Advantech Enables Next Generation Intelligent and Sustainable Networks

Advantech's new telco servers and network appliances are based on 4th Gen Intel® Xeon® Scalable processors for high throughput, low latency, and energy efficient vRAN, edge AI and secure access service edge (SASE) services

The advancement of virtualization and workload-optimized commercial-off-the-shelf (COTS) servers have caused a paradigm shift in network architecture, moving away from the traditional fixed, centralized purpose-built hardware model, to the virtualized, software defined, flexible, and scalable edge network model.

Edge networks bring enhanced compute power and connectivity closer to devices and user equipment to enable ultra-low latency, high bandwidth applications. It is estimated that today over half of IT infrastructure is at the network edge, five times what it was in 2020[1]. The edge computing market size is predicted to grow from $44.7 billion in 2022 to $101.3 billion by 2027, driven by growing demand for high-speed connectivity, extreme reliability, low-latency, and real-time machine learning solutions.[2]

The software-based, fully virtualized intelligent edge architecture of 5G mobile networks, for public and private use, is at the center of this trend. 5G technology is predicted to deliver speeds twice as fast as 4G, with latency of less than 1 millisecond and with 100 times larger traffic capacity due to the hyper-densification of edge base stations.

Virtualized radio access networks (vRAN) and multi-access edge computing (MEC) give mobile network operators (MNOs) the ability to deploy and customize private networks to enterprises to accelerate their adoption of Internet of Things (IoT), artificial intelligence (AI), and augmented/virtual reality (AR/VR) applications that are transforming industries such as manufacturing, mining, and healthcare rapidly and cost-effectively.

The 4th Gen Intel® Xeon® Scalable processors were developed to enhance performance at the network edge through an architecture that combines high-efficiency cores with on-chip accelerators to drive performance at a lower power consumption. Based on the advances of the 4th Gen Intel® Xeon® Scalable processors, Advantech has introduced a family of servers and appliances, to serve the growing demand for near real-time compute and operation, with long supply life and high reliability, that deliver unprecedented performance and scalability to accelerate network edge intelligence.

Network Optimized 4th Gen Intel® Xeon® Scalable Processors Accelerate the Most Demanding Workloads

The 4th Gen Intel® Xeon® Scalable processors have specific performance features for 5G and enterprise cloud-based networks to improve network performance, energy efficiency, and total cost of ownership (TCO). The processor architecture includes an array of built-in hardware accelerators that enhance a wide variety of networking workloads.

Designed to run core, secure access service edge (SASE), and vRAN workloads on a common, virtualized network platform, 4th Gen Intel® Xeon® Scalable processors deliver a range of features for managing power and performance, making the best use of resources on a standards-based servers to achieve key sustainability goals.

Select 4th Gen Intel® Xeon® Scalable processors include new Intel® Advanced Vector Extensions (Intel® AVX) that improve power utilization and increase throughput. Cloud-native 5G vRAN can be deployed and optimized with up to two-times higher capacity[3], improved energy efficiency, and reduced carbon footprint.

Network workload-specific SKUs (N-SKUs) (Figure 1) of 4th Gen Intel® Xeon® Scalable processors support the demands of low-latency, high-throughput applications with optimized system performance for the 5G core user plane function (UPF), faster DDR5 memory and PCIe 5.0 bandwidth, delivering up to 30% higher performance[4] for packet processing.

Figure 1. 4th Gen Intel® Xeon® Scalable processor.

Built-In Intel® Accelerator Engines Power the Edge

The following powerful accelerators designed for distributed network workloads are built into the processors, delivering increased throughput and reduced latency without requiring external hardware. Advantages include cost reduction and significant energy efficiency without having to power additional devices or passing data over the PCIe bus between the cores and external accelerator hardware.

Intel® Advanced Matrix Extensions (Intel® AMX)

Accelerates deep learning (DL) inference and training workloads, such as natural language processing (NLP), recommendation systems, and image recognition. This vector processing unit also brings performance improvements for cryptographic algorithms.

Intel® Advanced Vector Extensions (Intel® AVX) for vRAN

Increases virtual radio access network (vRAN) density up to two-times compared to the previous generation, with the same power envelope.[5]

Intel® vRAN Boost

Reduces vRAN compute power consumption by approximately 20 percent[6], above and beyond the performance-per-watt gains of the 4th Gen Intel® Xeon® platform.

Intel® Dynamic Load Balancer (Intel® DLB)

Provides efficient hardware-based load balancing by dynamically distributing network data across multiple CPU cores as the system load varies.

Intel® Data Streaming Accelerator (Intel® DSA)

Drives high performance for storage, networking, and data-intensive workloads by improving streaming data movement and transformation operations.

Intel® QuickAssist Technology (Intel® QAT)

Boosts encryption, decryption and data compression performance by moving these functions off CPU cores to this built-in accelerator engine to help reduce system resource consumption.

Advantech telco servers and network appliances using 4th Gen Intel Xeon Scalable processors deliver value across key networking use cases including:

▪ 5G vRAN implementations provide distributed unit (DU) and centralized unit (CU) optimizations for massive multiple-input multiple-output (MIMO) pipelines with high energy efficiency to help reduce operating costs and improve sustainability.

▪ 5G core user plane function (UPF) deployments optimize system performance with efficient distribution of networking processing across multiple CPU cores as the system load varies, improving system efficiency.

▪ SASE implementations benefit from enhanced network, cryptography, and AI processing capabilities for both SASE edge PoP, and cloud-hosted SASE deployments.

▪ High-density content delivery networks (CDN) lower total cost of ownership (TCO) by supporting more sessions per node with enhanced performance that includes accelerated load balancing, media streaming and cryptography acceleration.

Tietoevry & Advantech

"Tietoevry has developed Intel® architecture-based vRAN solutions since 2015 closely following Intel's hardware and software roadmaps and supporting the growing demands coming from its industry leading network equipment providers, industrial 5G vendors, and communication service providers customers. Tietoevry is integrating the Advantech SKY-8134S-11 vRAN server in its 5G lab at Umea, Sweden, and onboarding the latest Intel® FlexRAN™ software release that supports all of the new CPU's vRAN enhancements. Tietoevry and Advantech use the server as the latest baseline platform for vRAN workload processing optimizations, energy savings optimizations, further integration of hardware and software components and commercial solutions developments."

Mike Nescholta – Tietoevry, VP Global Telecom Business

6WIND & Advantech

"At 6WIND we specialize in delivering High performance and Secure virtualized network solutions for the Telco, Service providers, Cloud providers and enterprise businesses. Our 5G and MEC solutions have proven performance and efficiency in various virtualized and cloud native network deployments leveraging COTS servers for a higher COST reduction. We are pleased to work with Advantech on its new platforms featuring the 4th Gen Intel Xeon Scalable processors. We are leveraging these platforms with our 6WIND VSR solutions to witness the solution's performance and power efficiency improvements. We already believe that these new network appliances and telco servers combined with the 6WIND VSR capabilities will be a real enabler for further boosting edge networking and building service providers' future disaggregated and cloud native network solutions."

Karim Mchirki – 6WIND, VP of Product Management.

Workload Optimized Advantech Platforms Meet Performance and Sustainability Goals

Incorporating innovations Intel has brought to its 4th Gen Intel Xeon Scalable processors, Advantech has introduced a new range of servers and network appliances that are focused on performance and energy efficiency.

Network Edge and vRAN

The new SKY-8134S-11 telco server (Figure 2) provides vRAN vendors, system integrators and service providers with a powerful platform to optimize access networks while meeting 5G and future generation traffic, signal processing and AI computing needs.

The SKY-8134S-11 is an innovative and unique LAN-on-motherboard (LOM) server based on 4th Gen Intel Xeon Scalable processor with Intel vRAN Boost that addresses network edge infrastructure and vRAN performance, sustainability, and TCO challenges. It delivers unrivaled density with up to twelve 25 GbE and two 100GbE ports for front-haul and mid-haul connectivity with precision time protocol (PTP), synchronous Ethernet (SyncE) and global navigation satellite system (GNSS) for high precision time sync in an ultra-compact 1U, 290mm depth form factor that preserves all the carrier-grade features of preview generations to meet NEBS-3 requirements. The server has been designed for high reliability to minimize costly service downtime and onsite interventions. Features such as redundant BIOS and firmware images for fail-safe remote updates, support for single fan failure or the capability to withstand extreme operating temperatures from -40 to +65 degrees Celsius make the SKY-8134S-11 a low-risk choice to optimize wide-scale vRAN deployment TCO.

Figure 2. Advantech SKY-8134S-11 Telco Edge Server.

Network Core, SASE PoP and Enterprise Edge

Telecom and enterprise data center applications requiring maximum performance with optimized density can utilize the new SKY-8134DU (Figure 3), a 1U, dual-socket server that balances best-in-class processing technology with high-capacity storage and I/O for optimized TCO. Architected around the 4th Gen Intel Xeon Scalable processor, the system offers broad flexibility scaling up to a total of 64 cores and supporting up to 12 2.5" NVMe drives. This robust server has been designed for superior reliability in business-critical applications including but not limited to mobile core, network security and video processing.

Figure 3. Advantech SKY-8134DU High-performance Server.

Enterprise Networking and Security

To address growing network bandwidth and security threats, the new FWA-5072, FWA-6072 (Figure 4) and FWA-6172 high-end appliances from Advantech improve application throughput using built-in Intel QAT for compression and encryption acceleration.

The single-socket and dual-socket platforms deliver high performance, memory, and I/O capabilities with up to 104 physical cores, 4TB of DDR5 DIMMs and 8 PCIe 5.0-based network mezzanine cards (NMC). Rack footprint is also improved with shorter 600mm depth chassis. In addition, the systems provide internal PCIe slots to integrate additional acceleration including the option of a dual-deck GPU card in the FWA-6172. Advanced platform management features combined with advanced thermal and mechanical design makes the Advantech network appliances the platform of choice to run business-critical network security applications.

Figure 4. Advantech FWA-6072 Network Appliance.

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Industrial and Edge AI

To enable next generation intelligent and sustainable AI solutions, the new SKY-620V3 and SKY-820V3 based on 4th Gen Intel Xeon Scalable processor maximize graphic processing unit (GPU) density while using built-in acceleration from Intel® Deep Learning Boost, and Intel AMX providing improved AI inference performance.

The new Advantech SKY-620V3 (Figure 5) is a dual-socket, GPU server that enables AI, machine learning, deep learning, and video analytics for industrial, transportation and medical IoT markets. For maximum AI performance, the SKY-620V3 AI server supports up to six double-deck and single-deck GPU cards in a 2U, 760mm deep system.

Figure 5. Advantech SKY-620V3 GPU Server.

The SKY-820V3 is a dual socket, 2U short-depth edge server that maximizes PCIe density to integrate high-performance accelerators with support for up to six PCIe 5.0 cards. Its compact, 450mm depth design makes it ideal to consolidate edge workloads with the objective of improving infrastructure efficiency.

Added Value Beyond High Quality Hardware Designs

Advantech is a trusted telecom hardware specialist working with leading telecommunications equipment manufacturers (TEMs) for more than 20 years. The company's deployments span both wired and wireless operators. Customers needing servers in high volumes and optimized to their specific application can count on Advantech's value-added hardware design and manufacturing capabilities that make the company unique in the industry.

The company owns its own manufacturing facilities for high quality control and rapid turnaround. Advantech works with worldwide customers to develop customized designs using its original design manufacturing (ODM) capabilities. This includes an in-house R&D team of specialized mechanical and advanced thermal design engineers as well as industry leading facilities and DQA process. In addition, Tier-1 equipment vendors and service providers that require worldwide deployment can rely on Advantech global logistics network for responsive services.

The company is an Intel Partner Alliance Platinum member and Intel® Network Builders Winners' Circle Titanium member and is an active member of the ecosystem which provides access to cutting edge software companies as well as early access to the latest Intel technology. Advantech works closely with ecosystem partners to develop verified solutions that shorten time to market and reduce deployment risks for customers.

Conclusion

As CoSPs and enterprises expand into advanced intelligent applications and strive to build software-defined, automated infrastructure, Advantech high performance servers and appliances built with 4th Gen Intel Xeon Scalable processors deliver long supply life, high reliability, and powerful edge intelligence to bring advanced applications to life. They have been designed to optimize compute intensive workloads in high efficiency and reliability platforms that help service providers and equipment vendors build more intelligent and sustainable networks.

Learn More

Advantech Network Edge Appliances and Servers

Advantech Homepage

4th Gen Intel® Xeon® Scalable Processors

Intel® Network Builders

intel.

[1] https://www.forbes.com/sites/forbestechcouncil/2021/03/15/computing-on-the-edge-can-be-transformative---but-look-before-you-leap/?sh=7a49f09a6f3a

[2] https://www.marketsandmarkets.com/Market-Reports/edge-computing-market-133384090.html

[3] See (N10) at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.

[4] See (N8) at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.

[5] See (N9) at intel.com/processorclaims: 4th Gen Intel® Xeon® Scalable processors. Results may vary.

[6] Estimated as of 08/30/2022 based on scenario design power (SDP) analysis on pre-production 4th Generation Intel® Xeon® Scalable processor with Intel® vRAN Boost (integrated vRAN acceleration) and pre-production 4th Generation Intel® Xeon® Scalable processor at the same core count and frequency with an external vRAN accelerator card. Performance and power vary by use, configuration, and other factors. Learn more at www.Intel.com/PerformanceIndex