

QCT Builds Intel® Xeon® D 2700 Outdoor Server for 5G and AI

QuantaEdge EGD33B-WT* is a fanless IP67 outdoor server based on Intel® Xeon® D 2700 processors, featuring performance in a small profile to drive 5G base station and artificial intelligence (AI) edge compute applications.



The economics and scalability of cloud computing is compelling for a growing range of applications. But when low latency is needed, more mobile network operators (MNOs) are delivering cloud computing at the network edge – that is in remote base stations or on the customer premises.

One standard for edge servers is multi-access edge computing (MEC), which is under development by the European Telecommunications Standards Institute (ETSI) and is designed to combine both cloud-computing capabilities with an IT service environment. MEC is optimized for mobile networks supporting 5G network virtualized radio access network (vRAN) base stations.



5G is well known for delivering low latency, high bandwidth, and other features such as network slicing. 5G addresses the ever-increasing bandwidth needs of consumers but is also expanding into nearly every sector of life and business, providing the foundation for a diverse range of applications. The use of telco edge servers for RAN base stations contributes to the low latency, but also provides capacity to fill in network coverage gaps or to support locations where there is high demand for data – such as sports stadiums and parks.

One of the drivers of this adoption is the increased utilization of Open virtual RAN (Open vRAN), which replaces proprietary fixed-function RAN equipment with a virtualized software solution that can run on Intel® architecture-based servers. Open vRAN also connects to other aspects of the network using open standards, such as the 5G core and the remote radio unit (RRU). This enables the MNO to customize a solution for edge locations.

Edge Use Cases Need Real-Time Performance

There are a range of edge server use cases in smart cities, manufacturing, public safety and other industries that need high compute performance and low latency. Many of them also benefit from artificial intelligence (AI) inferencing that can use compute performance for fast analysis and corrective action. For example, AI-guided robots must respond to manufacturing errors quickly and so benefit from low latency proximity to an AI inferencing engine at the edge that can quickly analyze the issue and send a response to keep the production line running at full speed.

Additionally, edge applications often involve high-bandwidth video data. By processing the data at the network edge, this data is kept off of the backbone network, freeing that network up for other traffic.

One challenge for edge servers is that they are not in climate-controlled data center environments. In some cases, these servers must be mounted outdoors on a utility pole or the side or roof of a building. Often they are exposed to windy or rainy conditions, or high temperatures.



Figure 1. Top and bottom views of the QuantaEdge EGD338-WT.

Intel® Network Builder ecosystem partner Quanta Cloud Technology (QCT)* is a global data center solution provider that combines the efficiency of hyperscale hardware with infrastructure software from a diversity of industry leaders to solve next-generation data center design and operational challenges. The company has developed an outdoor-mounted cloud server with the performance needed for edge 5G and AI applications.

Outdoor Server Delivers Compute Power

The QuantaEdge EGD338-WT outdoor bookshelf pole mount server is powered by the Intel® Xeon® D-2700 Series processor to offer compute performance in a small form factor, featuring a fanless design needed for operating in an enclosure.

Intel® Xeon® D-2700 processors are high-performance systems on chip (SoCs) with integrated Ethernet and high-capacity input / output (I/O) optimized specifically for edge server applications. They deliver server-class computing, advanced security capabilities, and bandwidth and feature built-in AI acceleration.

Intel Xeon D-2700 processors feature extended operating temperature ranges and industrial-class reliability. This CPU family is suitable for rugged equipment, small form factors, and sealed fanless devices that must run nonstop in the toughest environments.

The QuantaEdge EGD338-WT (see Fig. 1) is available with an ingress protection (IP) 67 (IP67)-rated enclosure with a 24 litre or 32 litre capacity. Meeting the IP67 standard means the enclosure is certified to operate in harsh environments, offering complete protection against solid objects like dust and sand, and has been tested to work for at least 30 minutes while under 15cm to 1m of water.

In addition, the QuantaEdge EGD338-WT is designed to overcome extreme thermal fluctuations, high humidity, and other demanding environmental factors. Built to meet NEBS GR3108 class 4, the server features an extended temperature range of between -40 degrees C and 46 degrees C. The QuantaEdge EGD338-WT is the next wave outdoor server to enhance network transmissions, reduce data latency, perfect to be installed in tight spaces and can operate with minimal power consumption.

The server features support for CPUs with up to 20 cores and a total thermal design profile (TDP) of 118 watts. Maximum memory of 64GB is supported along with up to two M2-size SATA/NVMe storage drives. The server supports a range of SFP-based optical connectivity options including eight 10GbE ports, four 25GbE ports or a combination of two 25GbE ports and four 10GbE ports. These ports support Precision Timing Protocol (PTP) and synchronous Ethernet (SyncE) to provide the packet timing capabilities needed to support voice and real-time data traffic. There is also one PCIe*16 Gen 4 slot available on the server for additional I/O.

The [Intel® Ethernet Network Adapter XXV710-DA2T](#) includes key features such as an onboard high-precision oscillator for greater phase accuracy, DUAL SMA connectors for connecting to external timing sources/recipients, Dynamic Device Personalization (DDP) that enables increased packet processing efficiency for NFV and cloud deployments, Data Plane Development Kit (DPDK) optimized for efficient packet processing, and PCI Express (PCIe) 3.0, x8.

Complete Feature Set for 5G Applications

Up to six Open vRAN distributed units (DUs) can be supported on one pole or other location using two pole mount kits, each DU with integrated I/O and management.

The server supports open source FlexRAN™ Reference Architecture*, a reference design for accelerating L1 / PHY data throughput. This reference architecture enables the highest level of flexibility with the programmable on-board features, memory and I/O.

Network performance is improved with the acceleration of the forward error correction (FEC). To accelerate these data flows, the server features an onboard Intel® vRAN Accelerator ACC100 for L1 Acceleration, which provides FEC acceleration for higher capacity 4G/LTE and 5G vRAN cells/carriers.

5G network data packets also need accurate timing, and the QuantaEdge EGD33B-WT supports both the IEEE 1588+ standard as well as Synchronous Ethernet. The servers can use on board GNSS capability as master clock reference.

Acceleration for AI Applications

With computing performance provided by the Intel® Xeon® D 2700 family of CPUs, the QuantaEdge EGD33B-WT has features for AI inferencing applications such as video security monitoring, smart city traffic management, manufacturing and robotics. These applications make use of the Intel® Deep Learning Boost (Intel® DL Boost), a hardware acceleration capability for deep learning inference that is embedded in the Intel® Xeon® D2700 CPUs. Intel DL Boost combines three Intel® Advanced Vector Extensions (Intel® AVX) instructions into one, which speeds processing of int8 workloads. To take advantage of Intel DL Boost, QCT recommends using the Intel® Distribution of OpenVINO™ toolkit to tune and optimize deep learning models.

In many applications, co-locating 5G and real-time AI network functions on the same QuantaEdge EGD33B-WT can further reduce the distance that the AI data flows must travel before processing, thereby reducing latency. This is beneficial for applications such as autonomous vehicles, security cameras, drones, and intelligent machines.

Conclusion

Cloud computing is growing both in terms of the number of applications and in the fields where cloud servers are being deployed. Edge computing offers a significant performance advantage for applications that need the lowest latency. 5G and AI applications fit in this category and need new servers that can deliver the performance needed. The QuantaEdge EGD33B-WT is a next-generation outdoor pole-mount edge server designed for 5G and AI use cases. Its IP67 casing and fanless design enable the server to be exposed to weather extremes without impacting performance.

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