

High Performance SoC Motherboards for Responsive Computing

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This article introduces a highly dense motherboard series with SoC (System on Chip) which provide scale and flexibility across low power and high performance solutions for the edge. It enables the suited computational workloads for data analysis that span across storage, communications and security systems.



■ With exponential growth and innovation in the worldwide IoT (Internet of Things) industry, millions of smart edge devices are being added every second. As a result, there is an enormous growth in data generation, data analytics and data storage requirements. There is also a need to provide scalable and flexible solutions to move, manage, analyze and store this data at the edge with minimum tolerance for latency. In most use cases, data needs to be processed at the edge and response times cannot suffer due to latency delays from multiple hops to and from data centers. Latency is non-tolerant in many instances and backhaul can impact both performance and cost of moving data back and forth from the data center. In most use cases real-time data analysis at the edge is important, while streaming and batch processing of historical data for in-depth analysis is more ideal in the cloud. Massive amounts of historical data still need to be parsed and analyzed. This can be done at the cloud including storing and archiving large data sets for future reference.

There are a few advantages of managing data computation and decisions making at the edge. The first are maximizing productivity by managing industrial equipment and machinery and optimizing efficiencies by minimizing fuel consumption in the transportation industry. Managing extreme conditions in a chem-

ical industrial plant and managing inventory in a retail or grocery store chain as well as managing logistics for the last mile delivery of packages with routing algorithms based on package addresses, concentration and traffic conditions are other advantages. Managing digital signage with real-time data in public venues and large gatherings in Smart Cities with digital surveillance for managing traffic, parking and crime prevention complete the advantages.

With the enormous growth of (IoT) data and connected devices in mobile networks, carriers require a fully converged and scalable high-performance solution at the intelligent edge. Supermicro SoC solutions are helping IoT platform providers address these edge convergence needs by introducing a converged yet scalable building block solution with the new Supermicro X10SDV family of embedded/server motherboard designs. New sets of products based on Intel® Xeon® processor D SoC offer converged yet scalable solutions that can efficiently manage workloads at the edge. This enables data to be securely managed, moved, analyzed and stored at the edge and in the cloud. Designed expressly for consolidating infrastructure at the intelligent edge, these optimized solutions offer exciting possibilities when paired with the latest Intel® Xeon® processor D product family. The com-

bination brings new performance, density, low power consumption, and cost savings to a variety of compute, storage and networking workloads.

Analyzing and processing of data by collecting, inspecting and using data models with the goal of decision making and discovering useful information. SoC solutions at the edge provide the ability to quickly analyze data in real time and provide intelligent feedback to smart sensors locally to what is relevant. Cryptographic systems are used for encryption and decryption and to secure data for transport and access authentication. SoC solutions can act as edge managers for associating user rights and restrictions with the established identity by identity management and creating security certificates. The systems can regulate access to edge resources based on the roles of individual users. In this context, access of an individual user can be restricted to perform a specific task, such as view, create, or modify a file. These SoC solutions can offer data and traffic management across multiple networks with connectivity management or via secure transport using Tunnel/VPN applications.

Dynamic data or transactional data are situated where information is constantly being collected and can be stored locally for quick access. Persistent data can be backhauled to

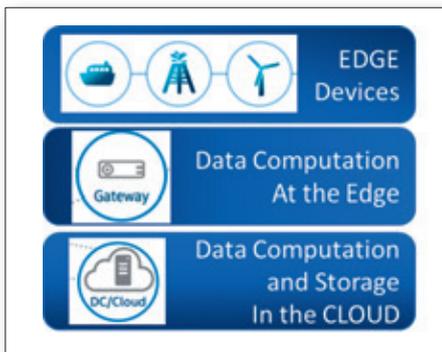


Figure 1. Computation at the edge

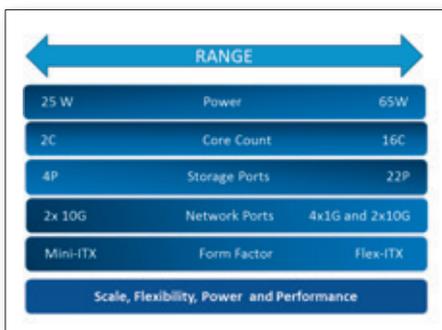


Figure 2. High density scalable SoC solutions - performance/watt

cloud for batch processing or archiving. SoC solutions provide options for cold, warm or hot storage that scale with performance and capacity with different cost points, including M.2 (PCI-e 3.0) storage expansion slots.

Network connectivity provides the ability to transport small data packets from multiple smart devices to edge devices and medium to large packets between edge devices and large payloads to the cloud. These SoC solutions can operate as single entities or as fabrics to avoid a single point of failure. SoC solutions provide a choice of LAN connectivity ports with 1G/10G Ethernet speeds, along with

mini-PCIe expansion port for Wi-Fi, ZigBee, and 3G wireless connectivity options. IoT platform and solutions providers can unify hardware requirements that are scalable with SoC solutions and to address specific vertical market segments.

X10SDVSoC family with its server-class capabilities offers the industry the most converged infrastructure and a low total cost of ownership (TCO) to a wide range of embedded applications. The motherboard is a small mini-ITX or Flex-ATX form factor solution providing up to 22 storage devices (16x 6Gbps SATA3/SAS2 ports, 6x SATA3 ports), 8 LAN ports (including Dual 10GbE fiber connectivity), and IPMI for remote management. The solution is optimized for 1U and 2U rack environment, including a new 1U solution for 12x3.5” hot-swap drives and 2U solutions for 24x 2.5” hot-swap drives. Features include redundant high-efficiency power supplies, specially designed optimized cooling, and dual PCI-e 3.0, Mini PCI-e/mSATA and M.2 expansion slots for superior network and additional storage options.

Powered by the latest Intel® Xeon® processor D product family with up to 16 cores, the high-density hyper-scale X10SDV family provides scalable power and performance solutions. Based on Intel 14nm process technology these processors couple lower power consumption with the performance of up to 16 cores. The processor family enables new options for infrastructure optimization, bringing the performance and advanced intelligence of Intel® Xeon® processors into dense, lower-power SoCs.

These powerful SoCs include improved cache sizes and support up to 128GB DDR4 ECC registered memory. Other advanced processor features include Intel Virtualization Tech-

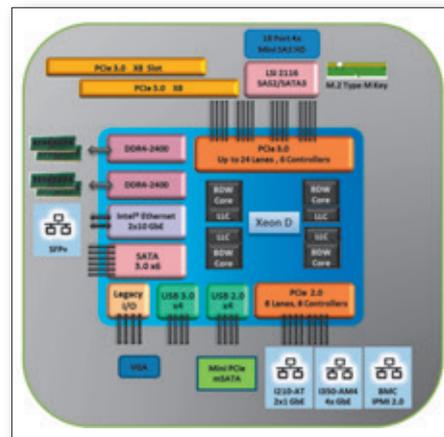


Figure 3. Block diagram of the X10SDV-7TP8F Flex ATX motherboard

nologies (Intel VT-x, VT-d and SR-IOV); Intel AES New Instructions (Intel AES-NI); Intel Trusted Execution Technology (Intel TXT); Intel Advanced Vector Extensions 2 (Intel AVX2); Intel QuickData Technology, silicon-based reliability, availability and serviceability (RAS); and built-in dual 10GbE Network Controller.

The X10SDV family is a highly scalable, compact, energy efficient design that provides outstanding performance for: lightweight hyper-scale workloads-dynamic web serving, memory caching, and dedicated hosting, dense, low-power storage workloads- warm storage and video-on-demand, and communication workloads - wireless base stations, routers, switches, security and network appliances that require hardware-assisted virtualization, acceleration, and integrated networking Supermicro promotes the building block approach to edge computing to carriers, cloud and data centers to deploy appliances and related services while responding to market requirements faster using building block solutions for the intelligent edge. ■