

The Global Village

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The Global Divide



Countries with % connections to Akamai >4Mb/s*



6 billion mobile subscriptions globally*

Only 25% of homes in developing countries have computers*

In many developing countries the cost of access exceeds the average monthly income*

Language divide: 6,000 languages globally, only 500 localized languages*

Internet accounts for one fifth of all GDP growth in G8 countries*

Impact of technology on poverty

A **PC + Internet bundle creates** an average of **95k USD per capita** in estimated economic and social impact over the course of student lifetime in Peru



Child living below poverty

YES	+6-8% secondary school graduation rate	40% pursue post-secondary education	Graduates from college/university & receives higher salary	Average lifetime earnings of 459,973 USD or more
Access to PC + Internet at home?		Increase earning potential	Make 10,454 USD on average	95,232 USD average per capita difference
		Limit earning potential	Likely to develop health issues, supp. income, etc	95,232 USD average per capita difference
NO	+6-8% secondary school drop out rate	Work lower wage unskilled jobs; risk for social disengagement	Increased likelihood of dependency on social resources	Average lifetime earnings of 185,201 or less + consumption of resources



Improved social impact

By targeting students in poverty

> 36B USD

in total economic and social impact can potentially be realized in Peru

E-Gov
\$103M

Healthcare Benefits
\$1,554M

Prison Savings
\$148M

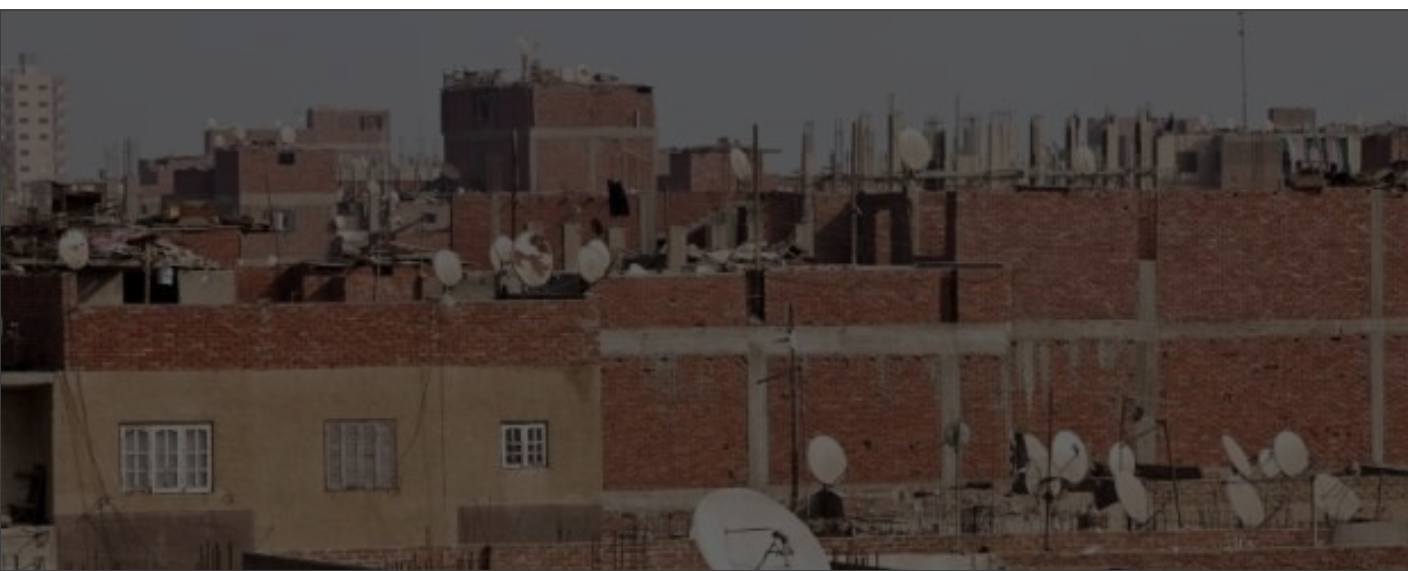
Social Savings
\$2,238M

Tax
\$5,989M

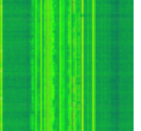
Earnings
\$26,140M




What about
those without?




Spectrogram
Displays power as a function of both frequency and time over a given time period.



Occupancy Graph
Displays percent occupancy as a function of frequency for a given time period.



Power Density Graph
Displays power as a function of frequency for a given month.



Occupancy Graph

Frequency Band
All Frequency Bands

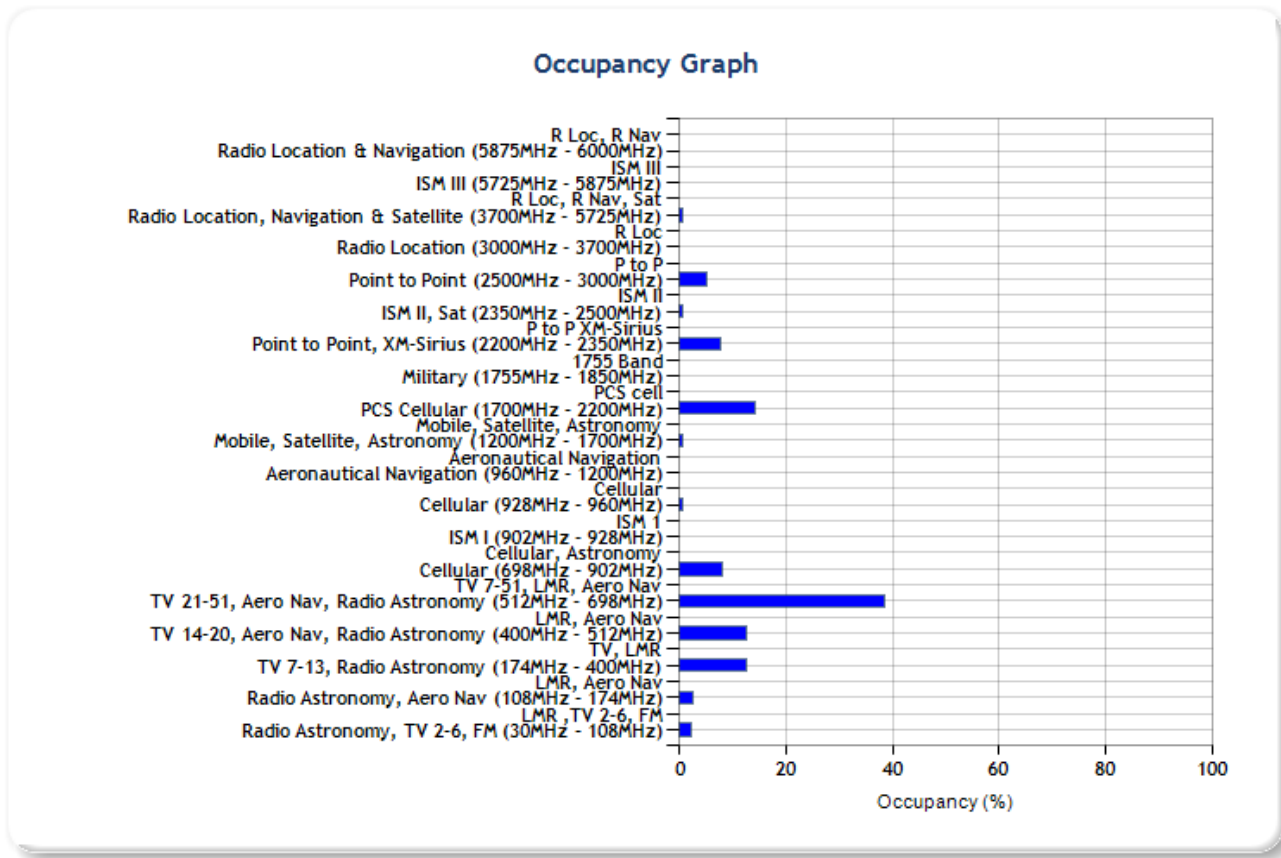
Date
April 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Time Range
Daily

Get Graph Get Data

Station Name: WashingtonDC
GPS Details: 47.64251, -122.1416
Address: 901 K St NW, Washington D.C.
Location: Roof top of a 12 story building located in a business district of Washington, D.C, seven blocks from the White House, 9 blocks from the Capitol.



Most spectrum in most places is unused most of the time.

Today's allocation system based on a 100 year old model optimized to avoid interference.

Dynamic access technologies can yield a substantial increase in available spectrum.

TV White Spaces is only the beginning!

More **connected objects** than people ...



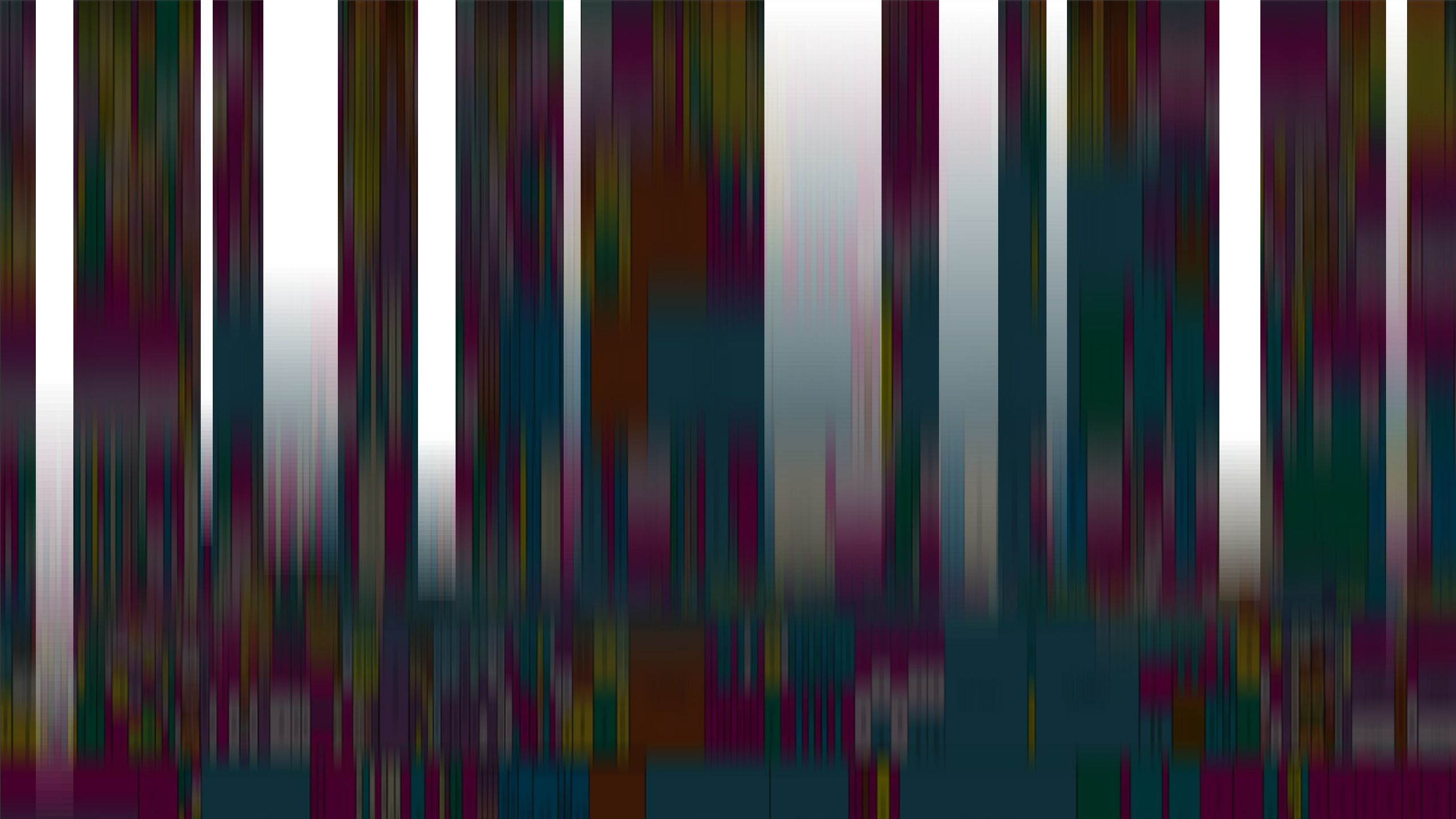
The internet
of things



50 billion
by 2020

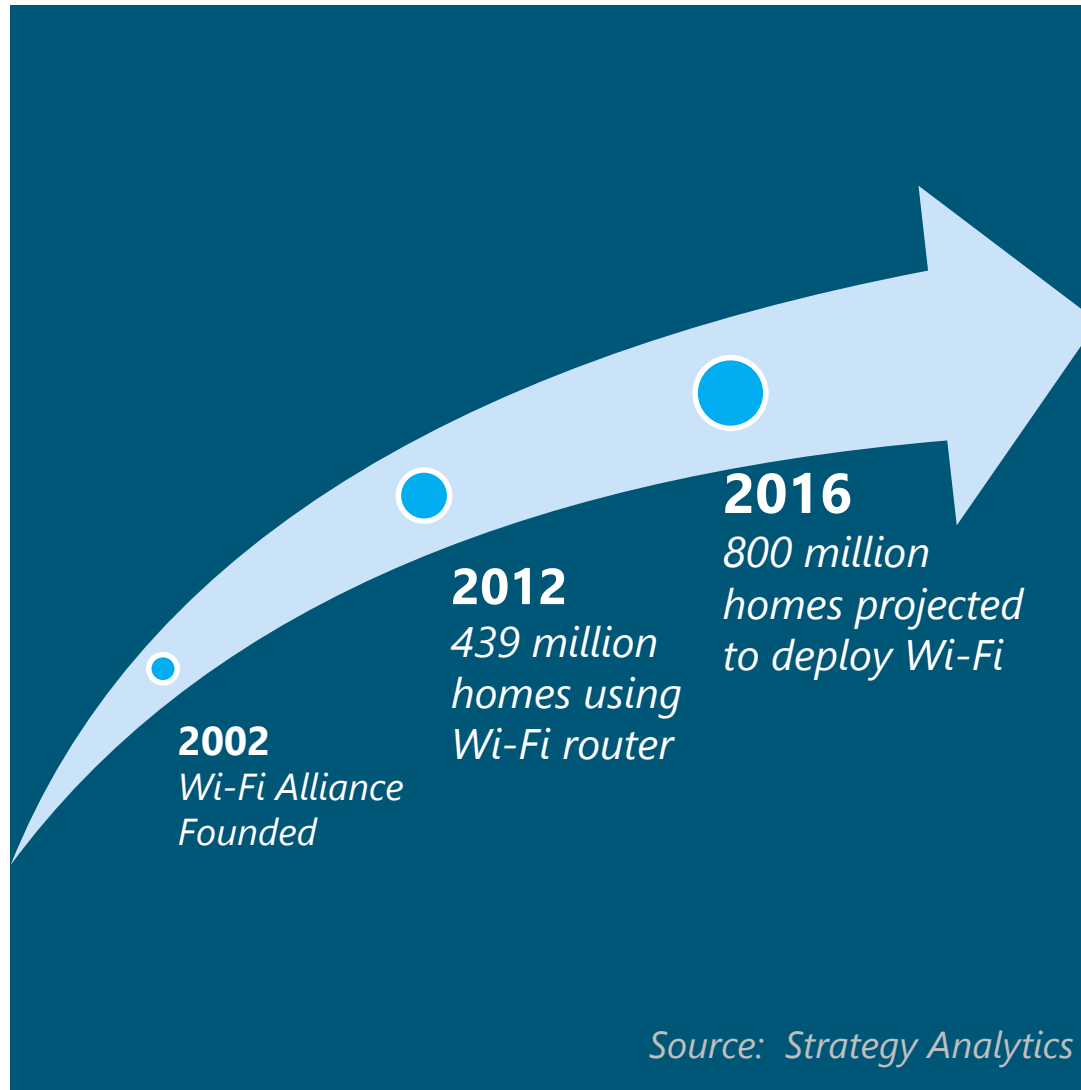


Spectrum is the oxygen of a digital world





Wi-Fi Impact after 10 years



85% penetration in homes with fixed broadband

\$46 - \$87 billion of consumer surplus each year

Maintains 49 – 101 million fixed broadband subscriptions

Unlicensed WiFi is a critical part of our broadband infrastructure

Source: Strategy Analytics

Global TV White Spaces Spectrum Activity





White Spaces

Devices can successfully co-exist with broadcasters and other licensees

Could be used for a variety of applications

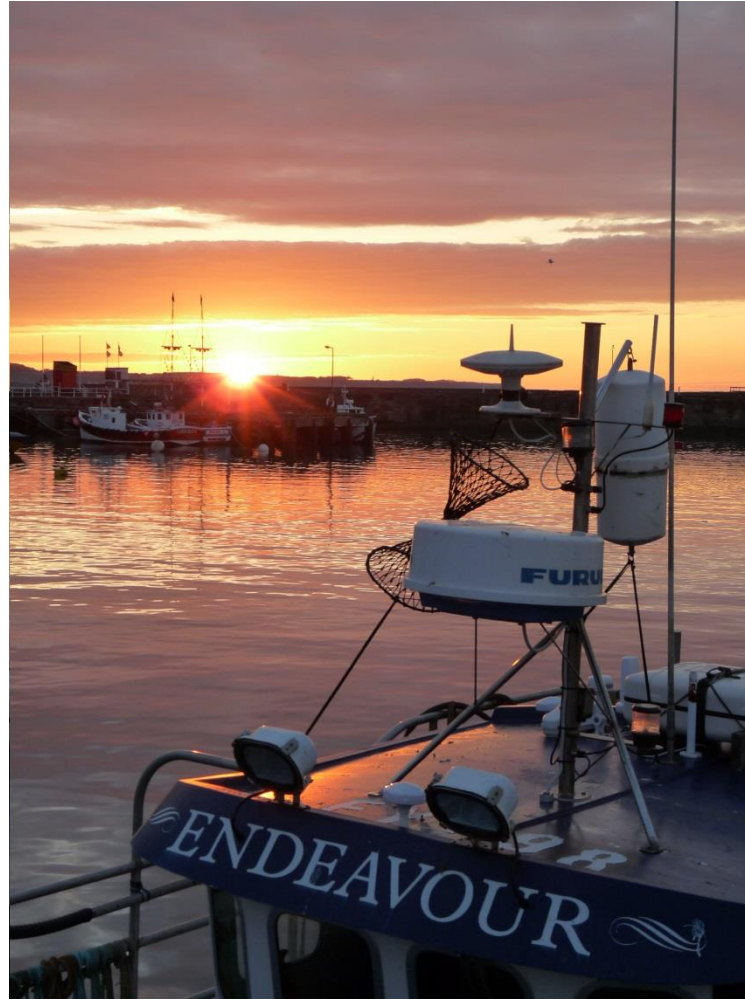
The trial participation and attention evidences growing industry interest and readiness

This and other trial results will aid regulatory decisions around the world

Cambridge – Key Conclusions

Through the Trees, Over the Water, and Into the Homes

TV White Spaces Commercial Pilots Begin in Singapore



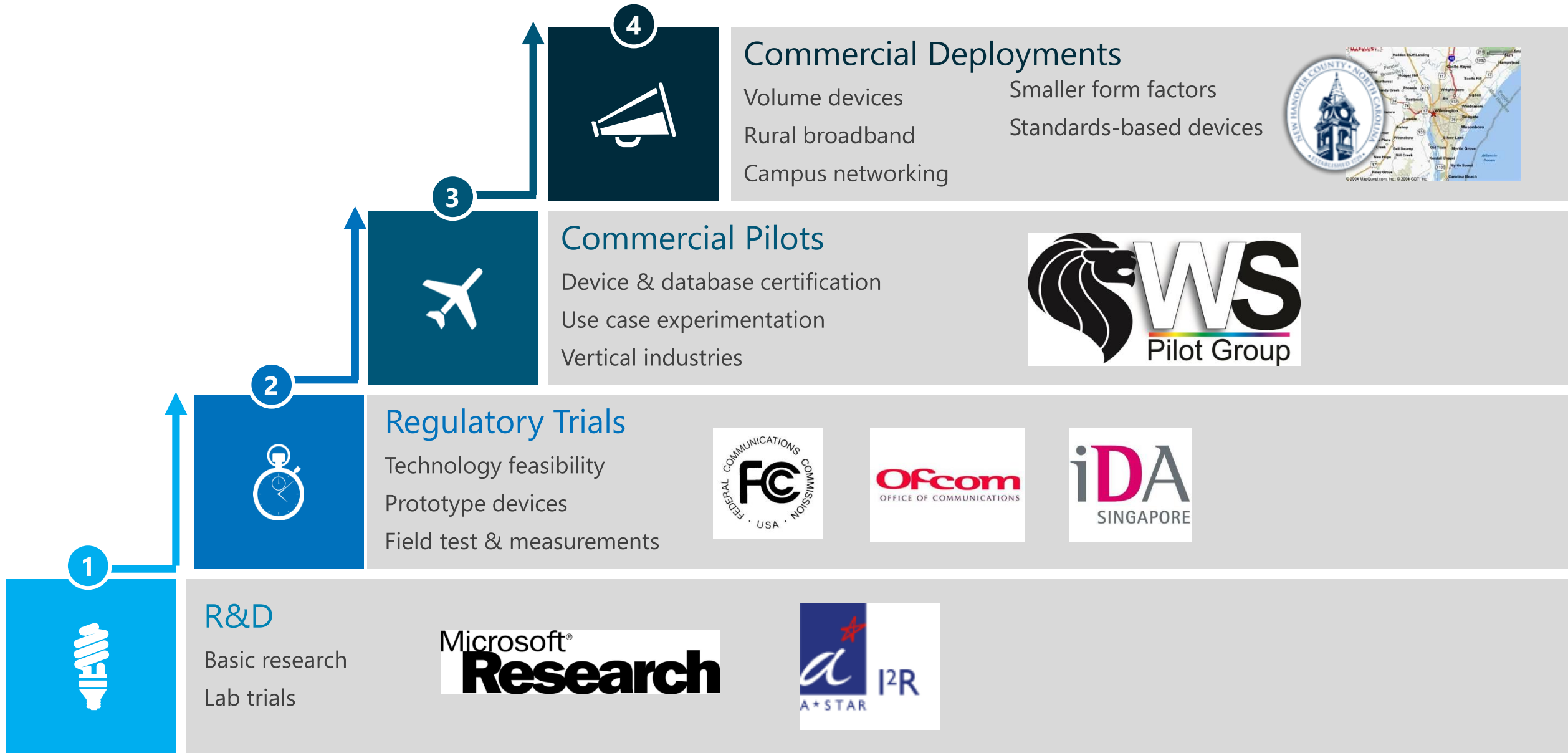
SMART RADIO FOR A SMARTER CITY

Over the Water

Area Of Coverage for the High-Speed Marine Wi-Fi



TVWS – From Concept to Commercialization



Momentum is increasing!

Standards Efforts

Standards Body	Issue
Wi-fi Alliance	White spaces device interoperability and certification program
IEEE	802.11AF wireless local area network TV Band channelization 802.11AC non-contiguous channel bonding for wireless local area networks 801.19 coexistence of technologies 802.22 higher powered Wide Area Networks 1900.6 spectrum sensing 802.15 TG4M low rate WPAN
IETF	PAWS WG database to device interface
ETSI BRAN	WSD to WSDB interface standards and radio interface standards
European conference of postal and telecommunications administrations (CEPT) SE43 work group	White Spaces implementation Cognitive radio systems 470-790 MHz
U.S. Database Administrators Group	Database to database interoperability

Summary

The technology is real and works.

The ecosystem is ramping up quickly.

Policymakers should explore new models for spectrum allocation and regulation.

Results are only limited by imagination.

Thank you Microsoft