

Wi-Fi 6: Unsung, underexposed—and indispensable to the future of enterprise connectivity

The next generation of Wi-Fi is set to play a pivotal role as organizations innovate with advanced networking

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5G MAY GET the lion's share of the publicity, but Wi-Fi 6 devices are quietly outselling 5G devices by a large margin and will likely continue to do so for the next few years at least.

Deloitte Global predicts that more Wi-Fi 6 devices will ship in 2022 than 5G devices, to the tune of at least 2.5 billion Wi-Fi 6 devices versus roughly 1.5 billion 5G devices.¹ And for good reason: Wi-Fi 6, just as much as 5G, has a significant role to play in the future of wireless connectivity—not just for consumers, but also for the enterprise.

Smartphones, tablets, and PCs are some of the

most popular Wi-Fi 6-equipped devices, but Wi-Fi 6 is also used in many others, including wireless cameras, smart home devices, game consoles, wearables, and AR/VR headsets.²

Wi-Fi 6 and 5G are partners

With the lavish press and advertising spend devoted to 5G, one might think that next-generation wireless networks in the enterprise will revolve almost exclusively around 5G, with Wi-Fi 6

playing a supporting part at best. But that's not the reality uncovered by Deloitte's 2021 global advanced wireless survey of 437 networking executives from nine countries, which found that 45% of enterprises are concurrently testing or deploying Wi-Fi 6 and 5G for their advanced wireless initiatives.³ Indeed, nearly all respondents (98%) expected their organization would be using both technologies within three years. Projected investment reflects coadoption as well: Over the next three years, on average, these leaders expect to allocate 48% of their enterprise wireless network spending to Wi-Fi and 52% to cellular technologies.

This is not entirely a surprise, as Wi-Fi 6 and 5G have some similar capabilities but also have

different, complementary strengths. Both technologies enable higher speeds, lower latency, and increased device density and network capacity. The differences lie in areas such as range, support for mobility, and cost. Wi-Fi 6 and its predecessors tend to be used for smaller, less expensive local area networks, often for connectivity inside homes and offices, while cellular networks such as 5G are used for both indoor and outdoor wide area networks, often for devices that move across large geographic areas (for instance, for smart city applications, ports and airports, and connected vehicles).⁴ Because decision-makers are targeting a blend of usage scenarios, it makes sense that they're evaluating both technologies to determine what combination will work best for their situation (figure 1).⁵

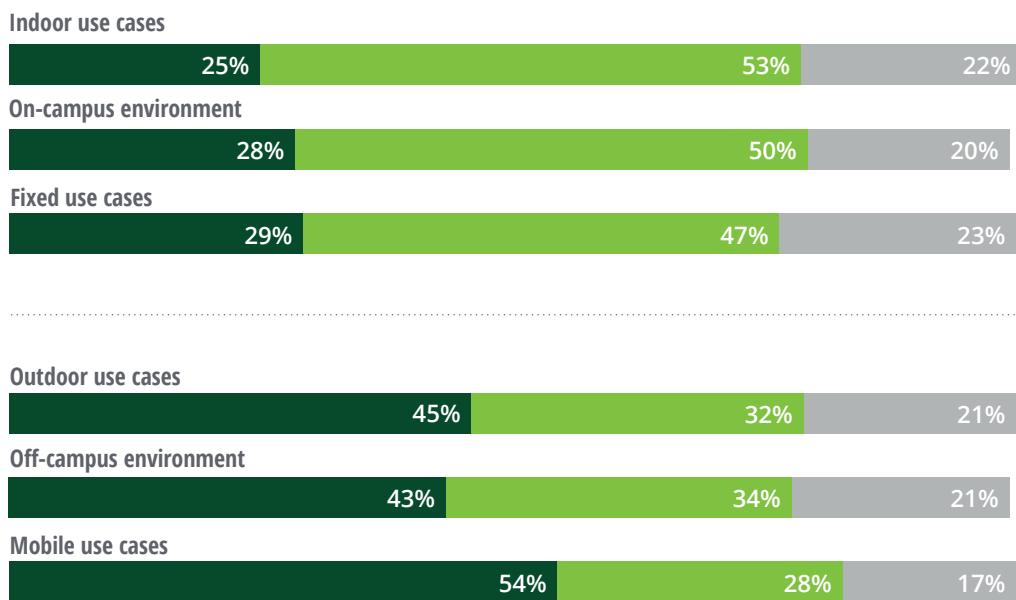
FIGURE 1

5G and Wi-Fi 6 have complementary uses

Which next-generation networking technology, 5G or Wi-Fi 6, does your organization prefer to use for each of the following scenarios?

■ Prefer 5G ■ Prefer Wi-Fi 6 ■ No preference

Wireless preferences of global networking executives for various use cases



Notes: N = 437 global networking executives. Not showing small percentages of "Don't know" responses.

Source: Deloitte's Global Study of Advanced Wireless Adoption, 2021.

Further, unlike past generations of wireless, Wi-Fi 6 and 5G are designed to work together smoothly, and the wireless industry appears headed toward a future in which devices can roam securely and seamlessly between all types of wireless networks.⁶ Industry associations and standards bodies are co-developing future network standards that will enable convergence of cellular and noncellular technologies, permitting integration of Wi-Fi 6 into core 5G networks.⁷ The expected benefits of an integrated architecture include improved traffic control on factory floors and the ability to provide uninterrupted service for smart city and edge applications.⁸

What's clear is that these buildouts will not be merely tactical solutions. Advanced wireless is a

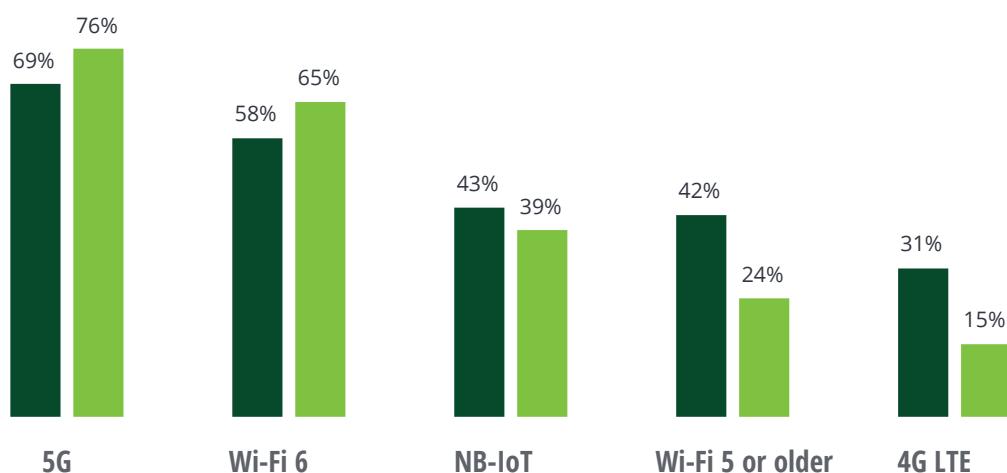
strategic priority for the enterprises surveyed, with eight in 10 networking executives expecting advanced wireless technologies to transform their enterprises substantially by 2023, changing how they operate, develop new products and business models, and engage with customers. These decision-makers already regard Wi-Fi 6 and 5G as the most critical wireless technologies for their businesses (figure 2). Sixty-five percent of the networking leaders in our study expect Wi-Fi 6 to be a top-three critical wireless technology for their business by 2023, and 76% expect 5G to be in the top three as well.⁹ Over the next few years, as wireless infrastructures are built out and more devices become available, leaders expect both technologies to become even more significant.

FIGURE 2

5G and Wi-Fi 6 are already seen as the most critical wireless technologies—and their importance will continue to grow

Percentage of global networking executives ranking each a top-three critical wireless technology for their organization's business initiatives

■ Today ■ In 3 years



Note: N = 437 global networking executives.

Source: Deloitte's Global Study of Advanced Wireless Adoption, 2021.



Though Wi-Fi 6 and 5G are equal partners in terms of building solutions, our study revealed that enterprise Wi-Fi 6 pilots and deployments are outpacing 5G in all the countries we studied, with double-digit gaps in some regions. While those gaps may narrow, we expect the Wi-Fi 6 enterprise adoption lead to persist through 2022 (and beyond). One likely reason is cost, as Wi-Fi 6 devices are more affordable and more widely available than 5G devices.¹⁰ Acquiring suitable spectrum may also be a challenge in some countries: Whereas Wi-Fi 6 uses free, unlicensed spectrum, 5G generally requires enterprises to license spectrum from network providers or government entities. In a number of major markets around the world, governments have set aside specific spectrum that can be assigned to a company for a particular area, such as a manufacturing campus or airport, often for a nominal cost. But policy, spectrum band ranges, conditions, and costs vary by country.

Ease of deployment has likely also contributed to Wi-Fi 6's head start. Wi-Fi networks are already widely established, along with a large base of Wi-Fi devices. As enterprises upgrade to Wi-Fi 6 networks, they can take advantage of backward compatibility, avoiding the need to replace older Wi-Fi devices all at once.¹¹ Familiarity may also be a boon: While there are 4G LTE private cellular networks around the world, these are outnumbered by enterprise Wi-Fi deployments, meaning that many IT departments already have expertise in deploying and operating Wi-Fi networks. Conversely, setting up a 5G network (either alone or with a network operator) generally means learning something new and potentially more complex, adjusting to a standard that is still rolling out, and perhaps working with a partner that is also just getting up to speed on 5G.¹²

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It's worth noting, however, that the countries reporting the highest levels of Wi-Fi 6 pilots and deployments (Germany, Brazil, United Kingdom, China, and Australia) were also those that reported the highest levels of 5G pilots and deployments. Once again, it's apparent that both technologies are being adopted concurrently and that both have a place in advanced wireless initiatives.

THE BOTTOM LINE

Three-quarters of the decision-makers in our 2021 advanced wireless survey believed that advanced wireless could create significant competitive advantage for their organization. To capture this advantage, organizations implementing advanced wireless initiatives can keep several things in mind.

A critical first step is to be crystal clear about goals. Innovation is a key objective for advanced wireless adoption. Our executive survey identified the desire to innovate using new technologies as one of the two top drivers of adoption, with four in five respondents reporting that advanced wireless was very or extremely important to their organization's ability to implement Internet of Things, AI, big data analytics, and edge computing capabilities.¹³ Improving efficiency was the other top adoption driver, and enhancing customer interactions was the third most commonly cited driver.

Adopters should also determine which usage scenarios they wish to target, their application requirements, and deployment and spending constraints. Understanding Wi-Fi 6 and 5G's specific capabilities and associated costs (e.g., for devices, solutions, and customer-premises equipment) can help decision-makers determine which would be better suited to different situations.¹⁴ For some advanced enterprise use cases, such as automated guided vehicles and autonomous robots in industrial IoT scenarios, both Wi-Fi 6 and 5G have proponents and may even be adopted side by side.¹⁵

Because advanced connectivity is a key enabler of other innovative technologies, leaders should increasingly treat advanced networking as a key component of their organization's end-to-end enterprise architecture. As they consider how to architect and manage a landscape with heterogeneous underlying technologies, networking executives face a key question around which partners to engage in this effort. To assemble complete advanced wireless solutions, organizations generally engage with a variety of vendors, such as cloud and application providers, consulting firms and other integrators, telecom companies, and network equipment providers.¹⁶

Given the role that infrastructure providers and device makers have played in initial Wi-Fi 6 trials, tapping into their expertise could help an enterprise assess its capabilities and establish pilots.¹⁷ Telecoms have a great deal to offer advanced wireless adopters too. With the benefit of holding 5G-suitable spectrum, many are seeking to extend their public networks deeper into the private setting. Given their extensive experience running cellular networks, network providers can offer key capabilities such as cybersecurity, privacy, and established relationships with other carriers to support WAN and mobility use cases. And for some mission-critical services (such as those that need to be free of device interference), dedicated, licensed 5G spectrum may have a distinct advantage. And, with better integration of Wi-Fi 6 and 5G anticipated, network operators will have the ability to direct and optimize traffic across both types of networks—for instance, offloading to Wi-Fi 6 to reduce cellular congestion.¹⁸

Whatever the end, Wi-Fi 6 will almost certainly be an important part of the means. As 5G's essential partner in advanced wireless solutions, Wi-Fi 6 will be increasingly central to realizing the benefits that organizations are pursuing through next-generation connectivity.

Endnotes

1. To arrive at our projections, we reviewed estimates of 2022 Wi-Fi 6 and 5G device shipments made by a variety of analysts, research firms, and industry groups. We computed weighted averages of these projections, giving relatively less weight to industry associations (which may have a vested interest in making exuberant estimates) and relatively more weight to analyst/research firms with long tenures.
2. 5G isn't limited to smartphones, tablets, and PCs either; 5G can be found in telecom base station equipment, connected vehicles/devices, broadband access gateway devices, and others.
3. To understand how enterprises around the world are adopting advanced wireless technologies, in Q4 2020, Deloitte surveyed 437 global IT and line-of-business executives who are responsible for networking at organizations in the process of adopting 5G and/or Wi-Fi 6 or planning to adopt either technology within the next three years. Nine countries were represented: China, India, Japan, United Kingdom, Germany, Netherlands, Portugal, Brazil, and Australia. See: Jack Fritz et al., *Accelerating enterprise innovation and transformation with 5G and Wi-Fi 6: Deloitte's study of advanced wireless adoption, global edition*, Deloitte Insights, March 22, 2021.
4. Intel, "5G vs. Wi-Fi 6: A powerful combination for wireless," accessed October 5, 2021.
5. Advanced wireless adopters tend to focus on usage scenarios involving *both* indoor and outdoor networks and both fixed and mobile devices. See Fritz et al., *Accelerating enterprise innovation and transformation with 5G and Wi-Fi 6*.
6. TechPower IT Solutions, "5G and Wi-Fi 6—friends or foes?," accessed October 5, 2021; Rowell Dionicio, "How 5G and Wi-Fi 6 will work together," Hewlett Packard Enterprise, November 5, 2020; Cisco, "5 things to know about Wi-Fi 6 and 5G," accessed October 5, 2021.
7. The 3GPP cellular standards organization is working to support integrated noncellular (e.g., Wi-Fi 6) access handling in core 5G networks, and the Wireless Broadband Alliance—backed by several wireless providers—has released a blueprint for convergence. See: NGMN, "NGMN & Wireless Broadband Alliance join forces to address RAN convergence opportunities," press release, January 22, 2019; Joe O'Halloran, "Wireless Broadband Alliance rolls out roadmap for 5G, Wi-Fi 6 convergence," *Computer Weekly*, January 26, 2021; Wireless Broadband Alliance, "Wireless Broadband Alliance releases blueprint for 5G and Wi-Fi 6 convergence," January 26, 2021.
8. James Blackman, "5G and Wi-Fi 6 'blueprint' sets out 'limitless potential' in Industry 4.0, smart cities," *Enterprise IoT Insights*, January 26, 2021; Catherine Sbeglia, "What does Wi-Fi 6 and 5G convergence really look like?," *RCR Wireless News*, August 20, 2020.
9. A related Deloitte study of US networking executives shows a similar view of the future: By 2023, 70% of US networking executives expect Wi-Fi 6 to be a top-three most critical wireless technology for their business, and 76% expect 5G to be in their top three. See: Dan Littmann et al., *Enterprises building their future with 5G and Wi-Fi 6: Deloitte's study of advanced wireless adoption*, Deloitte Insights, June 1, 2020.
10. Giacomo Bernardi, "Why 5G won't dethrone Wi-Fi 6 anytime soon at the edge," *TechTarget*, August 18, 2021. Wi-Fi 6 devices may have some advantages when it comes to power consumption as well; see: Vertiv, "Operators are optimistic about the future services 5G will enable, but estimates suggest network energy consumption could increase by up to 170 percent by 2026," press release, February 27, 2019.
11. Bernardi, "Why 5G won't dethrone Wi-Fi 6 anytime soon at the edge."

12. At the time of writing, the final timing for the commercial launch of 3GPP Release 17, the third phase of 5G, had yet to be finalized; see: 3GPP, "Release 17 timeline agreed," press release, December 14, 2020. For a discussion of complexities involved in setting up 5G private networks, see: Lee Badman, "How to build a private 5G network architecture," *TechTarget*, accessed October 5, 2021.
13. Fritz et al., *Accelerating enterprise innovation and transformation with 5G and Wi-Fi 6*.
14. Catherine Sbeglia, "Three key considerations when comparing Wi-Fi and cellular for your enterprise," *RCR Wireless News*, January 22, 2021; Intel, "5G vs. Wi-Fi 6: A powerful combination for wireless."
15. Mike Dano, "It's 5G vs. WiFi 6 for the factory of the future," *Light Reading*, December 18, 2019; Patrick Grosssetete, "How 5G/Wi-Fi 6 will transform multi-access networks in industrial IoT," Cisco Blogs, November 5, 2019.
16. Fritz et al., *Accelerating enterprise innovation and transformation with 5G and Wi-Fi 6*.
17. Joe O'Halloran, "Wi-Fi 6 ready for carrier network deployment," *Computer Weekly*, November 12, 2020.
18. Wireless Broadband Alliance, "How will Wi-Fi 6 impact telecom carriers?," accessed October 5, 2021.

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