

# Here comes next-gen Wi-Fi and the apps to make it succeed

With Wi-Fi 6/6E on a roll and Wi-Fi 7 right around the corner, service providers must prepare for the future.



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PUBLISHED BY:

**FIERCE**  
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Consumers are nearing a transition in the types of internet services available thanks to the efforts of service providers upping their game with support for fiber delivery and the latest Passive Optical Network (PON) standards, such as XGS-PON and beyond, as well as the approach of new Wi-Fi technology and standards that will enable everything from 8K HDR video streaming and immersive video experiences to aging-in-place and in-home medical monitoring services.

Concerns over network speed are off the table. Today, providers are following a deployment roadmap to take their access network bandwidth from 1 Gbps to 10 Gbps thanks to 10G-PON technology, and they have their eyes set on support for 25 Gbps and 50 Gbps data bursts over the next decade.

However, this is only half of what's required to make next-generation services a reality for consumers. The other part is a home Wi-Fi network that's equally capable. Without it, consumers will never experience the speed, latency and jitter benefits available from these access network enhancements.

Further, advanced home Wi-Fi technology that enables advanced services deployment is essential if providers are to generate future revenues to offset their capital expenditures (CapEx) to deploy 10G-PON technology and beyond. The introduction of Wi-Fi 6 and especially the addition of new 6GHz spectrum that only Wi-Fi 6E/7 devices can use has now created a new in-home Wi-Fi platform that can make Wi-Fi connections deterministic for the first time because of the scheduling capabilities in the Wi-Fi 6/6E/7 standards. This now enables Wi-Fi to connect current and future latency and jitter dependent experiences like gaming and immersive XR experiences at near reliability of a physical ethernet cable.



## Home Wi-Fi For Today And Tomorrow

Wi-Fi plays a central role in data delivery in the home. More than 75 percent of data used in U.S. homes is carried via Wi-Fi connectivity, according to Parks Associates [statistics](#). A 2019 report from Strategy Analytics Worldwide pegs the number of Wi-Fi devices in use at more than 5 billion. By 2025, the [Wi-Fi Alliance](#) projects the number of internet-connected devices will reach 41.6 billion.

The average internet speed is improving yearly with today the Global Average at 65Mbps downstream and 28Mbps upstream according to the Speedtest Global index at <https://www.speedtest.net/global-index>. Singapore ranks #1 with 209Mbps/174Mbps and the US ranks #8 with a 153Mbps/23Mbps recorded performance. Overall latency is also improving with the US for example getting close to 14ms for unloaded latency. This constant improvement is needed to support future improvements in immersive video and XR which range from 500Mbps to 100Mbps (with assumed improvements in compression and mapping) and even 8K TV demanding 100Mbps to 50Mbps (potential VVC compression rate) for future larger home screen devices.

Beyond entertainment, Internet of Things (IoT) devices will contribute to bandwidth requirements with the number of machine-to-machine (M2M) connections worldwide growing from 6.1 billion in 2018 to 14.7 billion next year. Connected home applications like home automation and video surveillance will account for roughly half, the report says.

## The Last 20 Feet

Manufacturers and industry groups are developing the Wi-Fi standards and technologies needed to meet these future bandwidth requirements, enable PON developments to fulfill their promise for consumers and support the next generation of home applications.

The first of these technologies is Wi-Fi 6 (IEEE 802.11ax) which improved Wi-Fi performance in the 2.4GHz and 5GHz band by 15-35% in rate and range. However, it is the Wi-Fi 6E standard and emerging Wi-Fi 7 standard that bring Wi-Fi and performance to a whole new level with the addition of up to 1.2GHz of new spectrum and different power levels that will cater for battery operated devices in low pow-



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er mode to extending the current range of Wi-Fi performance connections, greater access point availability and ultimately support for higher demanding applications.

A report from the Wireless Broadband Alliance released in fall 2021 predicted there would be nearly 340 million Wi-Fi 6 devices in the market with 20% supporting 6 GHz by the end of this year, according to a ComputerWeekly.com [story](#). Wi-Fi 6E has just launched to take early advantage of the new spectrum and we are already seeing high end Smart Phones, Laptops and tablets adopt the performance opportunity of new spectrum. The industry however did not stop at Wi-Fi 6E and with the standardization of IEEE 802.11be (Wi-Fi 7 elect) the features of 6E are now enhanced with

- Higher modulation rates to 4K QAM
- Multi-link Operation – to allow combining transmission on 2 bands – 2.4/5, 2.4/6 and 5/6 when the client supports Multiple Radios
- Multiple Resource Units – the ability to allocate parts of the modulated signal to different services, avoid noise and other transmissions and improve determinism of high value low latency applications.

These new speed and scheduler enhancements will give Wi-Fi 7 the capability to offer a deterministic, low latency, improved range and resilient platform for the next decade of home services.

## Services, Opportunities And Expectations

Deterministic delivery of packets will make it possible for providers and app developers to have confidence that packets will reach a consumer device precisely in time, which in turn will make possible next-gen apps with exciting, new capabilities. Starting out immediately with an improved Wi-Fi gaming experience for both Cloud Controller based gaming and even more reliable Working from Home experiences but then offering the platform for the acceleration of Augmented, Mixed, Virtual and Extended Reality (AR, MR, VR and XR) apps that demand packet delivery determinism and latency in the range of <15 milliseconds.



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These and other next-gen apps, including enhanced multi-player games, improved home video conferencing and immersive services yet unimagined, offer service providers a way to attract early adopters who immediately recognize the value of these apps. The support of these new entertainment and digital life services will allow the Service Provider to offer their customers the best connectivity experience for these services and the potential to create new revenue opportunity with best in class home immersive experiences.

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## Commscope Is Here To Help

Commscope, the largest gateway provider in the world, currently is at work on building the XGS-PON 10G Wi-Fi 7 gateways needed to enable consumers to enjoy the ultimate home Wi-Fi experience, and the company expects to begin making them available by the middle of next year.

For service providers wanting to offer customers a pathway to the network speed, ultra-low latency and jitter characteristics needed to experience the best next-gen apps have to offer, Commscope delivers the technology and after-sales support to make this goal a reality.

For service providers that aren't as far on their technology adoption journey, Commscope provides a range of other gateways to meet them where they are today while helping them to prepare for the future.

Commscope is here to help and has a proven track record that demonstrates success. For more information please visit us at: [CommScope PON solutions](#)

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