



WORLDVUE®

**TRANSFORMING OUR
CONNECTED FUTURE WITH
WIFI 7**



With our rich history in the property technology industry, we at WorldVue pride ourselves on our expertise and ability to advise our customers on key technology trends and developments. Below are our predictions for wireless connectivity and emerging applications that will depend upon improved networks to transform our future.



Developing technologies increasingly affect many areas of our lives- how we engage socially, relax individually, connect professionally, and progress financially. Advancements in wireless networking, smartphones, wearables, sensors, and connected building systems continue to occur rapidly. Technologies such as immersive augmented and virtual reality, robotics, and artificial intelligence are becoming more prevalent.

With these developments, modern life is becoming ever more reliant on secure, reliable, high-speed wireless connectivity. WiFi solutions need to evolve to keep up. Most buildings are currently ill-equipped to manage the sheer volume of data and demand for reliable connections that future applications will require. Addressing this issue will require a major shift in WiFi technology.

We believe this technological revolution is here today. On April 23, 2020, the FCC opened 1200 MHz in the 6 GHz spectrum band (5.925-7.125 GHz) for unlicensed use, intended primarily for the use of WiFi, marking the most significant technological leap for WiFi since its invention. Users have begun to realize the benefits of this development starting with the 2020 release of WiFi 6E. Further improvements are now possible with the announcement of WiFi 7 certification in January 2024.

From a consumer standpoint (e.g., hotel guests or apartment residents), these advances will finally allow for the necessary speed, latency, and reliability to offer transformative, immersive experiences, including a greater ability to interact with one another globally and in real time across financial, social, and physical boundaries.



What Is Changing and Why Is It a Big Deal?

To understand how WiFi works from a consumer perspective, we often use the metaphor of a highway. A wider highway with more lanes will result in less congestion, greater speeds, and a more enjoyable experience. WiFi 6E enables devices to use the new spectrum released by the FCC, thus increasing the number of lanes. However, WiFi 7 will go even further, adding the ability to use more than one lane at a time (or even more than one highway at a time) and boosting the capacity and speed of the car on the road.

WiFi 7 is thus not merely an incremental improvement to existing connectivity infrastructure. Instead, WiFi 7 creates an entirely different framework for technologies that enable a vastly different experience than what we are used to today.

Let us consider some of the benefits of this new technology and the features that enable them.

Greater Capacity

Most WiFi networks today use two frequency bands: 2.4 GHz and 5 GHz. These differ in several ways, but basically, in the 2.4 GHz band, data travels farther at lower speeds, while the 5 GHz band provides faster speeds in a shorter range. Dual-band-enabled WiFi devices allow users to connect to the band best suited for a particular application or device. This worked well until these bands became overwhelmed with traffic. This is where 6 GHz WiFi enters the picture with WiFi 6E and WiFi 7.

With up to 59 channels of 20 MHz each, the 6 GHz band has more than 20 times the capacity of the 2.4 GHz band (3 x 20 MHz channels in the US) and 6.5 times the capacity of the 5 GHz band (9 x 20 MHz channels in the US). This allows the network to accommodate more data at faster speeds with less interruption and higher throughput. This performance enables applications such as immersive augmented and virtual reality that require greater bandwidth.



Faster Transmission

WiFi 7 goes beyond simply adding channels to changing how traffic uses those channels. All 802.11 WiFi standards rely on an approach known as Quadrature Amplitude Modulation (QAM) to arrange data for transmission. WiFi 7 uses a more advanced version called 4096 QAM to incorporate more data into each transmission, enabling a far greater throughput and faster transmission speeds—in fact, a 20% data rate increase over WiFi 6.

Higher Throughput

Channel bonding is a customary practice that enables combining adjacent channels for increased throughput. Essentially, devices split traffic at the packet level across multiple channels and then recombine it after transmission. Successive WiFi standards have allowed for the use of increasingly wider bonded channels.

WiFi 7 will support up to 320 MHz of combined channel width, or twice the width available with WiFi 6. This will significantly improve the usability of WiFi networks, especially for data-heavy applications such as high-definition streaming and immersive augmented reality.

Faster Speeds, Lower Latency, & Higher Reliability

WiFi 6E improves connectivity by adding the 6 GHz band. But WiFi 6E routers still have limitations, as users can only connect to one band at a time (either 2.4 GHz, 5 GHz, or 6 GHz). Thus, a device may not be using the fastest available band, while some bandwidth may go unused.

WiFi 7 will further improve connectivity by enabling multi-link operation (MLO), wherein users can connect to multiple bands simultaneously. This potentially triples throughput, significantly improving network speed, latency, and reliability. By enabling seamless handoffs between bands based on performance, MLO will finally enable the multi-user capabilities first promised by WiFi 6E.

MLO also delivers redundancy and lower latency by enabling the use of priority channels and the ability to schedule traffic. This makes it more feasible to implement solutions that require communication among many devices, such as those using IoT technology.



Better Overall Performance

Historically, devices have selected a transmission band based on the needs of specific applications. WiFi 7, however, will allow access points (APs) to communicate and coordinate with one another. This enables them to determine which AP is best suited to support a particular application based on the current connectivity in each band. The APs will support one another by assigning bandwidth to connected devices and associated applications for improved performance.

An Improved User Experience

WiFi 7 offers several improvements for a better user experience:

- By doubling the capacity and tripling the speed of WiFi 6, WiFi 7 can support more devices in use concurrently. This will end the frustration caused by performance lag when others are using the network.
- WiFi 7 also offers a greater effective range with a stronger signal to minimize dead zones.
- WiFi 7 lowers the overall power usage of devices during data transfer for more efficient operation and lower battery consumption.
- For greater security, WiFi 7 improves support for WPA3 security (when used with the 6 GHz band) with robust authentication and encryption.

Faster Connections with Less Interference

Finally, to support improved communication using the next generation of WiFi devices, APs can now overlap their coverage instead of interfering with one another's data stream. For high-quantity or high-quality data transfers, multiple APs can broadcast the same information to one device without interference, improving transfer speed. This revolutionary practice will enable faster connections with little to no interference.



Transforming Consumer Experiences with WiFi 7

Ever-increasing amounts of data are overwhelming today's WiFi networks, often leading to frustrations for users. This is particularly true in high-traffic environments such as apartment communities, hotels, and transportation hubs. WiFi 7 will alleviate most of these connectivity woes with significantly more bandwidth and "smart WiFi" capabilities. These advances will allow data to move more intelligently, enabling new applications.

How will this affect high-traffic, many-user environments? Let us consider some key examples.



Hotels

Given business conditions in recent years, hotels have had difficulty justifying WiFi investments beyond simply meeting brand standards. Modernizing the digital infrastructure and adding APs can be expensive. It may not seem "worth it" when even upgraded WiFi technology cannot fully replace wired connections for phones, TVs, and security cameras. Also, most guests did not need the advancements in networking that WiFi 5 and WiFi 6 offered. Although such improvements certainly support a better guest experience, hoteliers have not considered them a must-have.

WiFi 7's ability to share data and converge networks will revolutionize how we use WiFi in hotels, providing a greater justification for infrastructure upgrades. In addition to expanded bandwidth and multi-AP coordination, we will see improved reliability, regardless of physical proximity to an access point. WiFi 7 will have the capacity and intelligence to decide how best to deliver fast, reliable internet to guests and staff alike, regardless of their location within a property, improving hotel operations and the guest experience for a positive impact on the bottom line.

These capabilities will be transformative. Increased bandwidth and channel bonding will significantly improve hotel Internet connectivity, enabling WiFi 7 to accommodate thousands of devices. This will support hotels' increasingly mobile-centric focus as guests continue to use mobile devices. WiFi 7 will also better support the addition of sensors and smart devices that can transform and personalize the hotel experience.



Multi-Dwelling Units

Only within the last few years have larger apartment and condominium communities begun to consider providing WiFi to individual units. Prior to this, most communities offered WiFi in their clubhouses or by the pool, but the units themselves were dominated by old-school technology designed for use in a single-family home environment. Cable providers would provide a set-up box and cable modem (sometimes with a built-in WiFi router) and bundle an old-school landline (just like Grandma and Grandpa used to use). When WiFi 5 arrived, this technology offered a simple, manageable, reasonably fast, and reliable connection. Thus, WiFi has become a sensible amenity for multi-dwelling community owners to offer their residents.

With the broader installation of smart building systems, including cameras, sensors, environmental controls, and asset tracking systems as crucial amenities for an improved resident experience, residents will come to view community WiFi systems like they view roofs, common area access controls, and driveways and parking lots today. Owners who do not keep up with these developments will see the quality and capitalized value of their community suffer.

We believe that the transformative nature of WiFi 7 will make community-provided WiFi an industry standard in multi-dwelling environments. It will provide improved performance for technologies such as smart solutions and managed WiFi that residents are increasingly coming to expect and for which they will pay higher rents.

Schools, Universities, and Student Housing

Today's students use the Internet more than ever before, and they rely on fast, accessible connections. Remote learning has changed how classrooms function; many students take classes and tests online rather than in person. Many professors and teachers live-stream their classes to increase accessibility. To ensure the same quality of education for remote and in-person students, schools and universities need superior WiFi coverage. WiFi 7 will be able to accommodate far more devices and applications that require greater bandwidth. This will ensure campus-wide Internet access to keep students connected for many different educational uses.

Well-performing WiFi is crucial for more than just students and faculty. For example, campus security needs connectivity for improved communications and safety monitoring through surveillance cameras. The WiFi infrastructure must enable greater capacity, faster speed, and lower latency to support newer devices that use artificial intelligence for proactive monitoring. By allowing improved performance with better reliability and lower latency with greater capacity, WiFi 7 will support not only the remote learning environments of today but also new possibilities for collaborative learning and research.

Senior Living

Senior living communities are becoming more dependent on connected technology to improve residents' lives and health in the face of decreasing staff numbers. In-room monitoring, remote health checks, new options for communication and entertainment, and improved security all require reliable, low-latency connectivity. WiFi 7 will finally enable senior residences to implement the newer technology options that residents and their families are looking for to support the vibrant and healthy lives of seniors.



Timing and How to Prepare

The Wi-Fi Alliance announced the availability of official WiFi 7 (802.11 be) device certification at the Consumer Electronics Show in January 2024. Per other announcements at the show, several manufacturers have already released WiFi 7-compatible chipsets based on the standard, while others featured upcoming chipsets and devices. Multiple consumer-grade routers are available, though currently at a premium price point. There are even several WiFi 7-ready mobile phones now on the market. However, most environments should not expect to deploy an enterprise-grade WiFi 7 platform until later in 2024.

Before then, though, property owners can prepare by improving their existing digital infrastructure. We recommend the installation of fiber optic cabling, which has virtually infinite capacity and can operate across longer cable distances (Cat6a twisted pair structured wiring will also work, although it is less future-proof).

In addition, we recommend careful consideration of access point (AP) placement, power, and security. In particular:

- Place APs as close as possible to where guests and residents will use them, using a ratio of one AP per unit if possible.
- Use house power for APs and ensure that individual units cannot turn off power to any AP.
- Secure each AP to limit physical access by guests, residents, or unauthorized persons.

Conclusion

People crave connectivity, and our modern lives are increasingly dependent on Internet access. There are already far more connected devices than there are people in the world. The connectivity offered by WiFi 7 will enable infinite possibilities for transforming technology in ways we have yet to imagine. WorldVue is excited to be part of this future in an industry that continues to have a profound impact.



Contact us today!

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