Solution Brief

Telecommunications, 5G Private Networks, Critical Infrastructure, Edge Data Center

Lanner Bundles Server, SmartNIC for Mobile Network Applications

Lanner's ECA-5555 multi-access edge computing platform and IAC-PTL301A SmartNIC rely on high-performance Intel® Xeon® 6 processors for performance that drives AI-enabled edge applications, vRAN and MEC use cases

The accelerating convergence of AI, 5G, and emerging 6G architectures is reshaping what multi-access edge computing (MEC) servers must deliver for mobile network operators (MNOs), expanding their use cases far beyond traditional packet processing and localized compute.

MEC platforms are now expected to serve as flexible, high-performance engines able to accommodate a new generation of radio, transport, and application workloads securely with precision, consistency, and tight integration across networks.

This shift is most visible in the evolution of the virtual radio access network (vRAN). These signal-processing-intensive workloads demand predictable latency, stable throughput, and robust acceleration—especially as 5G Advanced and 6G research introduce more complex scheduling, beamforming, and spectrum-sharing techniques.

Hosting vRAN distributed units (DU) / centralized units (CU) on MEC infrastructure enables operators to reduce deployment fragmentation, simplify operational models, and create a more unified edge platform. But it simultaneously raises the performance bar for every element of the MEC stack, from processors and accelerators to networking interfaces, memory bandwidth, and power budgets.

Beyond the RAN, MEC servers are the execution environment for an expanding universe of edge applications and network services. AI training and inference at the edge are quickly transitioning to commercial necessity, powering real-time analytics, automation, energy optimization, and location-aware user experiences.

High-bandwidth user plane function (UPF) offload, secure SD-WAN, and advanced cybersecurity functions—including edge firewalls, intrusion prevention systems (IPS), zero trust architectures, extended detection and response (XDR), and network detection and response (NDR)—are now integral to MNO revenue and differentiation strategies. These workloads depend on a MEC platform capable of sustaining 100G/200G routing, delivering robust cryptographic throughput, and maintaining deterministic behavior even under fluctuating traffic loads.

These use cases are driving new real-world network performance requirements. Deterministic, low-jitter compute behavior is essential not only for radio integrity but also for predictable scaling of latency-sensitive AI pipelines and security engines.

Cryptographic performance takes on greater prominence as operators expand encrypted transport, secure service mesh architectures, and identity-driven access models deeper into the edge. Looking ahead, the introduction of post-quantum cryptography (PQC) considerations adds new security requirements. Quantum computing can break conventional encryption keys in minutes. MNOs must ensure that their MEC infrastructure can handle significantly more computationally demanding cryptographic operations needed for PQC.

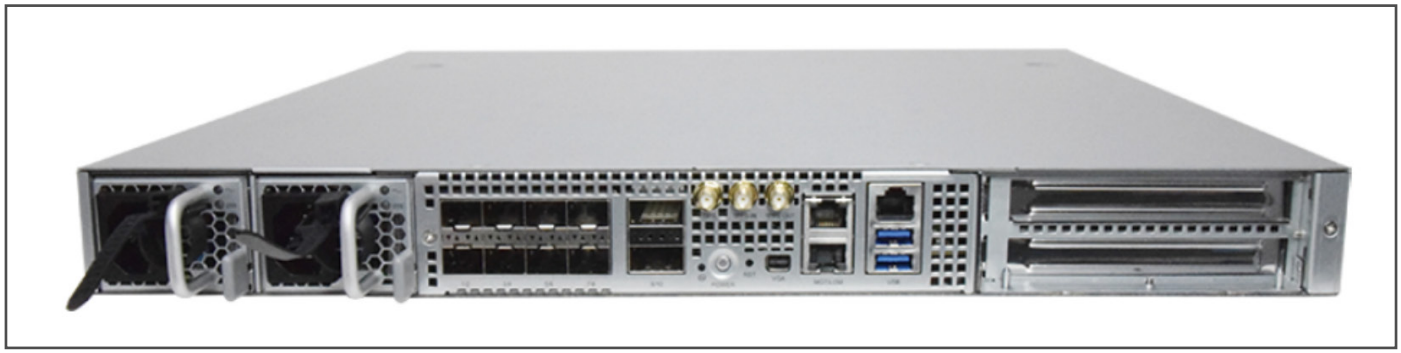

Figure 1. Lanner ECA-5555 front view with I/O and networking ports, PCIe slot and fans.

Power consumption must also be optimized; with MEC footprints multiplying across thousands of distributed sites, energy efficiency becomes an operational and financial imperative, especially in markets facing tightening sustainability requirements.

For MNOs, the next generation of MEC servers must therefore combine high performance with architectural flexibility, integrated acceleration, robust security, and long-term readiness. Lanner, an Intel® Industry Solutions Builders partner, and Intel have a history of collaborating on high-performance, secure network services and are now working together on a new Lanner accelerated network appliance based on a range of Intel technologies.

Bringing MEC Server and SmartNIC Together

Lanner's solution is a MEC platform that combines the Lanner ECA-5555 MEC platform with the Lanner IAC-PTL301A SmartNIC.

The Lanner ECA-5555 is a 1RU, rackmount network appliance / multi-access edge computing (MEC) platform with compute performance from the Intel® Xeon® 6 processor. Its design is ideal to include 5G RAN deployments as a DU/CU server. It can also serve as a content delivery server, including media streaming and cloud gaming.

All of the I/O, expansion and connectivity options are on the front panel. These include two 100Gbps QSFP28 ports and eight 25Gbps SFP28 ports allowing the system to maximize vRAN performance.

The system supports high-precision timing sync via IEEE 1588 PTP, SyncE and integrated GN55. The ECA-5555 features a global positioning system (GPS) pulse per second (PPS) input. It is expandable via a PCIe x16 full height, full length (FHFL) slot.

The system is designed with a wide operating temperature range of -40°C to 55°C, to ensure reliable performance even in challenging environments. The Lanner ECA-5555 features dual M.2 slots for NVMe storage and secure BMC remote management, enhanced expandability, reliability, and streamlined maintenance.

Intel® Xeon® 6 SoC-Powered SmartNIC

The extra processing power needed for hardware acceleration for networking and AI workloads comes from the addition of the Lanner IAC-PTL301A SmartNIC. Lanner has based the IAC-PTL301A on the Intel® NetSec Accelerator Reference Design, which integrates an Intel® Ethernet Controller E830 and an Intel Xeon 6 SoC.

The IAC-PTL301A is an Intel Xeon 6 SoC-based server in a full height, full length (FHFL) PCIe card form factor that supports up to 32GB of 2CH ECC DDR5 memory. The card features a 1 GbE RJ45 and two 100G QSFP56 ports. An NVMe slot can accommodate up to 128GB of onboard storage.

The card is optimized for high-density virtualized workloads that are AI-enabled, offering flexible port configurations, advanced time synchronization capabilities and superior security features.

Like the ECA-5555, the SmartNIC supports packet synchronization via IEEE 1588 PTP, SyncE, and GNSS integration to deliver sub-microsecond alignment of clocks across networked devices, ensuring deterministic operation in time-critical applications.

The IAC-PTL301A benefits from all the capabilities Intel Xeon 6 SoC delivers including AI acceleration, cryptography accelerations, confidential computing, as well as vRAN and media transcoding accelerations. For hardware security, Lanner leverages Intel® Secure Boot, Intel® Secure Firmware Upgrade and dual hardware roots of trust.

Figure 2. Lanner IAC-PTL301A SmartNIC is a PCIe Ethernet NIC with an Intel® Xeon® 6 SoC for hardware acceleration.

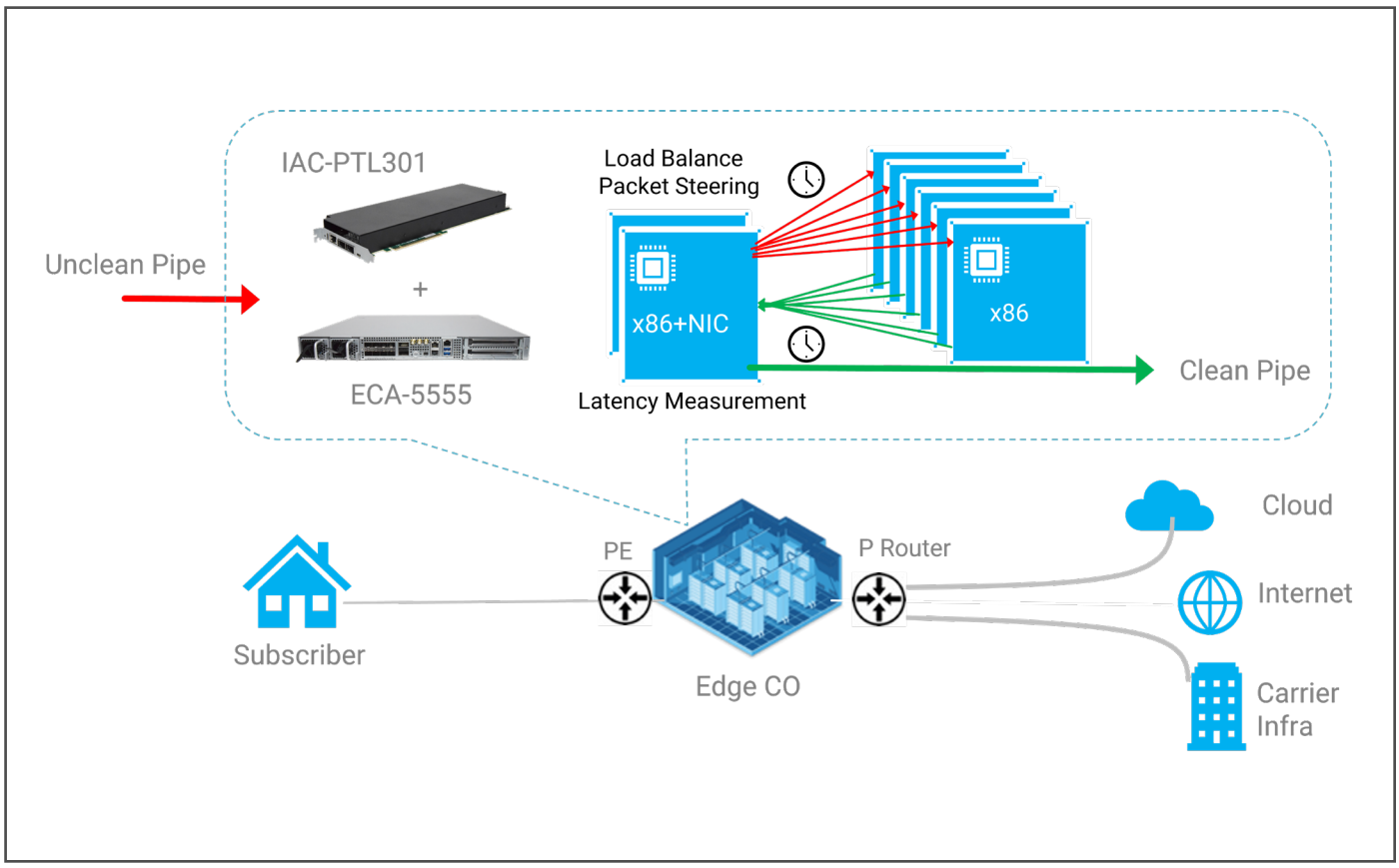

Figure 3. Block diagram of provider edge routing use case.

Optimized for Provider Edge Routing

One common MEC use case is provider edge (PE) routing, which is shown in Figure 3. Data flows from a telecom service subscriber to provider edge routing software running on the high-performance hardware platform provided by the ECA-5555 and IAC-PTL301A. Data enters the load balancer on the PE router, which distributes the packets to various processes that do deep-packet inspection in order to identify malware and other security threats. Once the data is "cleaned" it is then routed to its destination, either on the internet, to a cloud service or to another server in the carrier's infrastructure.

Solution is Based on Intel Technologies

Processing power for the MEC platform comes from Intel Xeon 6 processors. This family of processors is designed with two different CPU microarchitectures: Performance-cores (P-cores) and Efficient cores (E-cores).

Lanner utilizes the Intel Xeon 6 processors with P-Cores offering high performance along with greater performance per watt, core density, and overall rack density performance gains. Lanner ECA-5555 uses the processor SKUs with up to 42 P-cores (84 threads).

These processors come in one-socket to eight-socket options with enhanced I/O and memory within established data center power and cooling footprints.

Intel Xeon 6 processors enable better 5G experiences with excellent system performance for the user plane function (UPF) and increased control plane compute cycles to address the security and additional capacity needed from the service mesh.

The Intel Xeon 6 processor offers PCIe 5.0 lanes, integrated Ethernet, higher memory bandwidth compared to the prior generation, and key enhancements including Intel® Accelerator Engines for vRANs, Intel® Media Transcode Accelerator, AI, and more.

While the Intel Xeon 6 processors drove the MEC platform processing performance, other Intel technologies that are part of the solution include:

- **Intel® QuickAssist Technology (Intel® QAT)** provides a dedicated hardware path for accelerating cryptographic operations, data compression, and decompression. By offloading these workloads from general-purpose CPU cores, Intel QAT enables higher throughput and more

predictable latency for data plane and storage-intensive applications. Its integration into Intel Xeon 6 processors allows system designers to increase workload density while reducing power consumption.

- **Intel® vRAN Boost** integrates vRAN layer 1 acceleration directly into the CPU package, eliminating the need for discrete accelerator cards in vRAN deployments. This architecture improves 5G vRAN performance by increasing compute efficiency, lowering system power draw, and enabling higher cell capacity within the same power envelope. As a result, operators can deploy more scalable and energy-efficient vRAN infrastructures while maintaining full cloud-native flexibility.

Performance for Next-Gen Mobile Networks

The system is optimized for the next generation of mobile base station that uses generative AI and AI inferencing to enhance vRAN capabilities and improve spectral efficiency. It's a concept that Lanner calls AI-RAN and it is essential for both 5G and 6G networks.

Figure 4 shows how an AI-RAN would be deployed using the ECA-5555 with IAC-PTL301A MEC platform. The MEC platform is running DU software – processing the RF signals from connected devices and converting them into data packet while also managing the physical layer (PHY), radio link control (RLC), and medium access control (MAC) layers of the protocol stack. This is one of the most computationally intensive functions in a base station.

In a smaller, private 5G network the ECA-5555 with IAC-PTL301A could serve as the entire base station node – including the DU, CU, user plane, control plane, and 5G packet core.

In these enterprise applications, the dual-processor MEC and SmartNIC platform can also handle other MEC applications with the IAC-PTL301A providing a dedicated compute resource for network packet processing, cryptographic workloads and creating an end-to-end Intel-based architecture.

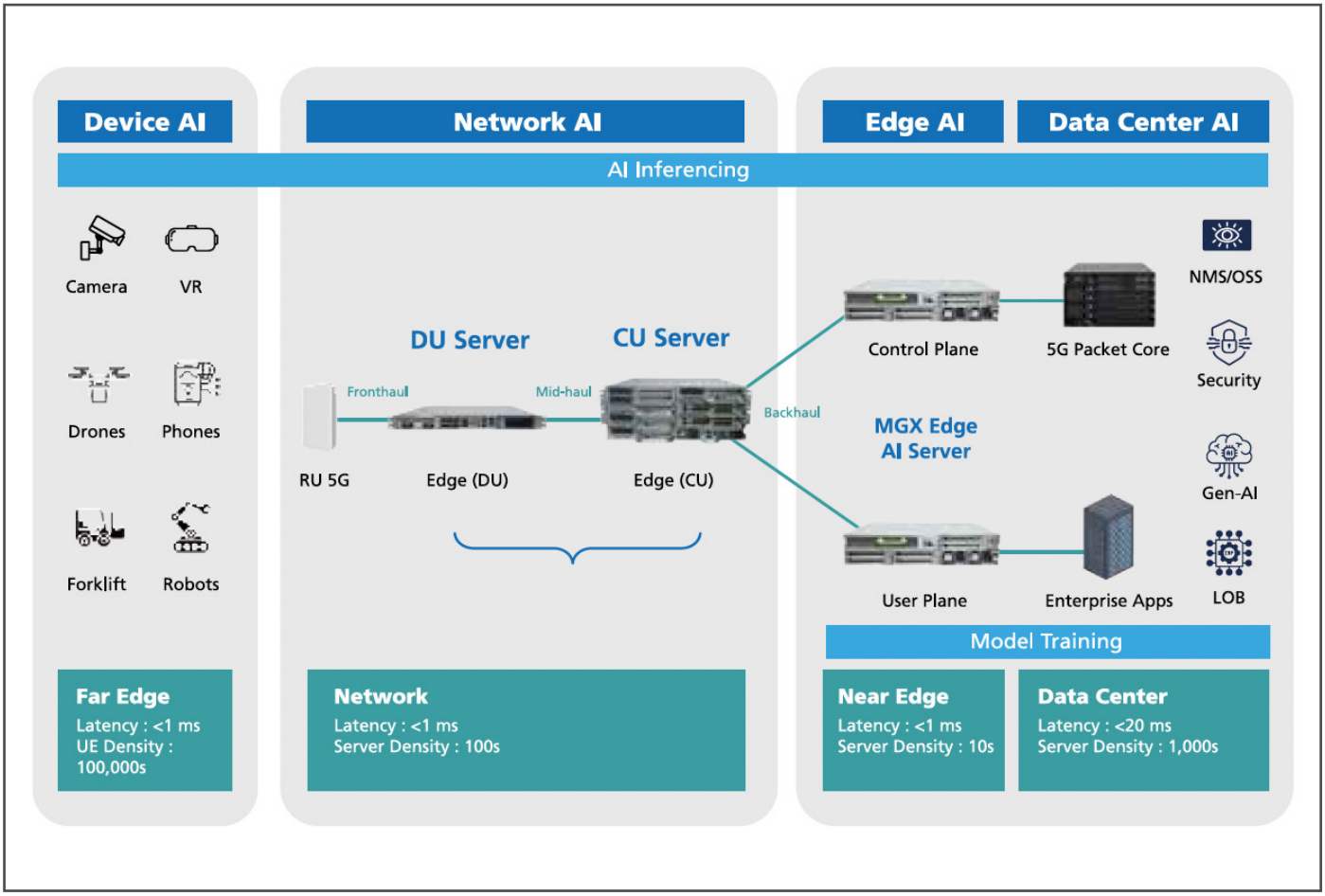

Figure 4. Block diagram of AI-VRAN network.

Conclusion

The performance requirements of MEC platforms have increased with the popularity of AI and 5G services – with 6G on the horizon. Working with Intel technology, Lanner has developed a MEC platform that combines its ECA-5555 and IAC-PTL301A – both powered by Intel Xeon 6 processors – to deliver hardware acceleration and advanced features like packet synchronization that is ideal for vRAN, security and other MEC use cases.

Learn More

Lanner Home Page

ECA-5555

IAC-PTL301A

Intel® Xeon 6 Processor

Intel® vRAN Boost

Intel® Ethernet Controller E830

Intel® Industry Solutions Builders

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