eBook

What You Need To Know About Wi-Fi 6 and 5G

While adoption is still in the early stages for both Wi-Fi 6 and 5G, both hold immense potential for business. All sectors can benefit from the faster data speeds and less latency promised by these new standards. Industries that rely more on connected devices and mobility stand to gain the most. Manufacturing, for example, with its embrace of IoT, from inventory management to safety stands to benefit dramatically from the expanded capabilities offered by both Wi-Fi 6 and 5G.

A study commissioned by Wi-Fi Alliance predicts that the global economic impact of Wi-Fi will pass $3.47 trillion by 2023. An IHS Markit study commissioned by Qualcomm, found that 5G will generate $13.2 trillion in sales enablement by 2035.

More than just faster, Wi-Fi 6 and 5G have each taken an evolutionary leap ahead of previous generations introducing new capabilities that promise to launch a transformation of wireless networking.

This Logicalis eBook looks at Wi-Fi 6 and 5G individually, shows how they can work together in your organization, and then discusses what you need to do to take advantage of both technologies. Let's look at Wi-Fi 6 first.

What is Wi-Fi 6

Wi-Fi 6 represents the latest iteration and sixth generation of Wi-Fi, also known as 802.11ax. (Wi-Fi specifications are determined by IEEE and adherence to the specifications is certified by the Wi-Fi Alliance.)

Wi-Fi 6 is the first major upgrade since 2014 and the first major upgrade to be identified by its generation number. Previous upgrades that kept their IEEE numbering protocol have been rebranded with their generational number.

Wi-Fi is already the backbone for today's indoor corporate communications. Beyond phone calls, data connectivity to laptops and tablets, it's also the basis of indoor Internet of Things (IoT) devices for everything from HVAC systems to lighting sensors.

The improvements included in the Wi-Fi 6 upgrade take it an evolutionary leap beyond Wi-Fi 5, rather than a generational step. Here are a few of the most significant improvements:

Throughput — The biggest driver for enterprises looking to upgrade from Wi-Fi 5 to Wi-Fi 6 is the increase in throughput. Wi-Fi 6 will easily deliver a 40 percent increase in throughput on your devices. Potential bandwidth increases could be significantly greater. (Note: Bandwidth is an estimate of potential performance. Throughput is a measure of actual performance.)

Enhanced Multi-tasking — Wi-Fi 5 could talk to many access points at once but could only listen to one access point at any given time. Wi-Fi 6 makes it possible to carry on multiple two-way conversations at the same time. Wi-Fi 6's enhanced multi-tasking is a game changer for arenas, cafeterias, lecture halls, basically any area where many users would otherwise be competing for throughput.

The ability of Wi-Fi 6 to support multiple clients in parallel, as opposed to series, also promises to dramatically accelerate the use of IoT devices. For example: Cities can use IoT devices connected to Wi-Fi 6 to deploy smart trash receptacles that can alert crews when they are full or have been tipped. IoT devices can also be used to detect gunshots, alert the police and provide them information about where the shot originated. Corporations can use IoT devices to enable real-time IT automation and control on the factory floor.

Battery Conservation — With Wi-Fi 5, devices needed to constantly let the network know they were online; saying "I'm here" over and over again. Wi-Fi 6 employs target wake up time (TWK) technology that allows devices to go into standby mode when they are not transmitting data. Target wake up time results in 30-40 percent longer battery life in connected devices. In healthcare that means doctors and nurses can use their laptops, tablets and medical sensors and devices to serve patients significantly longer and minimizes the risk that batteries will fail in the middle of a medical emergency.

What is 5G

Every new generation of cellular has rolled out with similar benefits: faster data speeds, increased capacity and lower latency. The latest generation - 5G differs from cellular networks of the past in its potential to operate in unlicensed spectrum, giving it access to broadband that wasn't available in previous generations, and resulting in faster processing and stronger connections. The average speed of 5G will be 170.2 Mbps—fully four times faster than 4G.

5G has other advantages over 4G besides speed when it comes to IoT. 4G modules are expensive, power-consuming, and demand complicated service plans. 5G will accept smaller, inexpensive, low-power devices, so it'll connect a lot of smaller objects and different kinds of ambient sensors to the internet. 5G will continue cellular's command of outdoor networks and may eventually offer some competition to Wi-Fi indoors.

Another key benefit of 5G is low latency, i.e., a short lag time between a device pinging the network and receiving a response. Latency with 4G was 30 milliseconds (ms). With 5G the latency is 1 ms which is imperceptible to humans.

This combination of increased speed and low latency promises to turbocharge the development of innovative new use cases. For example:

Internet of skills — Nearly instant response time makes it possible to precisely control machines and robotic devices from a distance. What's being called an "internet of skills" could, for example, include robotic surgery with the surgeon and doctor in different locations. Self-driving cars will be outfitted with 5G to talk in real time with other cars on the highway as well as sensors around the city. More than just transmitting data in one direction, IoT combined with the internet of skills will allow devices to talk back and forth with each other.

Backup — Dramatic increases in throughput with 5G, combined with the fact that using a distribution of repeaters is projected to make 5G available everywhere, combine to make a compelling case to use 5G for backup connectivity. 5G backup connectivity comes with the additional benefit of saving organizations the monthly fee for fiber lines or MLPS from commercial carriers. With 5G all you need is a network interface controller (NIC) card that you can plug into a router. Then, if a backhoe cuts your fiber line, you have a 5G for secondary connectivity, and you don't have to activate it until you need it. It's available on demand.
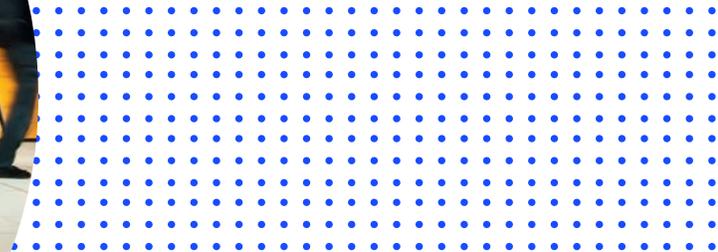
5G Timeline

Demand for 5G's capabilities is projected to drive unprecedented growth rates. According to Mobile World Congress Daily, GSMA Intelligence:

40%
of the global population will be covered by 5G by 2025

14%
(1 in 7 connections) will take advantage of 5G by 2025

5B
unique subscribers will have 5G in 2025

25B
5G Internet of Things devices will be connected globally in 2025 (11.4 Billion Consumer IoT; 13.7 Billion Industrial IoT in 2025)

$1.1T
in 5G revenue will be reached by 2025

Parallel Universes

Both Wi-Fi 6 and 5G, will play an important role in enterprise digital transformation efforts for years to come. Despite an abundance of overlapping features, the two networks operate in different spectrums and exist essentially as parallel universes within the wireless world.

The roll-out of 5G could bring those universes together. The Federal Communications Commission determines which radio frequencies and spectra wi-fi and cellular can access, and while wi-fi and cellular do not currently share the same spectrum, that is expected to change. The FCC is now fast tracking proposals to allow access points that can broadcast both Wi-Fi and cellular (5G). Approving devices with dual capabilities would enable a seamless hand off between the two technologies and build a bridge that would allow wireline and wireless, mobile and fixed networks to converge. The full integration of Wi-Fi 6 and 5G could appear to the user as almost limitless capacity and performance.

Getting Ready

The dramatic increase of speeds and throughput of new wireless technologies has the potential bring tremendous new capabilities to your organization. IT departments can expect a corresponding upswelling of demand for new wireless applications and devices.

The first step in getting ready to implement these new technologies is to take a holistic approach to your current wireless networks, evaluate your supporting infrastructure and develop a plan to incrementally upgrade it to support the wireless applications you want to make available.

When you discuss Wi-Fi 6, you're talking about multi-gigabyte experiences for users that you can't get by plugging into legacy switch ports, i.e., pre-Gigabit switch ports. When you talk about 5G you should be talking about 5G distributed antenna systems (DAS) so you can operate two simultaneous networks and use one or both as the service requires.
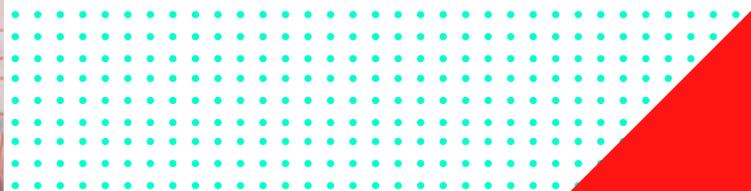
The Security Catch 22

All the innovative use cases that are going to be enabled by upgrading to Wi-Fi 6 and 5G come with a Catch 22 that IT departments will recognize. On the one hand IT departments have been given a mandate to make enterprise networks accessible wirelessly, not only to employees, but also to partners, customers and prospective customers. Upgrading to Wi-Fi 6 and 5G will help them do that. On the other hand, IT departments must also live with the mandate to keep enterprise networks secure.

The conflict between these two mandates will only grow more complex with the vastly expanded throughput, bandwidth and other attributes of Wi-Fi 6 and 5G. There is no silver bullet, but there are a number of foundational security principles that you can apply to protect your wireless environment.

Wi-fi 6 is generally thought to be more secure than 5G. The Wi-Fi Alliance requires all devices to support WPA3, it's recently updated set security protocols which, at the enterprise level, provides 192-bit, minimum-strength security protocols and cryptographic tools to protect sensitive data. Wi-Fi also ties directly into security capabilities of the wired network.

5G's security profile is a little more problematic. For example:

· 5G enables the movement and access of vastly higher quantities of data, and, in the process, opens broader attack surfaces to hackers; and

· Mission critical applications will quickly become more dependent on 5G than they were on 4G; potentially increasing the number of security breaches as well as the damage from each one.

Security is an extremely complex and ever-changing challenge. History has shown that security in IT environments is an unachievable goal that needs to be pursued both creatively and relentlessly. Simply by existing, IT resources are at risk.

Upgrading to W-Fi 6 and 5G presents an additional security challenge: pent up demand from users to take advantage of enhanced capabilities runs the risk of pushing the need for a rigorous, responsive and adaptable security strategy to the sidelines. It is incumbent on IT departments—with support of executive management—to keep security top of mind when evaluating implementation of new wireless applications.

Transformation Ahead

The combined rollouts of Wi-Fi 6 and 5G are forecast to release a sustained burst of innovation that is expected to transform information technology as new applications and devices in the wireless network stimulate innovation across all domains in the wired network, in a feedback loop of creative collaboration. Organizations that proceed strategically today have an opportunity to gain significant advantage over competitors who wait for the turmoil to settle down before committing to the changes ahead. Things are about to get very interesting.

Six Key Takeaways

1. **Fasten your seatbelts —** Expect to see skyrocketing growth in IoT and other innovative applications that will be introduced to take advantage of the increasingly wide-open potential wireless networks will provide. In general, Wi-Fi 6 will continue to be the choice for indoor networks, and 5G will be the choice for outdoor networks, but expect to see their capabilities converge.

2. **Think strategically —** Be prepared for an onslaught of demand for applications that will consume the increased bandwidth that upgrading to 5G and Wi-Fi 6 will provide. History has shown when increased bandwidth becomes available to users, they want new applications that will consume it and require still more. To keep from being overwhelmed, IT departments need to have a rigorous process— with buy in from senior management— for prioritizing new wireless applications strategically.

3. **Consider 5G for backup connectivity —** 5G has arrived with countless shiny new use cases for the frontend of your organization. Don't overlook its potential benefits for the backend as well. The speed, throughput and availability of 5G can provide backup connectivity and liberate your organization from expensive monthly charges for MPLS circuits or fiber lines that need to be maintained whether they are used or not. 5G backup, by contrast, will be available on demand.

4. **Keep an eye on the future —** Be aware that a seamless bridge between cellular and Wi-Fi will be available in the near future. Exactly how near will depend on when the FCC allows the two wireless networks to share spectrum, but your long-term planning needs to include a strategy for the merger not only of wired and wireless networks, but also the merger of wireless and wired networks into your corporate-wide IT infrastructure.

5. **Maintain eternal vigilance —** Never forget that all the advantages Wi-fi 6 and 5G will bring to your organization will also expand the attack surface of your wireless network to security threats. Unblinking security policies and procedures need to be integral parts of your wireless upgrade planning and implementation.

6. **Manage expectations —** Some of the promises made for Wi-Fi 6 and 5G can sound too good to be true. In fact, some of them may very well be unrealizable for your organization. These are both very complex technologies, and they have to be integrated securely into your already very complex wired network. Organizations are going to have to make a lot of smart decisions and investments to realize their potential. Thoroughly evaluate your existing technology and then proceed strategically from where you are today.

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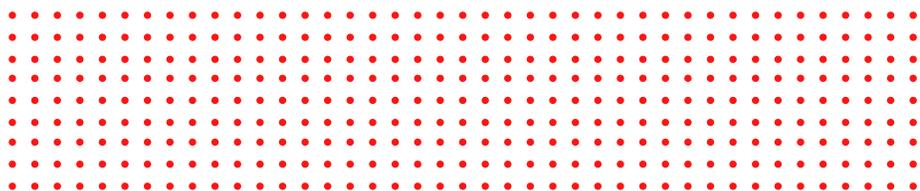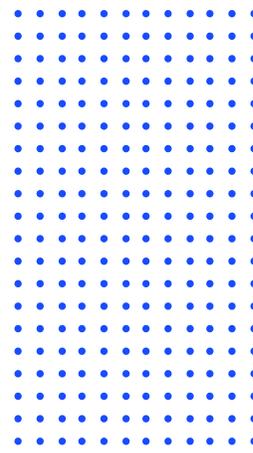
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