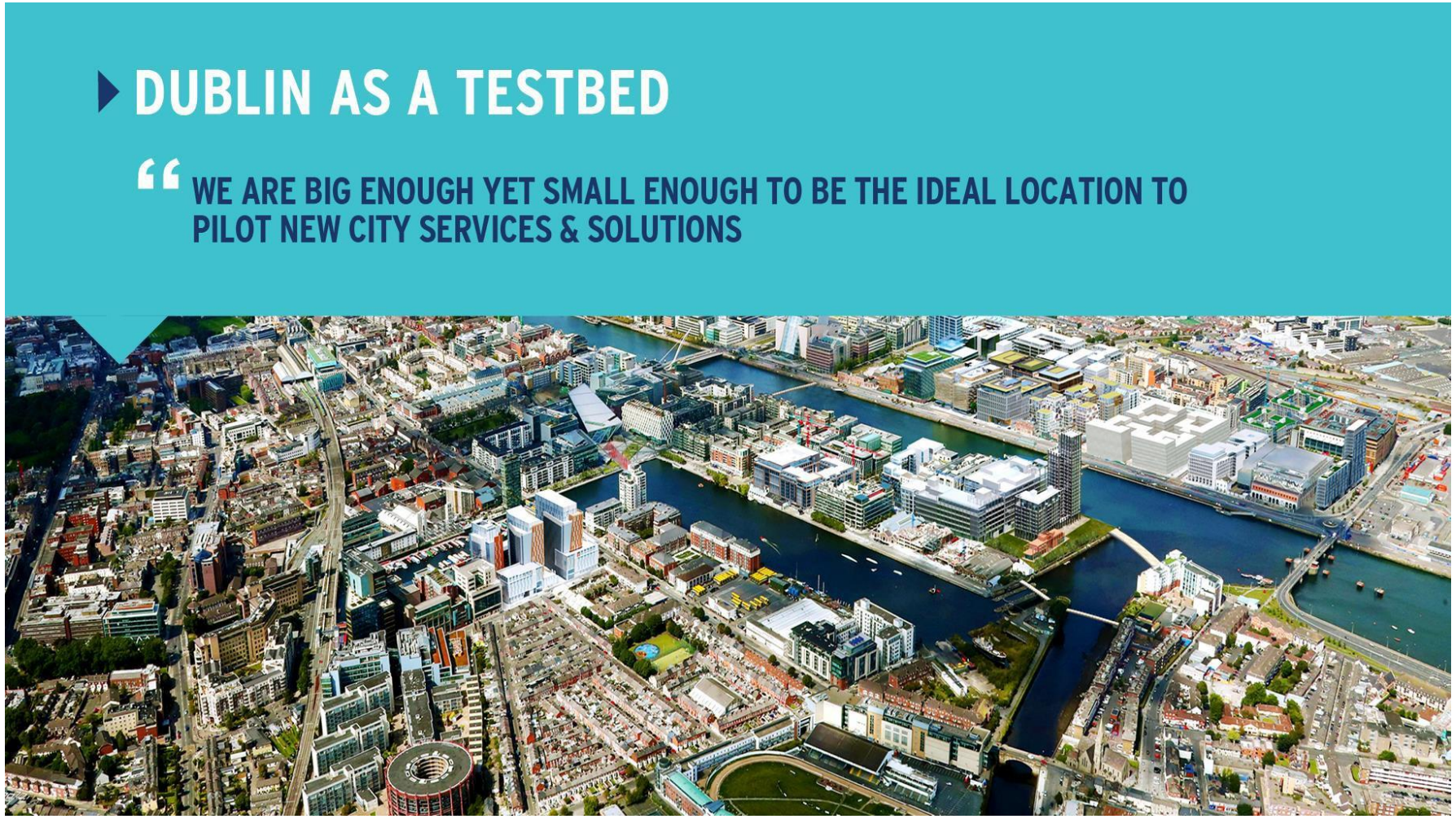
State Agencies:

IDA Ireland ENTERPRISE IRELAND

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND sfi SCIENCE FOUNDATION IRELAND

Delivering real projects – accelerated deployments

- Cities are big and messy and difficult to drive change
- Comfort in starting small
- Getting buy in
- Get stuff done
- Make it real…..
- Dublin is faster than anywhere else…



Smart Dublin Districts

City Testbed

Telecoms/Connectivity
IoT

Business District

Mobility
Research

Campus Testbed

Mobility
3D / Digital Twins

Regional Town

Community
Public Realm

City District

Health
Wellbeing

> Dublin's smart districts helped to accelerate its smart city development by ensuring that these solutions are feasible and attend to the priorities of the area they are serving.

"Dublin has developed a reputation for its smart city programme and this has been recognised in the latest Eden Strategy Institute's Smart City rankings. Dublin ranked 26th in the world, up 15 places on the previous year. Its highest scores were achieved for 'Leadership' and 'Innovation Ecosystem', with particular attention paid to the establishment of smart districts in the Dublin region to testbed innovations & partnerships"

SMART DOCKLANDS
A Smart Dublin District

CONNECT

0 na bl e
connecti g • communities

Part of
SMART DUBLIN

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Wi Fi

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0

DARK FIBER

novegen

'r/ sigfox

LoRa

5G

4G

TOP 5 FDI STRATEGY

RANK	CITY	COUNTRY
1	Smart Docklands	Ireland
2	Vilnius	Lithuania
3	Hamburg	Germany
4	Bogotá	Colombia
5	Stratford	Canada

FT FINANCIAL TIMES

tMi Intelligence

SMALL CELL AWARDS SCF 2019

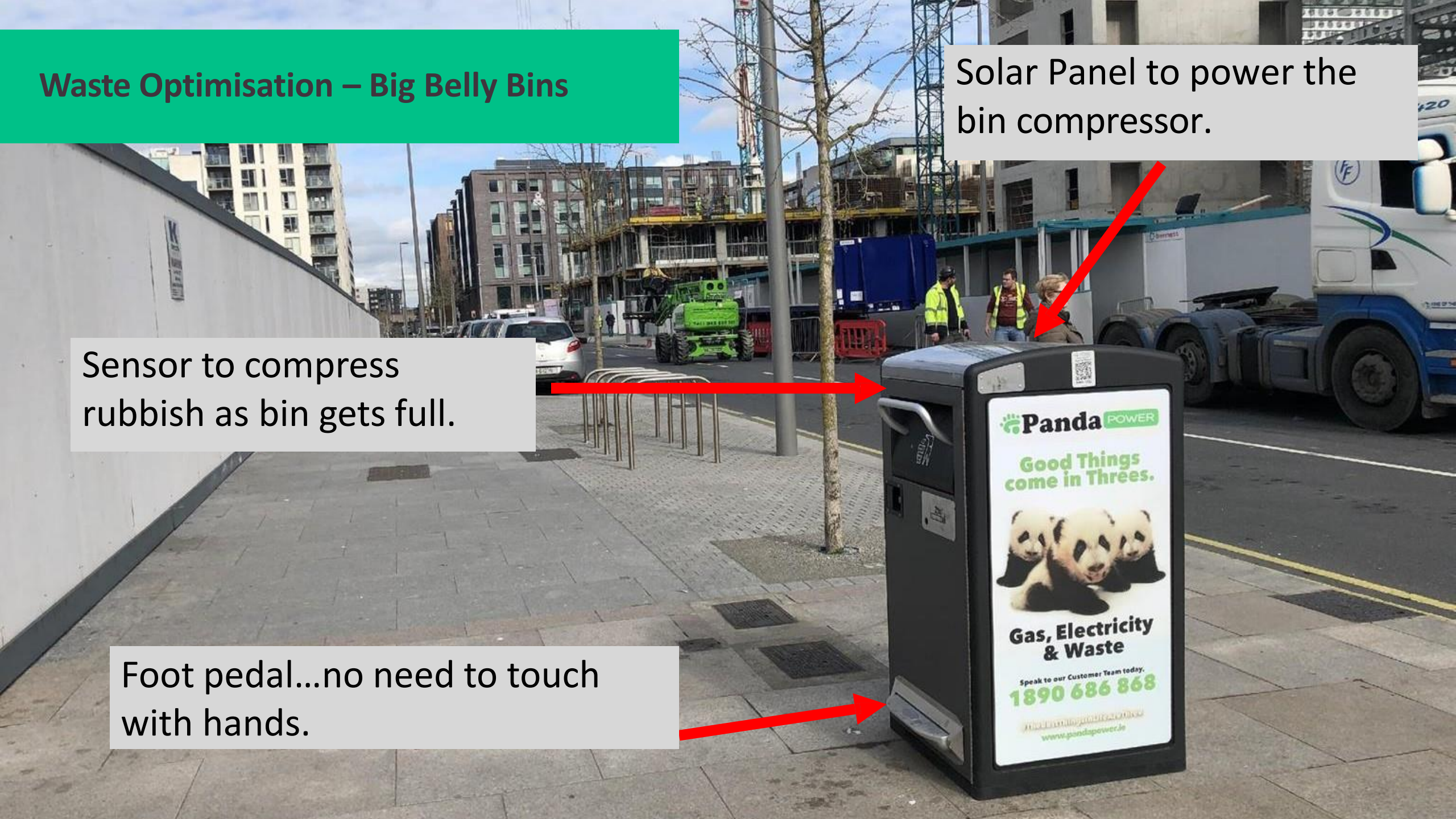
Home / Citizen Engagement

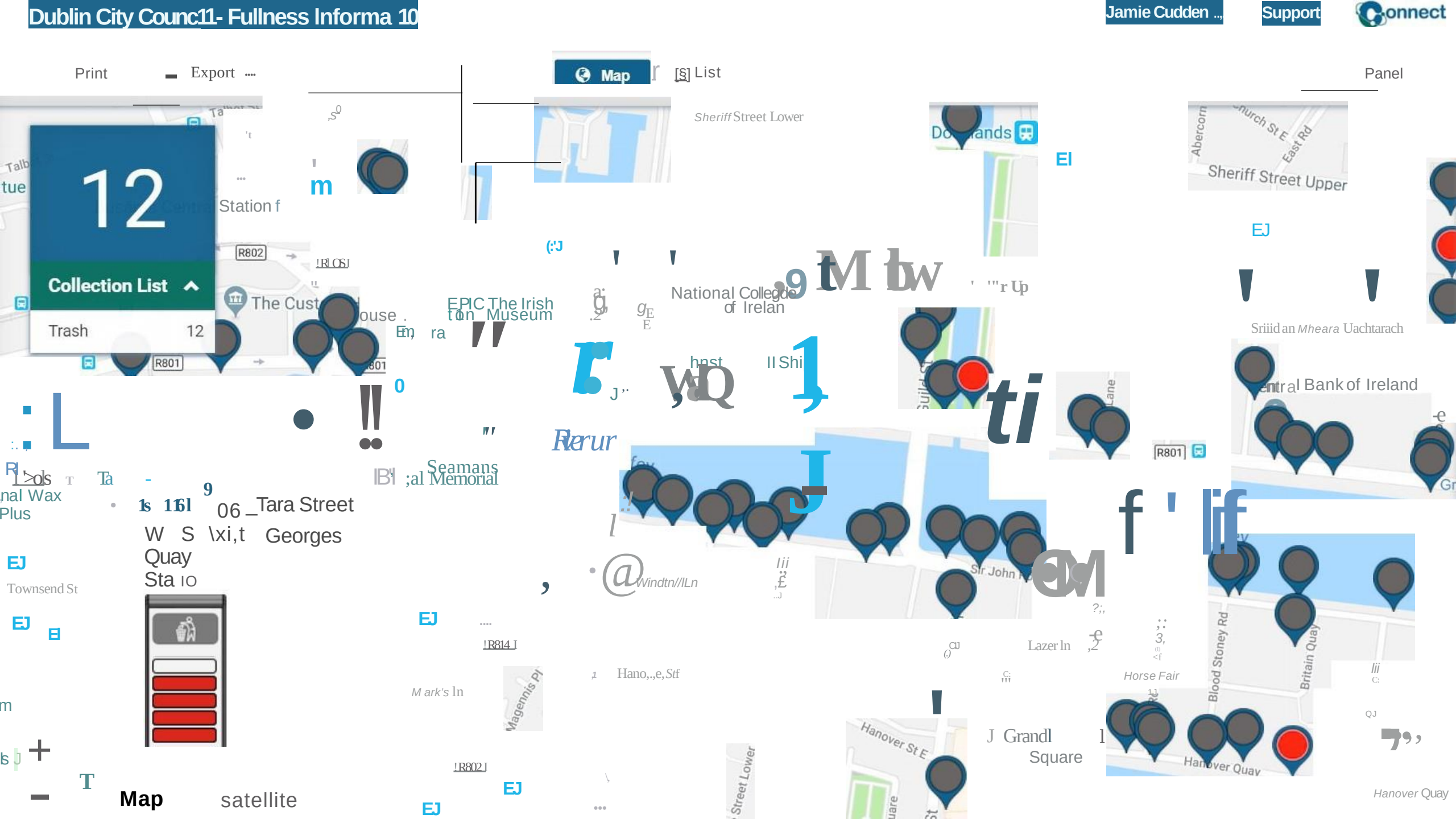
Dublin's Docklands becomes a centre for innovation

17th April 2019 Jonathan Andrews

Smart Office Optimisation
5G Mobile Indoor
Smart Bike Stands
Smart Bench
3D AR VR Model
Cyclist Prioritisation at Junctions
5G Mobile Outdoor
Smart Bins
Flood Prediction
Smart Gully Monitoring
Air Quality Sensing
Smart Bike Light

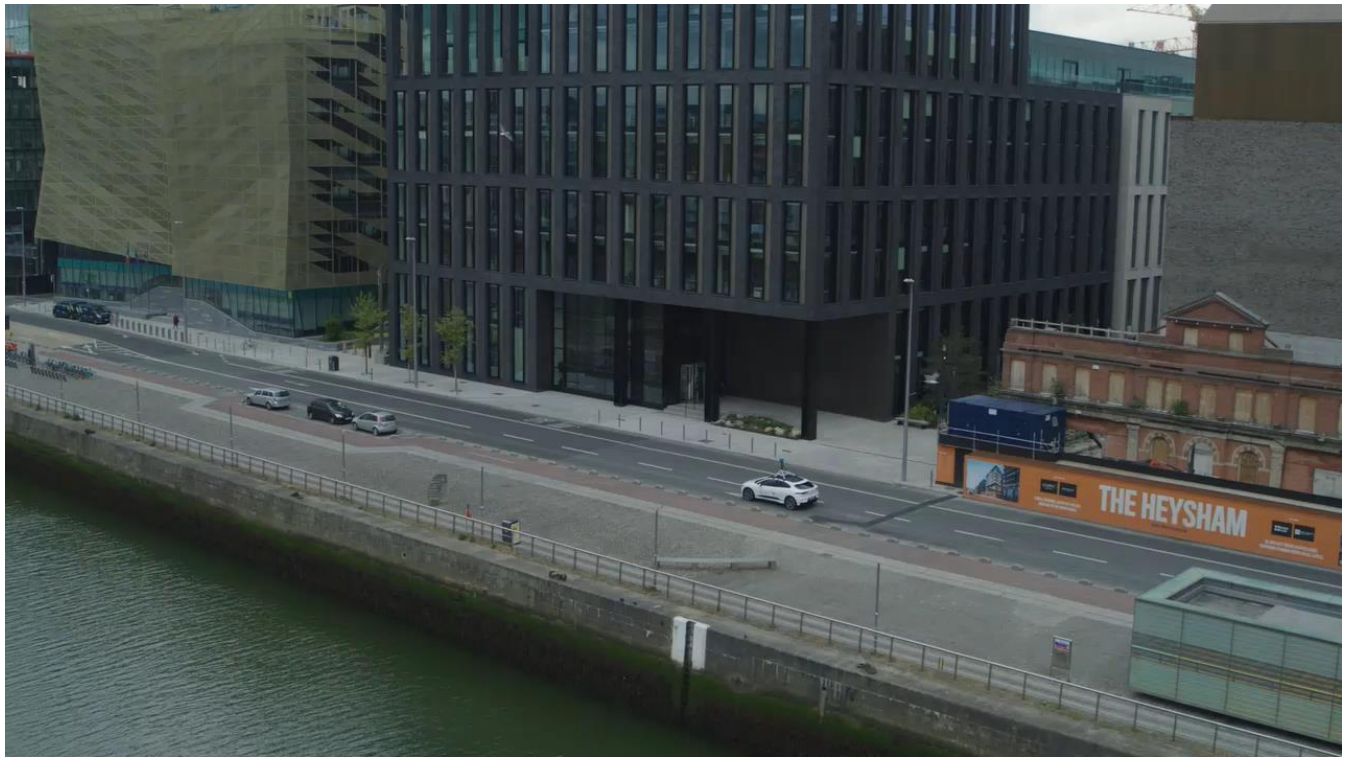
Waste Optimisation – Big Belly Bins




Dublin City Counc11- Fullness Informa 10
Jamie Cudden ...
Support
Connect
Print
Export ...
Map
List
Panel
12
Collection List
Trash 12
Sheriff Street Lower
Sheriff Street Upper
Station f
The Cust
EPIC The Irish
Museum
National College of Irelan
Sriiid an Mheara Uachtarach
Bank of Ireland
Seamans
Memorial
Tara Street
Georges
Quay
Sta
Townsend St
Windtn//ILn
Sir John
Lazer ln
Horse Fair
Blood Stoney Rd
Britain Quay
Hanover St E
Grandl
Square
Hanover Quay
Hanover Quay
Mark's ln
Magennis Pl
Street Lower
Map
satellite

A LIFELINE...
TALK TO US
PLEASE
do not vandalise
this lifesaving
device. It may be
eeded to save
YOUR life
someday.

Google Airview – First streetview EV-car



All of us can go on our smartphone and get the weather. But what if you could scroll down and see what the air quality is on the street where you're walking?

Karin Tuxen-Bettman

"As the virtual and physical worlds converge, the metaverse – comprised of digital twins, simulated environments, and mixed reality – is emerging as a first-class platform, and traction is being seen across the public and private sectors. Bentley Systems is building a digital twin of the city of Dublin to reimagine urban planning using Microsoft Azure Digital Twins and Azure IoT" (Internet of Things)".

Microsoft CEO - Satya Nadella highlighting Dublin's collaboration on a Q1 Microsoft earnings call – May 2021

ACADEMY OF THE NEAR FUTURE

A Smart City Tech Programme for students and upskillers.

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

CONNECT
SFI Research Centre for Future Networks

SMART DOCKLANDS
A Smart Dublin District

Fondúireacht Eolaíochta Éireann sfi Dá bhfuil romhainn

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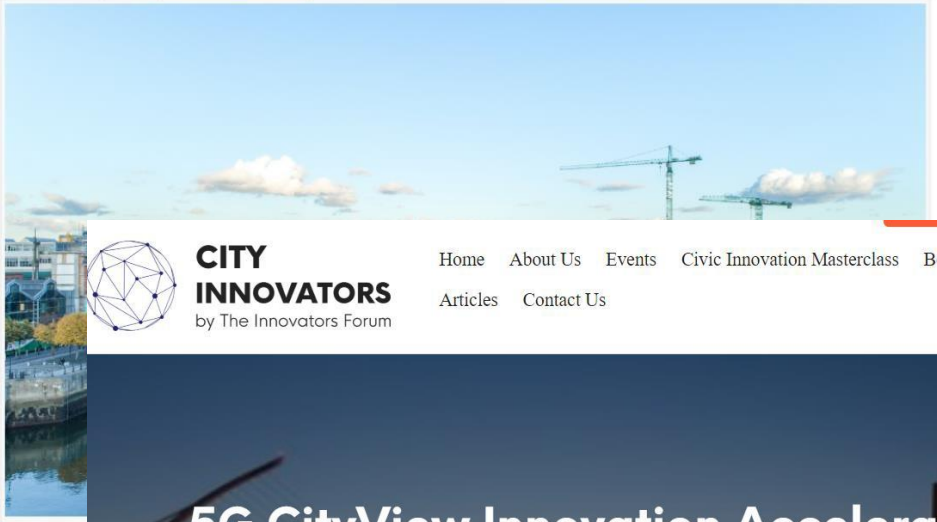
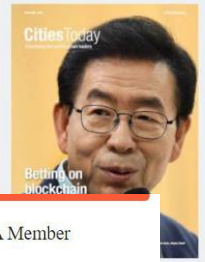
Dublin to test 'neutral' 5G network

21st February 2019 Jonathan Andrews



Latest Issue



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CITY INNOVATORS
by The Innovators Forum

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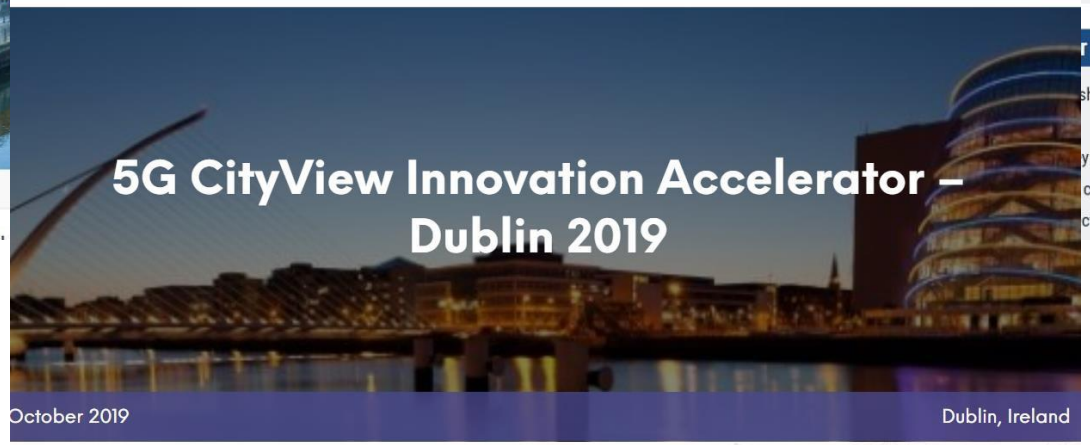

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SMART DUBLIN
DENSE AIR
accenture
NOKIA

FORA

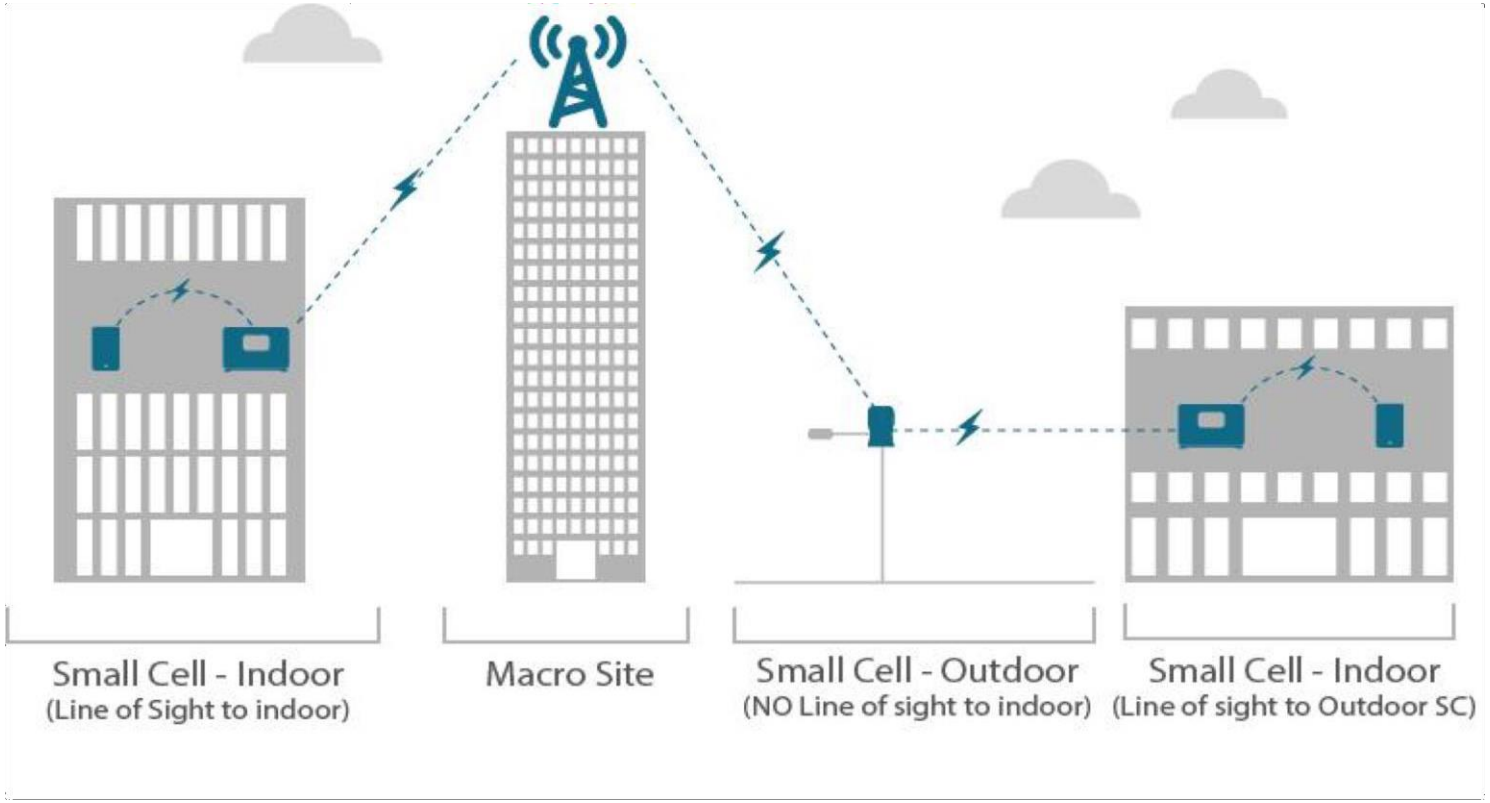
Dublin's docklands could be turned into a playground for testing 5G technology

The city council hopes a 'small cells' network will be available for use by native and international firms.

BY ZUZIA WHELAN REPORTER, FORA
FEBRUARY 18TH 2019 | 3 MIN READ

Smart Docklands - Small Cells

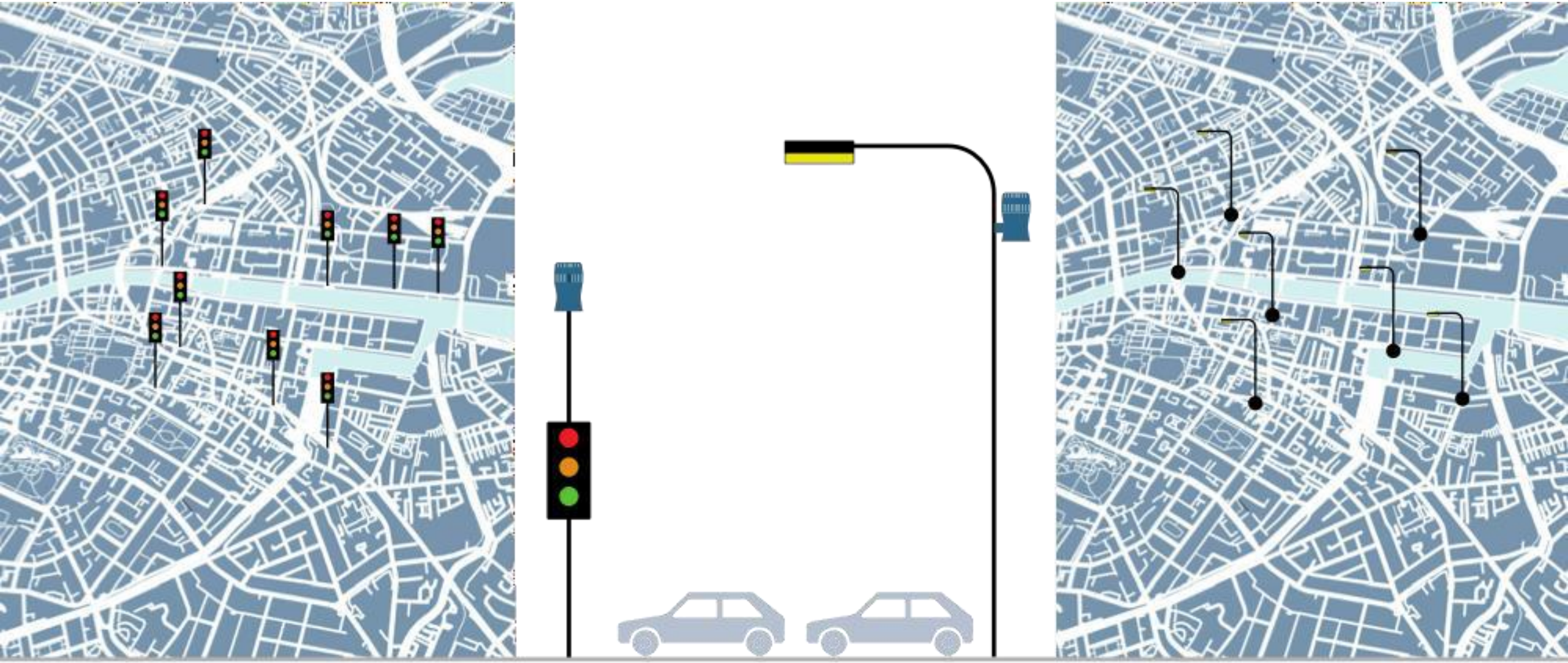
DENSE AIR
Mobile Networks Enhanced and Extended



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

CONNECT
Networks of the Future

Neutral Host – Small Cell – 5G Trial Network



Outdoor Densification...

Utilising DCC Street assets, providing a pervasive layer, enabling smart city services

DENSE AIR

GAS
P

5G and Future Connectivity

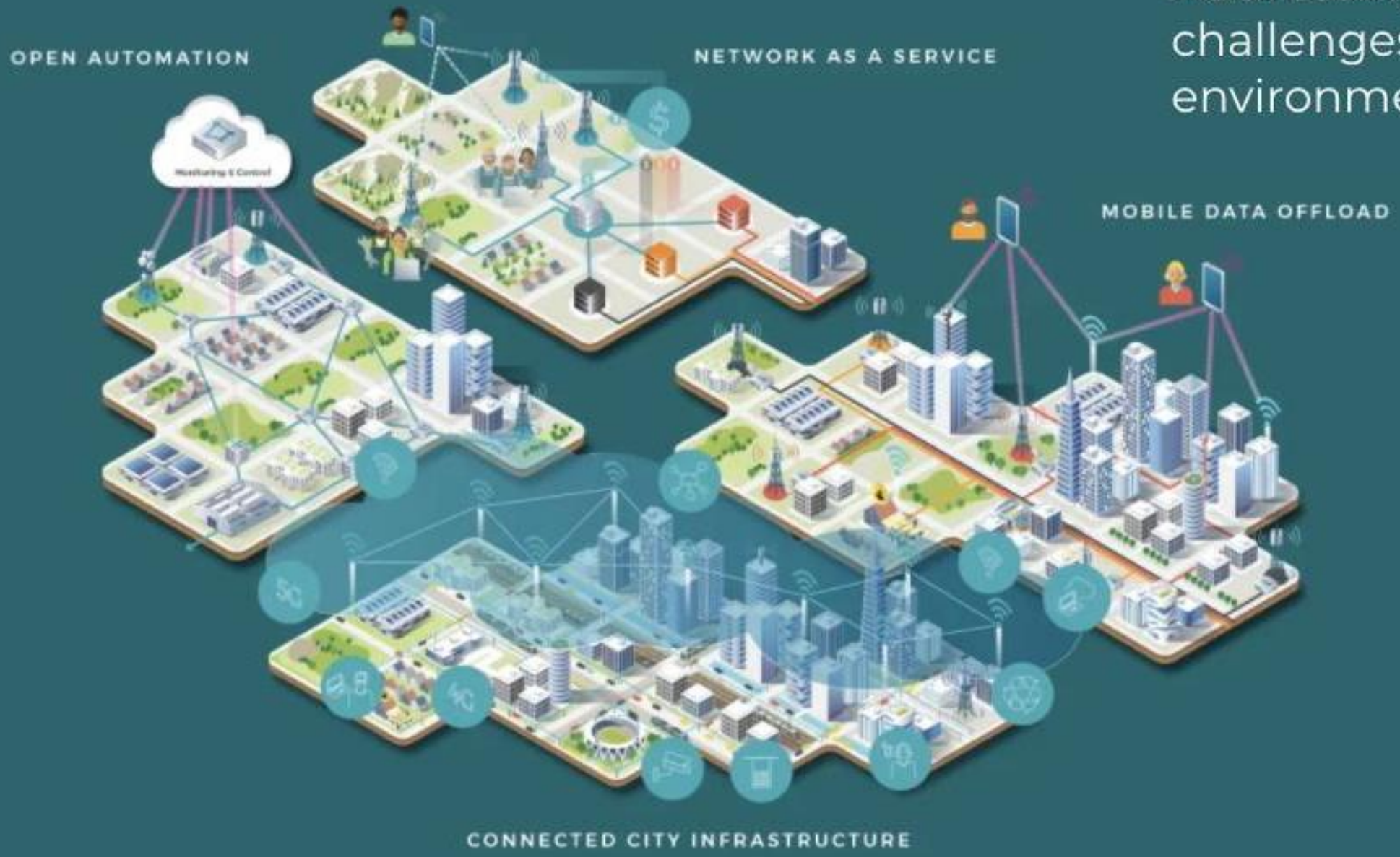
An Emerging Framework for Irish Cities and Towns

DISCUSSION DOCUMENT

SMART DOCKLANDS
An Roinn Forbartha Tuaithe agus Pobail
Department of Rural and Community Development
Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council
Sligo County Council
Comhairle Chontae Shligigh
CONNECT

TIP SOLUTION GROUPS

Addressing connectivity challenges in every environment.



STAKEHOLDERS

Stakeholder Map

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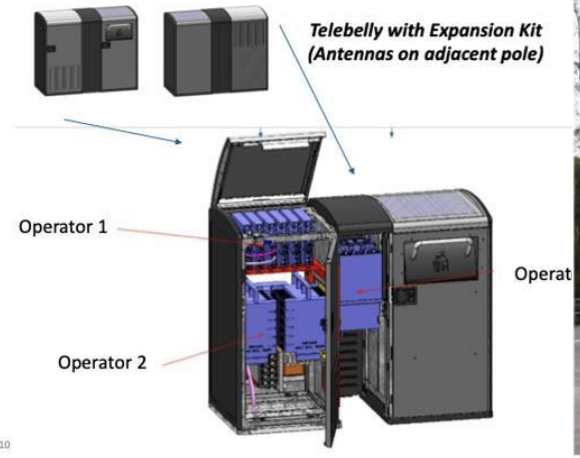
Outlined below are the 6 assets:

1. ‘Smart’ Pole - Ligman
2. ‘Smart’ Pole - Schréder
3. BigBelly - Cabinet, pole and antenna
4. BigBelly - As a cabinet
5. Standard Pole - Retrofit equipment to existing asset
6. Standard Pole - Retrofit to new standard pole



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Telebelly Multi Carrier Solution

Use Case Spotlight

Telebelly with Expansion Kit (Antennas on adjacent pole)

Operator 1

Operator 2

Operator 3

Telebelly cabinet before radios

- -Any fan modules Installed
- Operator 1 shelf and bracketry
- Operator 1 shelf and bracketrv
- ""-ombin er/ SAROplate installed

Sráid Uí Chonaill
O'Connell Street
Ard-Oifig an Phoist
General Post Office
Sráid Anraí
Henry Street
14 Sráid Henrietta
14 Henrietta Street
cct | College Dublin
WESTIN
MORELANDS GRILL
MORELANDS GRILL

cct | College Dublin
MORELANDS GRILL
MORELANDS GRILL

WIFI4EU Locations

In 2019, members of the public were invited to suggest locations where the free public WiFi should be installed. **Dublin City Council** received over 50 applications to access the **WiFi4EU** supports and are working with **Virgin Media** to install over 30 WiFi hotspots over the coming the weeks. Some of the locations involved are shown in map below.

- “The Wifi4EU programme will support connectivity in areas of the city that need it most with a particular emphasis on strengthening community engagement and supporting wider digital innovation initiatives”

Artane Coolock Family Resource Centre

Sean O'Casey Community Centre

Ballymun Axis Centre

YMCA Aungier Street.

SMART DUBLIN

Virgin media BUSINESS

Basketball Club

Football Club

Youth Service

Addiction Support Service

Youth Service

Elderly People Support Group

OpenRoaming
Wireless Broadband Alliance

World WiFi Day

Keep our city, communities and families connected.

Ag cruthú nasc a dhéanann difríocht

Virgin media BUSINESS

WiFi4EU

SMART DUBLIN

Rialtas na hÉireann
Government of Ireland

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

smartdublin.ie

World Wi-Fi Day

Ireland AM ♡

This morning we're joined by three woman who are doing incredible work for three different charities across Dublin and who are benefitting from free Virgin Wi-Fi

Connected Gallery – Hugh Lane Gallery

HUGH LANE
dublin

THE IRISH TIMES

Mon, Jun 28, 202

Dublin city centre pedestrian scheme to start this month

Areas around Grafton Street will become car-free to allow outdoor dining

Thu, May 6, 2021, 11:50 | Updated: Thu, May 6, 2021, 11:52

Olivia Kelly Dublin Editor

https://tre lo.com/b/1880 9azF/smart-dublin-project-board

Smart Dublin Project Board *

Personal &> Public

Show Menu

Smart Dublin & Smart

Smart Dublin

Smart Docklands

SMART SANDYFORD

SmartSandyford

Smart DCU

Smart Environment

Google Environmental Insights Explorer: Oata•dri ven Decision Making

GULLY MONITORING

Gully Monitori ng: Co-creating Solutions to Manage Flood Risks

Flooding Innovation Project: Real• Time Data for the Dublin Region

Smart People

The Dub li n Beat: Understanding Citizen Sentiment

Unheard Voices: Reaching Previously Unheard Communities

Grant Applications : Digital First, Always Accessible

Smart Mobility

SMART MOBILITY HUB

Smart Mobility Hub: Sustainable Mobility Innovation

Free Now Match Pilot: Optimising Taxi Usage

LAST MILE DELIVERY

Mileast Delivery Urban Deliveries Innovating

Smart Bike Lights: Crowdsourcing

Smart Economy

MyOoorStep: Bringing Vital Information to Citizens

lDub n Economic Monitor: yAna g Dublin's Performance

Smart Bins: Optimising and Innovating Waste Management

Smart Government

Dublinked Dub lin's Open Data Store

Drones : Managing our City's Skies

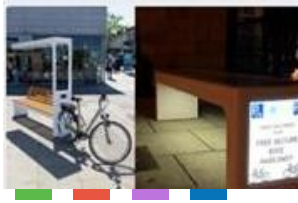
Dock land s 30 Vir tual Model: Future Planning & Ci tizen Engagement

Future Networks: roT for Asset Management

Smart Living

Connected Life Buoys: Reduci Theft and Saving Lives

Route4U: Just 30 Seconds and Smart Phone Can Improve Accessibility



Smart Street Furniture: Reimagining *out* Public Realm

WiFi4EU : Connecting Communi

SMART DUBLIN

Jamie.Cudden@dublincity.ie

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Public Wi-Fi Needs More than Just a Simple Boost to Support the Inequities in the New-Era Digital Divide

MORNÉ ERASMUS

Director, Smart Spaces

CommScope

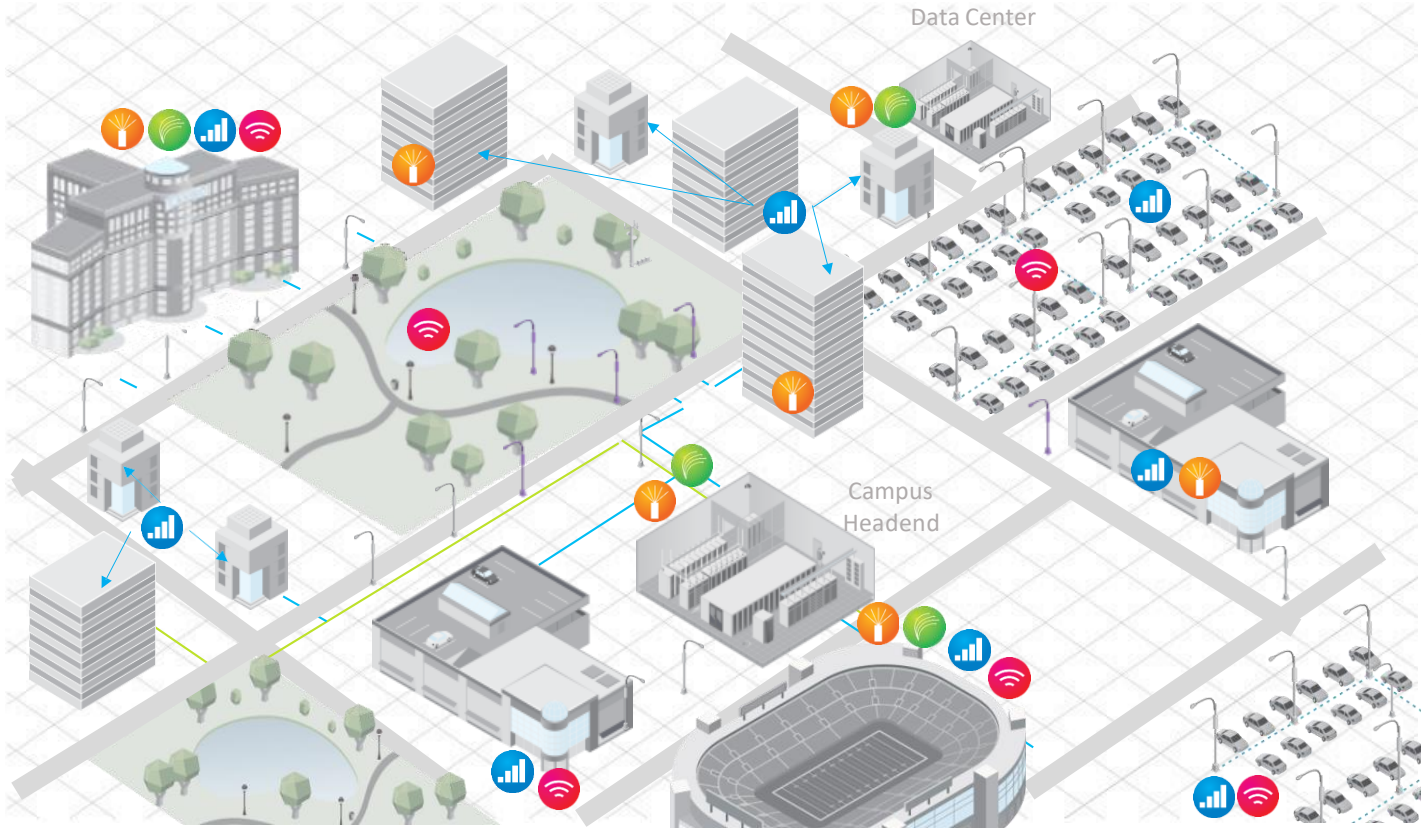
WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

Public Wi-Fi needs more than just a simple boost to support the inequities in the new-era digital divide

30 June 2021

Presented by: Morne Erasmus
Director Smart Spaces

CommScope is a global infrastructure provider



Wireline Networks

- Copper
- Fiber

Wireless Networks

- DAS
- Small Cell
- CBRS
- Wi-Fi
- IOT

Concealment solutions

- Smart Poles

- **Services**
- **Eco Partners**

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CONNECTIVITY IS EVERYWHERE.

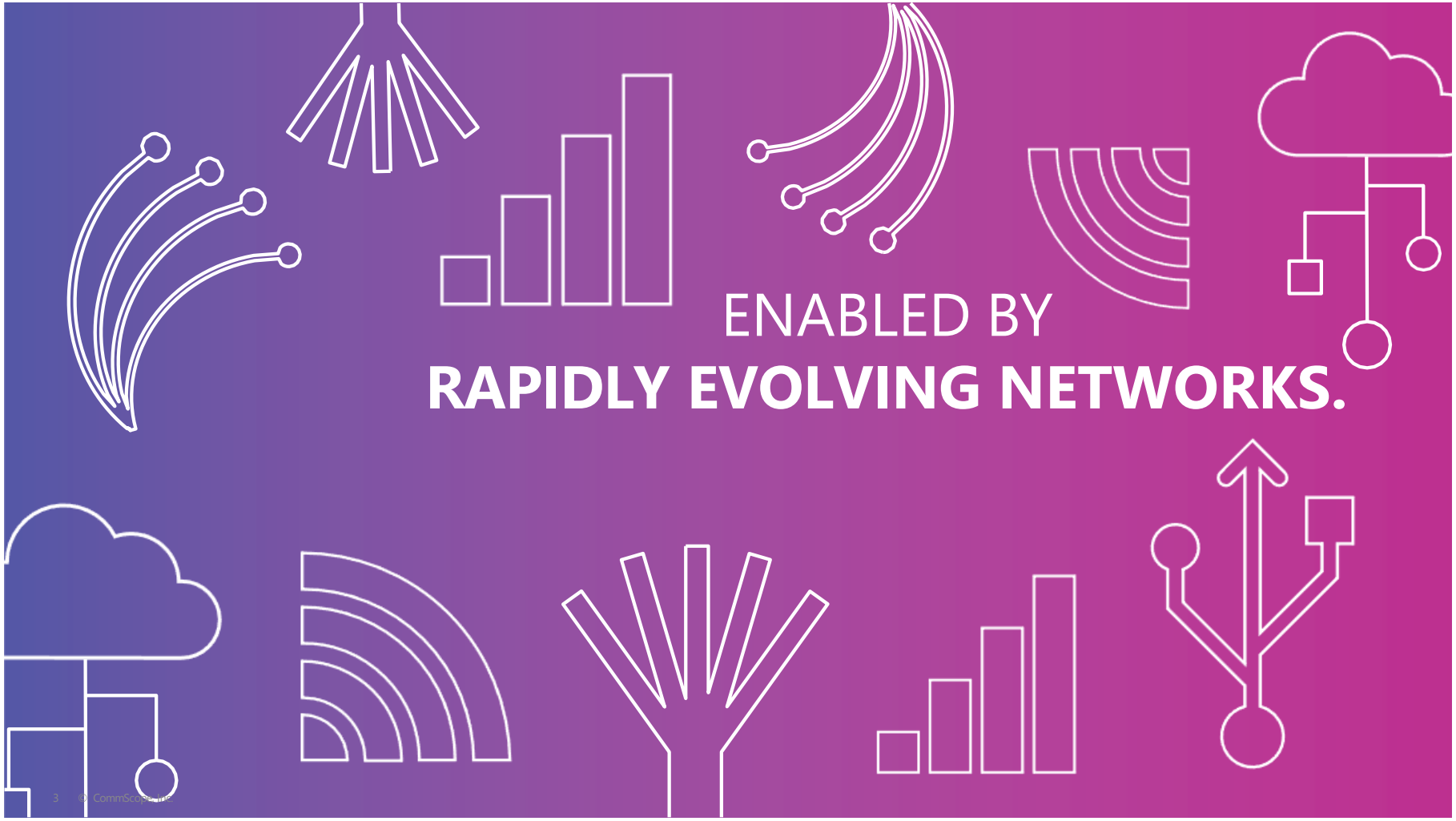
IN AN INTERNET MINUTE

4.1 MILLION
GOOGLE SEARCHES

764,000 HOURS
NETFLIX VIDEO WATCHED

$1,1MILLION USD
SPEND ONLINE

1,6 MILLION
SWIPES



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The Digital Shift

Driving Smart Connections

- Security Cameras
- Public Wi-Fi
- Cellular Coverage
- Private Networks
- IoT
- Mobile Edge Computing
- EV Charging
- Digital Kiosk
- Smart Poles

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Tough times are a catalyst for change

Our Customers' 20/21 Plans Did Not Materialize

Workers & Workplaces	Learning & Teaching	Healthcare Systems
Disrupted	**Interrupted**	**Put to the test**
Travel & Hospitality	**Supply Chains**	**Daily Interactions**
Grounded	**Challenged**	**"Socially distanced"**

Our Communities & Industries Are Looking For Creative Ways To Cope & Emerge Stronger

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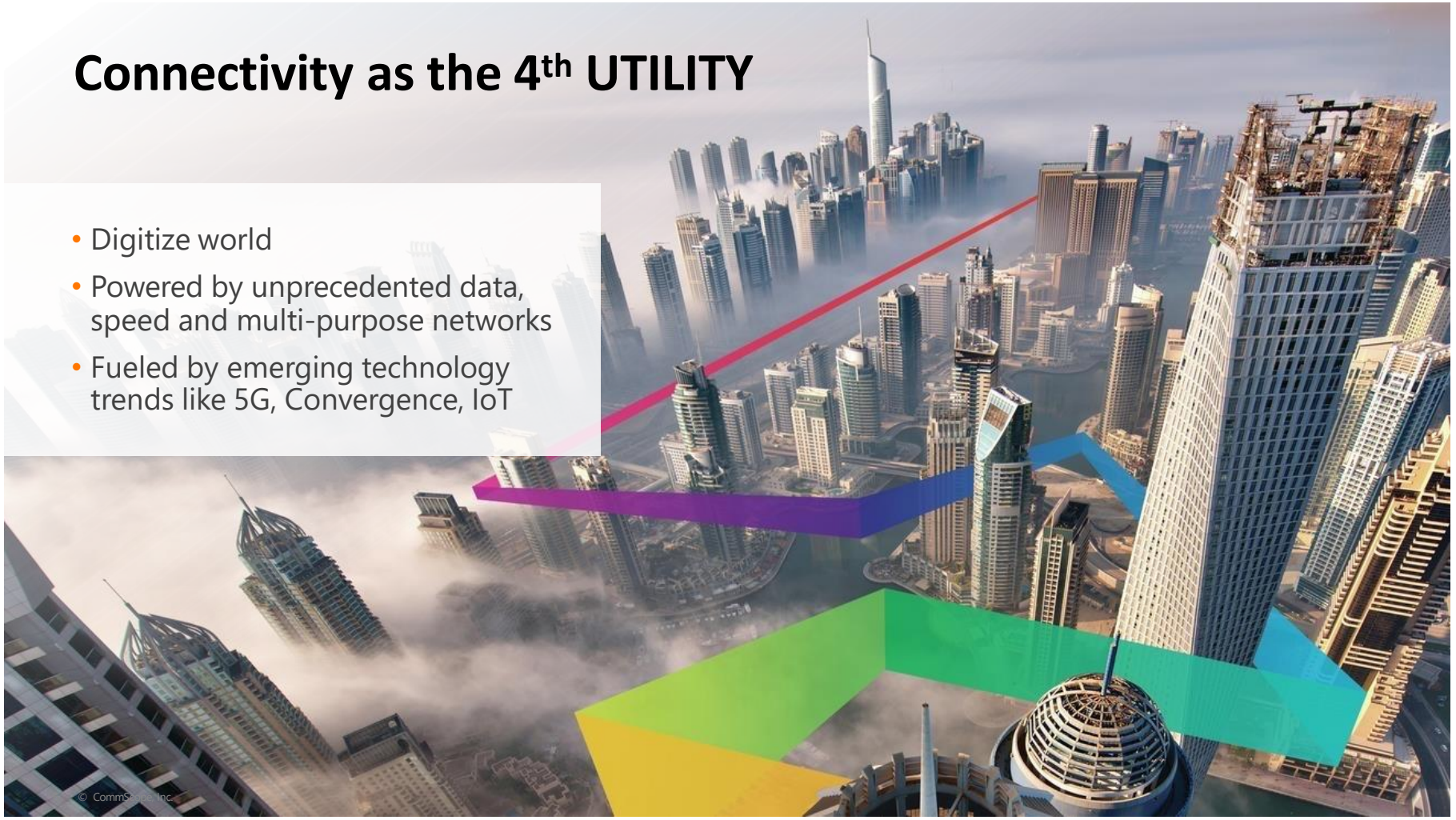
Connectivity as the 4th UTILITY

- Digitize world
- Powered by unprecedented data, speed and multi-purpose networks
- Fueled by emerging technology trends like 5G, Convergence, IoT



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Key challenges with public Wi-Fi deployments

- Backhaul & Power
- Site Location & Concealment
- Funding
- Convergence - Build smarter not just more networks!

COMMSCOPE

Backhaul

- Bandwidth consumption growing exponentially
- More spectrum & wireles edge devices = more backhaul capacity
- Look for smart ways to co projects like EV charging

#smartconnectivity

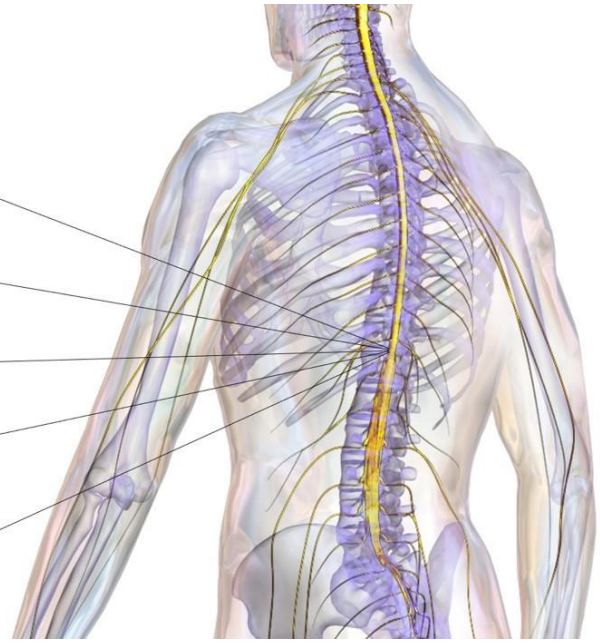
Copper Cable Networks

Fiber Networks

Licensed Wireless

Unlicensed Wireless

Private Networks



Bandwidth consumption

6E

10G

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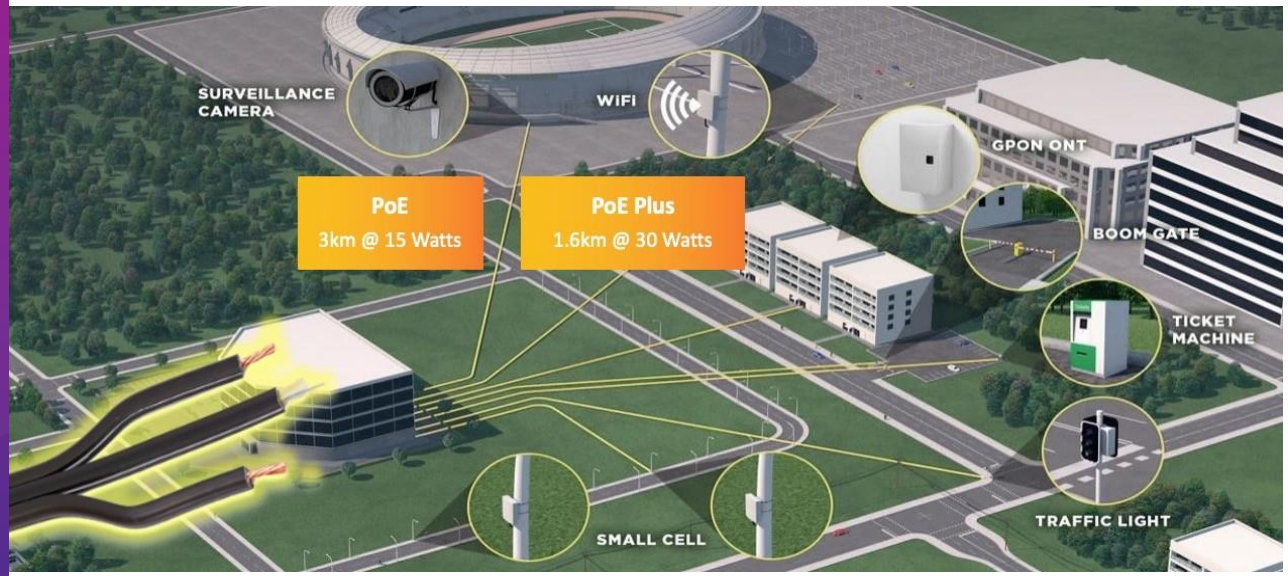
Power Supply

- Every edge device needs power
- More applications per edge device drive critical hardware & infrastructure
- Reliability, concealment and always ON culture

Shift to critical edge devices requiring backup power



Powered fiber cable solutions

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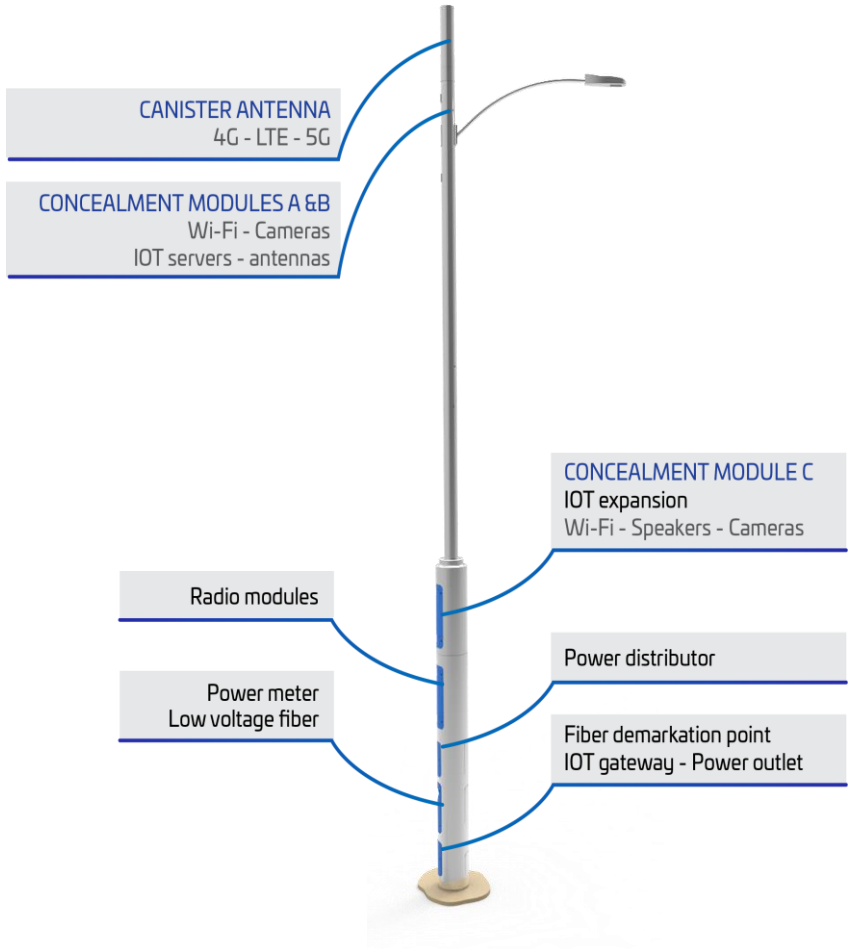
Site Location

- Where will we locate all these edge devices?
- Modular Smart Poles
- Street furniture



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Funding

- Evaluate the ROI on Economic, Political and Social benefits
- Hard to monetize / self fund public Wi-Fi
- Federal money helped jumpstart projects and proof success
- Urban vs Rural challenges

US FEDERAL FUNDING ASSISTANCE:
COVID Stimulus Funding Sources

Source	Total	IT Oppty
CARES Act	$2.2T	$26B
Consolidated Appropriations Act (H.R. 133)	$900B	$143B
American Rescue Plan	$1.9T	$639.1B

	PRIMARY EDUCATION	HIGHER EDUCATION	STATE & LOCAL GOV'T	TRANSPORTATION	HEALTHCARE	
	$59.2B	$22.7B	$7B	$45B	$9B	Consolidated Appropriations Act
	$128.5B	$39.6B	$372B	$38B	$61B	American Rescue Plan

The Need is Great, State Budgets have been Decimated, Federal Funding is Critical

- Advertising to offset cost
- Wi-Fi as amenity to win advertising rights
- Asset for 5G deployment
- Shared infrastructure – IP Video & IoT

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Convergence

Breaking down the silos between multiple:

- Owners
- Networks
- Services

Let’s build a smarter network!

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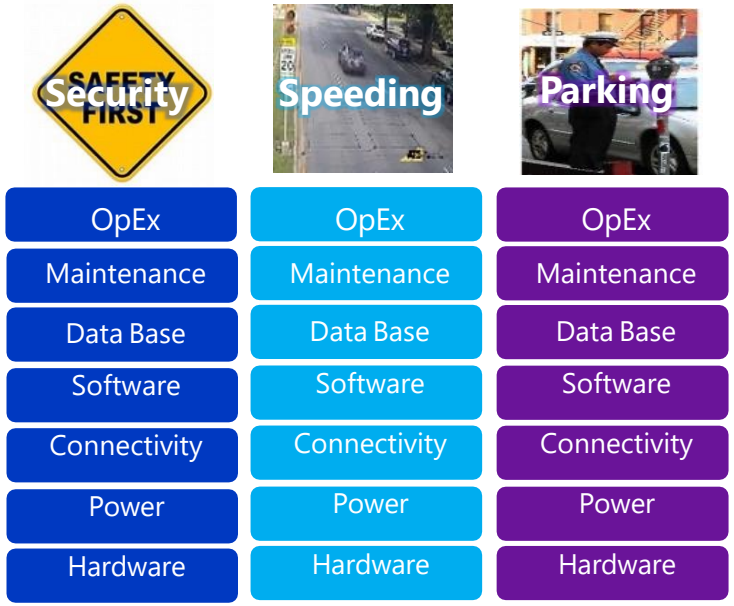
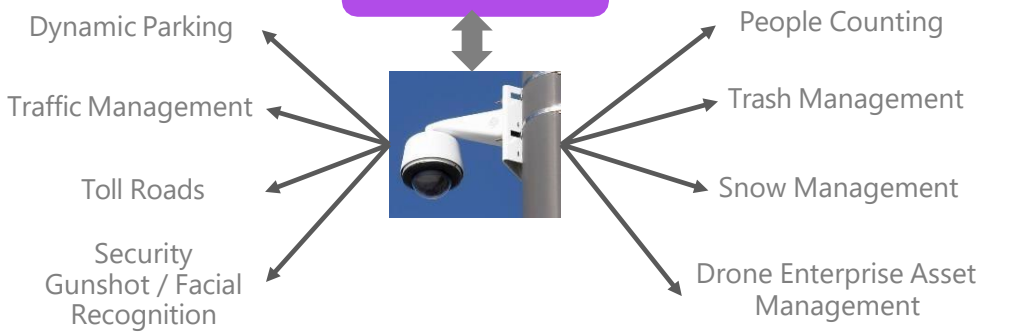
Owners - Silo Applications & Disparate Data Sets



Federated Approach



Smart Cities Creates Economic Opportunities

Open collaboration is more necessary and available than ever before

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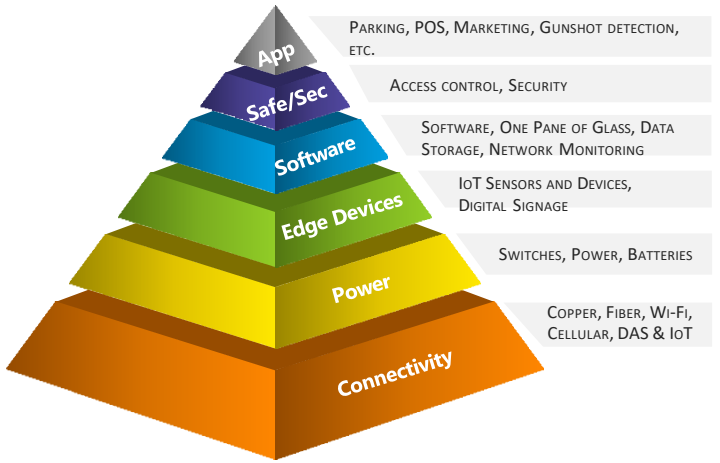
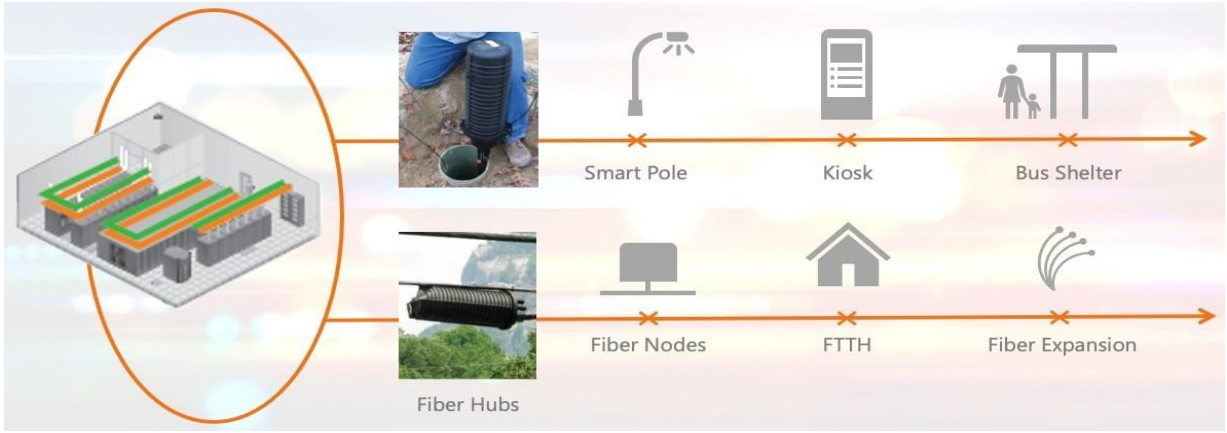
Network Convergence

- Start with connectivity as the foundation
- Fiber to the X network
- Wi-Fi & IoT converged network





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Converged Services

Challenge: Traffic & Parking in the City

Reduce traffic & pollution

- Emission limits are exceeded
- 20 min looking for parking
- 30% of traffic caused by search

Increase lost revenue

- Up to 80% are parking illegally
- Spaces aren't being monetized
- Space management is costly

Reduce Maintenance

Improve OPEX & Monitoring

Revenue generation

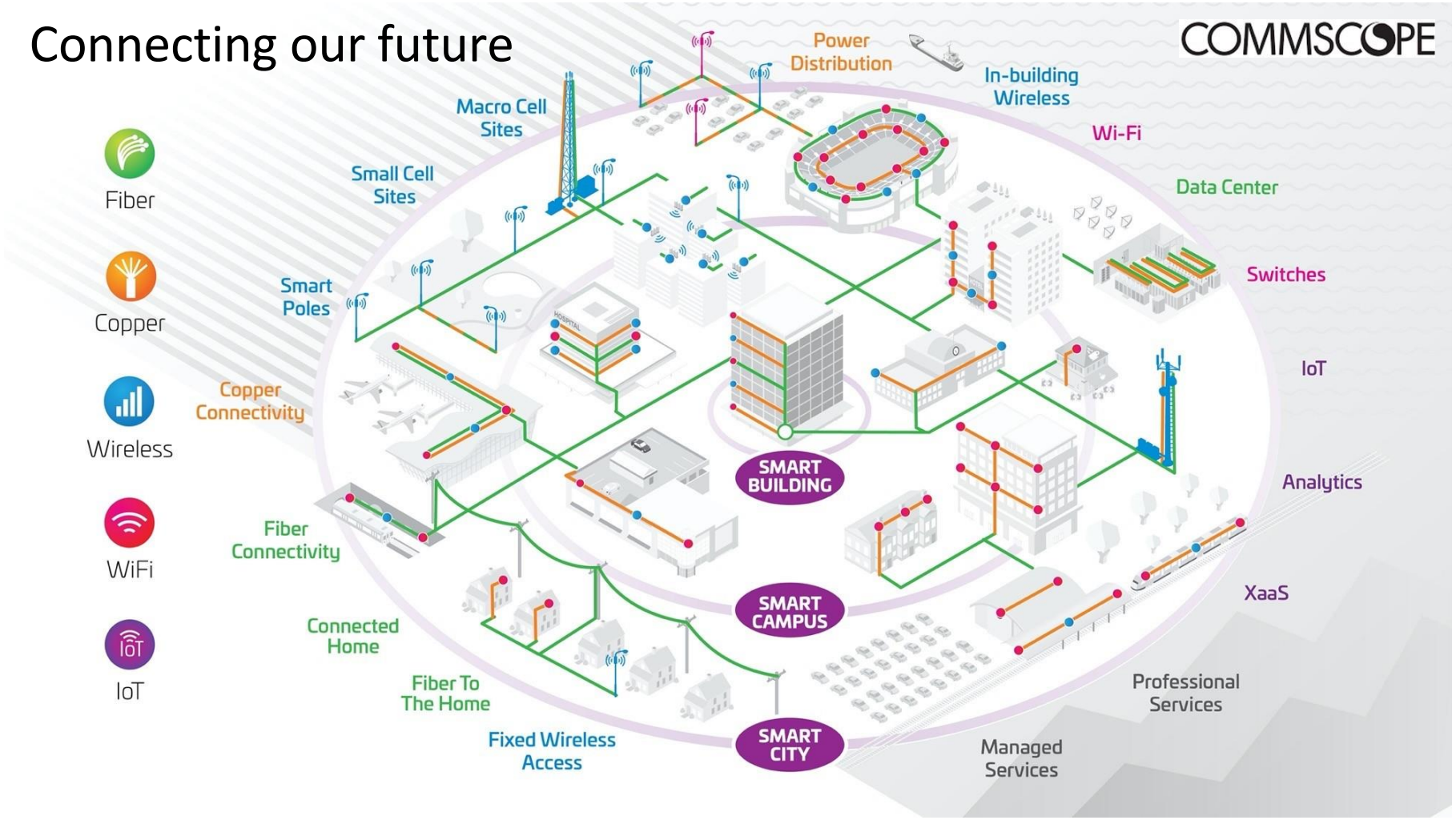
Traffic Route and Parking Optimization

Routing

Parking

Dynamic Price Parking

Connecting our future



WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

Innovation Through Technology: Powering Smart Communities for the Future

MICHAEL J. ZETO III

Senior Vice President, Global Strategy and Emerging Businesses

Boingo Wireless

boingo

INNOVATION THROUGH TECHNOLOGY

POWERING SMART COMMUNITIES FOR THE FUTURE

WBA WIRELESS GLOBAL CONGRESS | June 30, 2021

Michael J. Zeto III
Senior Vice President, Global Strategy and Emerging Businesses, Boingo

WORLD CLASS WIRELESS

FOR THE

WORLD'S PREMIER ENTERPRISES

Boingo delivers unparalleled wireless solutions at iconic venues serving more than

>1

BILLION CONSUMERS ANNUALLY

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A Trusted Partner of Iconic Venues

Leading venues nationwide partner with Boingo for the best in wireless innovation.

World Trade Center
New York, NY

Los Angeles International Airport
Los Angeles, CA

John F. Kennedy International Airport
New York, NY

State Farm Arena
Atlanta, GA

Soldier Field
Chicago, IL

Vivint Smart Home Arena
Salt Lake City, UT

John Wayne Airport
Santa Ana, CA

Salesforce Transit Center
San Francisco, CA

Hollywood Bowl
Los Angeles, CA

Live Nation
Various Locations

boingo

The
Vision
boingo

Connectivity Matters

Today connectivity is a necessity

30 million

Americans cannot reap the benefits of the digital age

$172 billion

The forecasted value of the global telemedicine market by 2026

70%

Of the global population is expected to live in cities by 2050

60%

Of airlines are focused on investing in biometric self-boarding gates

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Powering the Smart Communities

Powering intelligent communities of the future requires identifying the right technology for the right use case.

HEALTHCARE

- Remote diagnosis and treatment
- Home healthcare for disabled populations
- Support aging in place
- Secure data management

COLLEGE CAMPUS

- Touchless access points
- Wi-Fi connectivity
- Remote learning
- Campus safety
- Automated maintenance monitoring

PUBLIC WORKS

- Environmental monitoring
- Smart metering
- Water and waste management
- Weather monitoring stations

TRANSIT HUBS

- Touchless passenger journey
- Advanced security cameras
- Increased connectivity speeds
- Seamless ease-of-use for travelers

RESIDENTIAL

- Distance and remote learning
- Closing the digital divide
- Smart home solutions
- Energy-saving initiatives

OFFICE BUILDING

- Touchless experience
- Smart building solutions
- BYOD
- Predictive maintenance
- Energy monitoring and savings

PUBLIC SAFETY

- Real-time emergence response
- Drone patrol
- Intelligent cameras
- Traffic management
- Digital signage

OUTDOOR SPACES

- Smart outdoor lights
- Detect overcrowding
- Mobile Wi-Fi hotspots
- Food trucks
- Tenant services

STADIUM

- Touchless experience
- Mobile apps
- Wagers/betting
- In-seat ordering
- AR/VR
- Queueing
- Rideshare

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Realizing The Vision

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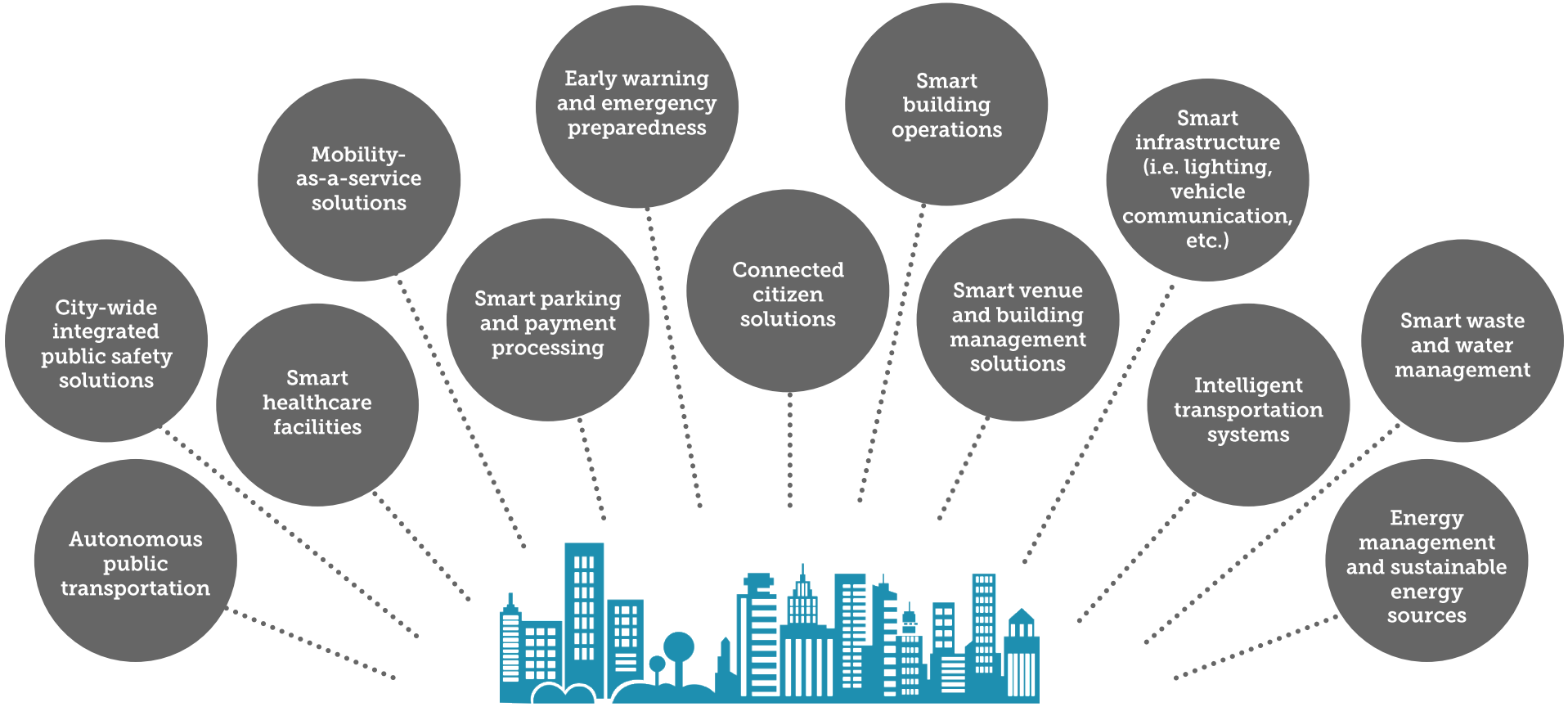
How Do We Get There?

Connecting from the **inside**, **out** with advanced network technologies.



Wireless Solutions

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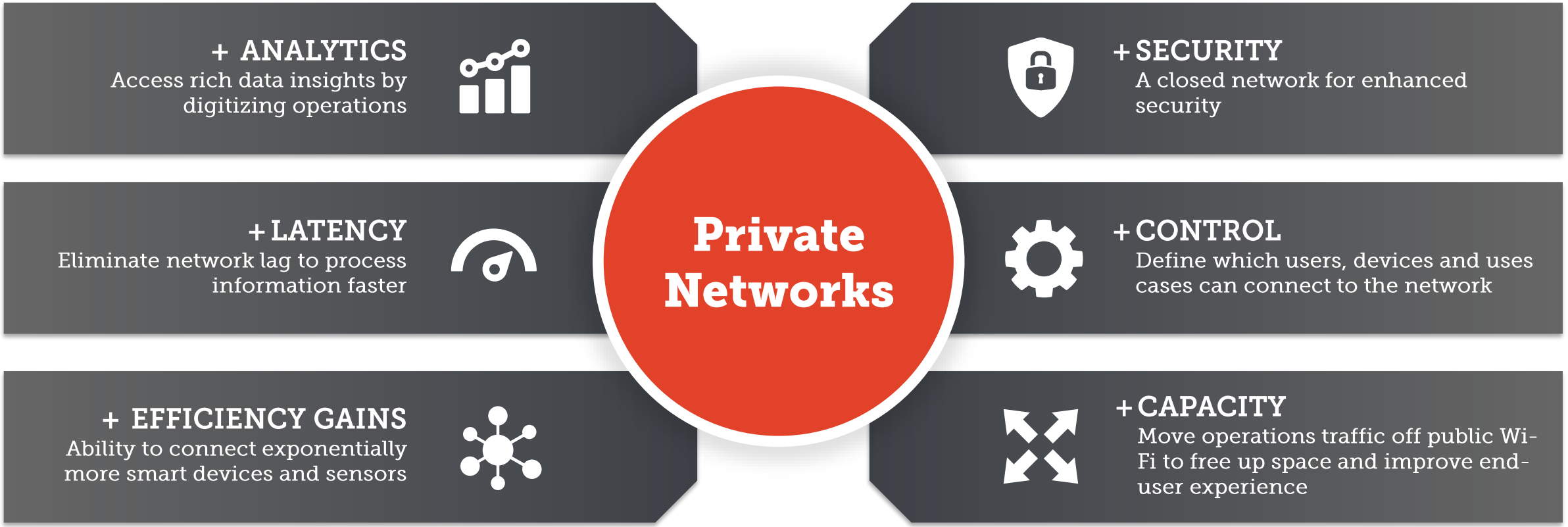
Private Networks Spotlight

A private wireless network provides dedicated, secure bandwidth to transform operations.



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A Safe Return to Public Transit

THE MOBILITY ISSUE

24%

Of IBM survey respondents said they would no longer use taxis

1 in 5

Of IBM survey respondents said they would stop using public transportation all together

THE CONNECTED SOLUTION

TOUCHLESS JOURNEY

- Mobile tickets and fare payment
- Pre-check kiosks
- Contactless concessions
- Social distance monitoring

DATA TRANSPARENCY

- Capacity monitoring
- Digital passenger communication
- Real-time reporting of ridership numbers

ENHANCED SAFETY

- 4K video surveillance
- Air purification systems
- Robotic cleaning devices
- Touchless temperature checks

boingo

Final Thoughts

Start with a converged technology model that can enable today's technologies and adapt for future innovations

boingo

THANK YOU
Michael J. Zeto III
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WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

Panel Discussion

Reza Jafari

E-Development International

Jamie Cudden

Dublin City Council

Morné Erasmus

CommScope

Michael J. Zeto III

Boingo Wireless

Simon Vaughan

GlobalReach Technology

Private Wireless Networks For Utilities

CLINTON VINCE

Chair, U.S. Energy Practice &
Co-Chair of Global Energy Sector, Dentons

大成 DENTONS

MORGAN O'BRIEN

Executive Chairman
Anterix

Anterix

Collaboration in SmartCity Ecosystem

BLAZ VAVPETIC

Chief Technology Officer

Single Digits

_Collaboration in SmartCity Ecosystem

WBA Wireless Global Congress

30th June 2021

Blaz Vavpetic, Chief Technology Officer

blaz@singledigits.com

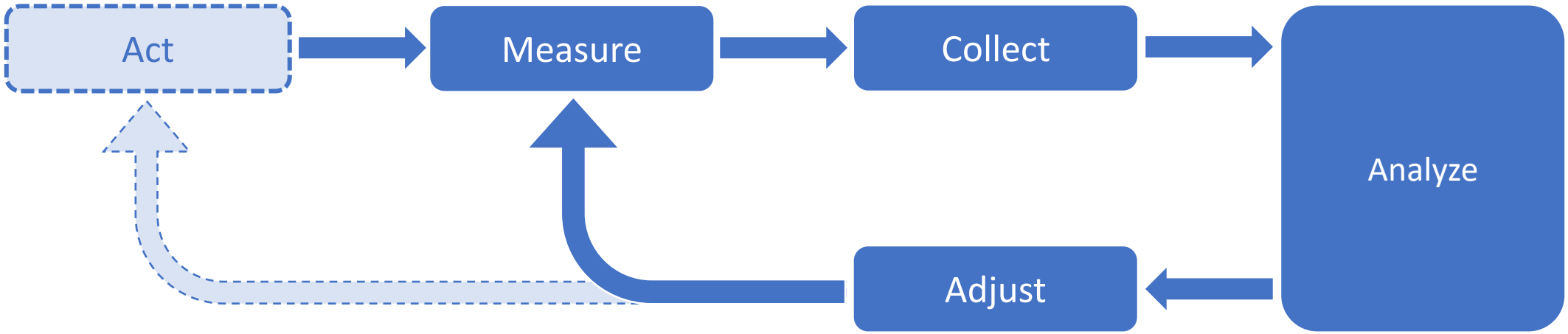
What Makes a City “Smart”?

+ Coordinated operations between ecosystem participants to the benefit of the municipality, private enterprise, consumers
+ Intelligence gained through continuous operation to drive improvement

Data

The city should ***feel*** intuitive and “smart” to those within it.

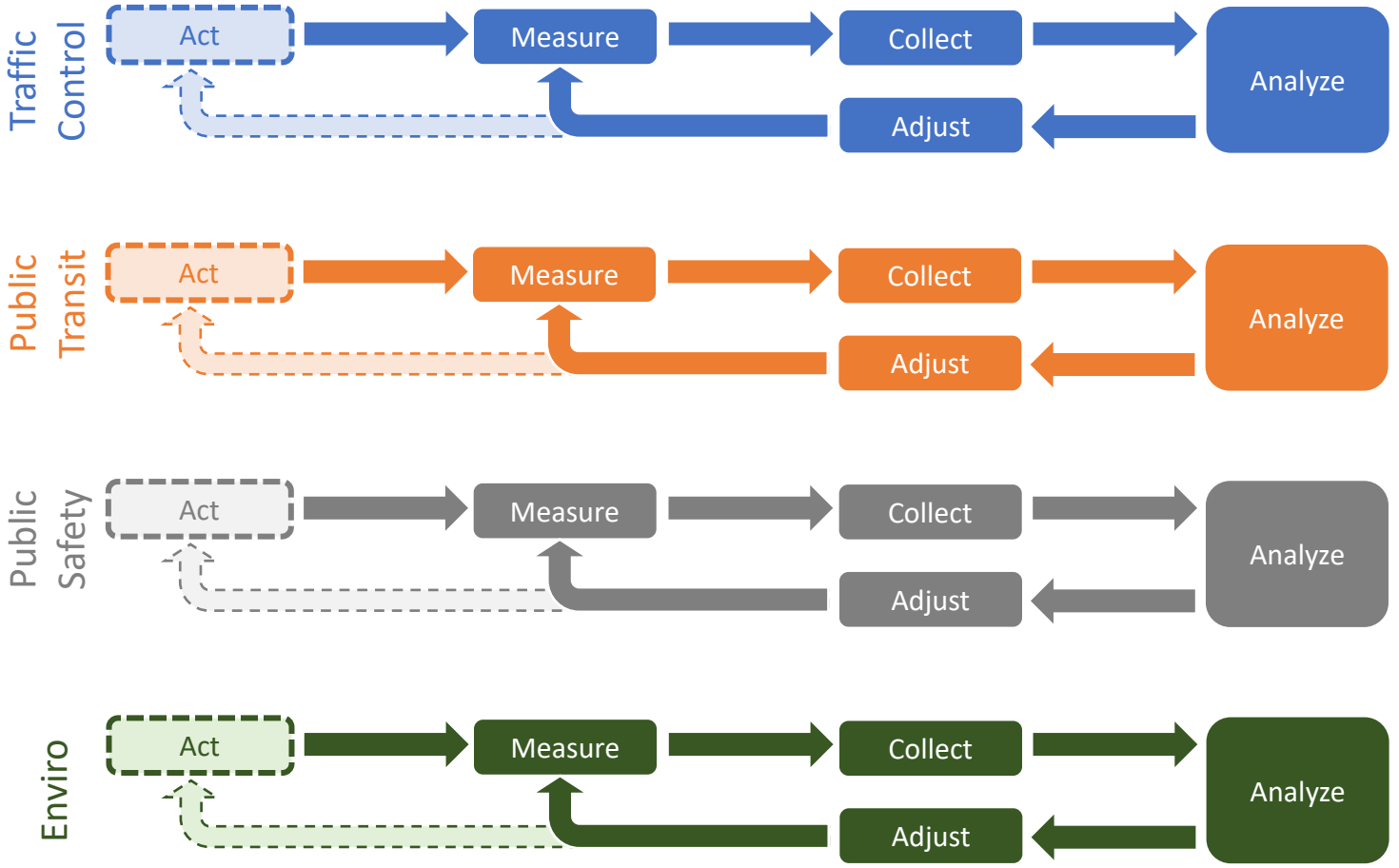
Individual Functions Getting Smarter



Enabled by…

Microtechnology	Communications	Compute	Software	Storage
Sensors / SOC	Fiber / Wireless / 5G	Local / MEC / Cloud	Data Science / AI / ML	

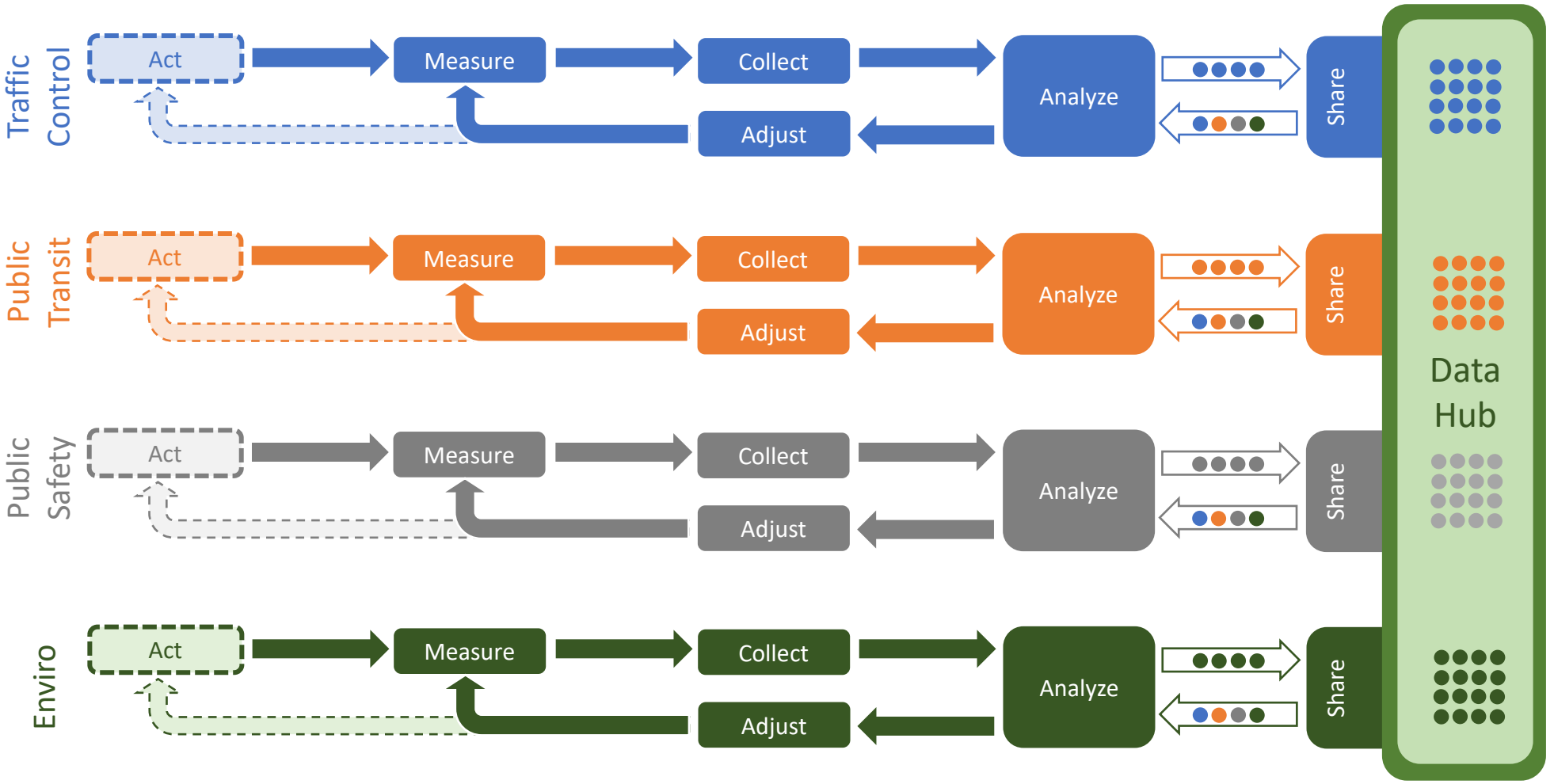
Individual Functions Getting Smarter



Smarter individual functions, but not well coordinated

Smarter functions, but not well coordinated

Smart City Platform - Individual Functions & Cities Getting Smarter



Enabled by…

Communications

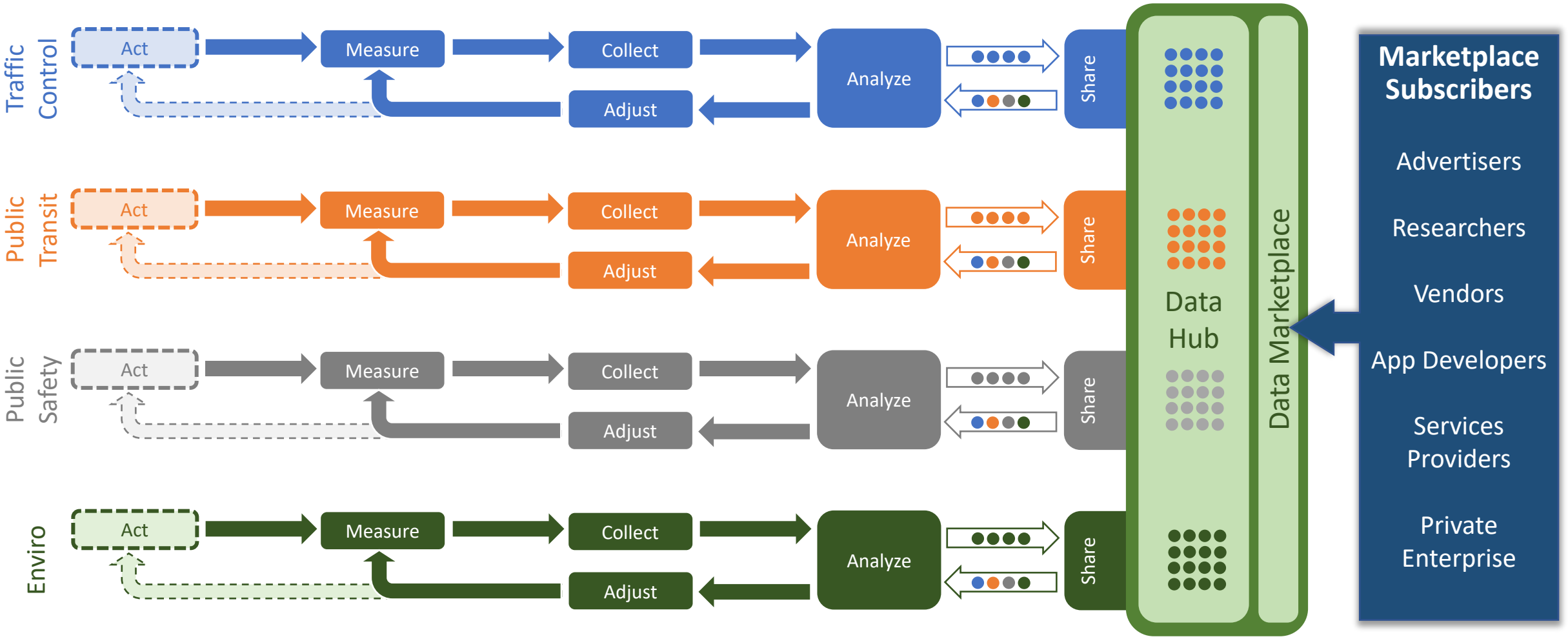
Cloud Services

Security

Big Data

Provides Context

Open / Monetizable Data Marketplace – Value Creation

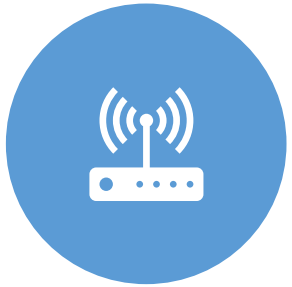


Wi-Fi's Role in Smart City

- Smart city operations resemble industrial IoT platforms
  - Enabled by an array of communications and wireless protocols fit for purpose
- Wi-Fi is the universal consumer & 3rd party interface to the smart city
- Unlicensed spectrum allows all to participate
- Small cell architecture enables context-based user engagement
- High fidelity location analytics describing pedestrian traffic flow

Historical Wi-Fi Challenges

Device On-boarding



Wireless Security

Identity & Entitlement Management

Service Quality

Wi-Fi Enabled Smart Cities

- Add Wi-Fi access to the Smart City Platform
- Utilize a Passpoint-enabled wireless roaming hub
- Smart City sponsored profile distribution management
- Contribute to the data hub & marketplace
- Enable brands and venues to retain their user experience

Confidential

Smart City Wi-Fi Enabled by Passpoint

+ Standard interfaces for public and private networks, and identity providers
+ Standard wireless encryption
+ Standard for location description
+ Central management of access service advertisements
+ Aggregation point for transactional data & reporting
+ QoS monitoring
+ Monetization opportunity

Wi-Fi's Role in a Smart City Ecosystem

- Serve as the standard for end user engagement
- Provide ubiquitous connectivity
- Enable venues to participate
- Contribute location data to enrich data hub

Collaboration in Smart City Ecosystem

Questions?

Thank You!

Blaz Vavpetic, Chief Technology Officer
blaz@singledigits.com

Future of WBA OpenRoaming & Convergence

STEVE NAMASEEVAYUM

Director, Membership & Industry Alliances

Wireless Broadband Alliance

WIRELESS BROADBAND ALLIANCE

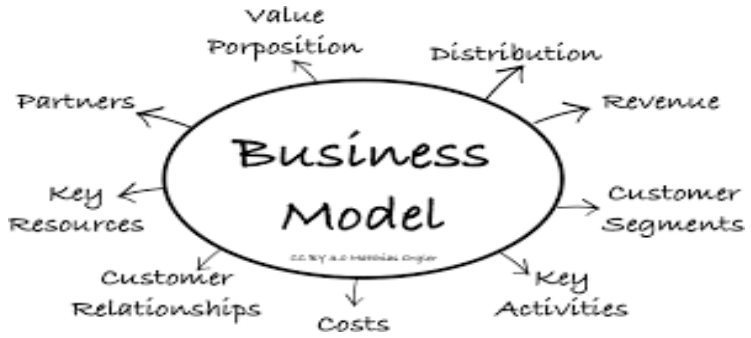
DRIVING NEXT WIRELESS EXPERIENCE

FUTURE OF OPENROAMING & CONVERGENCE

30th June 2021

WHAT IS CONVERGING?

- *Technologies*
- *Industry Verticals*
- *Industry Players*
- *Business Models*



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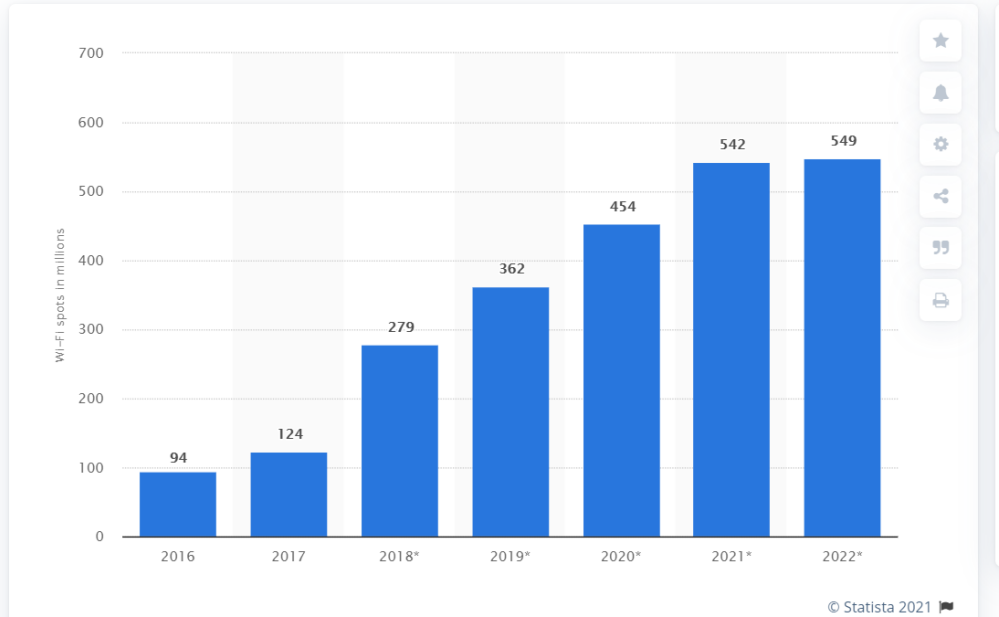
WHY DO WE NEED CONVERGENCE?

Number of public Wi-Fi hotspots worldwide from 2016 to 2022

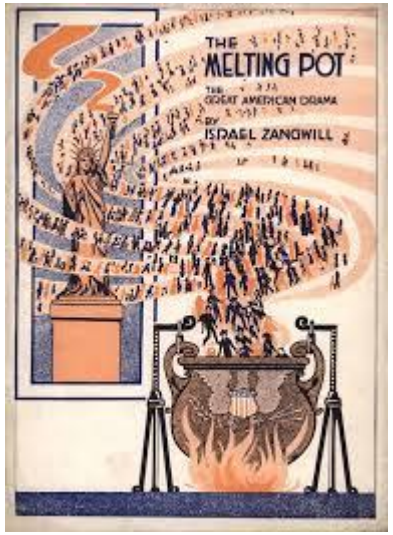
(in millions)



SSIDs, Username & Password, SMS Authentication, Advertising

Open Networks, Vouchers, Apps, SIM-Based Auth,

MELTING POT OF WI-FI CONFUSION



Poor User Experience, Poor User Engagement, Bill Shock, MAC Randomization, Unsecure Wi-Fi, Data Privacy Breaches

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INDUSTRY STANDARDS & TECHNOLOGIES

OPENROAMING TECHNOLOGY

What it means

Next Generation Hotspot (NGH) stands for an end-to-end Wi-Fi Roaming experience, achieving the seamless, secure and interoperable experience set as a benchmark.

A "cellular-like experience" - Turn on device and get automatic, secure Wi-Fi connectivity.

NGH

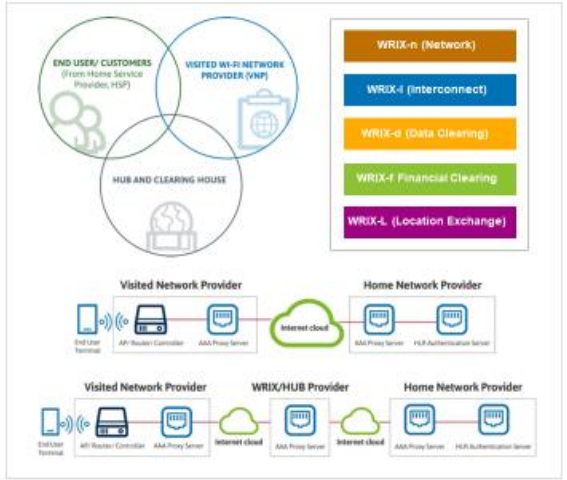
Passpoint®

Or can also be known as Hotspot 2.0 Technical Specification – by the Wi-Fi Alliance for an automatic, seamless and secure authentication to a Wi-Fi network.

Wireless Roaming Intermediary eXchange (WRIX) Framework

And a best practices framework developed by the WBA for the state-of-the-art Wi-Fi Roaming experience from a technical and business standpoint.

WBA WRIX UMBRELLA DOCUMENT AVAILABLE HERE



NGH WI-FI ROAMING GUIDELINES AVAILABLE HERE

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OPENROAMING TECHNOLOGY

WBA Members developed a robust program to scale Wi-Fi Roaming

Roaming Evolution Modular Building Blocks

Titles	Objectives
WBA Roaming Consortium Federation (RCOI) IEEE	• Simplifying partner discovery and onboarding • Implement new business models across verticals (IoT, SP's, Healthcare, etc.)
"WBA ID" for Roaming, Data & Financial Clearing iana	• Simplifying and normalizing information exchange (interoperable with GSMA/TADIG) • Possibility of performing accounting, billing, invoicing, charging across federations
Certificate Based Roaming (RadSec / PKI Server) IETF	• Simplify and automate security to enable scalable roaming relations • Evolved roaming architecture to bridge the divide between federations (integrated signaling, reporting, policy)
NGH Provisioning – Single SSID (Passpoint R3) Wi-Fi	• Improve customer experience on NGH networks by eliminating barriers (devices & infrastructure) • Automated profile provisioning across service providers and use cases

Stakeholders / Roaming Partners

Roaming HUBs · Operators/ Identify Providers · Infrastructure Vendor · Shopping Malls and Chains · Cities · Hospitals & Healthcare · Stadiums · Schools & Universities · Hospitality

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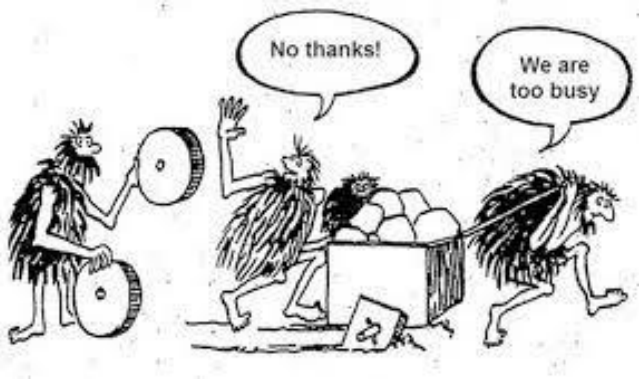
WBA OpenRoaming™

(Seamless Connections, Secure Wi-Fi, Data Privacy)



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OPENROAMING'S APPLICABILITY IN ANY VERTICAL

One Global Wi-Fi Network
WBA OpenRoaming™ creates the frame
billions of users and things to millions o

OPENROAMING FOR HEALTHCARE

In the healthcare environments guest wireless is a lifeline to staff, friends and family, social groups, as we move forward the moveable assets within a increasingly needing connectivity for patient reco expensive equipment.

Patients and visitors want reliable and seamless connectiv system, across campuses, at different locations, in the hosp etc. Connectivity to the resources they need during their vi happier, and as a result more satisfied with their service.

With that in mind, some challenges facing wireless guest n complicated Wi-Fi onboarding challenges and poor segme MAC rotation is disrupting how many brands are managing high data demands, and privacy. These can all have a nega experience could be addressed with automatic and seamle campuses, satisfaction levels and the patient experience c

This is where WBA OpenRoaming comes in. It is designed machines can connect to the network, with no lengthy and required. Connection to the network happens simply and s from the user.

OpenRoaming provides automatic and seamless, secure g system and across campuses and enhances the patient exp

In addition, traveling / visiting doctors and nurses are also systems. These mobile workers that travel between hospit records can utilize the automatic and seamless connectivit instantaneous access to the resources they need so they ca

One Global Wi-Fi Network
WBA OpenRoaming™ creates the framework to connect
billions of users and things to millions of Wi-Fi networks globally

OPENROAMING FOR HOSPITALITY

In recent years, Wi-Fi availability is rated as one of the top 3 factors why a guest will choose to stay at a hotel. For hotels around the world, providing a great guest Wi-Fi experience is not optional, its essential.

To that end, what defines a great guest Wi-Fi experience, and are you delivering it? Your guests may have great connectivity in their bedroom or in the hotel bar, but what about in the conference center with many people trying to simultaneously connect? Are your staff required to be connected to Wi-Fi in order to better serve your customers?

Common issues such as friction in different parts of the hotel, concerns about security, high data demands, and now MAC Randomization is disrupting how many brands are managing user identification. This can have a negative impact on the guest's experience and by association their loyalty to your brand and compliance to your brand standard. If this experience could be addressed throughout their holiday or business trip across different venue types and different transport modes, satisfaction levels and customer experience can reach new heights.

OpenRoaming provides seamless, secure access throughout the property, to other properties and other places your guests visit throughout their journey and OpenRoaming can enhance your loyalty proposition.

One Global Wi-Fi Network
WBA OpenRoaming™ creates the framework to connect
billions of users and things to millions of Wi-Fi networks globally

OPENROAMING FOR CITIES & PUBLIC SECTOR

The use of Wi-Fi across cities and the public sector has grown in popularity since the early noughties/2000's, reinforced with the recent COVID19 Pandemic. From outdoor public spaces, to indoor municipal use in areas such as libraries and public spaces in offices and education, society's increasing reliance on staying connected at all times and wanting constant access to information on the move demands a great customer experience. That is without mentioning smart city enablement!

Residents, students, visitors and businesses want a seamless and secure experience when connecting to Wi-Fi but all too often they get a poor first- time user experience when trying to connect to networks. This manifests itself through a frustrating and repetitive user authentication process and ongoing concerns about security.

Today, security and privacy in Public Wi-Fi is critical for all responsible decision makers who are looking to avoid open access Wi-Fi and/or share passwords that create an unrealistic sense of security for users. Additionally, while many networks continue to rely on MAC identification, the industry as a whole is moving towards MAC Randomization, implying that new security models and user identification must be put in place. For this reason, WBA members have been working on this matter to ensure that better and more secure Wi-Fi is available to all.

WBA has created a roaming federation service called OpenRoaming™ which addresses these issues by providing all the building blocks necessary to enable a Smart City for public Wi-Fi and other public services. Citizens are able to stay connected in virtually any location across the city while not having to worry about potential security risks, ensuring cities and public spaces are more friendly to businesses, visitors and residents alike, enabling a city of innovation.

One Global Wi-Fi Network
WBA OpenRoaming™ creates the fra
billions of users and things to millions

WHAT IS WBA OPENROAMING™?

WBA OpenRoaming™ is a roaming federation service enab
With WBA OpenRoaming™, we are creating an open conne
ecosystem to power new opportunities in the 5G era. It en

Cloud federation
Creates a federation of networks and identit
onboarding on Wi-Fi. Based on WBA's Wirele
to scale and facilitate different business mod

Cyber security
Enables simple, secure and scalable Wi-Fi connections amongst different organizations that are part of WBA OpenRoaming™. Allowing automatic and secure roaming between millions of networks, nationally and globally with secured interconnection and encrypted communications.

Network automation
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.

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.

One Global Wi-Fi Network
WBA OpenRoaming™ creates the framework to connect
billions of users and things to millions of Wi-Fi networks globally

OPENROAMING FOR GROUND TRANSPORTATION

Trains, Buses, Underground and Road

What happens when our day is paused? The majority of people on different modes of public transportation – such as a train or bus - will immediately reach for their smartphone or tablet – whether it's to check messages, to do some work or just to enjoy some entertainment while having some downtime.

However, problems can arise the moment you attempt to connect to the transportation's Wi-Fi network. How do I connect? Do I need a username or password? Will the network recognize me from my previous connections? Should I worry about security risks?

Companies responsible for deploying these networks are also concerned about delivering a good experience for passengers, and staff and need to be aware of any necessary operational guidelines or experience. Additionally, MAC Randomization is threatening to disrupt how user identification is managed.

This is where WBA OpenRoaming comes in. It is designed to drastically simplify how passengers and staff connect to the network, with no lengthy and repetitive sign-up or connection process required. From carriage to platform to subway and beyond, connecting to the network happens simply and securely without any further actions needed from the user.

Exemplative

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WBA OPENROAMING – ECOSYSTEM PLAYERS

Growing Ecosystem of Brokers / Identity Providers / Network Providers

- ***More than 70 organizations involved***
- ***Exemplative***

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WBA OPENROAMING IN ACTION

Canary Wharf, London

Palma de Mallorca, Spain

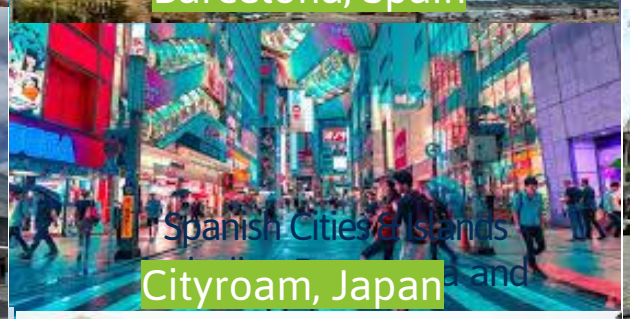
City of Austin, 6th Street

London Stadium

Barcelona, Spain

Olne, Belgium

Westfield Malls


Cityroam, Japan

Tervuren, Belgium

CEFCU (San Jose State)

Adventist Health

San Jose State University, USA

Clair Global

Sau Paulo Airport, Brazil

OPENROAMING STANDARDS FOR ANY BUSINESS MODEL

OpenRoaming Standard - Release 1
Settlement “free” traffic

“Baseline” QoS for Service Availability & Bandwidth

OpenRoaming Standard - Release 2
Settlement “paid” traffic

“Silver” QoS for Service Availability & Bandwidth

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OPENROAMING FOR DIFFERENT BUSINESS MODELS

Free

Advertising

Loyalty Program

Customer Retention

Analytics

IoT

Offload & Roaming

Customer Retention

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HOW TO PARTICIPATE

WIRELESS BROADBAND ALLIANCE

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

OPENROAMING™
WIRELESS BROADBAND ALLIANCE

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
OpenRoaming r2 June 2021 (Settlement &/or QoS)

https://wballiance.com/openroaming/join

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THANK YOU

WIRELESS BROADBAND ALLIANCE

WBA OpenRoaming / Roaming Consortium Codes / WBA Unique Organization ID / PKI Certificates

Get Involved OpenRoaming Now! PMO contact: pmo@wballiance.com

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WIRELESS GLOBAL CONGRESS
WIRELESS BROADBAND ALLIANCE

Panel Discussion

Steve Namaseevayum

Wireless Broadband Alliance

Blaz Vavpetic

Single Digits

Alphonso Jenkins

Formerly Deputy Commissioner for Telecommunications New York City

Robert Sokota

ZenFi Networks

Close

STEVE NAMASEEVAYUM

Director, Membership & Industry Alliances

Wireless Broadband Alliance

Wi-Fi Powering Innovation Series

Thursday June 3rd

Wi-Fi Innovations
Connecting your Worl

- Social Impact of Wi-Fi – fro wering the world economy to how Wi- elping the green agenda and bridg e digital divide.
- Future of Wi-Fi – th de ahead – overall market trends.
- D livering the wireless experience for carr nter onsumers and things.
- Regula es for Wi-Fi 7, Wi-Fi 6E and OpenRoa

Thursday June 10th

Connecting the
Wi-Fi -enabled Enterpris

- How can Wi-Fi address the em g needs of enterprise to innovate and post COVID 19.
- Industry 4.0 & IoT: Em opportunities for Wi-Fi in the 5G era.
- D ving the conn revolution in retail and hosp lity pos 19.
- Trains, utomobiles – connectivity into 2030.
- Marketing a cations for Wi-Fi
- Private 5G and Wi-Fi

Thursday June 17th

Wireless Innovation, Operation a Customer experience – Where next f operators?

- The future of wireless ne ks.
- Delivering a gold sta public Wi-Fi experience – Seaml ecure, permission-based privacy.
- Testing perfo e and optimization onitoring.
- W the road to convergence & Open
- Emerg nnologies – Wi-Fi 7, FWA, 802.11be and beyo

Thursday June 24th

Wi-Fi Innovations
For Hospitality

- Hospitality 2021 – What d ne industry need from Wi-Fi operato service providers.
- Delivering the ne eration Wi-Fi ex rience in hot venues.
- Driv oval keting applications and analytic the next decade.

Wednesday June 30th

Connected Communitie
Wi-Fi gets Smarter in th Era

- Market trends and drivers f mart cities and connected communities.
- Protecting our citize vacy, security and identity.
- ddressing the divide through public Wi-Fi.
- The b nvergence of 5G and Wi-Fi 6E.
- Monetizing Fi and the opportunity case for cities and local business.

Thursday July 8th

Carrier Grade Wi-Fi delivering the future for the smart connected Home

- Market trends and drivers for residential Wi-Fi.
- Key enablers for the Work at Home Era post COVID 19.
- Delivering on the connected home experience – Next 5 years of IoT.
- Next Generation of Wi-Fi Capabilities for in-Home (sensing, mesh, AR/VR and more....)

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THANKS FOR ATTENDING

Next Time:

July 8th - Carrier Grade Wi-Fi delivering the future for the Smart Connected Home

REGISTER NOW: https://www.wirelessglobalcongress.com/registration/

Find out more: www.wirelessglobalcongress.com
www.wballiance.com