Meeting Subscriber Demands with WiFi 6/E

MATSS 2023

ZYXEL

Wi-Fi is the Internet

It needs to be Fast

Wi-Fi is Continuously Fluid

Wi-Fi is Not an Exact Science

There can be many factor associated with Wi-Fi

Setting the right expectations on what the subscriber could experience with Wi-Fi in their home is key

Wi-Fi networks have a range that's limited by the transmission power, antenna type, the location they're used in, and the environment

Evolution of the Home Router

Wide adoption of Wi-Fi. Wi-Fi becomes mainstream

Wi-Fi home Router reaches over 1 Gigabit speeds

Intelligence built-in the Wi-Fi Router managing the home network

Wi-Fi Then and Now

The modern day connected home has evolved in the last 20 years

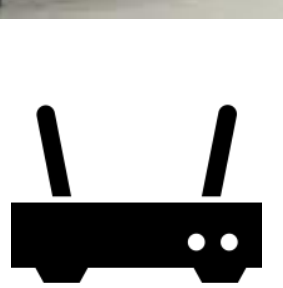
15 years ago, most subscribers had about 2 to 3 Wi-Fi enable devices in the home

Nowadays, we can see triple the amount of Wi-Fi enabled connected devices in our homes

Ever Evolving Wi-Fi Technology

11b	11a	11g	11n	11ac	11ax
1999	1999	2003	2009 (Wi-Fi 4)	2014 (Wi-Fi 5)	2020 (Wi-Fi 6)

Challenges with Coverage



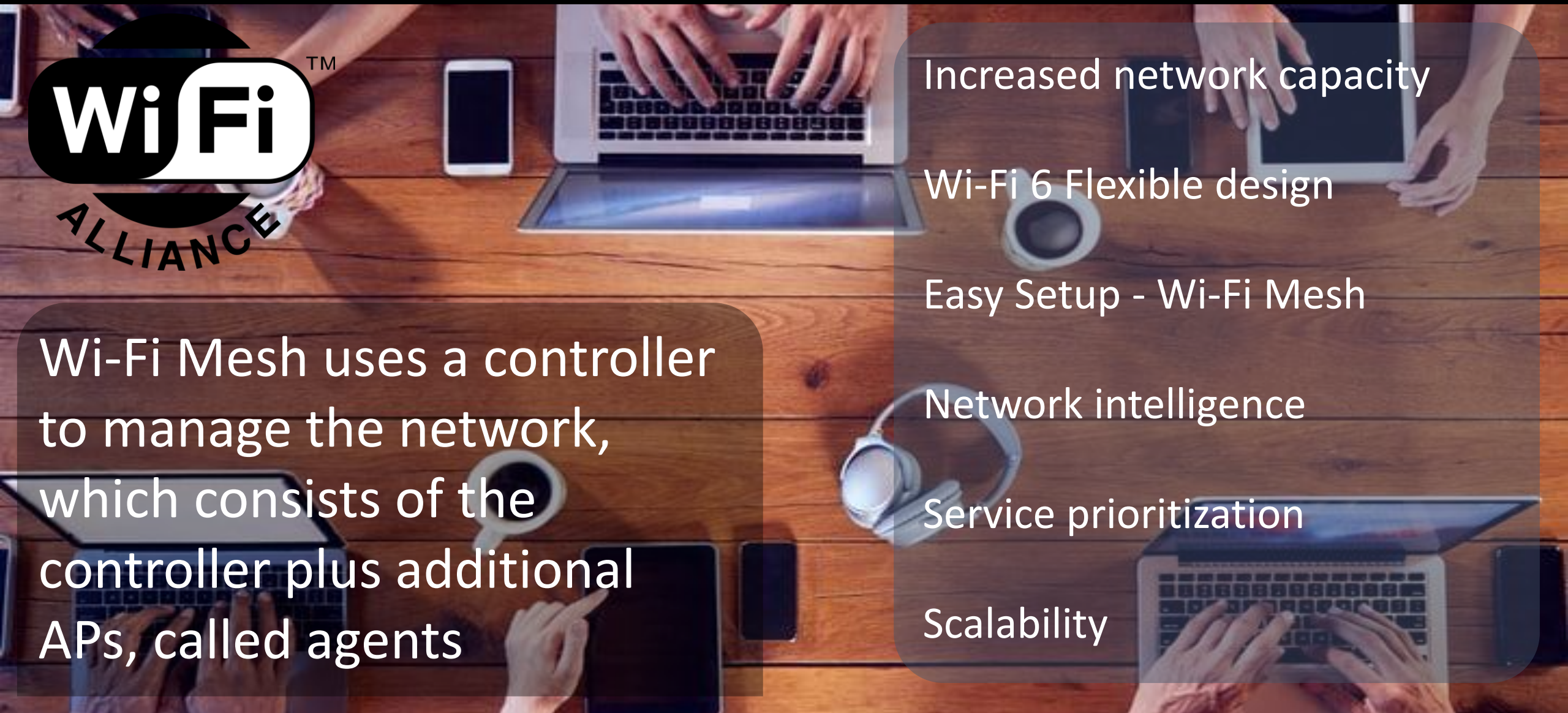
100%

50%

25%

Wi-Fi Router or Just an Extender?

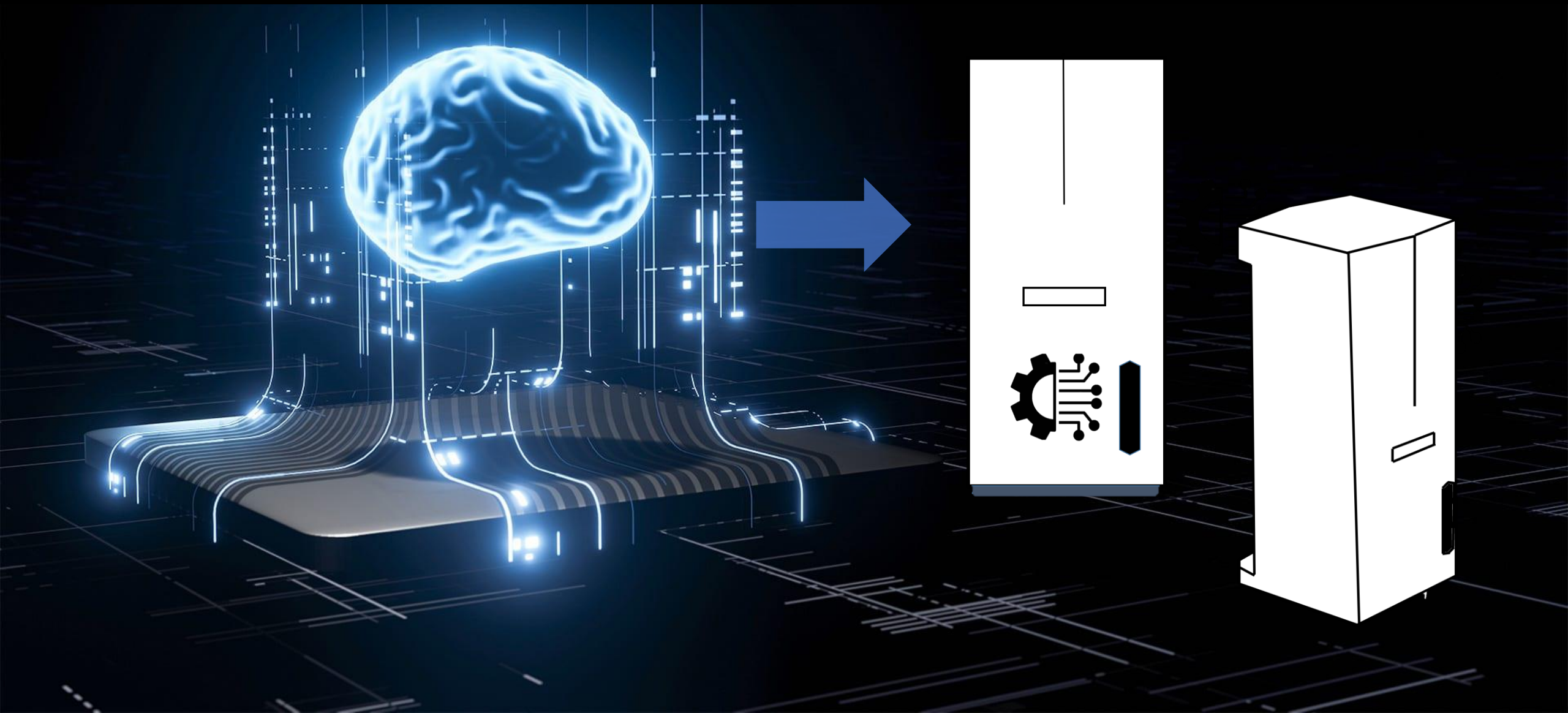
What Mesh Offers



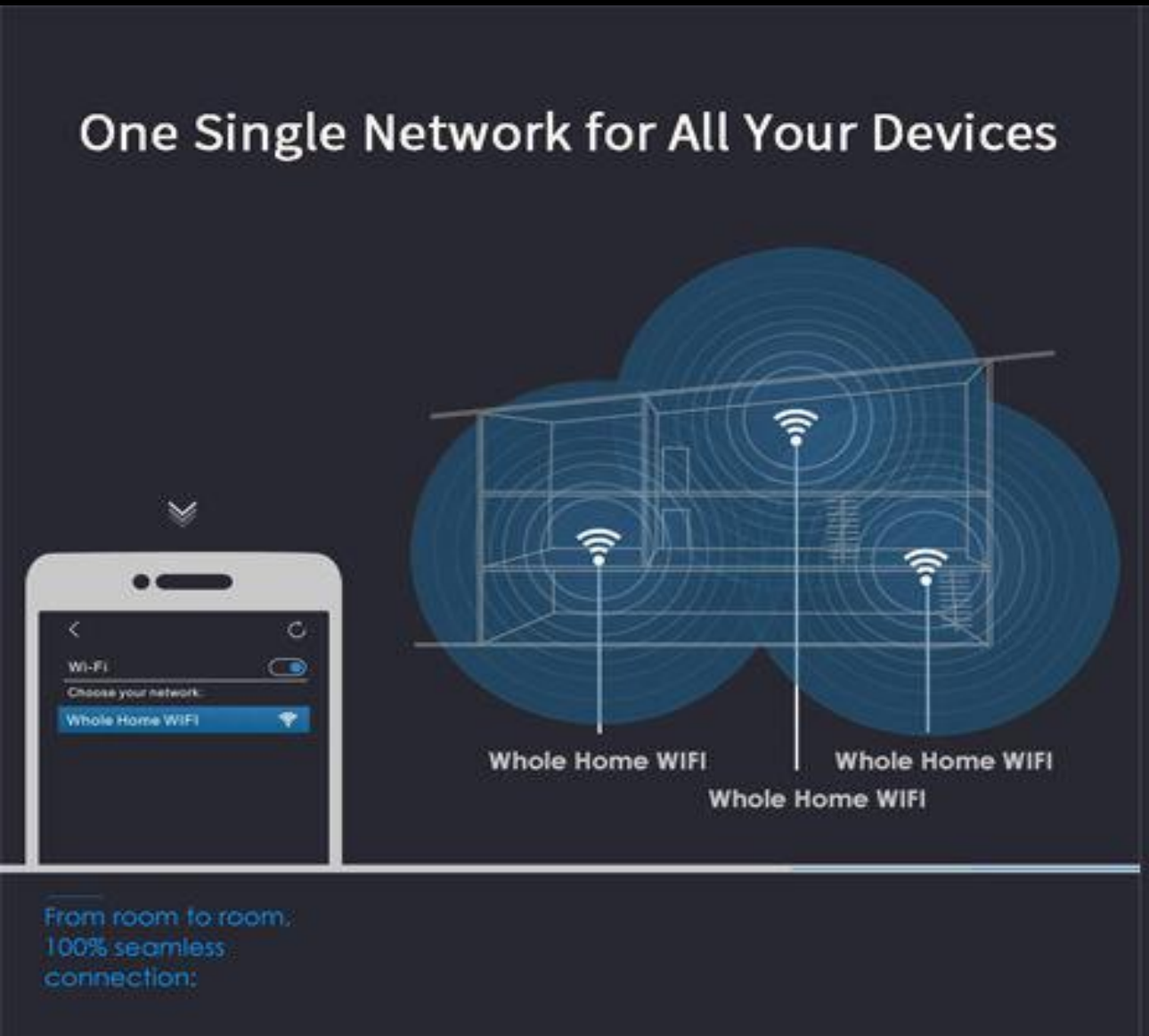
Wi-Fi Mesh uses a controller to manage the network, which consists of the controller plus additional APs, called agents

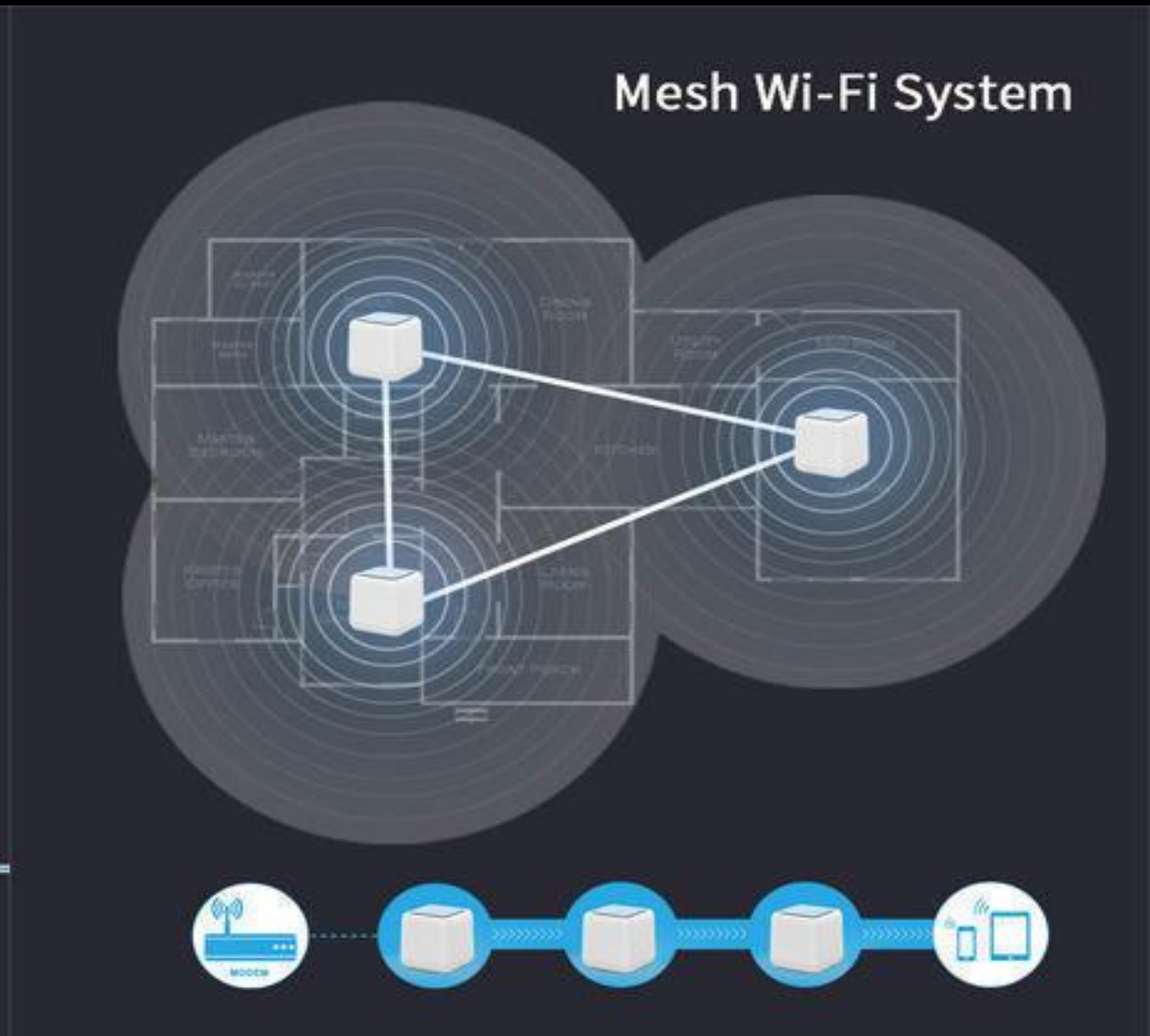
- Increased network capacity
- Wi-Fi 6 Flexible design
- Easy Setup - Wi-Fi Mesh
- Network intelligence
- Service prioritization
- Scalability

Introduction of Intelligence – Thinking for Itself

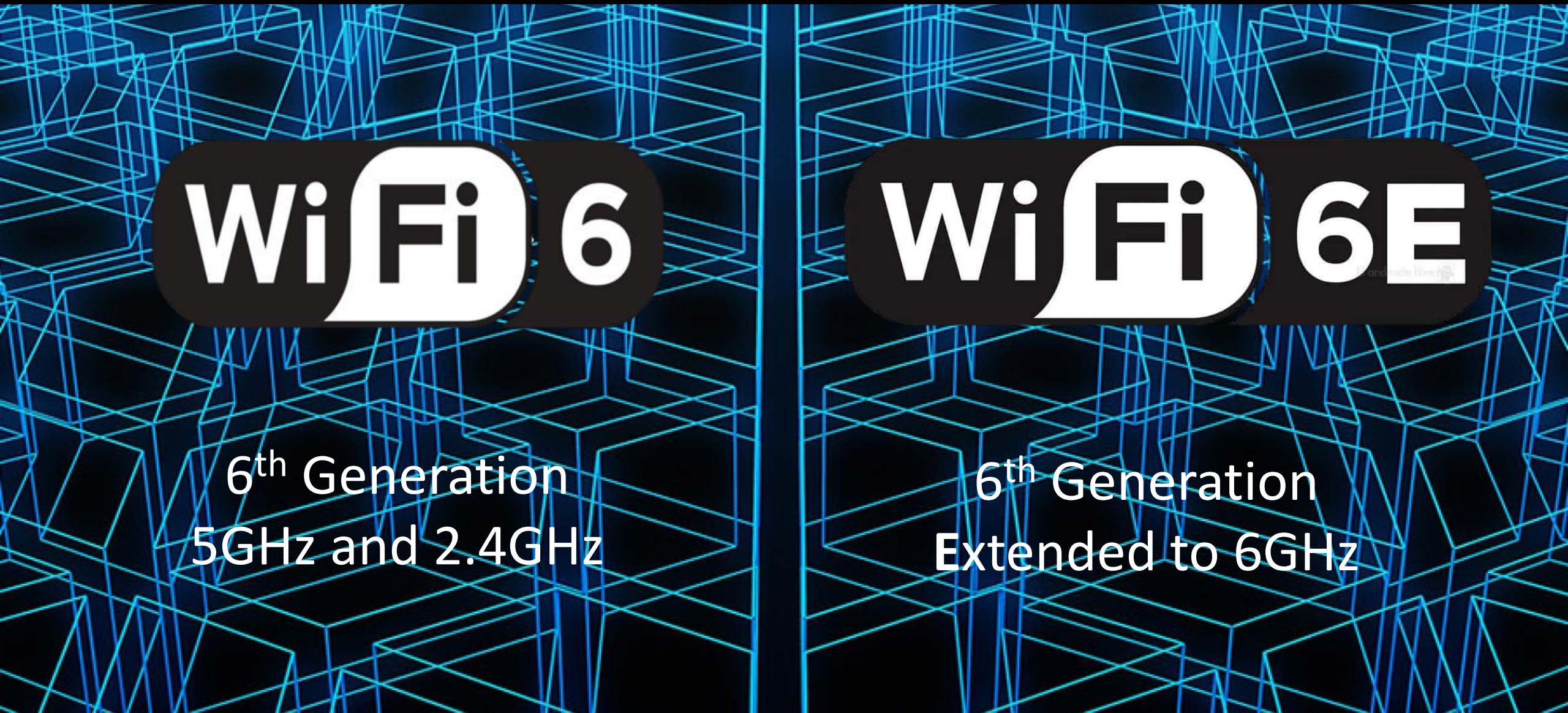


Managed Wi-Fi with Mesh



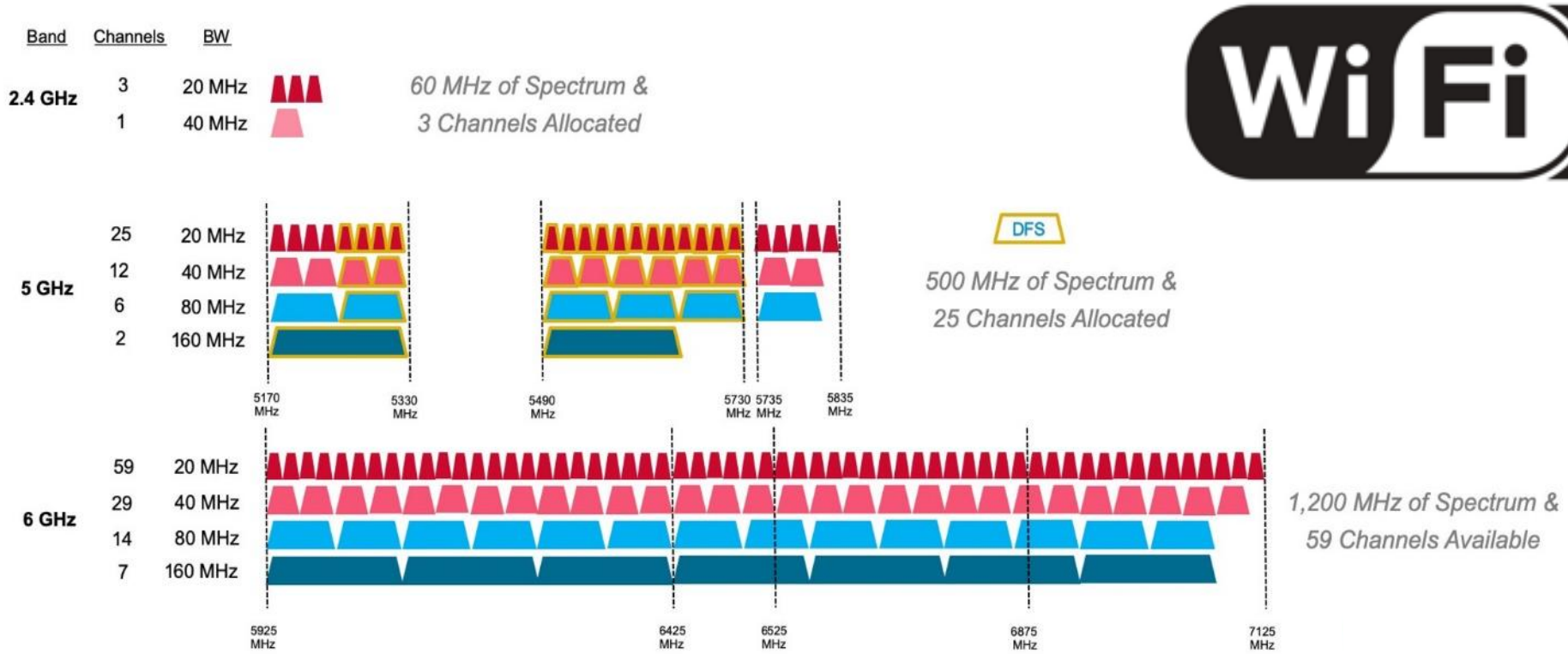


What’s in the Name



What is Wi-Fi 6E?

Wi-Fi 6E is a new extension to the existing Wi-Fi 6 standard to signify it's capable of supporting all-new 6 GHz frequencies. FCC opened up 1,200 megahertz of spectrum in the 6GHz band for different types of unlicensed uses.



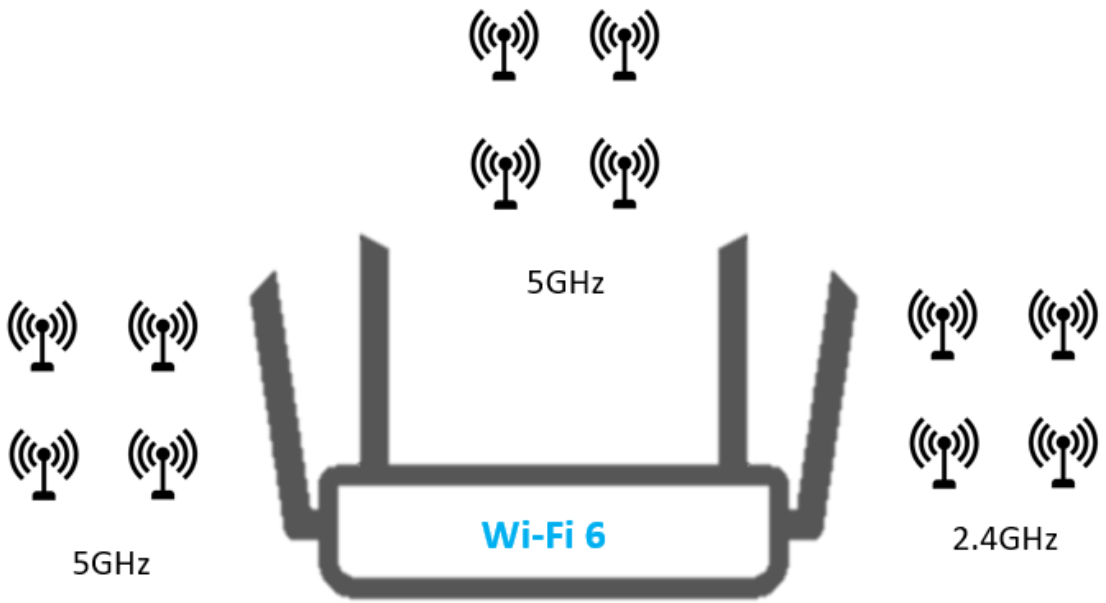
Standard Wi-Fi is facing a spectrum shortage because if the increasing number of devices being used around the world and the addition of 6GHz will help mitigate this problem. However, regulators have yet to fully approve the band's use.

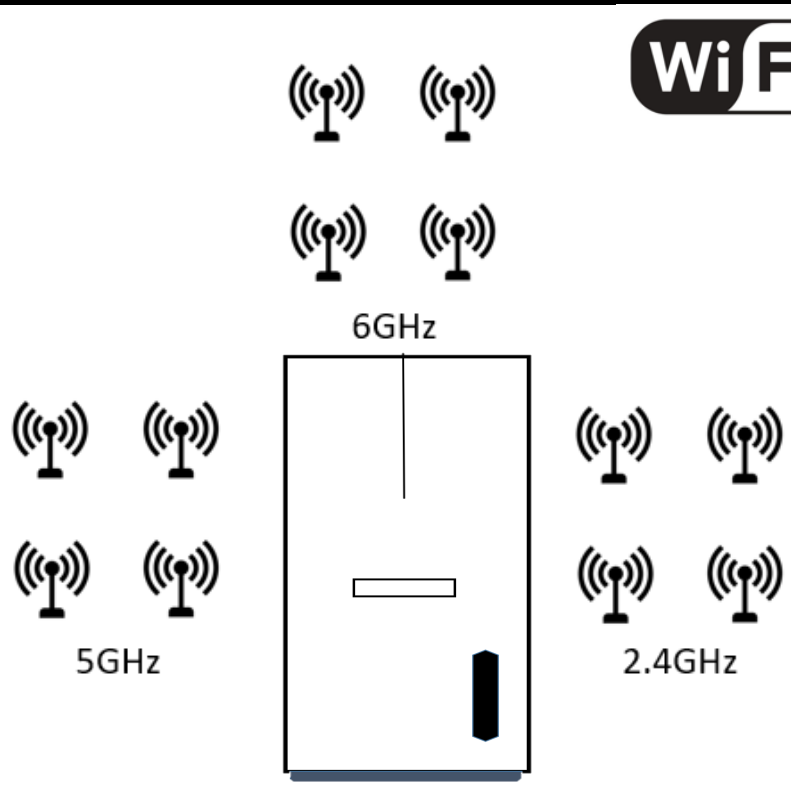
What’s the difference?

- Two 160 MHz channels
- 24 available channels
- Data Bands: 2.4 GHz, 5 GHz
- Number of 160-MHz-wide channels available: 1 (in 5 GHz band)
- WiFi 6 is backward-compatible with earlier WiFi standards
- Compatible with WiFi 5 and older WiFi devices

- Seven additional 160 MHz channels
- Hundreds of available channels
- Data Bands: 2.4 GHz, 5 GHz, 6 GHz
- Number of 160-MHz-wide channels available: 8 (1 in 5 GHz, 7 in 6 GHz bands)
- WiFi 6E is not backward-compatible with earlier WiFi standards
- WiFi 6E's support only WiFi 6E devices

Wi-Fi 6 and Wi-Fi 6E – 3 Bands





Still Dual-Band
Wi-Fi 6

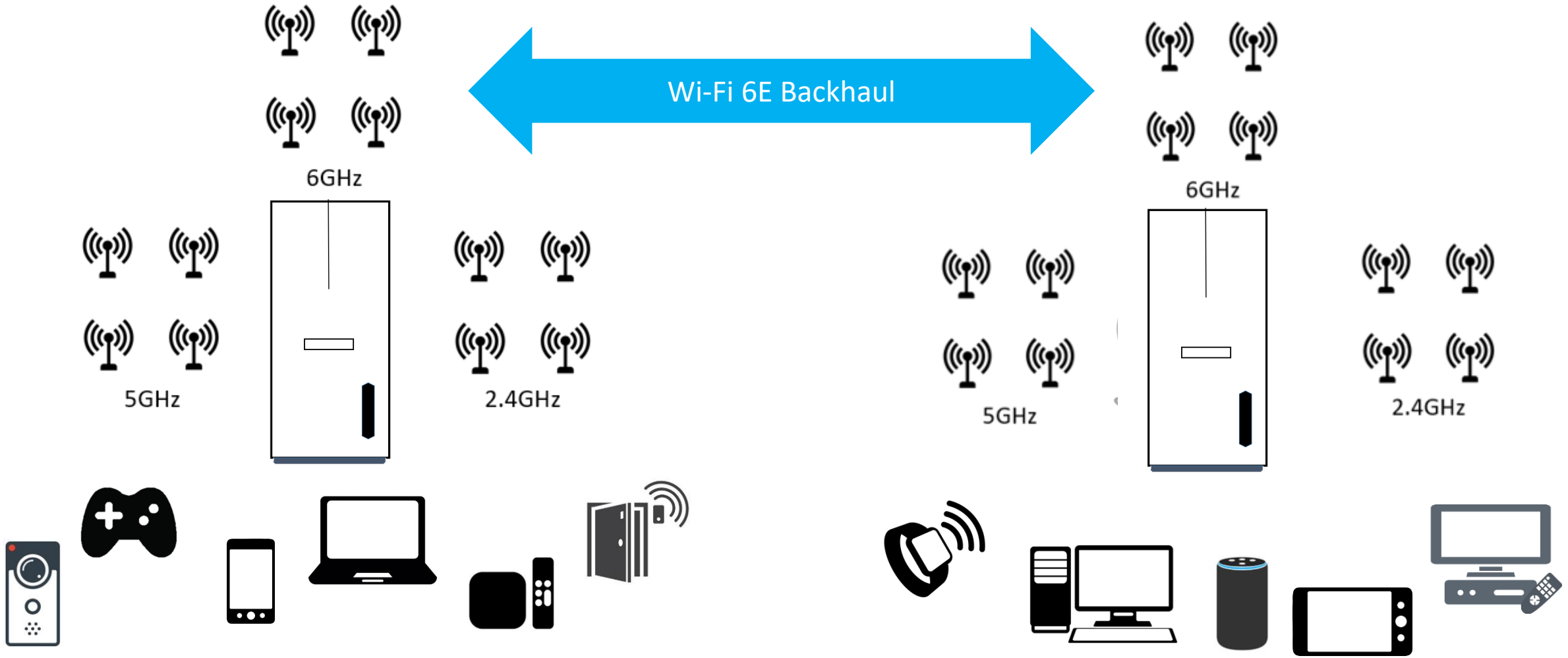
True Tri-Band Router

Up to 10 Gbps over Wi-Fi

The maximum theoretical speed of the router chip ranges from 5.4Gbps to 10.8Gbps, which is greatly improved compared to Wi-Fi 6

The maximum theoretical speed of the Wi-Fi 6E mobile phone chip is **3.6Gbps**

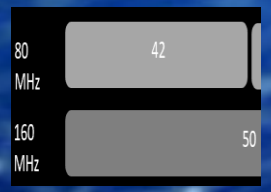
Wi-Fi 6E Home Network Usage



Wi-Fi 6E Delivers Benefits into 6GHz

Features

More contiguous spectrum



Wider Channels

Less Interference

Benefits

Gigabit Speeds

Extremely low latency

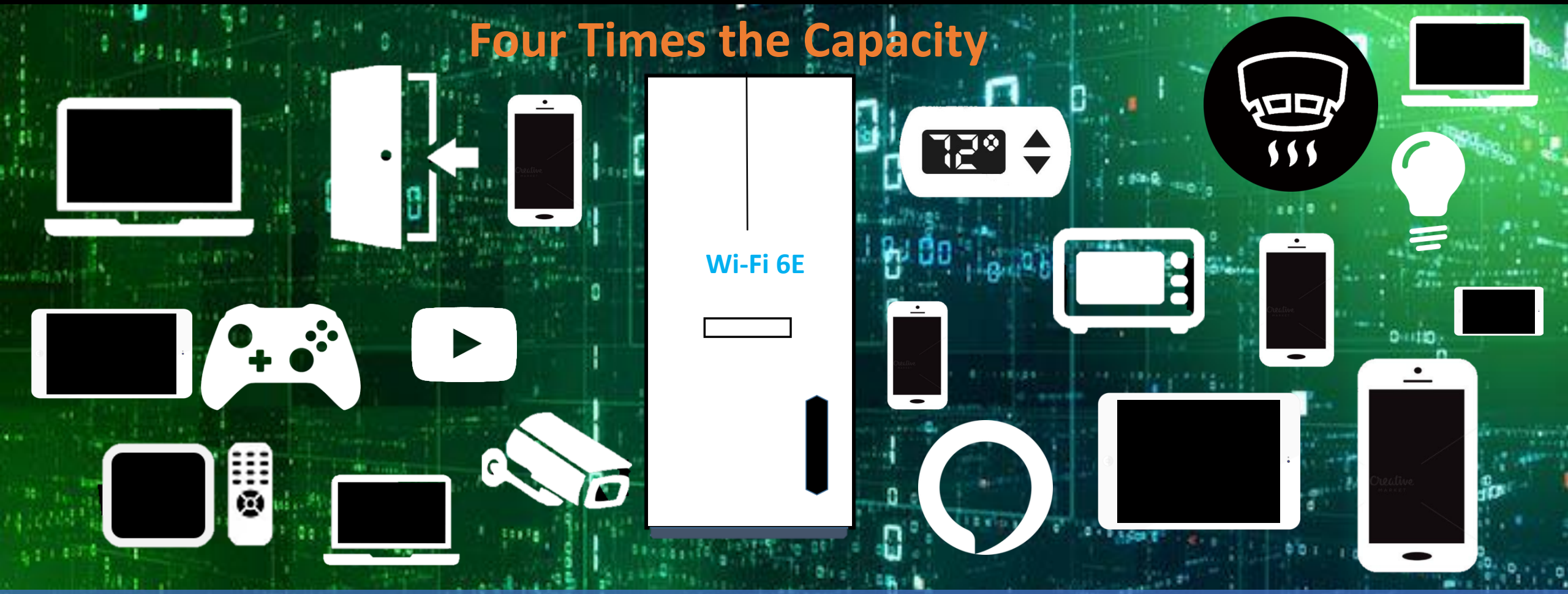
High capacity

Wi-Fi 6E Powers

Ultra High-Performance Short-Range Wi-Fi

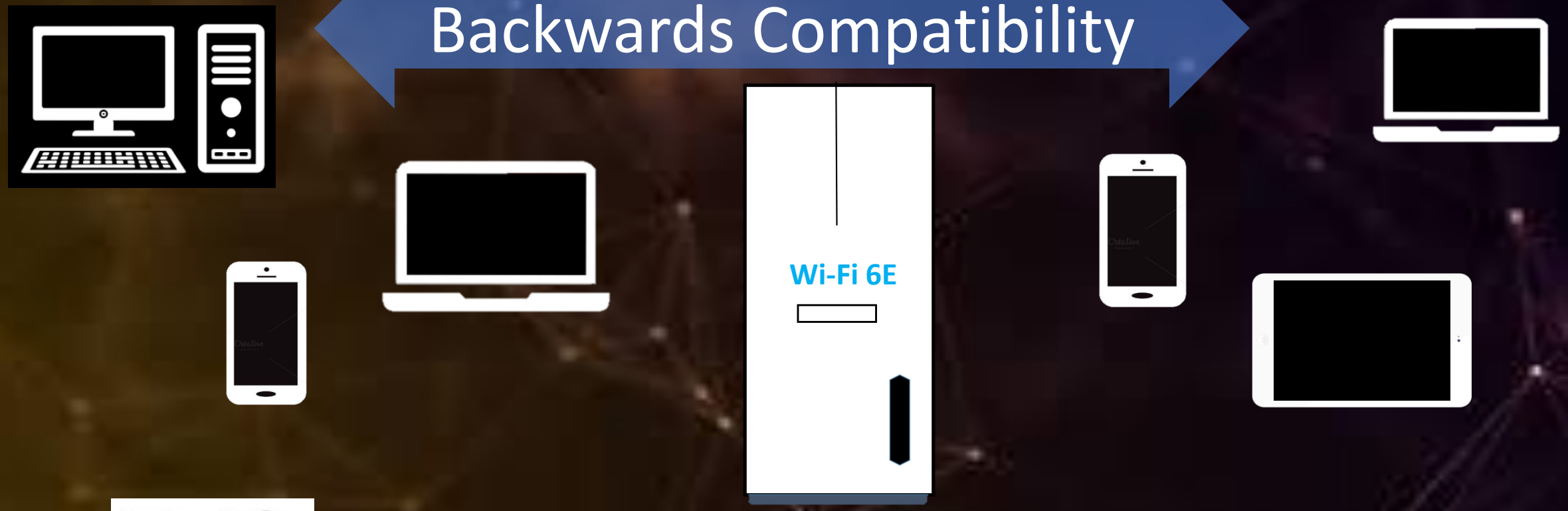
2 Gbps throughput and sub-ms latency

More Connected Devices with Wi-Fi 6E



Wi-Fi 6 improves over crowed Wi-Fi with an additional technologies with more radios and antennas to improve the overall Wi-Fi experience

Connecting the New and the Legacy Wi-Fi

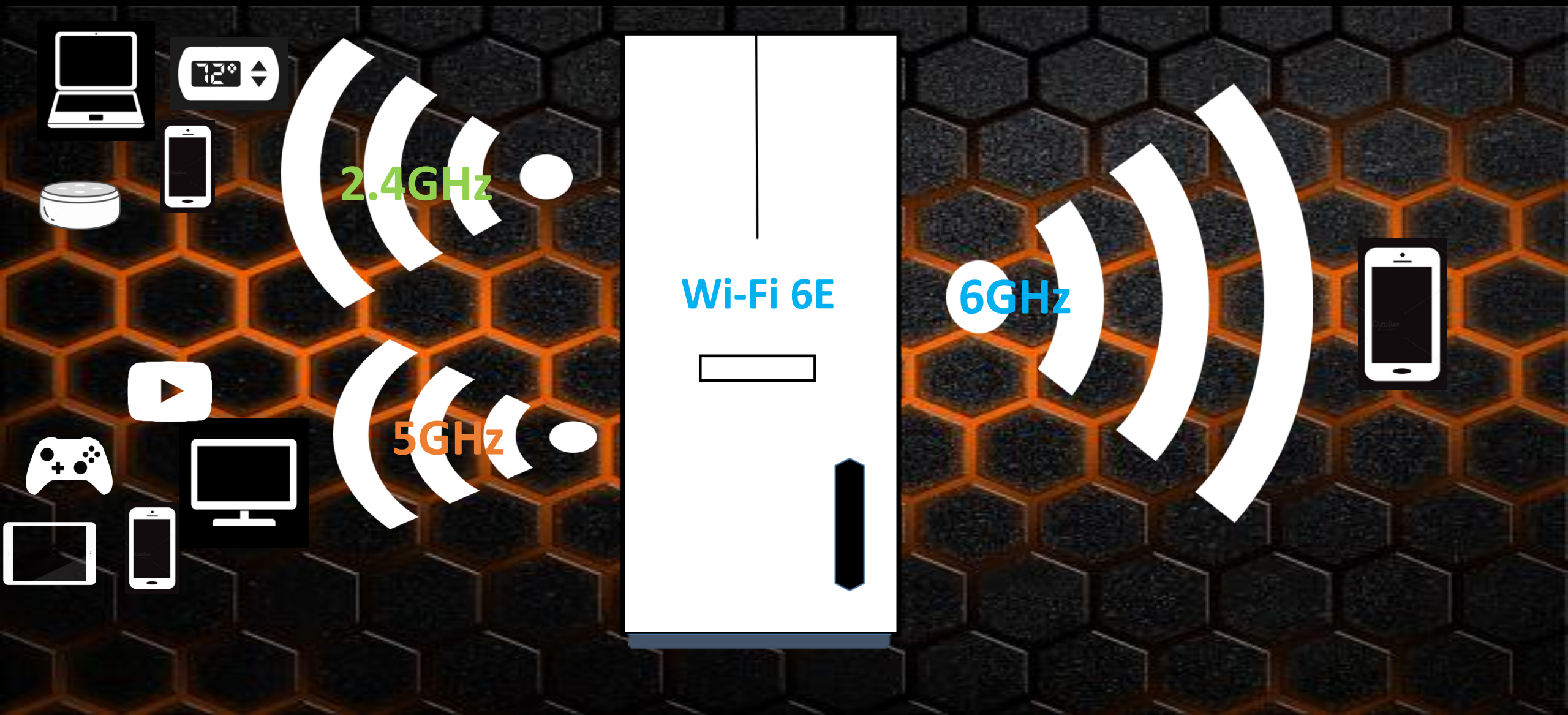


Wi-Fi 6E Routers are designed to handle existing Wi-Fi 4/5 Client devices at the same time as Wi-Fi 6 Client devices

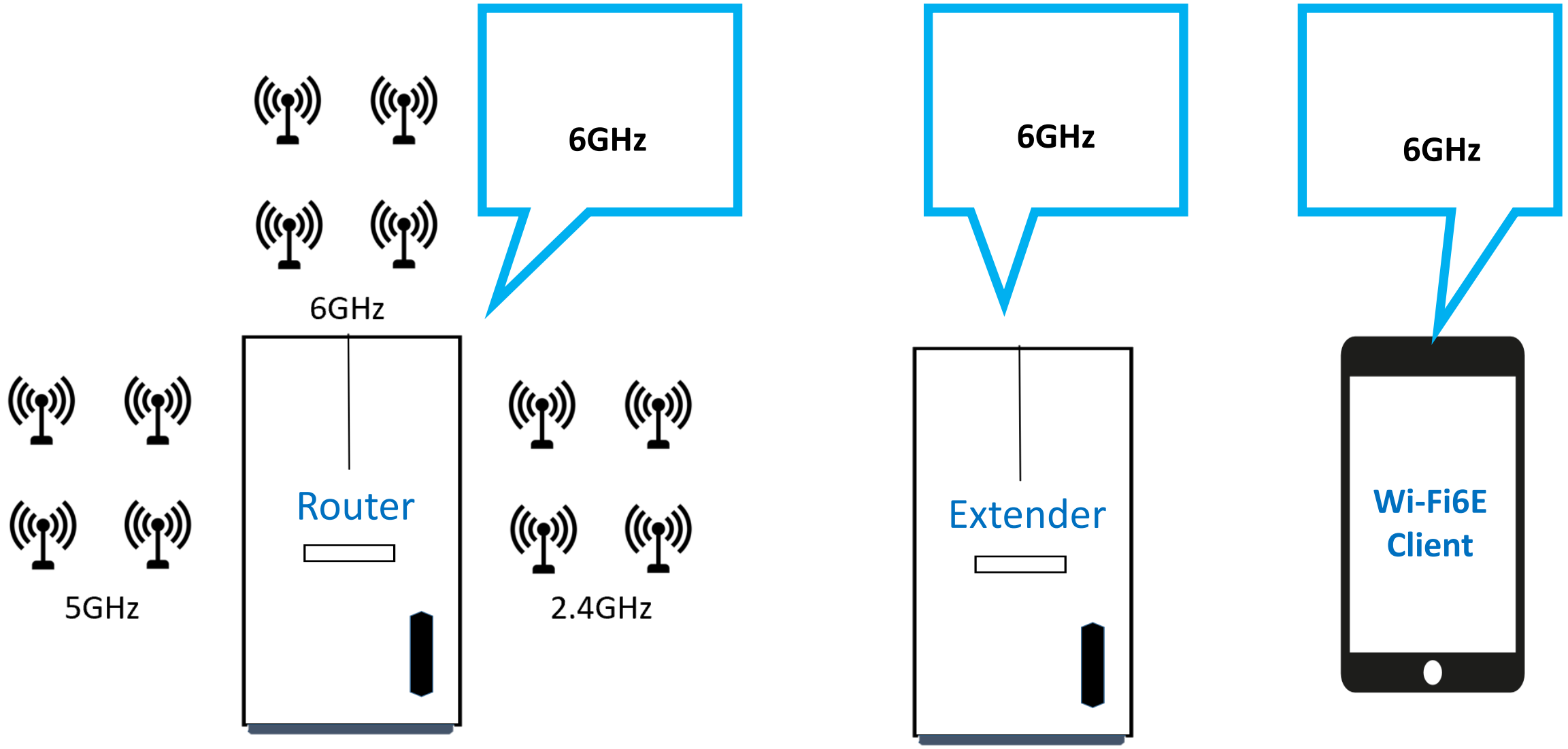
Aggregation of the Wi-Fi Clients

Wi-Fi 6E improves over crowed in Wi Fi home network by utilizing all connected clients push communication like a giant hive

No Interference Between Spectrums

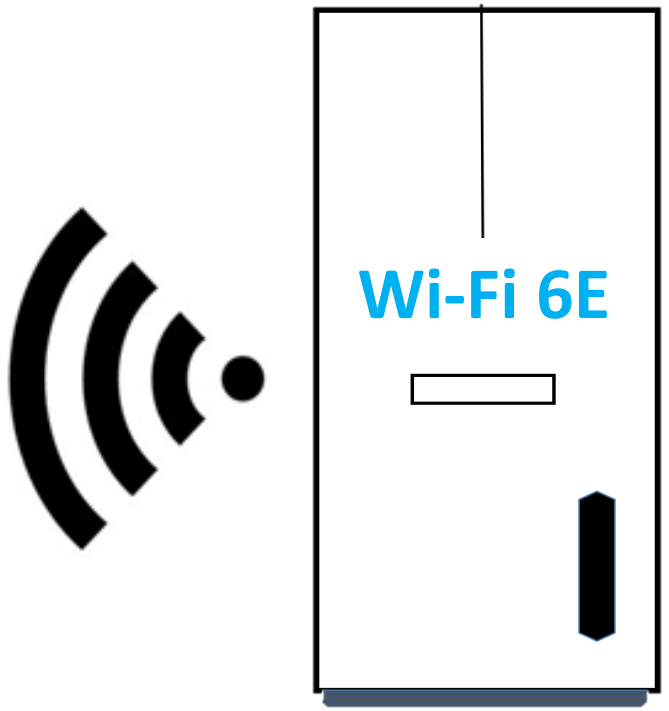


6GHz Devices Only



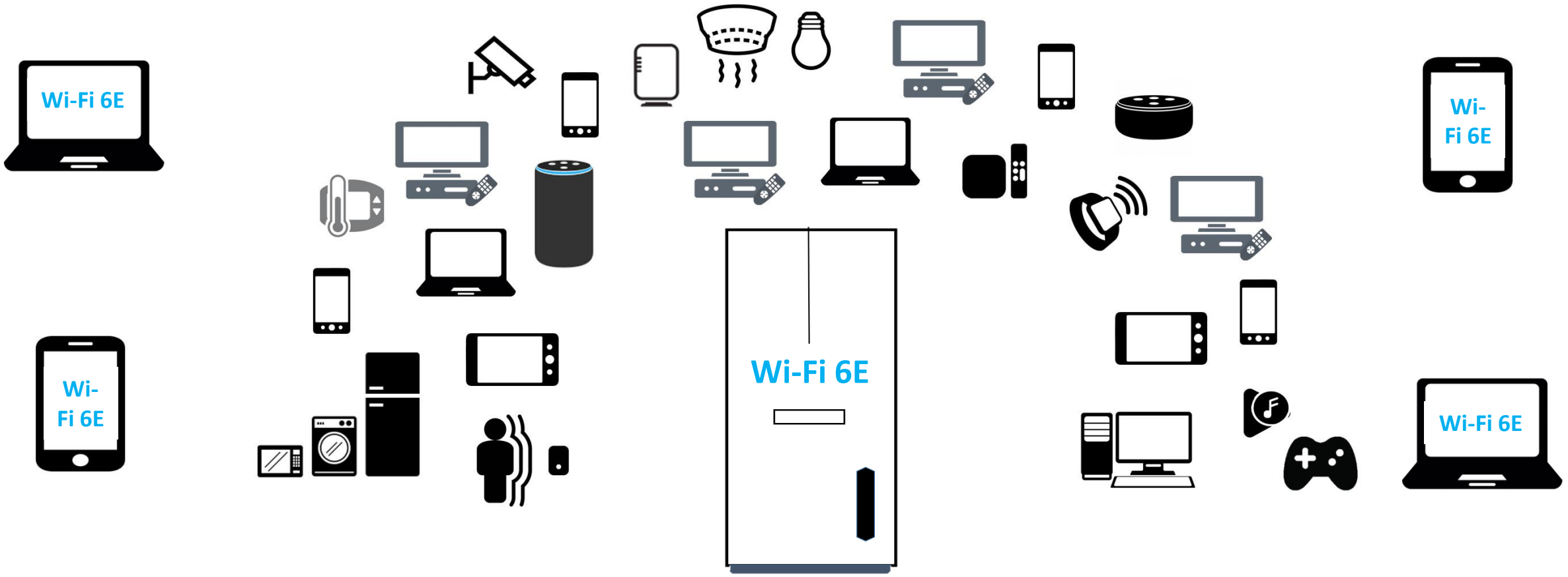
Not Much Difference at First Glance

A single Wi-Fi 6E Client connecting to a Wi-Fi 6E Router may only be slightly faster than a single Wi-Fi 5 (11AC) Client connected to a Wi-Fi 5 Router



Things will start to change….

The home network performance will start to change as more Wi-Fi client devices are added especially Wi-Fi 6 client devices.



Wi-Fi 6 Security

Wi-Fi started getting its biggest security update in a decade, with a new security protocol called WPA3

WPA 3 Wi Fi

WPA3 makes it harder for hackers to crack passwords by constantly guessing them, and it makes some data less useful even if hackers manage to obtain it

WPA3 adds new features to simplify Wi-Fi security

Use the latest security methods

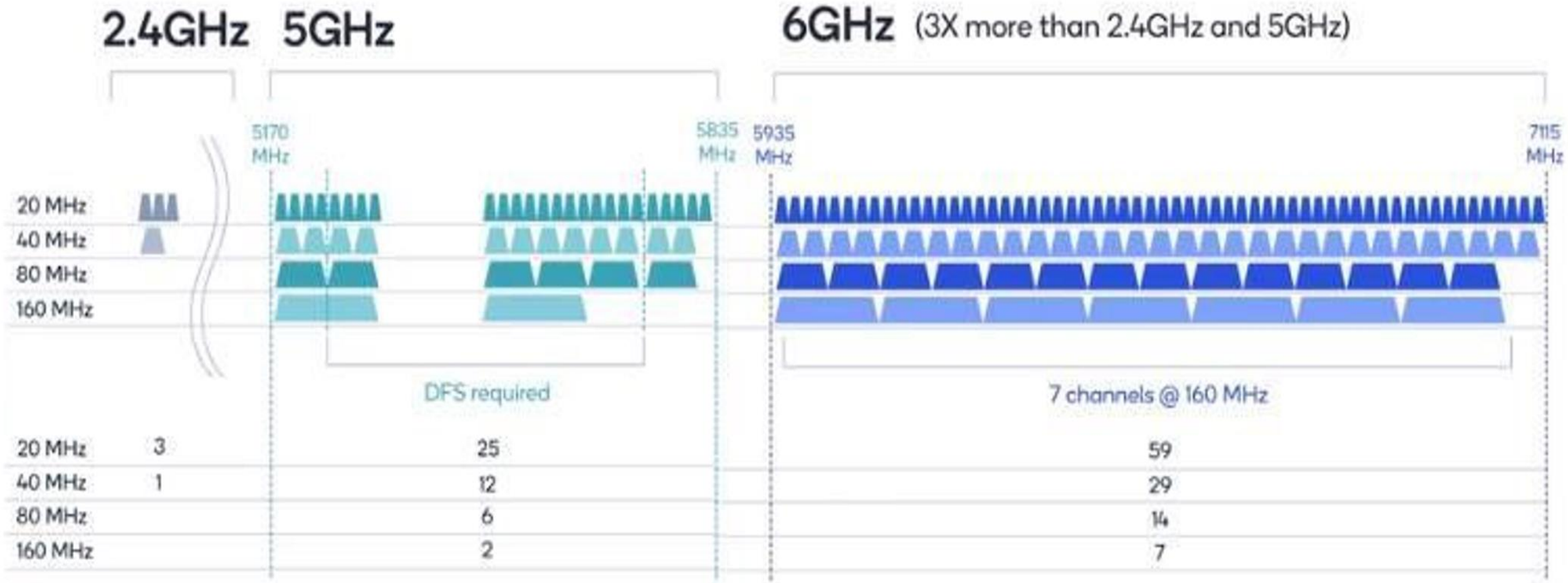
Disallow outdated legacy protocols

Require use of Protected Management Frames (PMF)

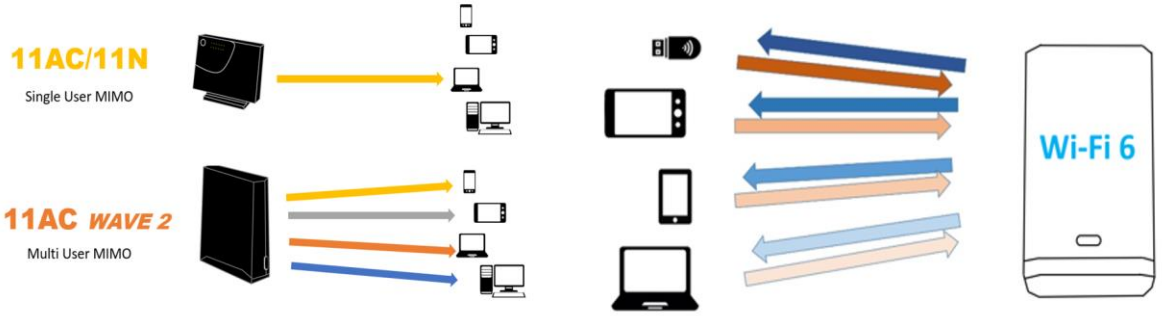
WPA3 security is a requirement for Wi-Fi 6 certification, but it may not be included in all uncertified devices.

What’s Under the Wi-Fi 6E Technology Hood

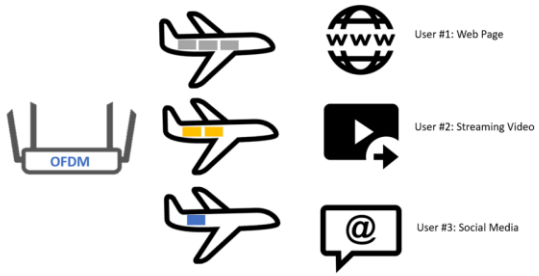
Increased Spectrum



Wi-Fi 6 Technology



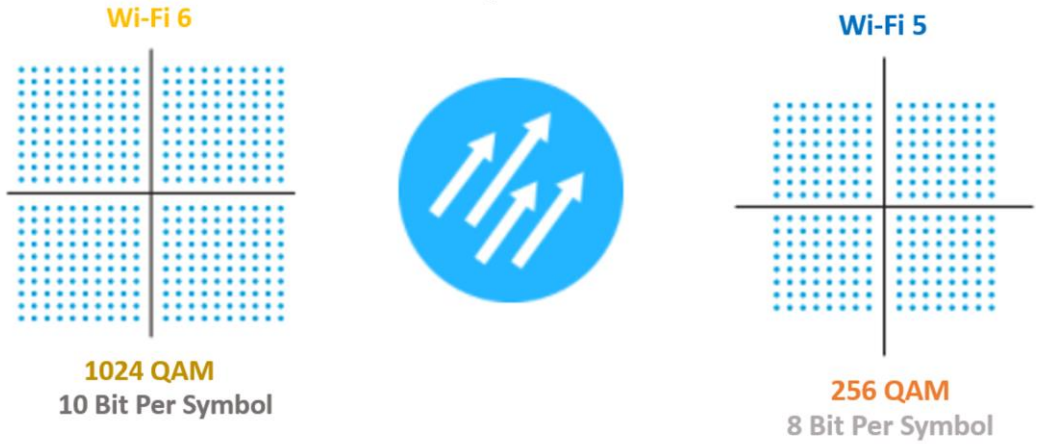
Wi-Fi 6 MU-MIMO Bi-Directional Communication

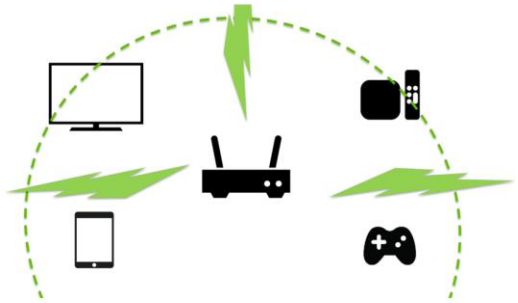


Orthogonal Frequency-Division Multiple

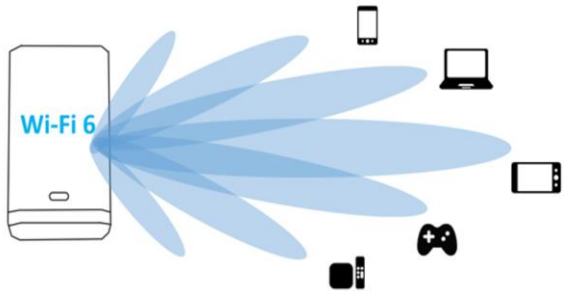
Orthogonal Frequency-Division Multiple Access

Quadrature Amplitude Modulation



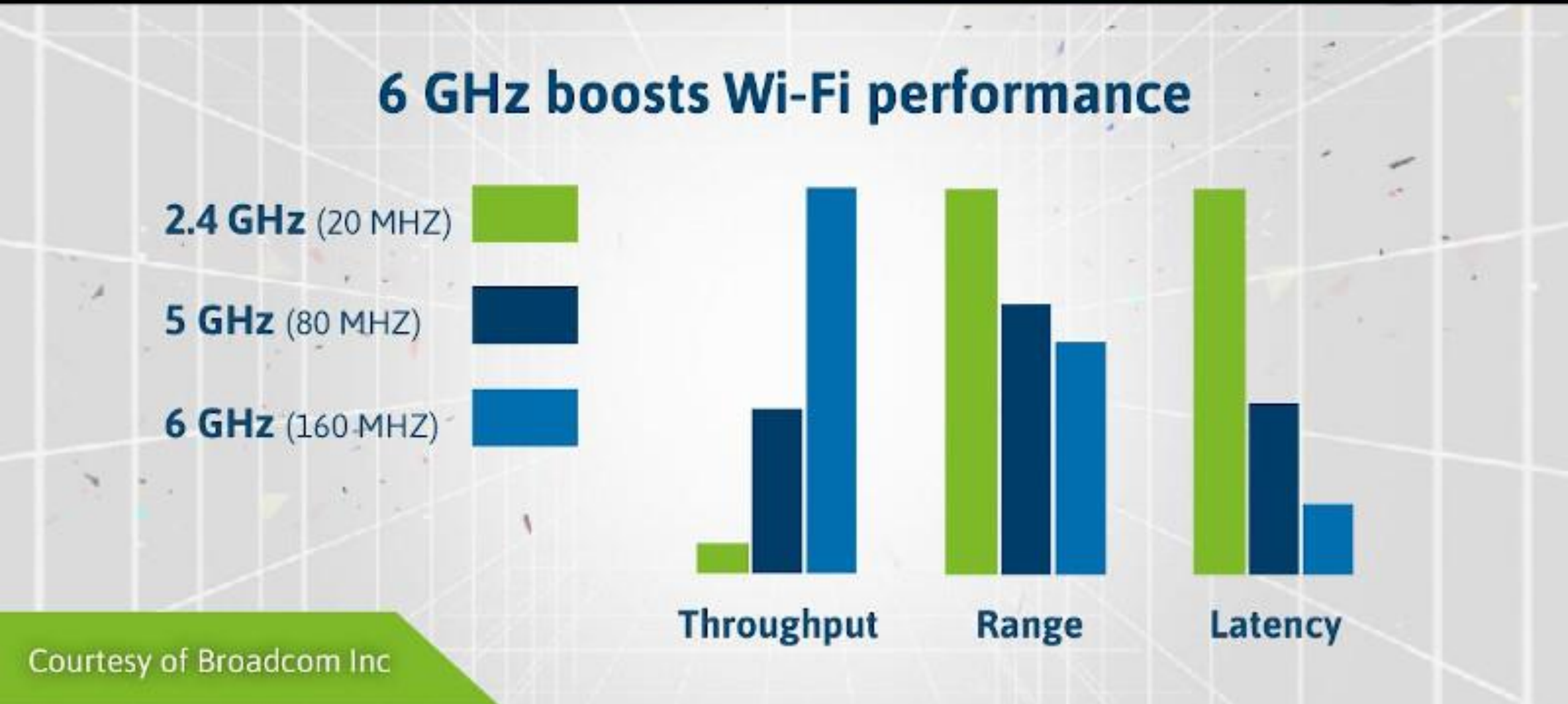


Omni-Directional Wi-Fi Broadcast Signal



Beamforming connection to individual Wi-Fi Clients

Wi-Fi 6E Trials with Performance



The Future Wi-Fi: Wi-Fi 7

Why Just Stop at 1Gigabit Broadband?

PON technologies like XGS-PON are built upon existing GPON technology

When planning for your next Greenfield or looking to upgrade an existing brownfield fiber network 10G XGS-PON can co-exist on the same Fiber Optics

The 10G investment cost has been coming down over the recent years making it ideal for selecting electronics that have support for higher bandwidths

10G Broadband allows for Service Providers to offer a variety of different service tier package with 2 Gigabit, 5 Gigabit, and 10 Gigabit Internet access

Meet today’s high demanding Broadband needs with technologies that deliver upon faster speed and overall performance

Why 10 Gbps Gateway?

Why we need a 10 Gbps Gateway:

Auto sensing bandwidth up to 10 Gigabit Broadband speeds

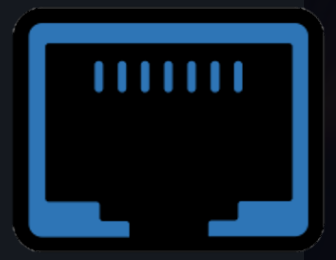
Pairs well with Wi-Fi 6/6E for faster speeds and improved coverage around the network

Ability for offer tiered service offering packages with more performance

Share high-speeds up to 10 Gig Broadband with all the in-home connected devices

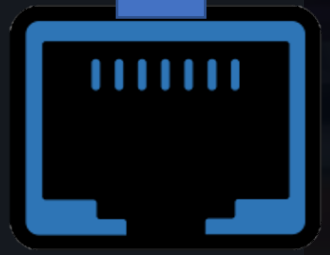
10 Gbps Broadband Advantage

10 Gigabit Ethernet Routers offers a variety of Internet access options to expand your Broadband services



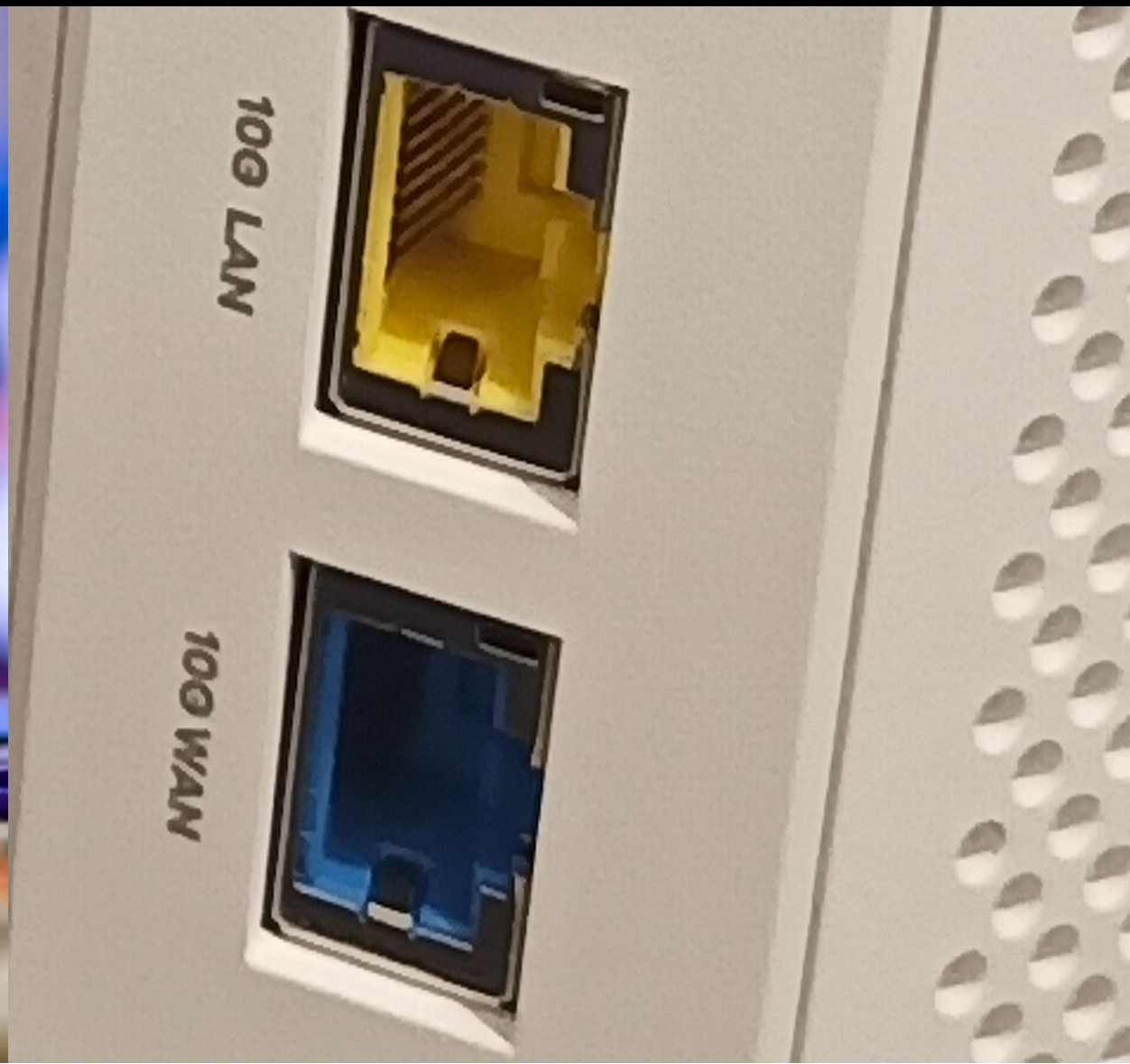
Up to 10 Gig Internet WAN

10 G WAN

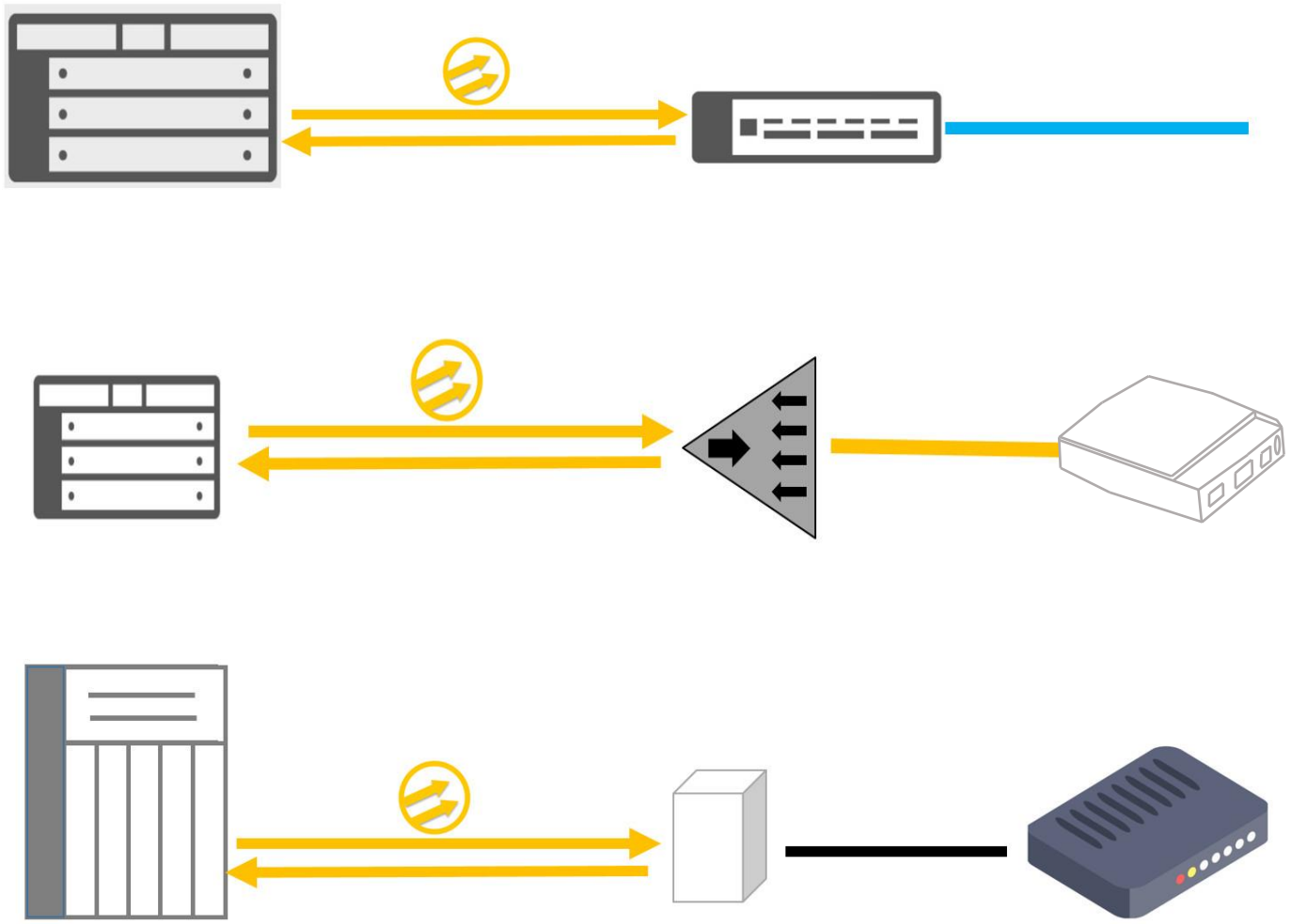


1 Gig Internet WAN

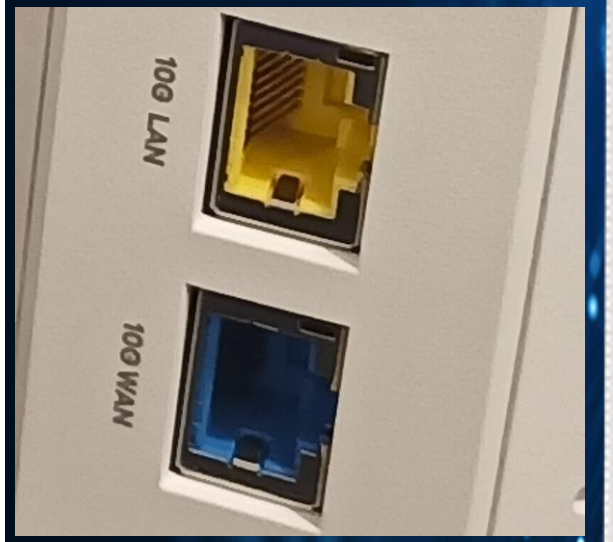
WAN
(1Gig)



Easy to Deploy and Upgrade



Ethernet

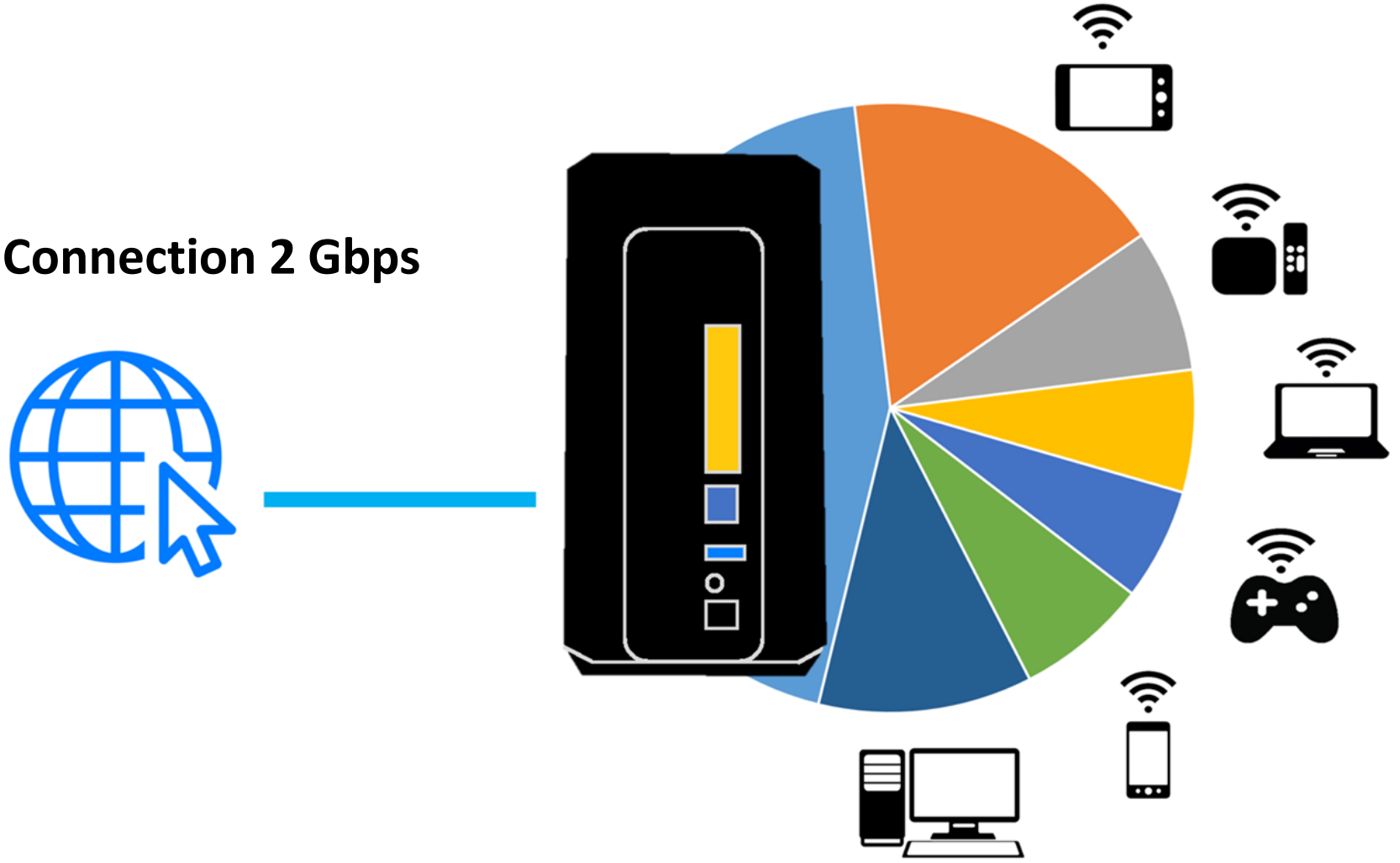


RJ-45

Where Are the Gigs I’m Paying For?

Sharing the Load

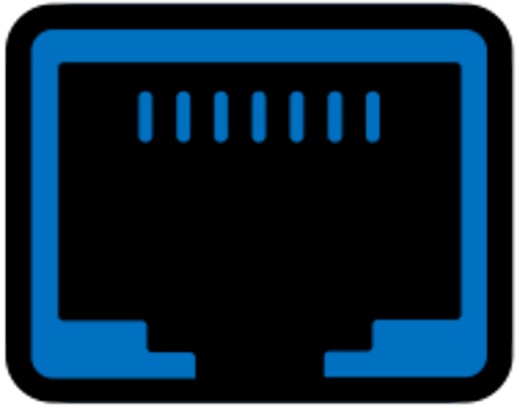
Wireline Connection 2 Gbps



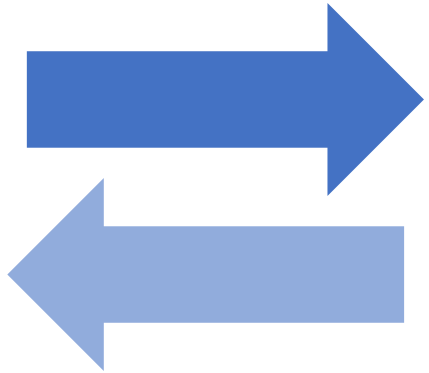
Shared WLAN Interface

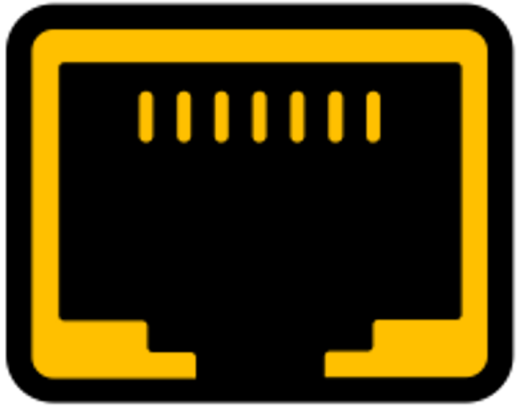
How to Show 10 Gig Performance Testing

10 Gig Internet WAN and 10 Gig LAN



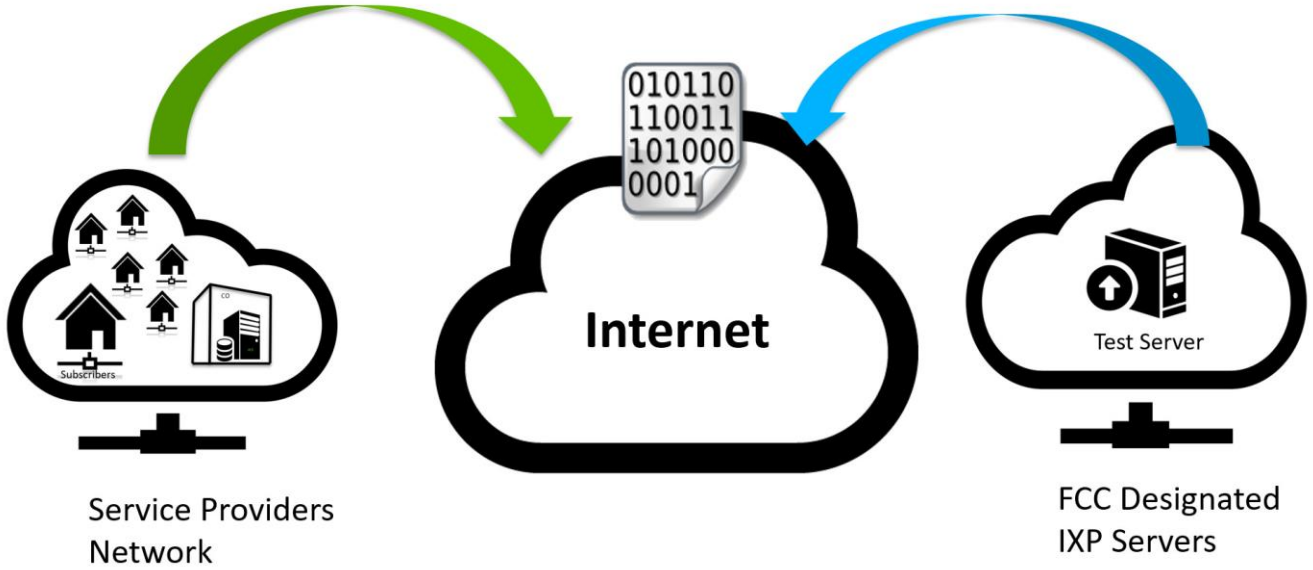
10 G WAN/LAN





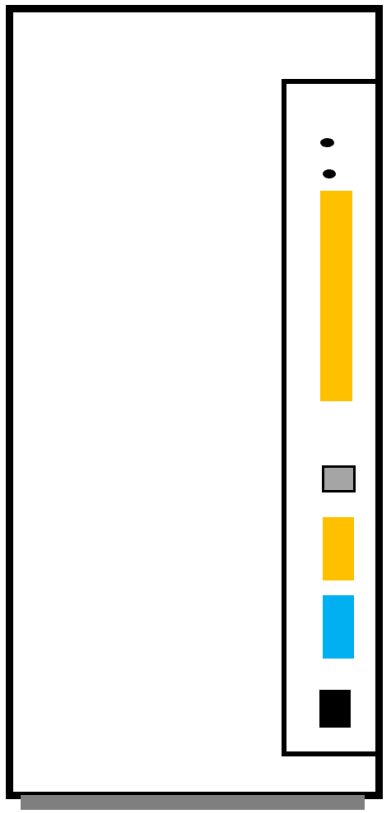
10 G LAN

Ideal Set Up for Subscriber Speed Testing



Service Providers Network

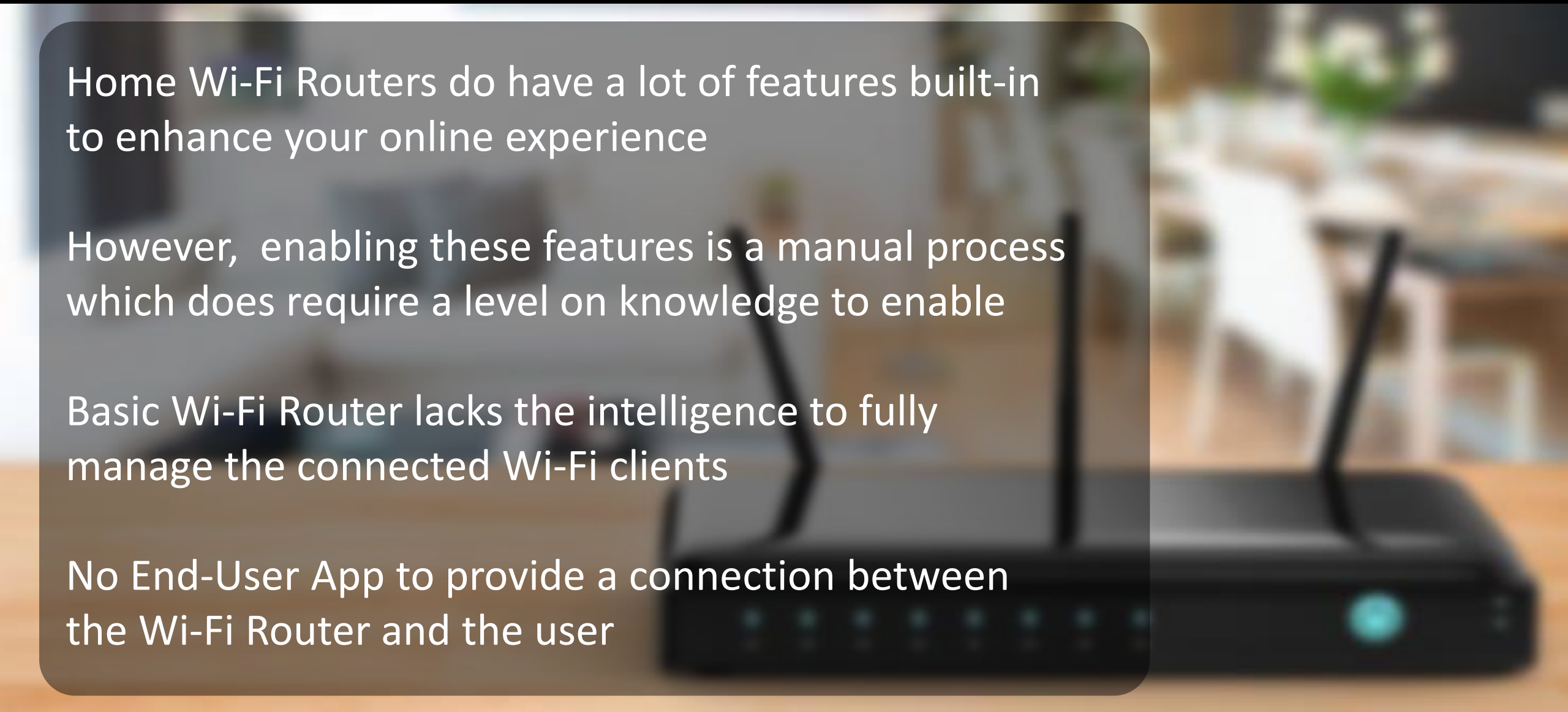
FCC Designated IXP Servers



Multi-Gig Router

Less bottlenecking with the Bandwidth

Will Any Old Router Do?



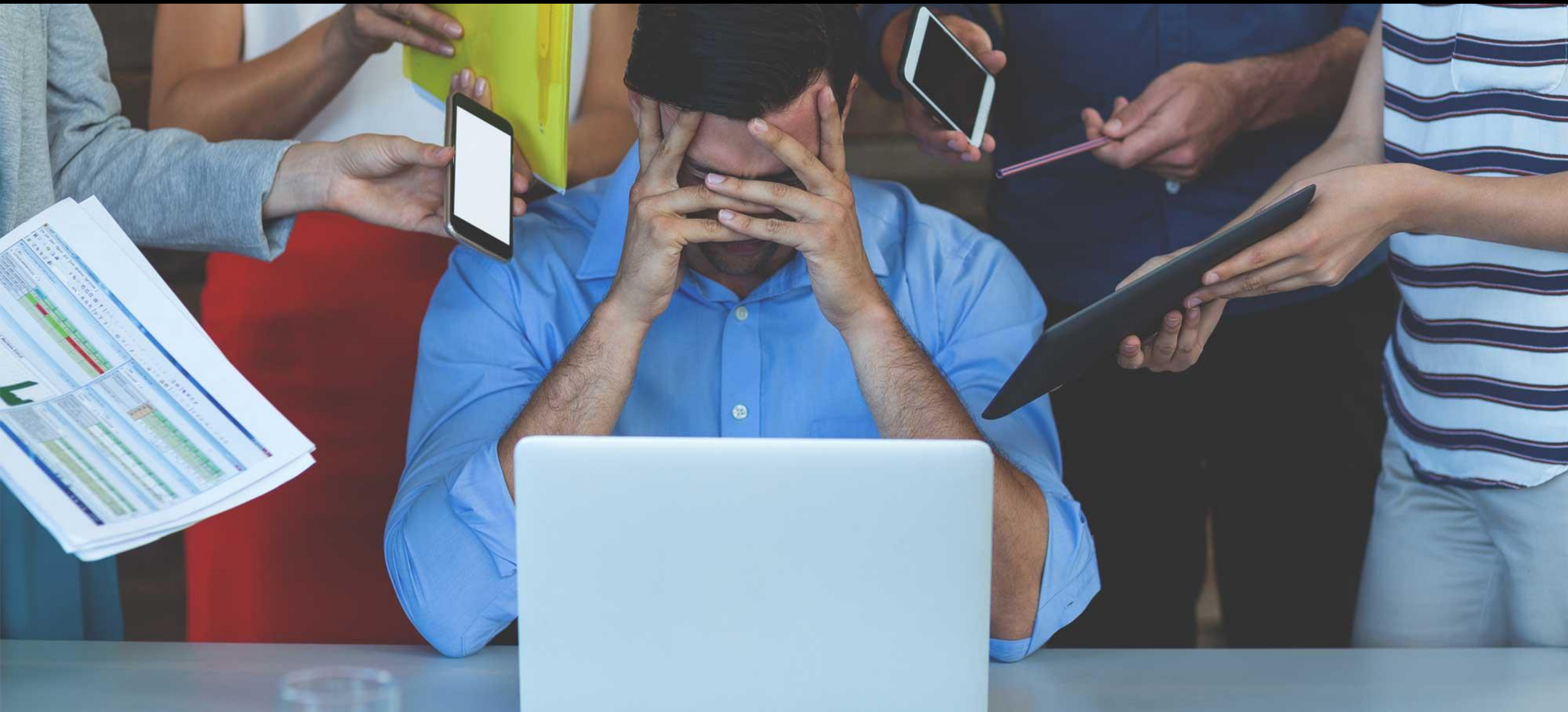
Home Wi-Fi Routers do have a lot of features built-in to enhance your online experience

However, enabling these features is a manual process which does require a level on knowledge to enable

Basic Wi-Fi Router lacks the intelligence to fully manage the connected Wi-Fi clients

No End-User App to provide a connection between the Wi-Fi Router and the user

Wi-Fi and Managing your Subscribers



Troubleshooting Wi-Fi 6E & 7

Troubleshooting the Unknown

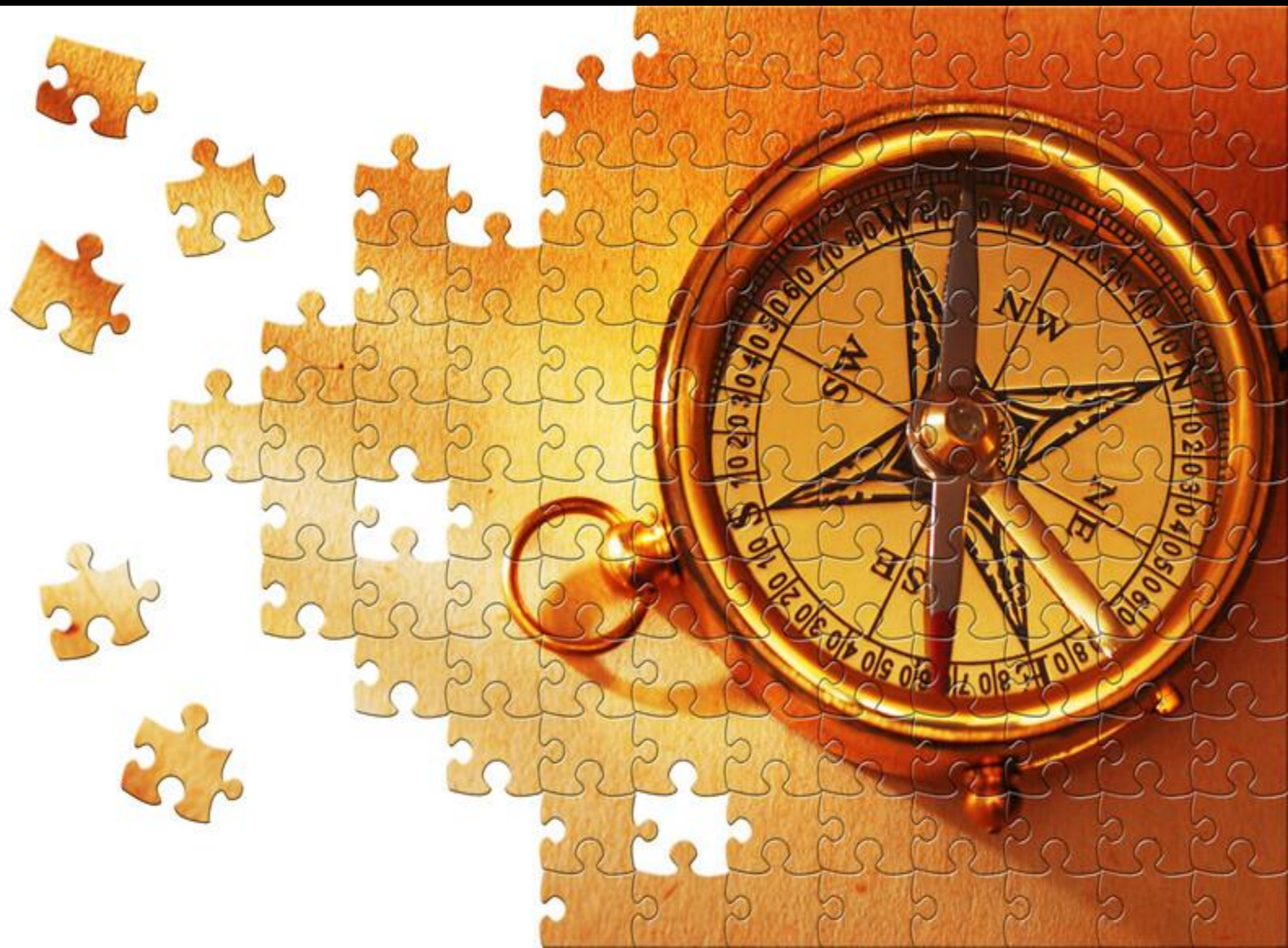
Same steps apply to Wi-Fi 6E & 7

Connect in a similar format

Wi-Fi 6E still has channels

Same kind of format for SSID and Password

Still will have some issues with Interference



Wi-Fi Routine Maintenance

Manage and Maintain the Subscriber's Home

Monitor the connected Wi-Fi Client devices

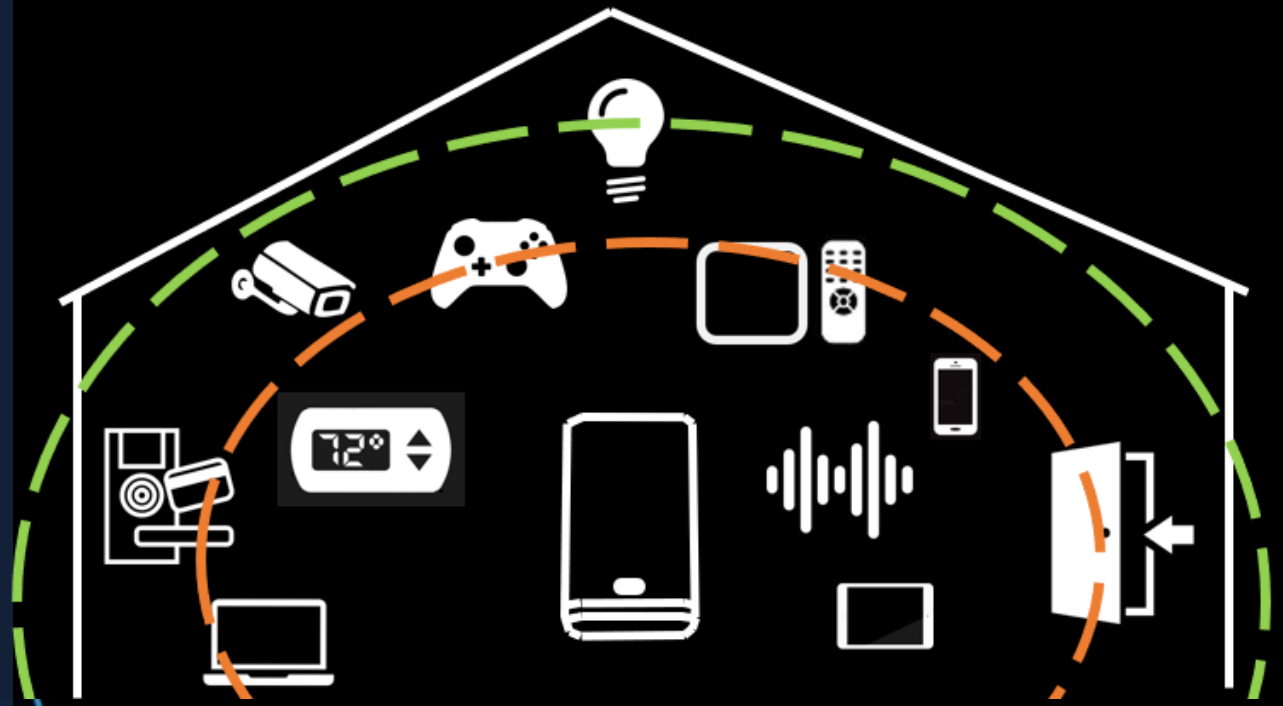
Update the Wi-Fi Password

Add guest Wi-Fi networks

Add a new device

Instant Troubleshooting

Wi-Fi Parental Controls

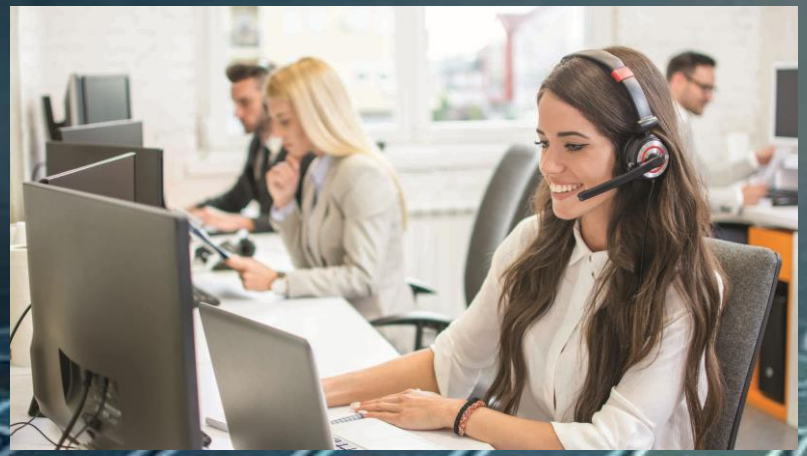


Remote Management with Wi-Fi

Instant Customer Care

Routine Maintenance

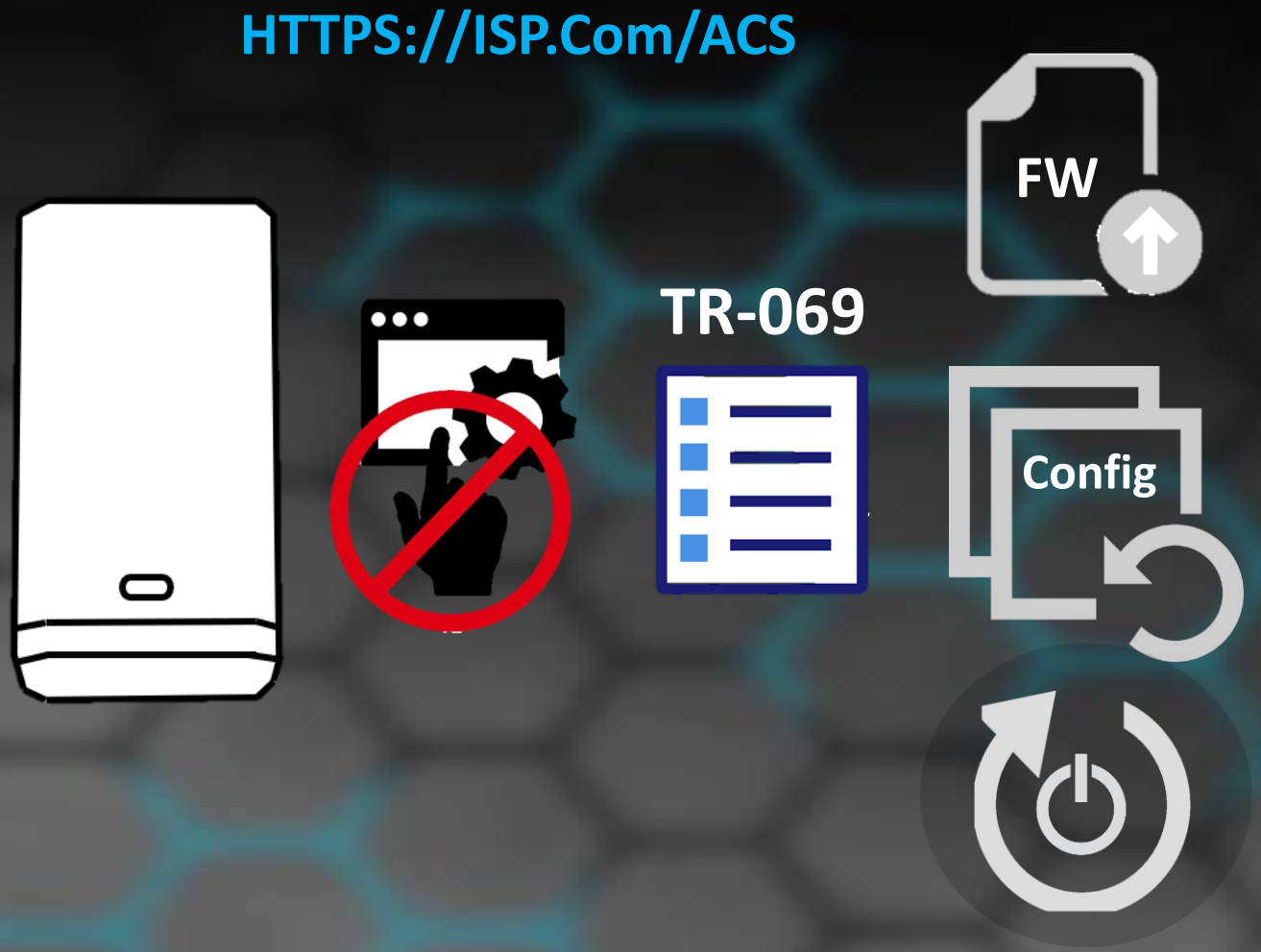
Saving Cost



Zero-Touch Configuration

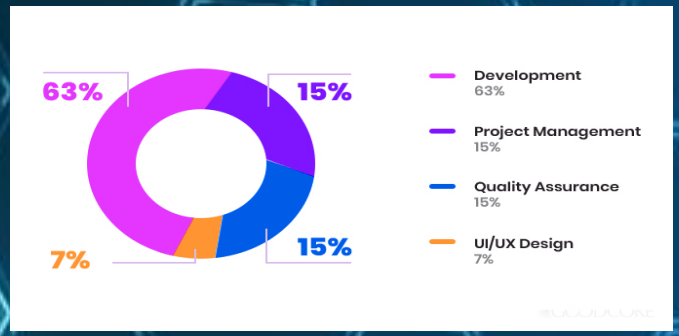
No need for anyone to access the Gateway

Configurations and troubleshooting can be performed remotely over the Service Provider's network



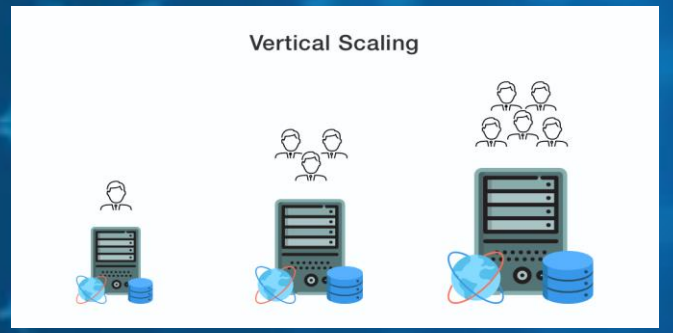
Locally Hosted ACS

Investment into TR-069

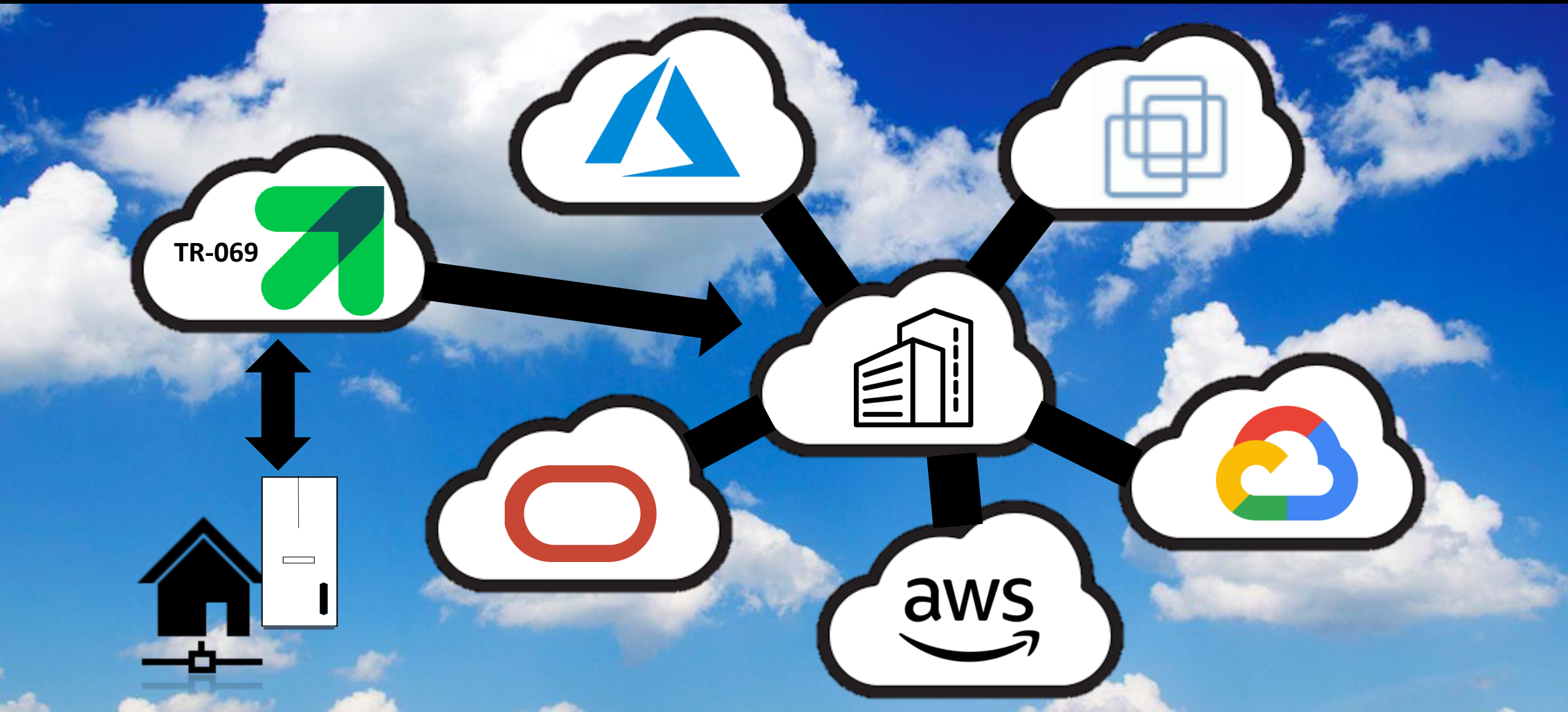


start

Remote Management Considerations



ACS in the Cloud



Cloud Hosted Remote Management

Managed Mesh Wi-Fi has opened the door for Service Provider to service offer their Subscribers a premium Broadband experience

Similar to TR-069's process, the cloud managed mesh solution does allow for the remote management system to be hosted in the cloud and saving the Provider's resources

Cloud Managed

What Cloud Managed Wi-Fi Delivers

Enables new services to be deployment quickly

Reporting on vital statistics from the Subscriber's network

Works with multiple vendors and on multiple levels for open interoperations

Scalable and ready for new services that often require only Cloud Management

IoT, Smart Home, and TR-369

broadband forum

TR-369 or USP (User Services Platform) is a standardized protocol for managing, monitoring, upgrading, and controlling connected devices

Meeting Subscriber Demands with WiFi 6/E

Interested in learning more? Contact us

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Thank you!

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