All-Flash NVMe Systems & Storage Family
Transformative Performance, Density & Efficiency

Transform Your Data Center TCO with Supermicro servers based on the 2nd generation Intel® Xeon® Scalable processors
Over the last decade, flash-based SSDs have transformed storage and have been increasingly adopted across a wide variety of application workloads and tiers of storage due to the significant improvements in performance, latency, and power consumption over that of traditional mechanical HDDs. While initially comparatively expensive, the cost of flash has continued to drop, which has also contributed to the mass adoption of SSDs.

Until recently, SDDs have utilized SAS and SATA connectivity as their storage interface. While providing dramatic benefits over traditional HDDs, when connecting SDDs through legacy storage interfaces designed for HDDs, the full potential of flash-based SDDs cannot be realized. Through HBAs, SATA provides 6GB/s throughput, while SAS provides 12GB/s, in essence limiting the throughput of SSDs.

NVMe is a newer interface specification designed as a host controller interface and storage protocol for the use of SSDs directly over a computer’s PCIe bus. NVMe SSDs are connected to a CPU’s PCIe bus without need for HBAs, eliminating component count, cost, and layers in the IO stack. As a result, NVMe takes flash-based SSDs to the next level by providing up to 6 times more throughput, with up to 7 times reduction in latency, lower power consumption, and higher reliability.

Until recently, there was a price premium for NVMe drives over that of SAS/SATA SSDs. As of early 2019, the pricing has equalized, enabling all the benefits of NVMe without forcing a cost per Gigabyte tradeoff. Supermicro offers NVMe systems across the broadest range of SuperServer and SuperStorage systems in the industry, ready to transform your data center infrastructure today.
TRANSFORMATIVE PERFORMANCE, DENSITY AND EFFICIENCY

Other benefits of NVMe include the broad choice in drive form factors as well as support for both single and dual port access. The Supermicro product portfolio supports them all.

- U.2 is recognizable by its traditional 2.5” enclosure, designed to support NVMe as well as SAS and SATA with the same connector family. Addressing the enterprise market, hot-plugability was a key design principle. U.2 has been the predominant form factor for flash based SSDs and Supermicro’s portfolio of NVMe systems includes many systems which support this form factor.

- M.2 was originally designed for internally mounted computer cards and supports a wide variety of interfaces, including NVMe. Based on its design for internal usage, M.2 is not a hot pluggable storage device. Many Supermicro systems support NVMe M.2 drives for boot or cache drives as part of a system with multiple tiers of storage.

- NF1 has been known as Next Generation Small Form Factor, developed by Samsung to provide a high capacity, hot-pluggable follow-on to M.2 for the enterprise. NF1 allows for a shorter depth chassis together with high capacity drives. Supermicro offers a 1U Petabyte scale system with NF1 drives.

- EDSFF (Enterprise & Data Center SSD Form Factor) is a new industry standard form factor focused on high density, thermal efficiency and hot-plug capability. EDSFF supports NVMe through PCIe Gen 3/4/5 up to 16 lanes. Within EDSFF there are two primary form factors, Long (E1.L) and Short (E1.S). With EDSFF, Supermicro offers 1U systems with 32 front accessible drives in the Petabyte range of capacity, with NVMe throughput and latency, and the optimal cooling attributes only EDSFF can provide.
1U Petascale
CAPACITY OPTIMIZED SYSTEMS WITH FLAGSHIP DENSITY

1U dual-socket storage systems and JBOF
Up to 36 drive bays; U.2, NF1, E1.L, E1.S support
2nd Gen Intel® Xeon® Scalable processors
24 DIMM slots; Intel® Optane™ DCPMM support
Onboard 10 Gigabit Ethernet

Ultra
PERFORMANCE OPTIMIZED FOR SINGLE SYSTEM IO THROUGHPUT

1U/2U dual-socket server systems
Up to 20 NVMe (7mm z-height) in 1U / 24 NVMe in 2U
2nd Gen Intel® Xeon® Scalable processors
24 DIMM slots; Intel® Optane™ DCPMM support
Onboard networking options up to 25G Ethernet

Learn more on page 6
Learn more on page 10
BigTwin™

FLAGSHIP PERFORMANCE FOR MOST DEMANDING HCI AND STORAGE APPLICATIONS

Two or four dual-socket nodes in 2U
Up to 40 drive bays; U.2, M.2, E1.S support
2nd Gen Intel® Xeon® Scalable processors
24 DIMM slots per node; Intel® Optane™ DCPMM support
Onboard flexible networking up to 100G

Learn more on page 12

Storage Bridge Bay

DUAL-PORT STORAGE FOR HIGH AVAILABILITY SOLUTIONS

Two hot-pluggable nodes in 2U
Up to 24 drive bays; dual-port U.2 support
2nd Gen Intel® Xeon® Scalable processors
Up 12 DDR4 DIMM slots per node
Onboard 10 Gigabit Ethernet

Learn more on page 14
Supermicro 1U Petascale SuperStorage platforms provide industry leading density in a 1U footprint across a wide choice of NVMe form factors. By offering 32+ hot-pluggable drives Petabyte-scale capacity can be achieved and enable an unprecedented combination of storage performance, density, efficiency and enterprise serviceability. This combination optimizes IOPs per Watt which is ideal for transitioning capacity tiers of storage based on legacy HDDs to the benefits of all-flash NVMe SSDs.

The latest Petascale systems offer choice in EDSFF Long and Short form factors with one system offering 32 E1.L drives with the largest capacity options and longer chassis depth. The second system offers 32 E1.S drives with a proportionally shorter chassis depth. The U.2 based system uniquely enables 32 industry-standard hot-pluggable NVMe drives made accessible through dual drive trays, while the NF1 provides 32 NF1 drives plus 4 additional SATA M.2 drives.
1U systems featuring two CPU sockets and 24 DIMM slots
Support a wide range of SSD form factor including EDSFF, U.2, NF1 and M.2
Onboard 10 Gigabit networking with dedicated IPMI LAN ports

**1U Rackmount**
Up to 32 hot-swap NVMe drive bays in 1U

**2-Socket**
Up to 2nd gen Intel® Xeon® Scalable processors; up to 205W TDP

**24 DIMM Slots**
Up to 6TB DDR4-2933 ECC memory per node; Intel® Optane™ DCPMM support available

**NVMe**
Supported SSD form factor: EDSFF E1.S and E1.L, 2.5" U.2, NF1, M.2

**Input/Output**
Dual 10GbE with dedicated IPMI LAN port; Additional PCI-E 3.0 slots for expansion

**Titanium Level**
Up to redundant 1600W high-efficiency digital power supplies
The Supermicro Petascale family also takes the Just-a-Bunch-Of-Disk (JBOD) architecture and brings it into the modern world of high performance NVMe storage with Just-a-Bunch-Of-Flash (JBOF). Ideal for 1U storage expansion, the Petascale JBOF systems provide the same density and capacity as their Petascale system counterpart and are intended to be an extension of storage hosted from as many as 8 systems. For scenarios where capacity and efficiency are the primary goals, Supermicro Petascale JBOF systems provide maximum 1U capacity together with the thermal efficiency of SDDs.

The latest Petascale JBOF system offers 32 E1.L drives in 1U and represents the ultimate in Resource-Savings with thermal efficiency built in to the EDSFF design. The U.2 based system also enables 32 industry-standard hot-pluggable NVMe drives, also using dual drive trays while providing SDD-based efficiency over that of HDD JBOD systems.
1U storage expansion chassis optimized for all-flash applications
Support up to 32 EDSFF or 2.5” U.2 NVMe SSDs
Two full-height PCI-E expansion slots with dedicated IPMI LAN ports

1U Rackmount
Up to 32 hot-swap NVMe drive bays in 1U

Titanium Level
Up to redundant 1000W high-efficiency digital power supplies

NVMe
Supported SSD form factor: EDSFF E1.L and 2.5” U.2

Flexible Networking
2 RJ45 Dedicated IPMI LAN ports; 4 PCI-E x16 IO ports, 2 PCI-E x16 slots
While Supermicro Ultra systems represent the flagship dual processor SuperServer, NVMe based configurations enable extremely high performance storage systems optimizing IOPS per Gigabyte. Supermicro Ultra SuperServers are designed to deliver the highest performance, flexibility, scalability and serviceability in a 1U or 2U dual processor server. By providing the highest TDP available with the latest 2nd generation Intel® Xeon® processors together with maximum, balanced bandwidth to NVMe drives, the CPU to drive ratio is optimized and provides the highest IOPS per system.

NVMe based Ultra SuperServers include both 1U and 2U form factors with a range of choice in available U.2 drive bays. 1U models include 10 2.5" NVMe drives, 12 2.5" NVMe drives, and 20 2.5" 7mm NVMe drives. Rounding out the family, the 2U models include 20 2.5" drives as well as the largest in the family providing 24 2.5" drives.
1U/2U systems supporting dual processors with 24 DIMM slots
All-NVMe storage for up to 24x 2.5” U.2 SSDs in 2U or 12x 2.5” U.2 SSDs in 1U
Up to dual 25G Ethernet and rich PCI-E expansion possibilities

1U/2U Rackmount
Up to 12x 2.5” or 4x 3.5” drive bays in 1U; Up to 24x 2.5” or 12x 3.5” drive bays in 2U

2-Socket
Up to 2nd gen Intel® Xeon® Scalable processors; up to 205W TDP

24 DIMM Slots
Up to 6TB ECC memory with 256GB DIMMs, up to DDR4-2933MHz; Intel® Optane™ DCPMM support available

NVMe/SAS3/SATA3
Supported SSD form factor: 2.5” U.2; Optional SAS3 support via AOC; Optional M.2 support via Riser/AOC

Input/Output
Flexible networking via Ultra Riser adapters* with dedicated IPMI LAN port

Titanium Level
Up to redundant 1600W high-efficiency digital power supplies
The Supermicro BigTwin represents an innovative, no-compromise multi-node system with up to 4 nodes in a 2U form factor which is ideal for HCI architectures. BigTwin provides the ultimate in multi-node performance with the highest TDP processors and balanced bandwidth to NVMe drives. NVMe based configurations optimize the highest IOPS per node in a multi-node system, providing maximum IOPS per Gigabyte. With shared power and cooling across a multi-node system, BigTwin also provides Resource-Saving efficiencies without compromising on performance or density.

The latest BigTwin offers 10 E1.S EDSFF drives per node, together with 2 additional front-accessible SATA M.2 drives per node providing a maximum of 40 E1.S drives and 8 SATA M.2 drives.

BigTwin also offers U.2 based models. The 2U, 4 node BigTwin with 6 2.5” NVMe drives per node maximizes IO throughput per node and multi-node density. The 2U, 2 node BigTwin with 12 2.5” NVMe drives per node maximizes drives per node in the same footprint.
2U systems supporting two or four nodes with 24 DIMM slots
Flexible storage options including all NVMe and hybrid NVMe/SAS3/SATA3
SIOM networking options including 10GbE, 25GbE, 100GbE and InfiniBand

Two or Four Nodes
Two sets of 12 U.2 drive bays; four sets of 6x U.2 or 10x E1.S drive bays

NVMe
Supported SSD form factor: E1.S, U.2 and optional M.2

2-Socket
Up to 2nd gen Intel® Xeon® Scalable processors; up to 205W TDP

Input/Output
Super I/O Module (SIOM) networking* with dedicated IPMI LAN port per node; Additional 2 PCI-E 3.0 x16 LP slots

24 DIMM Slots
Up to 6TB DDR4-2933MHz ECC memory per node; Intel® Optane™ DCPMM support available

Titanium Level
Up to redundant 2600W high-efficiency digital power supplies

* For more details, please refer to page 14
The Supermicro Storage Bridge Bay is optimized to deliver the highest availability for mission-critical storage applications. The SBB is a fully redundant, 2U “cluster-in-a-box” system featuring dual hot-swappable nodes and 24 dual-port NVMe drives. All active components are hot-swappable with the SBB midplane providing heartbeat and data connectivity which enables the surviving node to take over storage control and maintain service availability. Storage software from Supermicro partners completes a high-availability solution and provides Active-Active or Active-Passive failover configurations.
Supermicro offers the broadest and deepest portfolio of advanced technology server and storage systems in the IT industry. This offers several advantages to our customers. First, customers can readily select the most optimized solutions to satisfy their business requirements, helping them to reduce their costs and improve the quality and time-to-market (TTM) of their offerings. Additionally, the breadth and depth of Supermicro’s product line provides the efficiency, cost, and reduced complexity advantages of one-stop shopping.

Better. Faster. Greener.
Expect Better Data Center Performance, TCO & Impact on the Environment

Systems featuring 2nd generation Intel® Xeon® Scalable processors
Supermicro®, the leading innovator in high-performance, high-efficiency server technology is a premier provider of advanced server Building Block Solutions® for Data Center, Cloud Computing, Enterprise IT, Hadoop/Big Data, HPC and Embedded Systems worldwide. Supermicro is committed to protecting the environment through its “We Keep IT Green®” initiative and provides customers with the most energy-efficient, environmentally-friendly solutions available on the market.

Learn more at www.supermicro.com

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