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How Private 5G Networks Are Reshaping Telecom

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The global private 5G network market is expected to explode to [\\$36.08 billion and a 47 percent compound annual growth rate \(CAGR\) by 2030](#) as advanced 5G private network use cases roll out, and the full potential of 5G is realized.

Mobile network operators (MNOs) have driven worldwide wireless network adoption, with continuous improvements from 2G to 3G and then 4G/LTE. However, 5G will enable many new potential areas of growth—but also lower the barrier to entry for new competitors. How MNOs leverage this 5G opportunity while protecting and growing their mobile network market share remains to be determined as they explore this new frontier.



Benefits of 5G

Much of the conversation around mobile generation upgrades has focused on consumer mobile phone use and improvements in throughput—but 5G isn't just a faster version of 4G/LTE. Instead, 5G technology delivers new capabilities such as network slicing, ultra-reliable low latency, and a service-based architecture that enables optimized solutions for businesses across all verticals including Industry 4.0.

The high speed (100 times faster than 4G), low latency (for better real-time decision-making), and massive capacity (can connect up to 1,000,000 devices per square kilometer versus 2,000 for 4G) make this new technology the foundation for revolutionizing many industries.

The case for private 5G networks

A private 5G network is an enterprise network that provides dedicated bandwidth and capacity using 5G technology. Enterprises can choose from several delivery methods:

- Truly private with the entire 5G infrastructure (core and radio access network) deployed at the enterprise premises.

- Semi-private with a managed service option, hybrid with some workloads deployed on-premises (such as radio access network and user plane function), while others are deployed in a remote location (such as control plane deployed in a centralized location on a private or public cloud).
- Fully managed from an operator using a network slicing model or partial integration with their public network.

Private mobile networks that started to emerge under 4G are now seeing significant expansion to 5G. New use cases involving advanced technologies such as video (virtual reality, augmented reality, digital twins, immersive gaming, and video surveillance), process automation (robotics, autonomous vehicles, and connected machines), and decision-making (artificial intelligence, machine learning, and edge computing) are under development. They target sectors such as ports, supply chain and warehousing, mining, healthcare, education, and manufacturing operations.

MNOs can partner with vendors and system integrators to implement these private networks, providing dedicated spectrum slices and their know-how to support new services with stringent service level expectations. MNOs may also work with the IT industry and hyperscalers like Amazon/AWS to offer turnkey private 5G solutions to fit other business verticals and use cases.

Enterprise customer benefits

Today, many businesses operate their office campuses utilizing a combination of hard-wired and Wi-Fi connection points and leverage public mobile networks for their employees' and visitors' mobile phones. MNOs can liberate their enterprise customers from the constraints of hard-wired connections and Wi-Fi distance, security, and stability limitations by overlaying a private 5G network. Following are some of the advantages a private 5G network provides:

Control: The enterprise can define, direct, and tailor their business processes, data processing, and data flow without the limitations of a public network.

Security: The organization can set and manage security policies and control access to services in a more flexible and customized way with 5G than with legacy technologies.

Connection: With the high speed, low latency, high capacity, and application support of 5G, millions of devices (unlike with Wi-Fi or 4G) can be connected, opening up opportunities in campus environments, ports, mining facilities, agriculture, and others—to connect indoor and outdoor spaces and the infrastructure that could not otherwise be linked effectively with a Wi-Fi only network, or where public mobile networks don't support service KPIs) or customization at the network or device level.

User experience: Mobile networks enable workers to move from location to location without dealing with disconnection and reconnection issues that often come with a Wi-Fi-only system. Indoor and outdoor environments become seamless, and workers (and their connected equipment) far away from the wireless network source get the same quality experience as someone right next to it.

Risks for MNOs in 5G private networks

What are the risks in shifting MNO resources toward private 5G network implementations? What do MNOs need to watch out for?

Increased install and operational complexity

While past advancements from 2G to 3G to 4G all focused on building new or modifying existing cell sites, private networks rely on a different deployment model entirely.

Instead of focusing on optimizing service for a wide variety of customer types (for example, consumer, enterprise, IoT, and so on) simultaneously and determining site locations and network design accordingly, a private network requires a much more targeted approach. As such, elements from base station and antenna location to wireless network management at the enterprise level and connecting a wide range of devices with diverse capabilities must all be considered.

That's why these implementations often require strategic partnerships between the carrier, original equipment manufacturers (OEMs), company IT team, company core network. edge resources, and more.

New competition

Multiple industry dynamics have lowered the barrier to entry for new competitors in the private network space. Many countries and regulators around the world are making spectrum available for private use at competitive prices—Citizens Broadband Radio Service (CBRS) spectrum is such an example in the USA. Additionally, wireless technology has evolved toward software-centric networks running on commercial off-the-shelf hardware. MNOs no longer compete just against other MNOs for market share in the enterprise connectivity space.

In this new environment (and while use cases are fully developed and validated) MNOs will need to be flexible in their approach, including pursuing partnership opportunities. In those partnerships, sometimes the MNO will take the lead, while in other cases, they will contribute assets and expertise to a partner with relevant domain expertise. Competitors with significant funding and a different way of thinking about implementation that is not tied to existing carrier service models will require MNOs to be both thoughtful in their strategic approach and swift in adoption to avoid being left on the sidelines for not realizing the full potential of private 5G network business.

The MNO competitive edge

MNOs can't be all things to all people in the private 5G network space. Focusing on all aspects of implementation will spread critical resources too thin and often deliver a substandard product.

MNOs must leverage their access to spectrum. Although enterprises might be able to acquire their own spectrum, whether shared or dedicated, either directly or through private network integrators, the wireless operators retain control over the majority of spectrum available for wireless use.

MNOs may see an opportunity in the technology management and operational elements, delivering via a SaaS model. Very few companies interested in private 5G networks have the in-house skillset to operate these complex systems effectively. Their IT staff does not have the training or know-how required to run a mobile network in an optimized fashion, consistently delivering the expected performance to each of the multiple use cases these systems will support.

As 5G moves into the enterprise, MNOs can bring tremendous value with their extensive knowledge of mobile network security and performance. This will require a shift from the 'best effort' delivery of services approach to one where they can monitor network KPIs and application performance, measure the end-to-end service experience, and deliver the actionable insights needed for guaranteed network management performance. Additionally, operators can help conduct regular security assessments to continuously identify security risks and verify the efficiency of the controls in place to protect against threats. When private 5G networks are delivered via network slicing, there will be different SLAs per slice,

bringing added flexibility but also complexity to the private network. Finally, operators can offer their private 5G customers end-to-end active testing to ensure highly reliable services—and customer satisfaction. The combination of all these capabilities will enable closed-loop orchestration, service assurance, and auto-healing capabilities, allowing the enterprise to enjoy the high performance of a private 5G network without being bogged down by the operational complexity.

Private 5G networks present an enormous opportunity for mobile network operators—opening up an entirely new market and paving the way for unparalleled future innovation and growth in the connected enterprise space.