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Supermicro Adds Outdoor Edge System Family with IP65 Enclosure

Supermicro Outdoor Edge System family leverages Intel® architecture processors for performance for 5G, AI, smart city, and other edge applications. Servers come in IP65-rated enclosures for a complete solution.

Edge computing is growing and new applications are demanding more compute performance optimized for outdoor installations. Artificial intelligence (AI), 5G, smart city, vehicle to everything (V2X), and other applications demand the low-latency of edge servers, but need high-performance compute, acceleration, flexible storage, and networking.

In many applications, these servers must be deployed outdoors on utility poles or on building walls and be protected from the elements. Early generation edge switches were hardened against extreme temperatures, but still needed a separately sourced IP65 enclosure to protect against rain and dust. IP65 enclosures are rated "dust tight" and protected against spraying water. Communications service providers (CoSPs) paired their servers with the IP65 enclosure, a process that didn't always result in an optimized solution.

Intel® Network Builders ecosystem partner Supermicro developed its Outdoor Edge System product to fill the gap in outdoor edge servers. The company added an IP65-rated enclosure to its Server Building Block architecture, based on Intel® architecture CPUs, delivering modular servers that can be custom-ordered to meet specific network edge applications.

Compute Intensive Applications Move to Edge

Many compute-intensive, cloud-based applications are moving to the network edge. AI inferencing is one example. Traditionally, most AI deployments have been in data centers or cloud data centers to provide the required processing power. The cloud servers in these data centers can easily scale to match the needs of AI applications.

For predictive and prescriptive analytics for a wide range of applications in e-commerce, e-medicine, and other applications, cloud-based AI, delivered via ever-faster wireless and wireline broadband connections, is still the lowest cost and most scalable way to deliver AI services.

But a new class of AI-powered applications that need the very low latency of an edge server are emerging. Technology analyst firm Omdia has defined the network edge as locations with a maximum 20 milliseconds (ms) round trip time (RTT) to the end-device.[1]

This latency timing is important because many AI-powered applications are only possible with real-time decision making. Examples of these include self-driving cars, automated manufacturing, augmented reality training, smart city applications, and robots.

AI is just one example of the need for intelligence at the network edge. Others include the following:

- Road side unit: These systems monitor roads and transportation systems and help to alleviate congestion. Edge servers support streaming security video, V2X connectivity, and video analytics.

- 5G: Edge servers are located at the base station and support the distributed unit (DU). The DU needs compute acceleration as it is the component of the virtual radio access network (vRAN) that provides real-time processing of the incoming RF signals.

- Content delivery network: Uses edge of network proximity to the end user and high-speed storage in an edge server for very low latency delivery of streaming media.

- Augmented reality/virtual reality (AR/VR): Similar to streaming media, but also supports very low-latency interactivity.

- Internet of things (IoT): Edge servers process data from a large number of IoT sensors. While low latency can be important, the use of edge servers reduces traffic on CoSP backhaul and transport networks.

The availability of cost-effective, high performance servers is expected to drive other business and consumer applications.

Edge Server Requirements

To succeed in delivering edge servers that meet the needs of the applications above requires a combination of features:

- High-performance compute: Compute-intensive emerging edge applications require data center class CPUs.

- Acceleration: Some applications, like 5G and AI, will require dedicated processing and acceleration, requiring support for field programmable gate arrays (FPGAs) or graphics processing units (GPUs).

- Power optimization: Power availability can be a challenge in some remote locations driving the need for a modular system that can be optimized for low power consumption for these applications.

- Virtualization support: To make edge applications cost effective will require the use of virtualization to enable multiple services being deployed from a single server.

- Management: Remote locations make it costly and time consuming to send technicians for routine maintenance. Use of remote monitoring and management capabilities provides the ability to fix problems from a central facility.

- Hardening and Enclosure: Edge servers are in uncontrolled environments and need to support extreme temperatures and the possibility of dust and precipitation.

Supermicro has developed its Outdoor Edge Systems to be an integrated and modular solution designed to provide pole- or wall-mounted data center performance.

Supermicro Outdoor Edge Systems

The servers in the Outdoor Edge Systems family of ruggedized servers are based on the company's Server Building Block architecture that allows customers to choose chassis, power supplies, and accessories to optimize the solution's power consumption and performance for their application.

Supermicro has configured AC-powered and DC-powered Outdoor Edge Systems servers that both come with a pole-mounted IP65 enclosure with a 300 W heater and high-efficiency heat exchanger supporting operating temperatures between -40° C to 50° C.[2] Theft prevention measures include lockable buckles and an intrusion detection system.

Figure 1. Supermicro Outdoor Edge Systems servers AC version (left two pictures) and DC version (right two pictures).

Both systems feature Intel® Xeon® D-2100 processors, which bring the architectural innovations of the Intel Xeon Scalable platform to a system-on-a-chip (SoC) processor for lower-power, high-density solutions. The SoC integrates essential network, security, and acceleration capabilities. The device is ideal for the Outdoor Edge Systems because it offers optimized performance-per-watt for servers with

constrained operational space and power requirements. A software-programmable platform features robust virtualization support with low latency, high-bandwidth capabilities through a flexible design for a variety of solution and service deployments in space- and power-constrained environments. Design innovation delivers seamless solution scalability from the data center to the network edge.

Supermicro is also developing compute modules that support the 2nd generation Intel Xeon Scalable processor family for 5G RAN applications that need additional performance. The Intel Xeon Scalable processor family provides the foundation for a powerful data center platform that creates an evolutionary leap in agility and scalability. Each processor in the family sets a new level of platform convergence and capabilities across compute, storage, memory, network, and security. Enterprises and cloud and communications service providers can now drive forward their most ambitious digital initiatives with a feature-rich, highly versatile platform.

Across infrastructures, from enterprise to technical computing applications, the Intel Xeon Scalable processor family is designed for data center modernization to drive operational efficiencies that lead to improved total cost of ownership (TCO) and higher productivity for users. Systems built on the Intel Xeon Scalable processor family are designed to deliver agile services with enhanced performance and groundbreaking capabilities, compared to the prior generation.

For additional processing, the servers feature up to three PCIe expansion slots that can be populated with FPGA or GPU acceleration cards. This additional processing power is often used in real-time edge AI inferencing and also for real-time processing of 5G vRAN software.

Supermicro has specified the Intel FPGA Programmable Acceleration Card (Intel® FPGA PAC) N3000 SmartNIC for 4G/5G layer 1 network acceleration needed for forward error correction (FEC) applications. The Intel FPGA PAC N3000 is a highly customizable SmartNIC platform for multi-workload networking infrastructure and application acceleration. It has a memory mixture designed for network functions, with integrated network interface card (NIC) in a small form factor that enables high throughput, low latency, and low power per bit for custom networking pipeline.

Storage is important in many applications, and the Outdoor Edge Systems can support up to four SATA 3 2.5" drives that support flexible SSD, M.2, and EDSFF storage capabilities.

Remote Maintenance

Remote management of the server is critical as it may not be cost effective to send a technician to the remote location. Supermicro has built in support for the Intelligent Platform Management Interface (IPMI), which provides management and remote maintenance of computer subsystems. For higher level management, the server also supports Redfish, an industry standard specification, API, and schema for management and monitoring a system that was created by the Distributed Management Task Force (DMTF).

The servers support nine Gigabit Ethernet ports and two 10 GbE small form factor pluggable (SFPs) for fiber-optic connectivity. The servers can also support 5G WAN links as back up connections or where there are no wired connections available.

Conclusion

Supermicro has leveraged its modular server architecture and combined that with an IP65 enclosure to provide AC and DC powered server families. The tight integration of the server and the enclosure is important for CoSPs that need to optimize performance, storage, and networking on a per-server basis to support a wide range of emerging applications including 5G, AI, smart city, V2X, and other low-latency applications.

Supermicro has based the Outdoor Edge System product line on Intel Xeon D processors with up to 16 cores. Future models will support 2nd generation Intel Xeon Scalable processors. These processors provide data center caliber performance, with the Intel Xeon D processor optimized for the power requirements of the network edge.

By combining Intel architecture performance, modularity, and IP65 protection, the Outdoor Edge System product family can meet the needs of edge computing applications today and in the future.

Learn More

Outdoor Edge Systems proof of concept request https://www.supermicro.com/en/products/outdoor-edge

Intel® Xeon® processors: https://www.intel.com/xeon

Intel® Edge Technology and Solutions: https://www.intel.com/content/www/us/en/edge-computing/overview.html

Supermicro is a member of the Intel® Network Builders ecosystem: https://networkbuilders.intel.com

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