WHITE PAPER

Private 5G Networks Accelerate Industry Transformation

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In the wake of a global pandemic, businesses everywhere are looking for new ways to remain competitive and relevant; in particular, they're looking to digitally transform themselves with 5G capabilities. After all, 5G has already begun revolutionizing communications, accelerating the emergence of futuristic data-centric technologies such as artificial intelligence (AI), machine learning (ML), virtual reality (VR), augmented reality (AR) and robotics—not to mention real-time data analytics. And no other industry is as primed for the ongoing 5G revolution as telecommunications.

The 5G mobile networking standard has already shaken the foundation of telecommunications. Companies have been furiously brainstorming new business models to take advantage of 5G's myriad benefits, from the standard's enormous speed increases, high capacity and low latency to its reduced energy usage and massive connectivity. Private 5G networks, in particular, enable enterprises to become more agile and transform their traditional business operations through Industry 4.0 transformation.

As the media endlessly trumpets the consumer impact of 5G, it's important not to underestimate the enterprise opportunity. Even if enterprise customers don't immediately take advantage of 5G's aforementioned capabilities, the promise of the technology creates a new paradigm of deep collaboration with the provider, as well as fresh opportunities for finding mutually valuable and innovative business models. As providers stress the vitality of 5G networks, enterprise IT departments crave not only cutting-edge use cases but also the promise of improved customer satisfaction.

5G changes the game for MNOs

According to Research and Markets, the global 5G enterprise market is estimated at $2.8 billion and is forecasted to reach $9.8 billion by 2026. In fact, as indicated by a GSMA Intelligence report, 5G is expected to be "the first generation of mobile network technology to have a larger impact on enterprises than consumers." This report puts an emphasis on verticals such as manufacturing, digitizing product assembly and operations management, but as previously mentioned, the benefits extend to a broad swath of enterprises.

"The enterprise market will be the main revenue generator and the 10-year cash cow for mobile operators looking forward," Saadi said at ABI Research's virtual 5G Technology Summit.

All of this equates to an ideal opportunity for mobile network operators (MNOs) to offer 5G with complementary infrastructure, services and analytics. MNOs can now take an enterprise-first posture that gives control of the enterprise to the business itself—larger degrees of self-management of network segmentation, the ability to rapidly self-adjust device settings and the freedom to innovate at the business's own pace.

MNOs and data centers alike can now divide their networks into virtual subnetworks and interconnect them, thanks to network slicing. Each subnetwork can provide dedicated functions and services can be adapted to the needs of individual customers. With network slicing, MNOs can realize new revenue streams by providing low-latency services to both on-premises and offsite customers; a distinct advantage of 5G network slicing is an MNO's capability to offer broadband connections even when many objects are connected to the network. Equally important to the emergence of 5G in the enterprise scenario is edge computing, which further reduces latency and supercharges performance by bringing compute capabilities closer to the end user. In essence, edge computing is the driving force behind the evolution and deployment of Internet of Things (IoT) applications.

These are the innovative 5G features that are making the difference for MNOs, and they align with the industry's widespread trends of digital transformation, industrial transformation and Industry 4.0—all accelerated by 5G and IoT. The emergence of so-called "critical communications" over the mobile network in real time opens opportunities in the industry, connecting billions of devices (e.g., smart sensors, control units) in tomorrow's smart

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factories and enabling new manufacturing concepts. MNOs can set up private 5G networks in these kinds of environments and tailor them precisely to a given application.

The MNO opportunity is ripe as enterprises oversee the virtualization and cloud-based trajectory of their 5G core networks and multilayered architectures. The rise of network functions virtualization (NFV) and software-defined networking (SDN) as network-building tools has reached a point at which MNOs have become an industry force toward making operations truly customer-focused, and 5G only heightens that effect.

The benefits of a private 5G network

To begin realizing the full capabilities of 5G, many of the world's largest businesses are implementing private 5G networks. Contracting with their MNO, enterprises can now have a customized 5G network that addresses their unique business needs and use cases, fine-tuned according to their deployment timeline and customized according to all service-level agreement (SLA) coverage and security needs.

Today, Wi-Fi is the most ubiquitous wireless networking technology in business, but it comes with inherent weaknesses in the enterprise environment: It lacks strong security, can be vulnerable to interference and can exhibit substandard range, particularly in sprawling environments such as factories. Private LTE options have been more popular in those larger sites, offering dedicated spectrum as well as proprietary operating assets—thus generating clear security, coverage and capacity benefits. However, challenges remain, including the prohibitive cost and need for onsite cellular expertise. Even Ethernet remains expensive, not just in materials but in management—especially at scale.

A private 5G network offers the most performant, most cost-conscious and most technologically evolved solution in communications history, with the bonus benefit of laying the groundwork for many businesses to finally achieve the digital transformation they've considered for years. This is particularly true of large enterprises that have been lagging in this regard, such as manufacturing. (Recent Accedian research found that 76 percent of manufacturers are looking forward to using private 5G networks by 2024.) Beyond the oft-touted (and considerable) performance, reliability and latency enhancements that 5G brings to any network, a private 5G network offers greater support for strict security and privacy, as well as secure separation of data silos—essential for public and private enterprises concerned about critical data being shared over the wireless network.

A key aspect of any network is its agility—the ability to respond and adapt to network changes in real time while maintaining resiliency, simplicity and security. Private 5G networks offer enterprises a uniquely reliable ability to handle mission-critical endeavors, integrating with the company's existing infrastructure. The result is a seamless experience for both IT and users. As an example, public 5G networks will deal with inevitable traffic congestion, while private 5G networks will have no such limitations. In addition, private 5G networks introduce

significant cost savings because enterprises can streamline their hardware expenditures by moving from Wi-Fi to 5G. And for many companies, 5G technology will reduce dependence a physical office, opening up opportunities for employees to work from anywhere.

Customizability is another important benefit of the private 5G network. Enterprises can configure their network to their particular needs, depending on the work they need to do. This benefit works in both directions, too: An enterprise customer can inform a service provider about its unique application and bandwidth requirements, and the provider can shape its solution with cost-saving precision. A private 5G network offers the ability to customize bandwidth for both upload and download speeds, allowing such enterprise-specific customizations and preferences—as well as the capability to create specific SLAs for certain applications or devices on the network. This benefit is compounded by one of 5G's premier architectural features—network slicing—which allows the creation of multiple virtualized networks atop a common physical infrastructure. Network slicing in 5G underpins a wide range of use cases, facilitating the efficient distribution of resources from one network slice to the next.

Private 5G network implementation is flourishing in larger environments—from seaports to airports, from factories to warehouses, from campuses and hospitals to retail hubs—but its benefits reach far and wide. Regardless of an enterprise's size and regardless of use case, private networks enable new ways to leverage high-speed connectivity while opening the door to the next generation of SDNs and rich edge 5G mobile devices. Above all, they represent the essential, bleeding-edge method for retaining a company's competitive edge.

5G monetization opportunities

As 5G overtakes the telecommunications industry, MNOs face the prospect of new revenue streams that also strongly benefit the customers they serve. New monetization opportunities arise around use cases focusing on many of 5G's features, which power enterprises in every vertical. But three of 5G's most widely heralded concepts—AI/ML and real-time data access/analytics—are experiencing a rapid rise in the enterprise when it comes to the value proposition for MNOs.

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AI/ML's predictive capabilities means that MNOs will now have the ability to monetize their wares in real time, connecting and monitoring 5G endpoints such as personal devices, kiosks, cameras, smart sensors, autonomous cars and much more, all in the effort of providing unified quality of experience (QoE) to end users. Imagine the potential revenue streams inherent in AI-powered camera monitoring in factory assembly, medical robotics, crop enhancements in agribusiness and smart city traffic management, or simply the automation of previously manual tasks in the workplace. AI/ML will help enterprise data specialists predict the spectrum and bandwidth needs of their private 5G network, and it will also help them identify problems before they wreak havoc.

TMForum sees 50 percent of future MNO revenue coming from enterprise customers using 5G features such as AI to improve their strategies and thus earn increased revenue from their infrastructure investments. Particularly in large environments such as manufacturing, utilities and ports, AI/ML will help enterprises automate their physical operations and increase the speed of decision-making. Already in the midst of Industry 4.0 transformations, MNOs have an opportunity to provide high-speed performance, ultra-low latency and edge agility in environments where Wi-Fi or Ethernet has struggled. Factories and warehouses experiencing interference or increasing numbers of device connections over large spaces need the right MNO partnership to design a custom private 5G network, determine the right spectrum allocations, and the ideal mix of new infrastructure and maintain network optimization. A well-implemented private 5G network will be easy to manage, rendered stable through auto correction, so that when a cell site goes down or one area experiences unexpected peaks high traffic, the network self-corrects. The realities of 5G automation, virtualization and cloudification make such tasks scalable, so MNOs can oversee many private 5G networks at the same time, thereby rendering their revenue possibilities exponential.

It's also in information-rich environments like factories and hubs where 5G AI/ML's data capabilities shine, offering the ability to process and analyze giant quantities of data, leading to enhanced efficiency throughout the supply chain. But regardless of the size of the enterprise, real-time data access/analytics drives new revenue opportunities for all customers, and those efficiencies reduce costs. Cost savings result directly from a technology that can precisely process and interpret data in real-time: Data analytics help predict and prioritize service degradations before the customer sees outages or degraded performance. Plus, of course, AI/ML-based analytics help reduce network complexity—and the end result is enhanced QoE, increased customer satisfaction and reduced subscriber churn, all of which improve a business's bottom line.

The most disruptive mobile technology yet

Despite the impact of the COVID-19 pandemic on the industry, the telecommunications landscape is still in the midst of a radical upheaval—and its name is 5G. Enterprises everywhere are gearing back up for digital transformations, and the broad adoption of 5G for private networks has implications for many types of companies and verticals. These companies are connecting more devices than ever—not to mention collecting more data than ever—and they're getting the hang of AI/ML and data analytics in ways that have them starry-eyed about monetization opportunities.

MNOs are in a prime position to not only to take advantage of these burgeoning 5G impulses but to do so in complementary ways. The promise of 5G will lead to new kinds of mutually beneficial relationships among MNOs, enterprises, and customers of all kinds—effectively revolutionizing the way the telco world works. As increasing numbers of companies undertake their 5G transformations, industry itself will evolve dramatically, becoming faster, more agile, and more interconnected. History will view 5G as a fundamental force that reshaped the way we do business.

Learn how HCL Technologies can help you in your 5G journey here.

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