Solution Brief

Higher Education, Enterprise, Manufacturing, Warehouses, Refineries

Highway 9 Networks Delivers Mobile Cloud Platform for Enterprise Private 5G

Highway 9 Mobile Cloud private 5G solution supports emerging and specific use cases that complement Wi-Fi. The system delivers high-speed, low-latency networks using 4th Gen Intel® Xeon® Scalable Processor-based servers

Private 5G networks offer a compelling solution to address the new and evolving enterprise connectivity needs. These networks provide low latency, flexibility and performance, and makes a preferred choice for emerging use cases including:

1. Networks deployed in manufacturing and logistics industry segments that require broad-based coverage and ultra reliable connectivity. Many Industry 4.0 initiatives are modernizing and digitizing industrial processes. This includes increased use of industrial robots and automated guided vehicles that need pervasive connectivity and seamless roaming.
2. Networks deployed on education campuses that deliver flexible, indoor-outdoor connectivity and where carrier network extensions are needed to serve large student and faculty populations. The high bandwidth capability also is needed to support compute-intensive advanced research initiatives.
3. Networks deployed in oil and gas refineries that support very large and spread-out operations requiring extensive coverage. These networks must contend with RF signal interferences from high-voltage, metal equipment and requires strong signal strength to ensure connectivity.
4. Healthcare applications including enabling remote monitoring, telemedicine, and carrier network extension. These procedures require very low latency, reliable and high-bandwidth networks.

Technology Components of a Private 5G Network

Thanks to virtualization, 5G systems that were expensive and inflexible fixed-function appliances have evolved to become software services running on high-performance Intel® processor-based servers. This has resulted in private 5G networks that are as easy to deploy and operate as Wi-Fi networks.

The key components for a virtualized private 5G system include:

- **Radio Access Network (RAN)**: The RAN is responsible for transmitting and receiving data between the devices connected to the network and the core network. It includes base stations (centralized and distributed units), antennas, remote radio heads (RRH) and front-haul networks.
- **5G Core**: The 5G core relies on high performance packet processing to shape network packet behavior and ensure QOS policies are applied. The most notable features of the LTE / 5G core include Access and Mobility Management Function, Authentication Server Function and a series of control functions including Session Management Function, the Policy Control Function, the Application Function and Unified Data Management.

- **Spectrum**: Private LTE / 5G networks require radio frequency (RF) spectrum to operate. Many countries around the world have dedicated unlicensed spectrum bands for use in private LTE / 5G networks. In the US, the Citizens Broadband Radio Service (CBRS), a 150 MHz wide broadcast band of the 3.5 GHz band (3550 MHz to 3700 MHz) has been established for private cellular networks.
- **Security**: Robust security measures are essential to protect private LTE / 5G networks from unauthorized access and cyberattacks. These measures include encryption, authentication, and intrusion detection systems.

Highway 9 has developed a private 5G solution based on its powerful mobile cloud solution. The company is an Intel® Partner Alliance Gold Tier Partner and Intel® Industry Solution Builders Network Builders community member and has integrated its mobile cloud solution on servers using 4th Gen Intel Xeon Scalable processors.

A Mobile Cloud Solution for Enterprise Connectivity

Highway 9 Networks offers a comprehensive mobile cloud solution designed to cater to the evolving needs of enterprises. Highway 9 provides a scalable and customizable platform for delivering reliable and high-performance mobile connectivity.

Key features and benefits:

- **Cloud-Native Architecture**: The solution is built on a cloud-native platform, enabling rapid deployment, scalability, and efficient management of applications.
- **Hybrid and Private Network Capabilities**: Highway 9 supports both hybrid and private network configurations, allowing enterprises to choose the deployment model that best suits their specific requirements.
- **Integration with Existing Infrastructure**: The solution can seamlessly integrate with existing enterprise networks, minimizing disruption and maximizing compatibility.
- **Advanced Network Management**: Highway 9 provides a centralized management platform that offers real-time visibility, analytics, and automation capabilities.

Mobile Cloud Offers SaaS Private 5G

Highway 9 Mobile Cloud is a comprehensive software-as-a-service private 5G platform (that also supports LTE networks) that is comprised of three components: Mobile Cloud Services, Mobile Edge, and Mobile Network (see Figure 1). It was designed to simplify and automate the deployment of private mobile networks for enterprise and campus environments. Mobile Cloud provides zero-touch provisioning and autoconfiguration of both its software layers and on-premises radios.

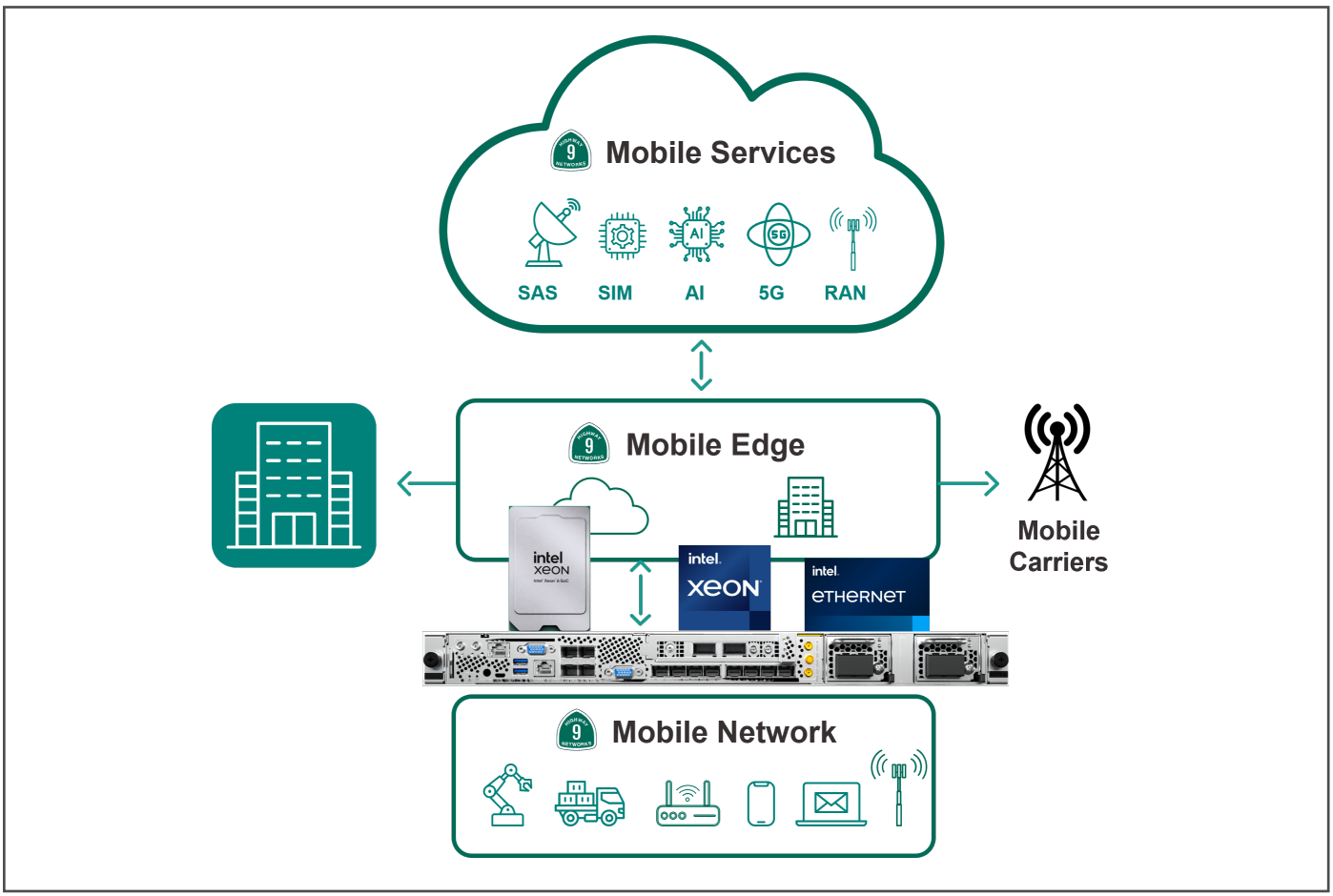

Figure 1. Block diagram shows the three software platforms of the Highway 9 Networks private LTE / 5G network and how they are connected to the enterprise or to public MNOs.

Mobile Cloud Services

The Highway 9 Mobile Cloud Services component is the control panel for customers, giving IT and DevOps teams the ability to manage the entire stack. The company's unique user-defined Virtual Mobile Zones (VMZ) capability allows the creation of private network segments in the mobile network with user / group segmentation, application isolation and quality of service policy enforcement. These Zones can be used by different departments within an organization enabling the IT team to extend and apply enterprise IT security policies and controls to these users. A VMZ also limits the network's cybersecurity attack surface and maintains enterprise security/regulatory compliance.

Mobile Edge

Highway 9 Mobile Edge provides mobile core services and can be flexibly deployed on-premises within the enterprise or on a public cloud. Mobile Edge powers 4G and 5G mobile use cases by delivering a distributed and scalable 5G core, provide extension of public network carrier services within a building, and can be integrated with other services from enterprise IT service providers and MNOs.

Mobile Network

Highway 9 Mobile Network enables a next-generation mobile network, fully integrated into an existing network architecture. This reduces the need for costly integration exercises and leverages the mobile cloud for an enhanced delivery model.

Key Capabilities:

- Pre-integrated solution that leverages best-in-class 5G RAN, CPE, eSIM.
- Deep integration with AI-driven intelligent machines and an ecosystem of networking and security vendor partners.
- Integrated visibility to clients and radios for bootstrap configuration and day 2 operations and setting and achieving KPIs.

Hardware Platform Uses 4th Gen Intel Xeon Scalable Processors

Highway 9 packages the Mobile Edge solution on servers powered by 4th Gen Intel Xeon Scalable processors. This processor family delivers compute agility and scalability, benefiting from decades of innovation for the most in-demand network workload requirements.

4th Gen Intel Xeon Scalable processors have a balanced architecture that supports RAN, LTE / 5G core and other workloads with built-in acceleration and hardware-based security features. Other CPU features for private 5G network workloads target low latency, high throughput, and deterministic performance.

In addition, the processors also have a range of features for managing power to further optimize performance per watt. The CPUs feature up to eight different on chip accelerators. For RAN applications, the Intel® vRAN Boost on-chip accelerator offloads computationally heavy layer 1 tasks such as low-density parity check (LDPC) decoding and forward error correction (FEC). Highway 9 software also integrates Intel® Advanced Vector Extensions 512 (Intel® AVX-512), which provides built-in acceleration for demanding workloads that involve heavy vector-based processing.

The Highway 9 servers also feature multiple 100GbE Intel® Ethernet Network Adapters E810 that optimize high-performance server NFV workloads.

Conclusion

The demand for the low latency, high throughput wireless data networks is growing, and Highway 9 Networks has responded with a private 5G system that takes advantage of cloud-native and edge technology to deliver a high throughput, automated and flexible solution. The private 5G network is tightly integrated with the cloud to provide 360-degree network visibility and easy integration with security, and other management capabilities. For high performance, Highway 9 delivers the system on servers powered by 4th Gen Intel Xeon Scalable Processors.

Learn More

Highway 9 Networks

Highway 9 Mobile Cloud

4th Gen Intel® Xeon® Scalable Processors

Intel Partner Alliance

100GbE Intel® Ethernet Network Adapter E810

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