



Creating your digital future

The role of 6 GHz license-exempt RLAN

Mary Brown

Senior Director, Government Affairs

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Your digital future: what role for license-exempt and 6 GHz?

Why is Wi-Fi in 6 GHz
important?

Isn't 5G more important?

How can we think about this
issue in a principled way?

A Digital Plan is a good start

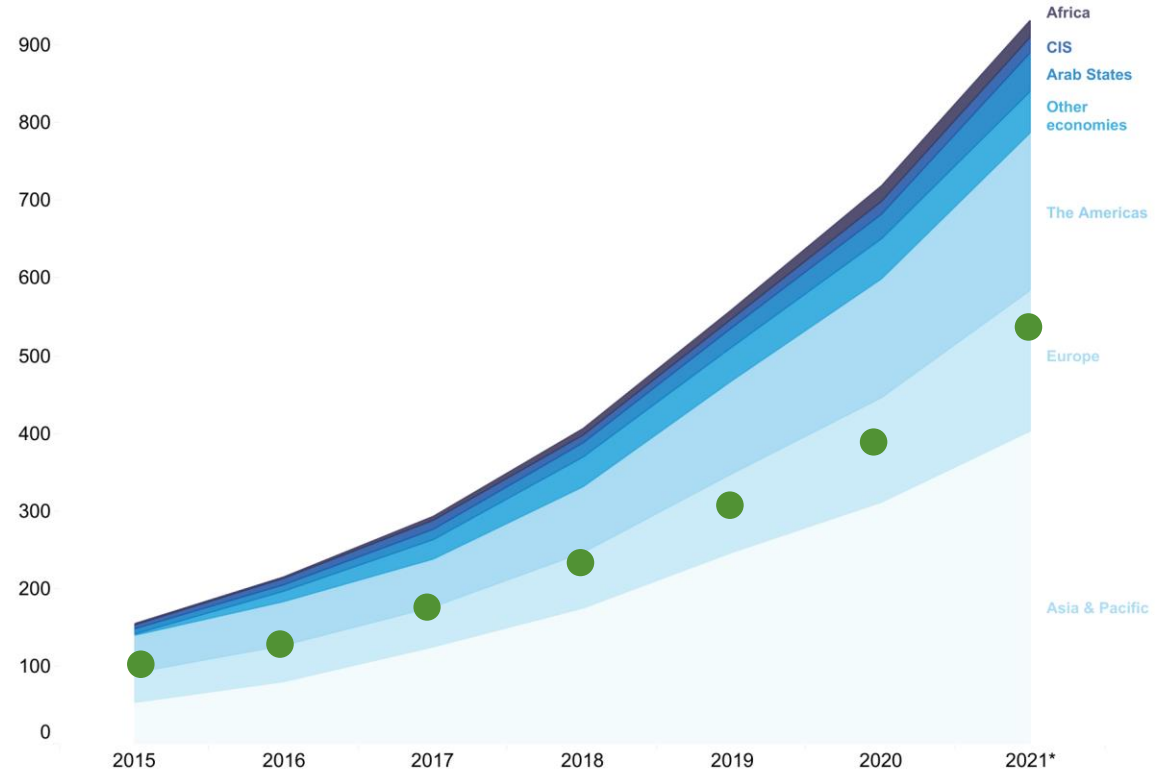


- These plans often express “what” – what does our economy and our nation look like when the plan is fully implemented?
- Often include “when” – by when do we want to see the proposed changes in our economy?
- The “how” to achieve the objectives is usually not discussed, or a “buzzword” or two is provided

Bandwidth consumption continues to grow at a relentless pace

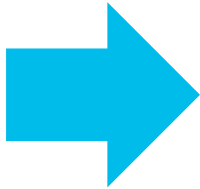
- Slightly more than 50% of that data begins or ends on Wi-Fi networks

International bandwidth by region, Tbit/s**



Technology must stay AHEAD of the curve

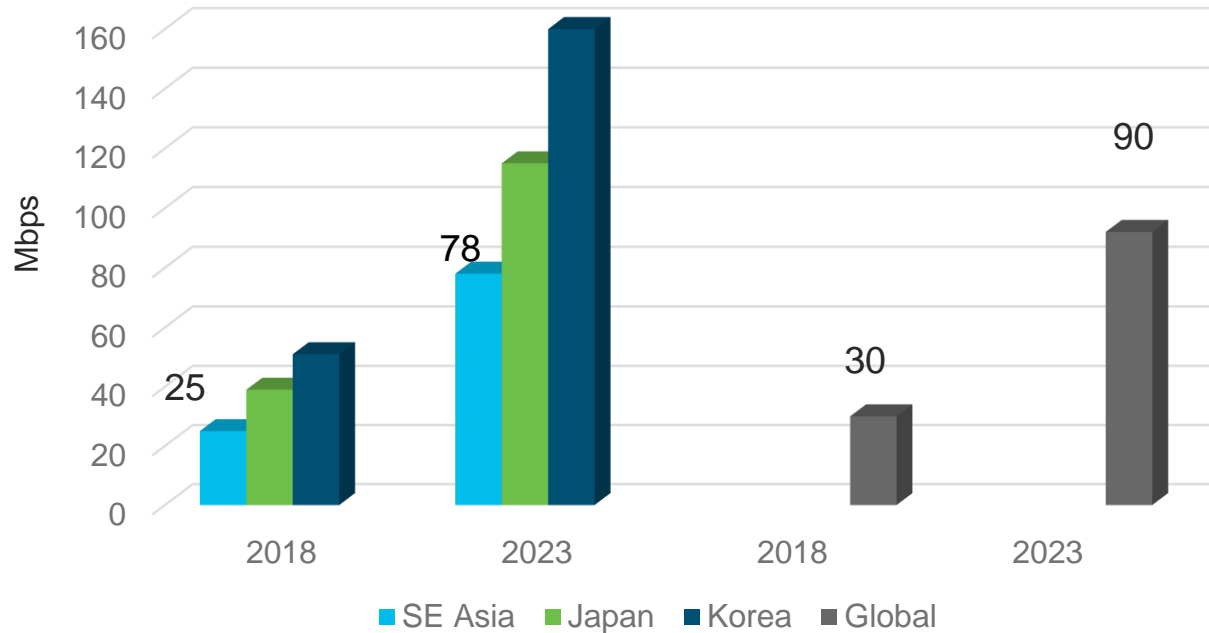
Bandwidth
Density
Latency
Device diversity
New use cases



- Wi-Fi 6 to Wi-Fi 6E to Wi-Fi 7
- 4G to 5G to 6G
- Fiber optics
- Satellite Geo to Leo

Where we were before Wi-Fi6E

Wi-Fi speeds 2018-2023 (Wi-Fi6, 5 GHz)



Cisco Annual Internet Study

Wi-Fi6E; a fundamental change for a new era

- Bandwidth – over 1 Gbps
- Density – 6 GHz provides up to 60 20-MHz channels, 29 40-MHz channels, 14 80-MHz channels, and 7 160 MHz channels
- Latency – wide channels enable large bursts of data, freeing the airwaves for other transmissions
- Device diversity – MuMIMO antenna technology to direct data stream to each device, according to its needs
- New use cases – AR/VR/XR – further enabled by Wi-Fi 7
- New security capabilities; energy efficient functionality

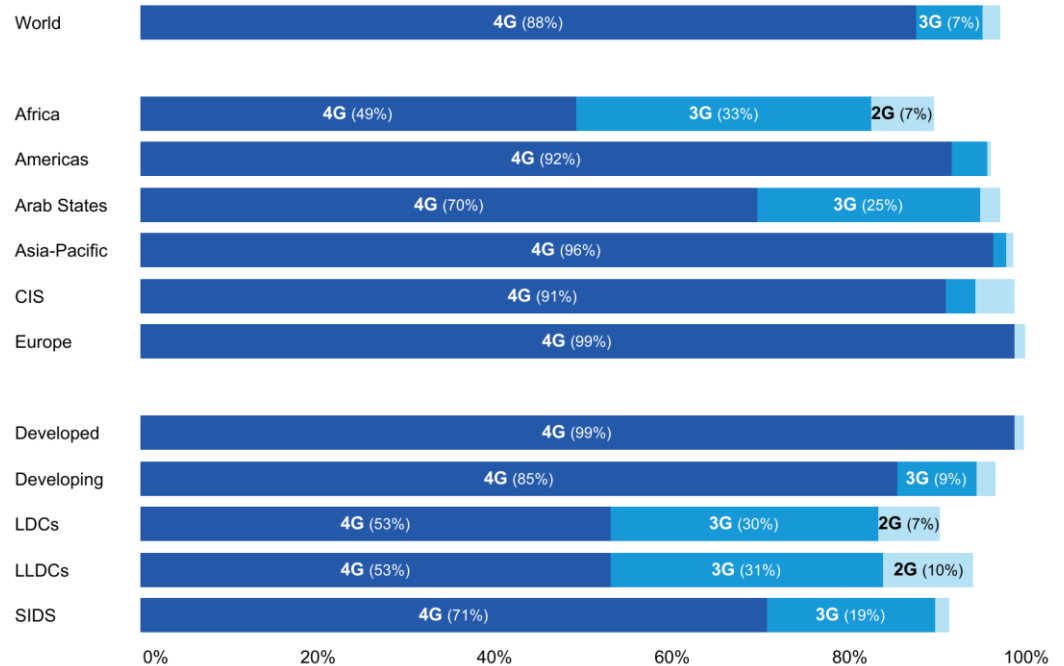
“5G will solve it”

ITU data as of 2021 – we are still in a 4G world

Coverage is not ubiquitous

McKinsey (2018): to build 5G, network-related capital expenditures would increase 60 percent from 2020 through 2025, roughly doubling total cost of ownership (TCO)

Population coverage by type of mobile network, 2021*



Note: The values for 2G and 3G networks show the incremental percentage of population that is not covered by a more advanced technology network (e.g. 95% of the world population is covered by a 3G network, that is 7% + 88%).

Source: ITU
* ITU estimate

5G and Wi-Fi have a complementary role in meeting digital goals

Mobile devices rely on Wi-Fi offload (70% of data)

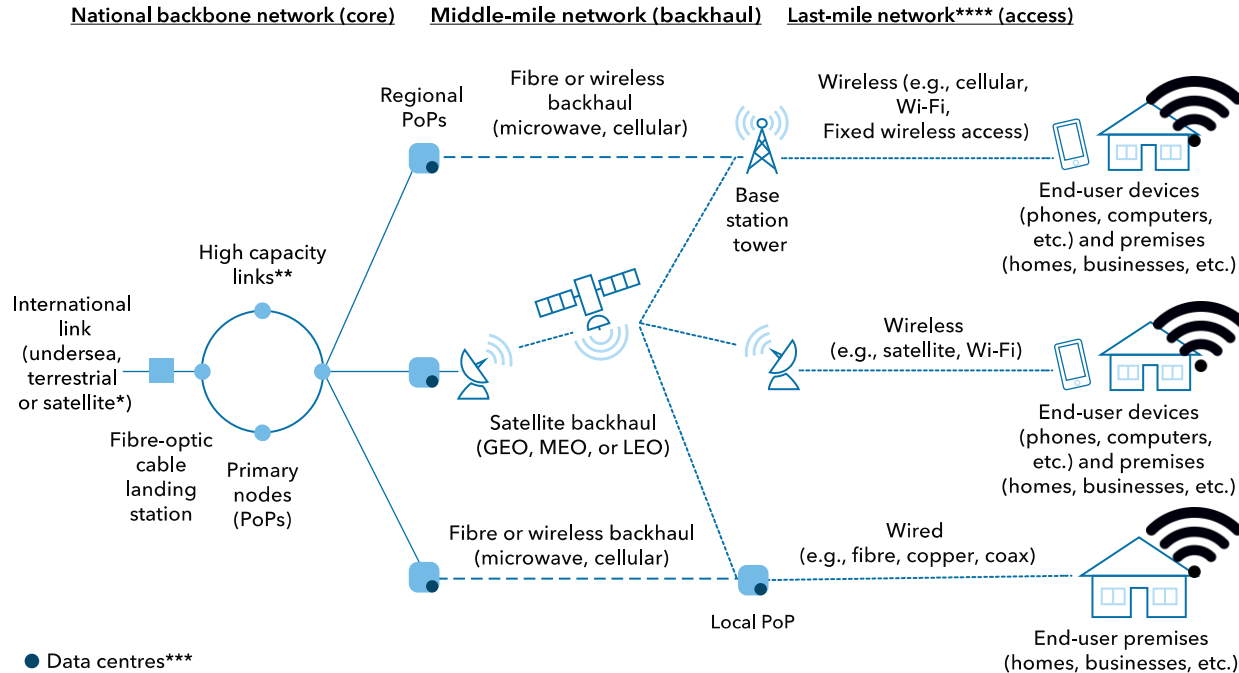
A mobile device supports individuals, not households

5G fixed wireless access – relies on Wi-Fi for indoor connectivity to devices

Global consumer electronics industry remains committed to Wi-Fi

Wi-Fi is preferred enterprise wireless technology for many networking needs; private 5G emergent & likely outcome is a mix of both

In fact, Wi-Fi is at the edge of every broadband connection, and is sometimes itself “the last mile”



Source: Last Mile Internet Connectivity Solutions Guide, ITU-D (2020)

Wi-Fi security is also adapting to new demands

WPA3 is standard for Wi-Fi 6E and beyond

For **personal networks** WPA3 utilizes Simultaneous Authentication Of Equals (SAE), as per IEEE 802.11. Improvements from WPA2 PSK –

- Creates shared secret which is different for each SAE authentication
- Protection against brute force “dictionary” attacks and passive attacks
- Updated in 2019 to define a new “Hash-to-Element” (H2E) – more computationally efficient and defeats side channel attacks to obtain a password.

WPA3-Enterprise: the optional 192-bit mode provides consistent cryptography and eliminates the “mixing and matching of security protocols” that are defined in the 802.11 standard; it requires management frame protection.

Enhanced Open – In public places Enhanced Open uses Opportunistic Wireless Encryption (OWE) for encrypting the traffic prevents passive eavesdropping

Evaluating the urgency of a 6 GHz decision

What mix of digital technologies will you need to achieve your country's goals?

How is any given decision going to ensure that those technologies & their capabilities will be **fully available** to your consumers and to your economy?

For spectrum technologies, do you have a path forward to enable future generational changes for all the technologies you will need in the time frame you need it?

Colombia ANE: “[T]he existing 20MHz and 40MHz channels and modulation technologies may become a bottleneck for the residential and corporate segments in Colombia given the data transmission needs projected...” by 2025.

Thank you!

The time to build our digital future is today.

The license-exempt industry believes that our newest technology, Wi-Fi 6E operating in the full 6 GHz band, should be an important part of your country's digital future.

We invite you to listen to the knowledgeable speakers our hosts have arranged for you, and ask any question that you have.