HPE Delivers Intelligent Connectivity

Smart Manufacturing on the Edge

Executive Summary

Today's 4G LTE mobile networks deliver a number of transformative connectivity services and applications globally. From a consumer perspective, ridesharing applications such as Uber and Lyft continue to disrupt a taxi industry fraught with poor service, high prices, and lack of reliability. For enterprises, private LTE networks provide new connectivity options for verticals such as transportation, logistics and manufacturing. 5G promises to further transform the enterprise with significant improvements in device support, bandwidth and responsiveness. Carriers in the United States, China and South Korea are spending billions of dollars on aggressive 5G deployment efforts in the hopes of achieving "first mover" status to monetize new service offerings. Those enterprises that want to be early adopters and reap the potential competitive advantages of 5G seek guidance given the various stages of deployment currently underway. It's also important to note that Wi-Fi will have an equally important role in facilitating a flexible networking fabric. Based on its unlicensed spectrum, cost-efficiency and superior propagation indoors, Wi-Fi 6 will play a strategic role in the overall connectivity of devices, assets and people.

Enterprises with large manufacturing operations are typically early adopters of new technology, given the potential to facilitate innovation, increase efficiency and reduce operational and capital costs. 5G and Wi-Fi 6 stand to enhance current industrial Internet of Things (IoT) deployments and also drive new enterprise use cases that take advantage of both wireless standards' higher density and lower latency. One area in particular that stands to benefit from the blend of new connectivity offerings is "smart manufacturing", which integrates computational power to improve the production process through automation, control and preventative maintenance. Intelligence and security at the network edge are critical components within these new manufacturing paradigms with datacenter-grade compute, storage, fabric and management tools placed close to where data is created.

A number of networking infrastructure providers offer point solutions to support smart manufacturing applications, but few have a complete end-to-end connectivity offering that spans Wi-Fi, 4G and, eventually, 5G. The technology stack must include telecommunications and other enterprise-grade hardware, management and security

software, and services. Hewlett Packard Enterprise (HPE) is uniquely positioned to guide enterprises on their smart manufacturing deployment journey with its "Intelligent Edge" leadership, IoT capabilities, strong portfolio of offerings (including Edgeline, Aruba and IT consumption services), and deep experience in both enterprise and cellular networking.

HPE'S VISION FOR INTELLIGENT CONNECTIVITY

The Intelligent Edge

HPE defines the "intelligent edge" as the place where action occurs and IoT devices reside. Computational power must reside close to where data is created in order to enable real-time analytics and intelligent decision-making. It's unrealistic to depend on only the traditional data center or even the cloud to manage the current proliferation of networked devices, sensors, and data. HPE invests heavily in its edge strategy, earmarking $4 billion from 2018 to 2022 for solution development and an additional $1 billion to facilitate sales and support through its global IT channel. This level of financial investment should translate into a widespread solution offering made available to enterprises through tens of thousands of distributors, value-added resellers and integrators. Wi-Fi connectivity is also an important element of HPE's strategy, and its Aruba division delivers a robust offering that includes the latest Wi-Fi 6 access points, policy and connectivity management, security, and analytic support.

5G and Wi-Fi 6 Better Together

Recently, a handful of carriers around the world theorized that mobile 5G could make Wi-Fi obsolete. This may be due to an exuberance to monetize considerable investments in licensed spectrum and new infrastructure. Rather, the co-existence of Wi-Fi with next generation 5G networks will come to four considerations: economics, propagation, scale and experience. From an economics perspective, today's 4G LTE and tomorrow's 5G chipsets are inherently more expensive than Wi-Fi to integrate into devices. Furthermore, the licensed spectrum aspect of cellular-based mobile services typically equates to a monthly charge per device, although private LTE networks are gaining momentum for particular use cases and will likely grow with the CBRS OnGo initiative set for initial commercial deployment in September 2019. OnGo promises to deliver a flexible spectrum sharing model that eliminates some of the licensing cost depending on the access tier, but its delivery as a managed service will likely price it above Wi-Fi. From a propagation perspective, cellular has significantly more trouble traveling through walls and objects than Wi-Fi. Many companies are trying to solve this challenge, and Aruba in particular has integrated Passpoint technology based on the

Wi-Fi Alliance specification into its ArubaOS to provide a more seamless roaming experience for users. When it comes to scale, Wi-Fi rules the roost—its footprint in organizations large and small is unrivaled with global carriers also offering managed services that include Wi-Fi. Last, the combination of 5G and Wi-Fi is poised to provide a better mobility and connectivity experience by transitioning users between networks with less required interaction and improved performance consistency. HPE has significant wireless networking capabilities and a wide enterprise installed base through its Aruba division. Aruba is also an historic innovator of Wi-Fi technology and is making significant contributions to improving the wireless networking experience on a number of fronts.

Experience-Based Networking

The power of networking is its ability to facilitate connectivity without borders. As human beings, connectivity with other people creates experience. Companies that focus on creating enhanced experiences with networking infrastructure stand to reap the rewards of delivering exceptional customer value and business transformation. This is the concept behind a term that our firm coined in a recently published article, "experience-based networking."

Aruba continues to enhance its smart digital workplace initiative in the areas of real estate, office furnishings, presence detection, and more as evidenced by documentation on its website. CBRE, the largest real estate management company in the world, partners with Aruba to integrate functions such as facility trouble ticketing and smart building IoT. Iconic furniture brand Herman Miller collaborates with Aruba to customize user ergonomic settings for sit-to-stand height adjustable desks. Another partnership with Patrocinium provides a solution focused on presence detection and crisis-management. These partnerships all seek to leverage connectivity to make workspaces smarter, healthier and safer.

WHY HPE FOR SMART MANUFACTURING

Smart manufacturing employs intelligent edge solutions that facilitate demand-based production agility and automation. Furthermore, it leverages secured connectivity for Operations Technology (OT) like manufacturing equipment, robotics and sensors. With its IoT capabilities, broad portfolio, reference design efforts and global services, Moor Insights & Strategy believes HPE is well-positioned to deliver smart manufacturing solutions that utilize Wi-Fi 6, 4G LTE and, eventually, 5G.

Deep IoT Capabilities

HPE possesses significant resources and capabilities to help enable industrial IoT deployments. These include IoT Innovation Labs in Houston, Texas, Geneva, Switzerland, and Singapore, which offer "edge experience zones" for manufacturing use cases. One doesn't even have to visit these labs in person to take advantage of these resources—customers can remotely access any lab via a VPN to test use cases and applications easily and securely.

Aruba Central consolidates network management, AI analytics, service assurance and security to deliver simplified IoT and edge management. Aruba ClearPass Device Insight extends capabilities even further by enabling the visibility, discovery and classification of network and headless IoT devices to improve overall management. In the near future, Aruba will also integrate IoT wireless protocols and support for Zigbee and Bluetooth 5 into its newest access point products and offer an IoT expansion radio for existing installations. From an edge purpose-built perspective, HPE Edgeline IoT Quick Connect aims to reduce the complexity associated with the management of IT and OT sensors and devices, providing a critical bridge between HPE Edgeline EL300 Converged Edge Systems and Microsoft Azure IoT for cloud-based management.

Broad Portfolio of Hardware, Software and Reference Designs

HPE Edgeline, powered by Intel Xeon processors, delivers a single socket, single I/O platform designed to reduce latency. To meet the harsh environmental demands of manufacturing environments, Edgeline comes in a smaller form factor hardened to withstand extreme temperatures and can be installed in rack, on wall or to pole and tower. Edgeline is also extremely flexible and can support multi-purpose applications such as radio access network (RAN), multi-access edge computing (MEC) and edge applications such as video analytics and augmented reality (AR). AR is poised to become a compelling tool for manufacturing, especially in troubleshooting and break-fix scenarios in its overlay of pertinent data.

Aruba Wi-Fi 6 Access Points, NetInsight and 360 Secure Fabric combine to deliver a best in class, secured enterprise-grade wireless networking experience both on-premise and cloud-enabled in the future. NetInsight is an AI-based analytics and assurance solution that optimizes network performance and ensures uptime. Aruba 360 Secure Fabric is a framework that provides security and IT teams visibility, control and threat defense. It accomplishes these tasks through firewall solutions, Aruba ClearPass policy manager and device insight, and Aruba IntroSpect for user/entity behavior analytics and network traffic analysis.

From a reference design perspective, HPE delivers building block modularity, high availability, reliability and performance amassed from global telecom deployments. NFV Blueprints and automation tools further optimize the design and deployment of current and forward-looking use cases including network core and edge. Telco certified modules can also be tailored for specific operator workloads to simplify network deployment, eliminate errors and deliver agility.

Global Service Offerings

HPE Pointnext assists with the design, implementation and ongoing support and management of multi-workload optimized networks, removing the dependence on purpose-built, proprietary, big infrastructure providers. The value lies in HPE's ability to act as a one-stop shop for design, NFV integration and deployment. HPE Pointnext services aim to assist customers with a number of challenges. Among them, collaborative design around digitizing core operations, analytics and edge management, multi-vendor workload optimization for both on-prem and cloud deployment, and other professional services that help "de-risk" the digital transformation journey.

HPE's GreenLake consumption-based IT solutions deliver desired outcomes, much like the promise of today's intent-based networking topologies, with hardware, software and expertise available on-premise or in the cloud. HPE claims that this simplifies the IT experience, provides robust management control and equates to faster time to value. Providing IT solutions as a utility is powerful. This allows enterprises to focus their IT staff on more value-added activities for the various lines of business supported, and also leverage an operational expenditure (OPEX) model that frees up capital for investment in other business initiatives. In theory, this could in turn accelerate the return on investment (ROI) in digital transformation initiatives.

CALL TO ACTION

Connectivity that spans Wi-Fi, 4G and, eventually, 5G will bring transformative services to consumers and businesses alike. Among the enterprise applications, manufacturing is poised to benefit tremendously as networks become smarter. HPE's solutions put intelligence at the network edge today, to analyze data as it's created and enable faster decision-making. In a smart manufacturing environment, this equates to improvements in manufacturing line change, yields and overall quality. HPE is already assisting customers in various smart manufacturing deployments, and this will dramatically improve over time with 5G given its ultra-low latency and resulting impact on tactile robotics, faster throughput and support for a massive number of IoT devices that will

significantly exceed that of LTE. Moor Insights & Strategy recommends consideration of HPE to any enterprise deploying or considering industrial IoT applications in the future that leverage the potential of 5G given the company's "Intelligent Edge" leadership, IoT capabilities, strong portfolio of offerings, IT consumption services and experience in both enterprise and cellular networking.

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