

**Private 5G cellular
network and Wi-Fi 6
coexistence
for enterprises**



As enterprises embrace the next wave of Digital Transformation and adoption of Industry 4.0 as part of their modernization initiatives, reliable and resilient connectivity becomes an imperative. Agile, flexible, and on-demand connectivity has been a long-standing ask, especially when it comes to OT; the need arises since guaranteed coverage, quality, and seamless connectivity have been in question to support these modernization initiatives.

It also demands a higher level of control on enterprises/IoT application with data privacy and limited exposure to the outside world through public networks. This is in addition to isolating from public networks where necessary and reducing Mobile Network Operator dependency where it's a necessity.

These trends and technology evolution are making network connectivity paramount for enterprises, along with the ability to choose the right technology meant to support their specific needs. One needs to consider the ecosystem they need to be supported with, and the connectivity and characteristics that they need to imbibe. This ecosystem could



“Making the right choice of connectivity as an enterprise to drive next generation Digital Transformation”

constitute IT systems, Robotics, Machinery, Sensors, IoT devices & gateways, Control systems like PLC or SCADA, among many others.

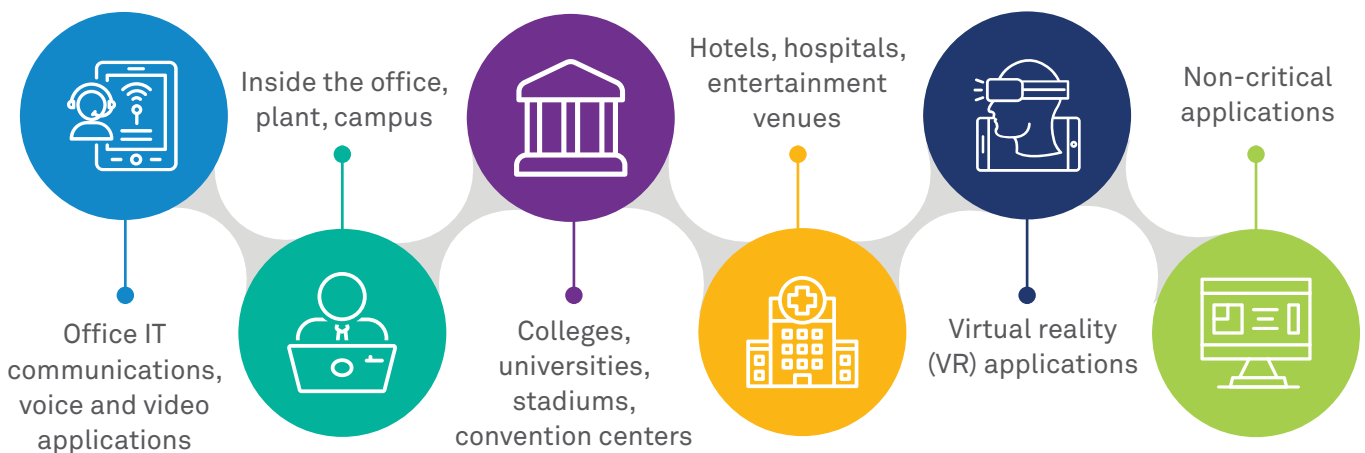
The impact of connectivity is significant enough and deserves due attention and therefore there is the need to judiciously make a sustainable choice. While enterprises are assessing various available connectivity technologies, private 5G and Wi-Fi 6 are at the centerstage gaining attention, with lot of hype and debate on one over the other. This leads to a debate over the pros and cons of both technologies.

In this point-of-view paper, we have examined enterprises' environments where these technologies are relevant and compelling for 5G or Wi-Fi 6 or both.

Wi-Fi 6

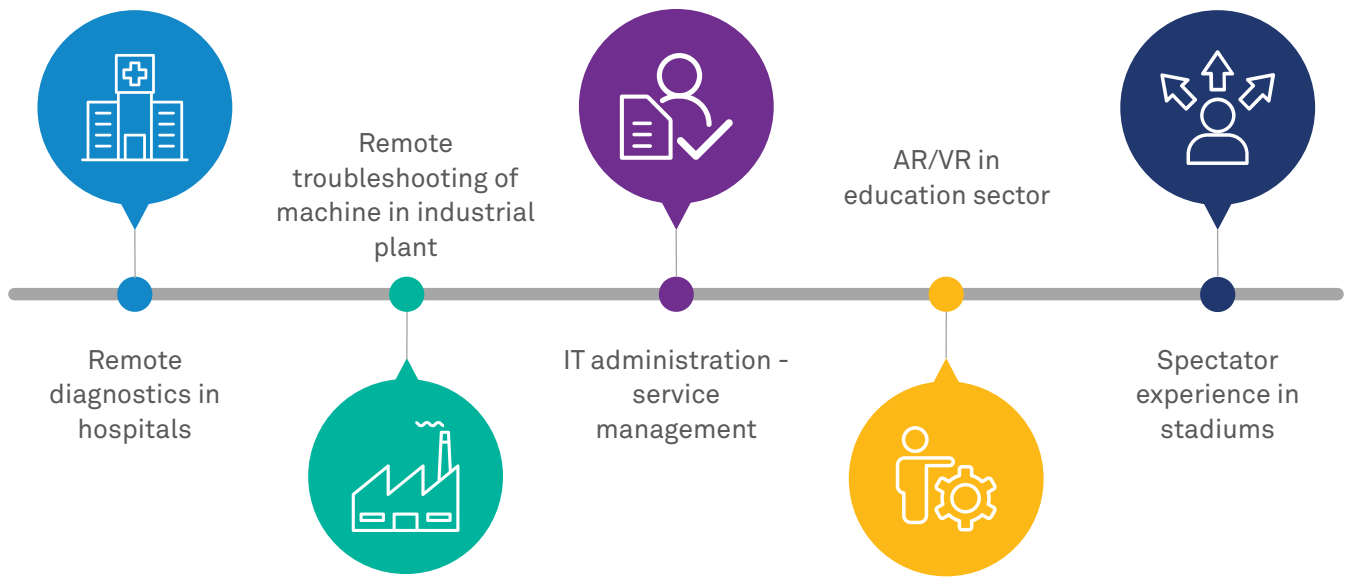
Wi-Fi 6 offers a significant improvement over the previous generation. To make workplaces more efficient and improve communication across the organization, enterprises are making a shift toward

advanced wireless technologies like Wi-Fi 6 to connect employees, customers, and many industry applications. Wi-Fi is the best-suited connectivity medium for non-mission-critical environments like:



Apart from the above-mentioned areas, enterprises will have various applications' connectivity based on

the industry vertical that they belong to, including but not limited to:



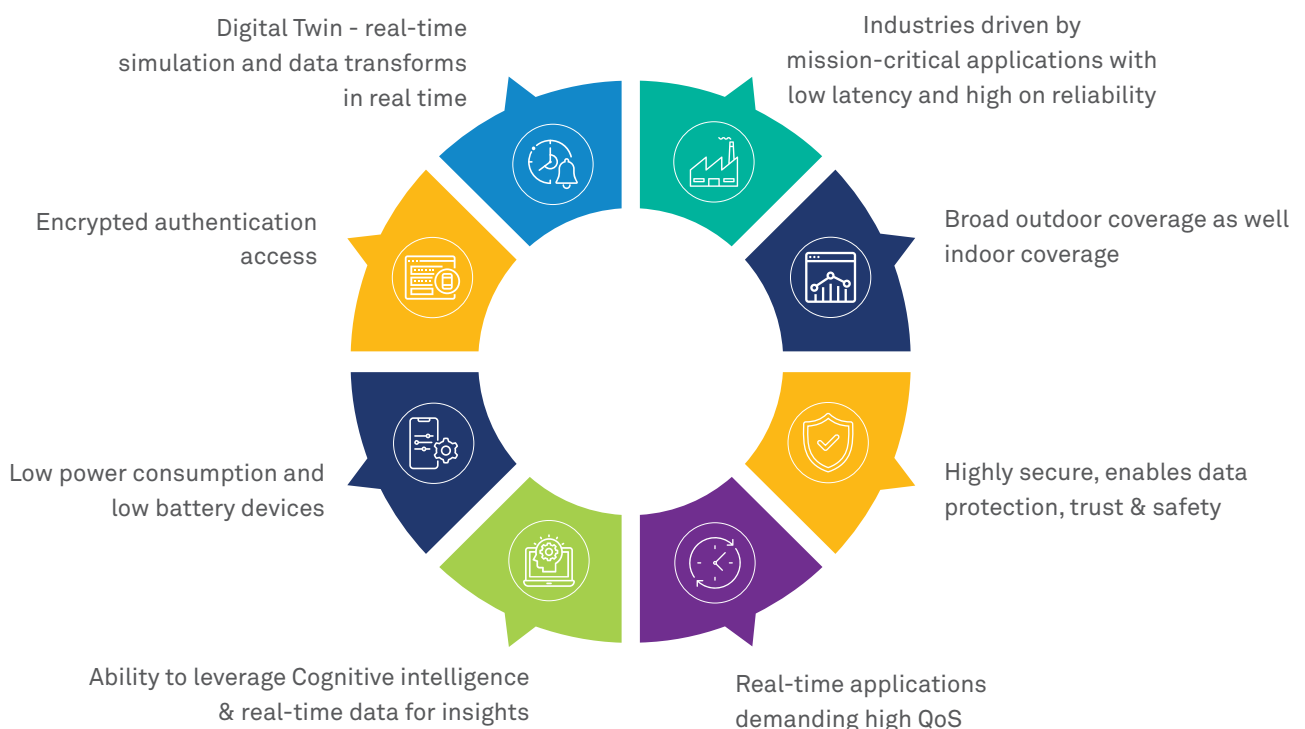
Many enterprises have wired infrastructure. Wi-Fi 6 needs to be integrated with wired infrastructure.

Therefore, unified management for both wired and wireless connectivity solutions is required.

5G

The evolution of cellular network from 4G (LTE) to 5G promises enterprise benefits like higher bandwidths, ultra-low latency, seemingly higher density, increased reliability, improved coverage, and many other futures. Many enterprises are

deploying private cellular network 4G/LTE as a path toward 5G. 5G cellular network for enterprise running on both licenses and shared spectrum lays the foundation for:



Here's a glimpse into some of our conversations with large enterprise customers from various industry verticals and industry use-cases that preferred a private 5G network:



A manufacturing plant that intends to transform its entire setup into a factory of the future. It wants to leverage 5G technologies to configure mobile robots, autonomous vehicles, sensors for remote operation, and intends to have each machinery console function executed remotely and simplify the operator's job while saving cost



A UK-based city council planner to have private 5G network for a planned smart city project to enable low-latency data connectivity, quicker download and upload speeds, and greater capacity of the network to enable more people to access data on more devices at the same time



An oil refinery that has equipment in the thousands, with sensors that require a predictive service alert and are connected wirelessly to a cloud platform to extract data from these devices remotely and analyze it for business benefits



<<<<<<.....Operation IT

Office IT.....>>>>>>

5G

Outdoor + Indoor

Wi-Fi 6

Mission critical vs. office IT

High reliability and low latency

Committed QoS

Licensed spectrum

eSIM / SIM authentication

Wide area coverage, full and true mobility

High capacity & local management

High speed, best effort traffic, cost effective

Unlicensed spectrum

WPA3 security

Local coverage and basic mobility

Fig. 1 - Coexistence of 5G & Wi-Fi 6

5G and Wi-Fi 6 are complementary technologies

Based on the industry vertical enterprises environment, operation, devices, and applications, both 5G and Wi-Fi 6 are competitive when it comes to addressing specific requirements. WiFi will be the preferred technology for indoor requirements along with non-critical applications and unlicensed spectrum to use, while 5G cellular network is for outdoor coverage, mission-critical applications, highly secured environments, and anticipating several QoS features.

However, there is overlap in some areas, especially

when different vertical enterprises are primarily considering bandwidth for a large event, hospitality or stadium, and in some cases, smart city projects or large campuses may end up considering both technologies.

However, we must remember that both technologies are continuing to evolve, and in some cases, both may be used simultaneously. Wi-Fi may be used for connected cars in vehicle applications and 5G cellular network for connecting the car itself.

Interoperability

As enterprises embrace 5G & Wi-Fi 6 to meet their varying needs, they will leverage both these technologies based on need and purpose; and there arises the question of interoperability. Both these complementary technologies will see a need to seamlessly offer an ability to switch back and forth between them to minimize disruptions that we generally experience in today's world. These disruptions will get resolved with 5G & Wi-Fi 6.

The 5G specification offers a sophisticated way to support interoperability with the Wi-Fi network to support and enable enterprises to run and manage them with minimal complexity. Compared to traditional Wi-Fi, Wi-Fi 6 will be more transparent to the 5G network, with an ability to share a lot more

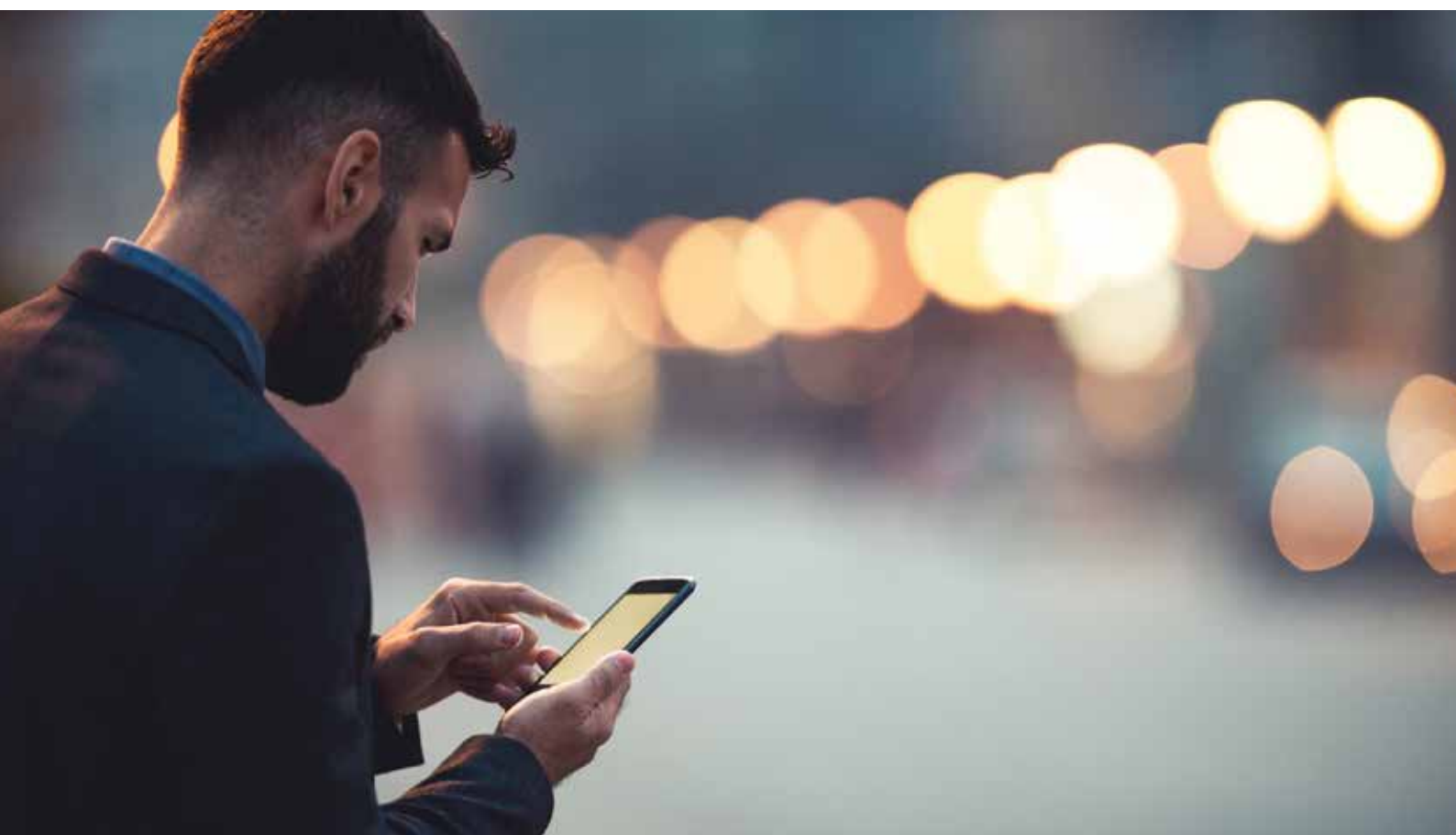
information like, coverage, data rates, latency, and load amongst other parameters, to enable intelligent decision-making to realize a truly integrated network. They are also self-governing and self-managed. Therefore, there is no need for manual intervention to tap the value of these technologies to the benefit of enterprises.

When it comes to interoperability and the ability to seamlessly switch from one to another, Wi-Fi 6 features will allow discovery and authentication for SIM-enabled devices. WiFi devices will hand off to the cellular network to natively support Wi-Fi Radio access per 3GPP 5G architecture specification. This is just the beginning and specifications will evolve over time.

Conclusion: What do enterprises prefer?

From a technology evolution standpoint, both 5G and Wi-Fi 6 have progressed much more compared to their previous generation's offerings, as both claims to have high data rates, device density, etc. Although both 5G and Wi-Fi 6 complement each other's strengths, it is the environment, sensitivity of the application, and use cases of the enterprise that will

decide which will be the better fit. The continuous advancement of industry-specialized applications, robotics, AR/VR solutions, AGVs, autonomous vehicles, and many other cutting-edge applications and data from various devices will determine the need for 5G or Wi-Fi 6.



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Prakash has 29+ years of experience in the telecom industry, having held various roles including Practice Consultant, Presales and Business Development, Transformation Lead, Network Automation and Alliance Head. He has delivered successful telecom infra solutions that cover setting up NOC, SOC, Service management and Automation Solutions to leading communication service providers globally. Currently, Prakash heads the private cellular network practice in CIS.

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