INDUSTRY GUIDE

Driving Enterprise Connectivity with Private 5G Networks

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How QCT's Infrastructure Provides the Foundation for A More Reliable, More Secure, More Robust Mobile Network

Contents

Analysts are proclaiming 5G to be highly enterprise-driven, more so than any previous mobile network deployed in the past two decades. While the consumer market is slowly catching up, enterprises are still predicted to hold a majority stake in 5G adoption as more 5G-capable devices are being purchased and as 5G networks roll out across the globe.

This drive is due to the fact that 5G is optimized for supporting enterprise use cases. 5G offers substantial IoT support, low latency, and the ability to carry greater bandwidths than its predecessors. Because of this, it is being recognized for the new use cases it enables in medicine, manufacturing, trade, and other connectivity-reliant operations.

This, in part, is also why private 5G networks are becoming one of the primary applications that mobile connectivity telecoms are deploying. Private 5G networks allow exclusive, secure, and uninterrupted connectivity for the location the network is serving, be it a hospital, a warehouse, or a remote location not typically reachable by networks.

Private 5G networks will shape the 5G mobile network landscape for the coming future as more enterprises come to rely on it for high-quality connectivity.

While it requires the right infrastructure and service provider ecosystem to implement, the use cases it supports will become a larger part of the connectivity picture as 5G continues to deploy and impact industry verticals.

The Landscape of 5G Private Networks

5G is predicted to reach about one-third of the world by 2025, according to the GSM Association. Currently, China, Japan, and the United States are reported to be the countries with the most 5G availability to the general public.

"However, 5G goes beyond general user access," says Ulysses Lu, business development manager at QCT. Industry use cases that rely on concentrated deployments of 5G — such as location-specific networks — are more widespread in some areas than general use deployment.

"5G coverage is not the only indicator of the deployment status of 5G networks. Some countries may take different approaches other than 5G supremacy," Lu said. "For example, Germany focuses more on industrial 5G use cases than on general 5G end-user services, and puts a high priority on private 5G network deployment with well-planned regulations."

More specialized 5G developments such as this are an indicator of both the fact that 5G deployments are not a straightforward mechanism to determine its impact on enterprises, and the fact that there has been more of a focus on these concentrated, private deployments within the relevant sectors.

A study by TECHnalysis found over 50% of surveyed IT decision-makers in the United States planned on adopting private 5G networks — more than upgrading to WiFi 6 or adding more WiFi hotspots to their sites. The demand for private 5G networks is present and will continue to be prevalent in the current landscape of connectivity demand.

Vertical Use Cases of 5G Private Networks

"5G is more focused on wide-area and mobility applications than WiFi," Lu said, "which makes it ideal for large warehouses, off-the-grid locations such as nature reserves or remote hospitals, or use cases with a need for high connectivity such as telesurgery."

"The benefits of 5G … [are] far beyond changing the consumer experience with the advanced network performance," Lu said. "The key contribution of 5G is about changing the vertical industries and enabling mission-critical use cases that the previous generations can never fulfill."

Manufacturing

Private 5G networks are considered to be a major part of the "Industry 4.0" revolution, which places a heavy emphasis on interconnectivity, virtualization, automation, and data-driven development in factories and production settings.

Over 90% of manufacturing decision-makers interviewed for a study by ABI research said they were actively investigating private mobile networks for their work sites.

Use cases within the manufacturing sector include data collection from machinery that can be backed up and analyzed in real-time; remote management of autonomous production lines; and reliable communication between different sections of the production process, whether they're in the same building or a large distance away.

The impetus for private 5G in this vertical mainly rests on improving reliability and productivity. According to the same study, over half of all respondents said they wished to reduce downtime in their networks, and nearly half responded that they wished to increase operations efficiency.

Medicine

Telemedicine and remote healthcare are increasingly prevalent in the 5G discussion. as Hospitals and other medical facilities are relying on distanced appointments and medical procedures facilitated by remote connections when personnel shortages or safety demand it.

Medical connectivity is defined primarily by a need for reliability and low latency, since an interruption in service can result in a critical risk to the patient — especially if the procedure being performed is surgical.

Security is also of utmost importance since patient health data is highly private and highly regulated in most countries, which is why more medical organizations are embracing private 5G networks. They are more secure than standard WiFi connections, and can provide a more robust, more widespread connection.

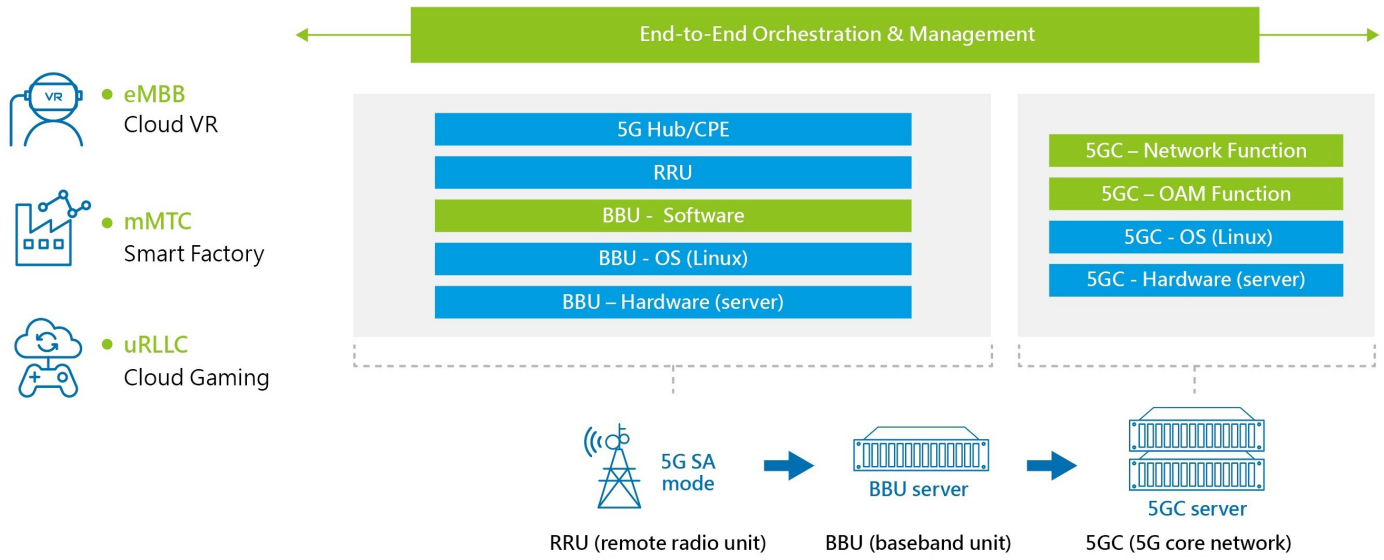
Transportation

Autonomous vehicles are expected to become part of the rapidly growing IoT ecosystem within the next few years, and require a highly reliable connection in order to collect data and facilitate machine-to-machine (M2M) communication. Enterprise-driven 5G networks ensure that vehicles stay in their own "lane" of connectivity and are prioritized during times of peak traffic, and can maintain a reliable connection.

As well, smart cities continue to grow and develop, driverless cars will become a part of a network of other vehicles, traffic lights, GPS mapping devices, and other IoT technologies. Due to geographical distribution and the nature of transport, a more-widely distributed network with a reliable connection is required for autonomous vehicles, making a widespread private 5G network the most optimal candidate for this.

Fig. 1: QCT Enterprise 5G End-to-End Architecture

QCT's private 5G architecture enables major vertical use cases, including immersive media, smart manufacturing and real-time entertainment.



QCT Enterprise 5G

Driving the Innovation and Development of Standalone (SA) 5G Private Network

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https://go.qct.io/telco/

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5G Private Network Infrastructure

One of the most prevalent challenges for both telecoms and enterprises in 5G deployment is the infrastructure involved. The services enabled by 5G require an intricate support system of network orchestration, automation, open-source, edge, and distributed hardware in order to build the connectivity and bandwidth to support 5G purports.

"Supporting private 5G networks require a specialized infrastructure," Lu said, "and with a big evolution in networking technology, 5G brings superior improvement in bandwidth, latency and connection; but [this is] also bundled with a very complicated networking architecture. Considering the larger-scale network coverage, as well as the massive data centers, central offices and edge sites, management and orchestration [MANO] have become the most challenging part in deployment."

In addition to infrastructure deployment, the management of the small cells and multiple data centers Lu mentioned requires a centralized management system, which is enabled by a virtualized network architecture and a robust orchestration system to achieve end-to-end automation.

This infrastructure and management system applies to both the telecom operators and enterprises using private 5G networks, though the degree of direct control the enterprises are given over their network is up to the discretion of their service provider.

The key to automation — and, by extension, network management — is using open-source components in the hardware and virtualized network. Open source enables communication and compatibility with disparate network sections, ensuring that automation can be implemented in a holistic manner.

As well, it allows a telecom to have more choices in providing its network services, Lu said.

"Open and software-defined architectures accelerate the roll out of service-based deployments and reduce proprietary vendor lock-in," he said. "An open ecosystem for private 5G solutions can enable more [virtual network function] vendors [to contribute] to different industry use cases, so as to fulfill their unique requirements. In addition, software-defined infrastructure enables easy scaling for the private 5G infrastructure depending on the operational environment."

QCT: Taking a Collaborative Approach to Enlarge the 5G Market

QCT's 5G network infrastructure is built to scale, allowing for fine-tuned control over a network of any size and distribution.

As such, QCT plans to continue supporting the development of private 5G networks around the world as those networks continue to grow, relying on its partnerships to bring a diverse product portfolio to telecoms and their customers.

"QCT works closely with ecosystem partners to build 5G architectures, aiming to enlarge the service coverage and business opportunities in Japan, Singapore, Germany, the United States, and other countries where private 5G regulations are enforced," says Ulysses Lu, business development manager at QCT.

QCT's partners include Red Hat®, Intel®, IBM®, and other hardware and software vendors that help it build a robust network infrastructure set with x86-based system powered by Intel® technologies, including 5G data center (5GDC), 5G core (5GC), 5G new radio (5GNR), network functions virtualization infrastructure (NFVI), and management and orchestration (MANO) solutions that enable a centralized view of the network and its distribution.

To optimize these carrier-grade solutions, QCT carefully selects hardware platforms powered by 2nd Gen Intel® Xeon® Scalable Processors to deliver the performance and reliability required for telecommunication services.

Various Intel® acceleration technologies such as Enhanced Platform Awareness (EPA) features are also incorporated to offer intelligent platform capability, configuration and capacity consumption, improving application performance as well as I/O throughput.

EPA is highly compatible with other open source components in all QCT's carrier-grade solutions, providing an improved understanding of the underlying platform hardware to allow accurately assigning the workload to the best HW resource. By integrating best-fit QCT hardware platforms with Intel components and features, QCT lays a solid foundation for its 5G infrastructure.

As well, QCT's partnerships extend beyond relying on the private market. As individual regulations and needs dictate the pace and manner in which 5G is deployed, QCT is working with regional partners in order to develop a 5G infrastructure solution that is most optimal for its location.

"QCT integrates with a Taiwan Radio Access Network [RAN] partner for Taiwan's first band-n79 RAN solution by leveraging an ORAN open architecture," Lu said. "To foster the development of private 5G with n79 standalone (SA) 5G telecommunications technology and equipment, QCT has formed a 5G Tainan Team with 10 Taiwanese and Japanese companies. With [this] experience in Taiwan, QCT is ready to provide the enterprise 5G solution with multiple radio bands ... to the rest of the world."

As 5G continues to develop, QCT plans to continue expanding its partner ecosystem in order to accommodate and build the platform for private 5G for enterprise-driven use cases.

For more information on QCT 5G solutions visit: https://go.qct.io/telco/.

About QCT

Quanta Cloud Technology (QCT) is a global datacenter solution provider. We combine the efficiency of hyperscale hardware with infrastructure software from a diversity of industry leaders to solve next-generation datacenter design and operation challenges. QCT serves cloud service providers, telecoms and enterprises running public, hybrid and private clouds. Product lines include hyper-converged and software-defined datacenter solutions as well as servers, storage, switches, integrated racks with a diverse ecosystem of hardware component and software partners. QCT designs, manufactures, integrates and services cutting edge offerings via its own global network. The parent of QCT is Quanta Computer, Inc., a Fortune Global 500 corporation.

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Bring to the table win-win survival strategies to ensure proactive domination. At the end of the day, going forward, a new normal that has evolved from generation X is on the runway heading towards a streamlined cloud solution. User generated content in real-time will have multiple touchpoints for offshoring. Progressively plagiarize resource-leveling e-commerce through resource-leveling core competencies. Dramatically mesh low-risk high-yield alignments before transparent e-tailers.

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