intel®

Axiomtek NA870 Network Server Designed for 5G Edge Applications

Utilizing Intel technology, Axiomtek enhances performance and throughput for 5G and compute-intensive edge cloud workloads

Network edge compute capabilities have evolved from low-performance branch office servers to include high-performance systems that can power advanced cloud workloads and services driven by growing 5G networks. In fact, both public 5G and private 5G radio access network (RAN) applications are driving this trend, along with content delivery networks, artificial intelligence (AI), internet of things (IoT), and other vertical business services for consumers and enterprise customers.

Using a network server at the edge of the network—closer to the point of data creation or service delivery—helps optimize system throughput and enables near real-time delivery of actionable insights. Network edge computing promises the benefits of high bandwidth and low latency for emerging applications that need fast network response and data transport times. Driving more and more data to the edge and having access to that data is extremely important to enable AI and IoT systems.

One solution for edge clouds is network servers, a class of powerful cloud servers that feature extensive network connectivity. Network servers can provide edge cloud capabilities, and at the same time connect to other edge cloud servers for additional or specialized processing. Network servers also provide network-focused services such as firewalling, caching, authentication, network address translation, and IP address management.

Network Server Design Considerations

The growth of network servers is driven by data processed outside of the traditional data center or cloud, which Gartner estimates will be 75%[1] of all data in 2025. The unique nature of network server deployments imposes some requirements that effect system design and are different from a similar server destined for a data center.

Support for zero touch management and advanced application/service lifecycle orchestration capabilities can reduce the number of technician maintenance and upgrade visits, contributing to the overall cost effectiveness of using commercial off-the-shelf (COTS) servers for telecom services.

As the scale of edge computing grows, security challenges specific to the edge need to be understood and addressed in the design of the network server. This will require remote network servers to have the same network and physical security capabilities to protect against vandalism, theft and hacking. IT teams will need to clearly map out user access, as edge computing may require access rights for users over a significantly larger number of devices. Authenticating the server itself is an important way to reduce the attack surface by adding to the CPU security layers that prevent malicious software execution.

Finally, network servers for remote deployment must be environmentally rated to operate in an edge location including featuring a wide operating temperature range along with redundant fan and power systems that can be hot swapped in the event of a failure in order to maximize uptime.

Figure 1. Front view of NA870 showing eight slots for LAN adapters.

Intel® Network Builders ecosystem partner Axiomtek has developed the NA870 network server that leverages the 3rd generation Intel Xeon Scalable processor family and 100 GbE Intel Ethernet Network Adapters E810-CAM2 for high performance compute and networking.

NA870 Offers Performance, Flexibility, Security

The Axiomtek NA870 is a network server designed to deliver an optimized mixture of performance, flexibility, and security for 5G networks, AI, high performance computing workloads, and multi-access edge computing (MEC) applications.

The Axiomtek NA870 is a two RU-high network server that can be configured as a single or dual-socket server utilizing the latest 3rd generation Intel Xeon Scalable CPUs. The NA870 can be configured with CPUs that offer from eight to 40 cores with a wide range of frequencies, features, and power levels to support diverse network environments.

These CPUs offer higher base frequency for greater throughput for virtualized network functions and lower power for dense or constrained physical deployments—ideal for network servers. The 3rd generation Intel Xeon Scalable processors feature a balanced architecture that brings flexibility from the edge to the cloud. Engineered for modern network workloads, the processors offer outstanding performance, built-in AI acceleration, and advanced security capabilities.

The NA870 takes advantage of the CPU's higher memory bandwidth to offer 20 DDR4-3200 memory slots for up to 1,280 GB of RAM. For even greater memory, the NA870 supports Intel® Optane™ Persistent Memory (PMem). Intel Optane PMem offers a unique combination of affordable larger capacity with support for data persistence where data remains in the Intel Optane PMem. This persistence enables the chip to retain data even when powered off—helping protect the system from data loss. Intel Optane PMem also offers AES 256-bit hardware encryption, helping protect data at rest from cyberattacks.

The NA870 network server platform also has two hot-swappable 2.5-inch SATA HDD trays at the front of the system and two M.2 Key M 2242/2280 supporting PCIe and SATA signal for storage expansions.

For networking, the network servers leverage the CPU's support for PCIe Gen 4 interfaces to use 100GbE Network Adapters. The server supports up to eight network adapters for a total of 64 connected systems (plus two built in Gigabit Ethernet ports).

Security
The innovative 3rd generation Intel Xeon Scalable CPU-based network security platform features Intelligent Platform Management Interface 2.0 (IPMI 2.0) to allow users to remotely manage and monitor servers. It also supports Trusted Platform Module 2.0 to provide data encryption for hardware-based data protection.

Most importantly, its built-in Intel Crypto Acceleration increases the performance of encryption-intensive workloads to enable greater efficiency and protection across server, storage, and network infrastructure.

The NA870 utilizes the Intel® C621A or C627A chipsets, the latter of which has built-in Intel® QuickAssist Technology (Intel® QAT) for packet encryption/decryption. The NA870 also features Intel® Crypto Acceleration technology, a feature of 3rd generation Intel Xeon Scalable processors that increases the performance of encryption intensive workloads including SSL web serving, 5G infrastructure, and VPN/ firewalls, while reducing the performance impact of pervasive encryption.

Axiomtek has built in Intel® Software Guard Extensions (Intel® SGX) to help protect the system itself using Intel SGX, which helps provide fine grain data protection via application isolation in memory, independent of operating system or hardware configuration.
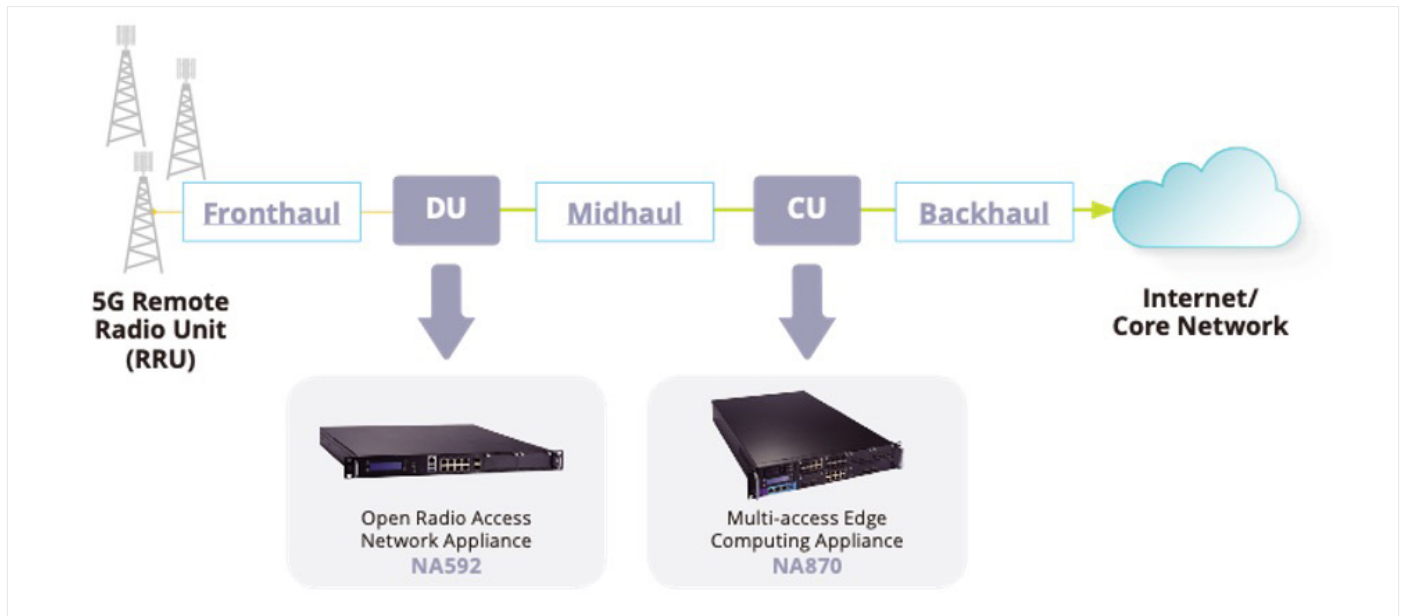
Figure 2. NA870 network server operating in a 5G basestation application.

Uptime

For maximum reliability, the NA870 features redundant, hot swappable power supplies and fans. For CPU configurations where power consumption is more than 270W, the NA870 can be ordered with liquid cooling for high reliability and performance.

Use Cases

While the NA870 can serve a wide range of applications, it is especially well suited to be the foundation of a 5G RAN basestation. As seen in Figure 2, the NA870 executes the centralized unit (CU) software that processes non-real-time L2/L3 data flows. The NA870 has the compute power to be connected to multiple edge locations supporting remote radio units (RUs) and distributed unit (DU) that provide real-time L1/L2 processing. For extra RAN performance, the NA870 can support the Intel® vRAN Dedicated Accelerator ACC100, which is designed to offload and accelerate the computing-intensive process of forward error correction (FEC) for 4G/LTE and 5G networks. This frees up processing power on the CPU for other tasks.

In addition to 5G, the performance and connectivity of the NA870 make it optimized for the following applications:

- **AI –** Provides built-in AI acceleration and hardware-enhanced security and software optimizations
- **Video analytics –** Delivers performance, security and operational controls required for complex video analytics
- **Location services –** Supports diverse network environments and is optimized for many workloads and performance levels
- **Internet of things (IoT) –** Offers edge compute and connectivity for a private 5G deployment for IoT deployments
- **Local content distribution –** Offers the compute, memory and storage capacity to serve content with low latency

Conclusion

The Axiomtek NA870 is a network server for emerging edge applications that need compute power and network connectivity. With single or dual 3rd generation Intel Xeon Scalable processor sockets and up to 64 network adapter ports, the NA870 can serve compute and network-intensive applications. In 5G base stations, the NA870 can provide CU services to multiple RRUs, dramatically reducing the cost of network deployments. In this application, the multiple network adapters allow the network server to seamlessly connect to existing 3G and 4G networks in a cost-effective way. In addition to 5G base stations, the NA870 can deliver on a wide range of edge cloud applications. Utilizing Intel technology, the NA870 delivers a new standard for edge compute performance.

Learn More

Axiomtek NA870

Intel® Ethernet Technology

Intel® Network Builders

3rd generation Intel® Xeon® Scalable CPUs

Intel® vRAN Dedicated Accelerator ACC100

intel.