



BETTER PERFORMANCE WITH LOWER THE TCO FOR VMWARE VSAN ESA WITH THE SUPERMICRO X13 BIGTWIN®

Empower Seamless vSAN Express Storage Architecture with 4th Gen Intel® Xeon® Scalable Processors



SupermicroX13 BigTwin Multi-Node Infrastructure Solutions

Executive Summary

Over the years, hyper-converged infrastructure (HCI) has emerged as a reliable solution for its simplified management, scalability, cost efficiency, and high-performance capabilities. In HCI environments, technologies like vSAN have proven to be critical as the underlying storage technology due to their seamless integration and ability to provide storage to multiple servers simultaneously. However, like any evolving technology, vSAN has faced several challenges. Addressing data growth and scalability has become essential for applications to meet the demands of the rapidly expanding market while maintaining top-notch performance and reducing latency for improved serviceability.

In this context, Supermicros' X13 BigTwin system introduces innovation with the new 4th Gen Intel Xeon Scalable Processors bringing new accelerators and more powerful cores. These cutting-edge components seamlessly integrate into the vSAN environment to elevate its capabilities.

Business Challenges

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Business Critical Applications (BCAs) are software applications vital to a company's core operations and success. Running business-critical applications requires on-demand scalability, improved performance, optimal efficiency, and simplified management. Hyperconverged infrastructure (HCI) platform helps boost data center efficiency by delivering developer-ready infrastructure, scaling without compromise, simplifying operations, and expanding file services. vSAN offers policy-based management to eliminate or automate highly manual storage processes, and it increases agility by enabling administrators to prioritize SLAs of mission-critical workloads on the fly. Organizations can configure multiple RAID levels for performance or capacity savings and non-disruptively scale out or scale up to size business-critical applications at each expansion interval.

Solution Overview

Supermicro's objective is to deliver a high-performance system optimized for VMware vSAN. The Supermicro X13 BigTwin, powered by 4th Gen Intel Xeon Scalable Processors, offers exceptional capabilities thanks to Intel DSA (Data Streaming Accelerator) technology, which optimizes streaming data movement and transformation operations, improving computing and storage efficiency for daily operations. As data becomes increasingly valuable as a critical corporate asset, accelerated data protection for NVMe/TCP becomes essential to improve efficiency for data storage applications by offloading CPU in storage solutions. To demonstrate this, Supermicro has selected the Supermicro X13 BigTwin SYS-221BT-DNTR and the Supermicro X11 BigTwin SYS-2029BT-HNC0R. The chosen configuration for SYS-221BT-DNTR is targeted for a vSAN-ESA-AF-6 ready node with a minimum storage capacity of 40TB per node. This configuration was carefully selected as the sweet spot between performance and cost to have a better total cost of ownership over prior generations.

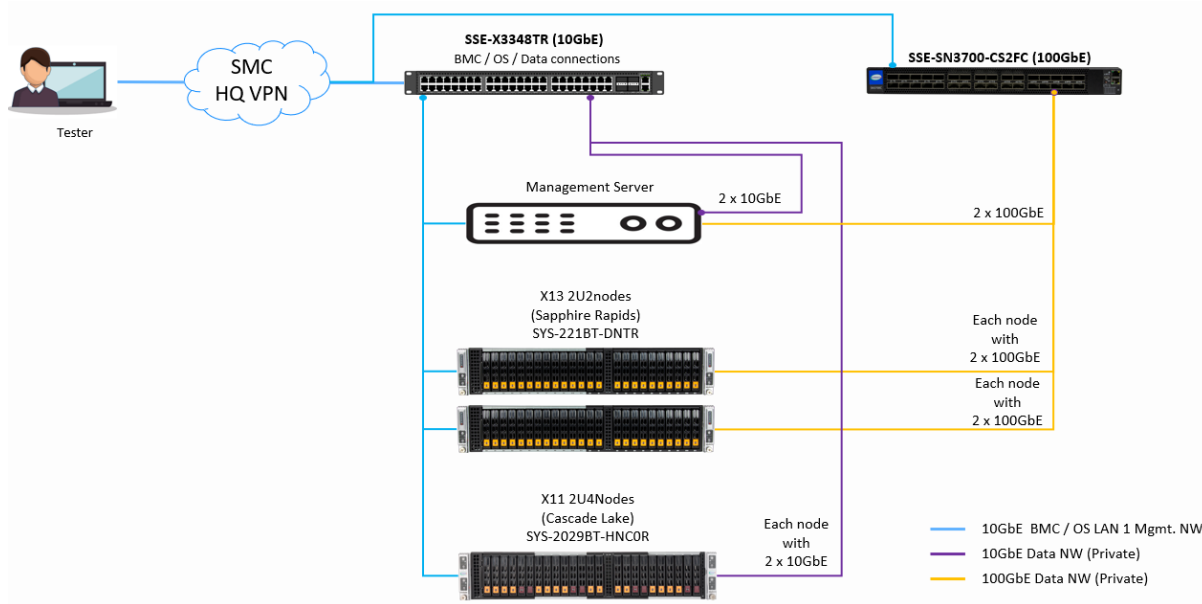
By leveraging the Supermicro X13 BigTwin, the solution was able to optimize the resources available within the vSAN environment. HCI Bench played a crucial role in benchmarking and validating the performance capabilities of the Hyperconverged infrastructure deployment, ensuring that it exceeded the anticipated workload demands. This solution highlights the successful integration of Supermicro X13 BigTwin, vSAN software-defined storage capabilities, and the solution's ability to handle demanding workloads efficiently and reliably.

Supermicro X13 BigTwin® System

When you look into the requirements of vSAN ESA environments, it becomes evident that computing power and storage density are needed for this kind of environment. The Supermicro X13 BigTwin, with its modular design, emerges as an ideal solution that aligns the most with these essential vSAN ESA requirements. With its flexible and dense design, the Supermicro X13 BigTwin ensures enterprises will have easy integration into their existing Hyper-Converged Infrastructure (HCI) environments. As the organizations' requirements expand and transform, the Supermicro X13 BigTwin can effortlessly accommodate these changes, making scalability a smooth and worry-free experience and allowing you to integrate new technologies seamlessly without interruptions.

In our Proof of Concept, Supermicro proud to spotlight the 2U 2-Node configuration, which optimally balances storage capacity and cost-effectiveness performance. The target configuration was a vSAN-ESA-AF-6 ready node with 40TB of storage capacity per node. This result was achieved by populating 7 out of 12 drive bays in the front. This configuration demonstrates the best minimum configuration for ESA-AF-6 for the best performance per dollar. However, if it is still needed to scale the infrastructure, the Supermicro X13 BigTwin 2U 2-Node can potentially be a high-density vSAN-ready node with 12x drives per node and 3x PCI-E Gen5 slots for networking. The Supermicro X13 BigTwin empowers organizations with the flexibility to accommodate any configuration in their existing HCI infrastructure. As a high-density vSAN-ready node, the Supermicro X13 BigTwin's 2U 2-Node configuration supports any workload with the most demanding storage and networking requirements. Whether you are pursuing to enhance your storage capacity, network connectivity, or overall performance, the Supermicro X13 BigTwin is an ideal solution with efficiency and adaptability for vSAN ESA environments.

Solution Lab Architecture



Test Configuration

SYS-221BT-DNTR

Type	SMC PN	Description	Node QTY	System Qty
System	SYS-221BT-DNTR	X13DET-B, CSE-217BD2-R2K22P, SCC-P12N12SGH-B2		2
CPU	P4X-SPR6448Y-SRMGN-MCC	SPR 6448Y 2P 32C 2.1G225W(24/2.6/225,16/2.9/205)60M BI(1000) 7yr---P4X-SPR6448Y-SRMGN-MCC	2	8
MEMORY	MEM-DR564L-CL01-ER48	64GB DDR5 4800 ECC REG---MEM-DR564L-CL01-ER48	16	64
AOC STORAGE	SCC-A2NM2241G3-B1	2x Gen3 Marvell2241 NVMe M.2 RAID with 1x PCIe16 Gen5 S	1	4
Drive	HDS-MMN-MTFDKBA400TFS1BC	Micron 7450 MAX 400GB NVMe PCIe 4.0 3D TLC M.2 22x80 mm, 3DWPD---HDS-MMN-MTFDKBA400TFS1BC	2	8
Drive	HDS-IUN0-SSDPF2KE064T1	D7-P5620 6.4TB NVMe PCIe 4.0 X4 3D TLC U.2 15mm 3DWPD---HDS-IUN0-SSDPF2KE064T1	7	28
AOC Network	AOC-S100GC-I2C-P	Standard PCIe 4.0x16 dual port 100GbE w/QSFP28	2	8
Accessory	SKT-1424L-001B-FXC	SOCKET E E1B CARRIER LGA 4677 W/SHIM SP MCC , DG1.0 , RoHS	2	8



SYS-2029BT-HNCOR

Type	SMC PN	Description	Node QTY	System Qty
System	SYS-2029BT-HNCOR	BigTwin 2U 4-Node, 6x2.5 NVMe/SAS		1
CPU	P4X-CLX6230N-SRFPR	Intel® Xeon® Gold 6230N 4/2P 20/(6+14)C/40/(12+28)T 2.3/(2.7+2.1)G 27.5M 1	2	8
MEMORY	MEM-DR432L-CL01-ER29	32GB DDR4 1.2V 2933 ECC REG--- MEM-DR432L-CL01-ER29	12	48
AOC Storage	AOC-SMG2-2TM2	2xSATA M.2 RAID adapter for Big Twin,HF,RoHS	1	4
Drive (boot)	HDS-IMT0-SCKKB240G8-NI22	Intel D3 S4510 240GB M.2 SATA 6Gb/s 3D TLC 22x80mm 1DWPDP	2	8
Drive (caching)	HDS-IAN1-SSDPED1K375GAX	Intel3D XPointDC P4800X 375G PCIe3.0HHHL AIC30DWPDP FW435	2	8
Drive (capacity)	HDS-I2T0-SSDSC2KB038T8	Intel S4510 3.84TB, SATA 6Gb/s, 3D, TLC 2.5" 1DWPDP, HF,RoHS---HDS-I2T0- SSDSC2KB038T8	4	16
AOC NETWORK	AOC-STGS-I2T-O	2x 10GbE RJ45 Intel X550-AT2, Gen3 x4 LP -- AOC-STGS-I2T-O	2	8



HCIBench

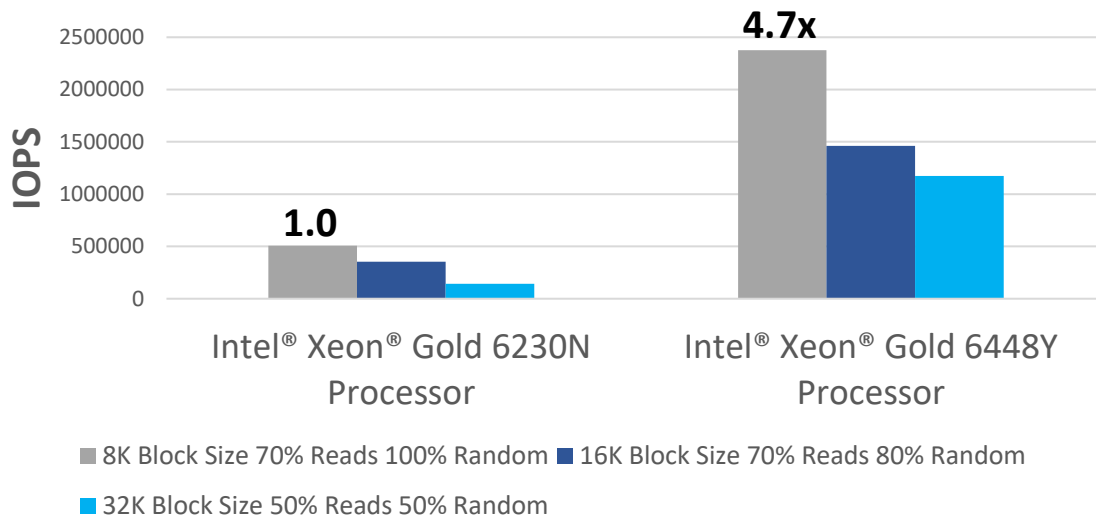
Performance Results – Throughput and Latency

HCIBench is a performance testing tool for Hyper-Converged Infrastructure (HCI) environments to ensure optimal functionality and resource utilization. This benchmark simulates real workload scenarios that test the system and configuration performance.

Supermicro compared the performance between Supermicro X13 BigTwin with 4th Gen Intel Xeon Scalable Processors and the Supermicro X11 BigTwin with 2nd Gen Intel Xeon Scalable Processors. The Supermicro X13 BigTwin achieved 4.7x higher throughput with almost 2.5 million IOPS and 87.8% lower latency in the HCIBench test. These incredible results reflect how the Supermicro X13 BigTwin can be the critical player for modern HCI environments that want to deliver optimal user experience, effectively handle any workload, and ensure high availability.

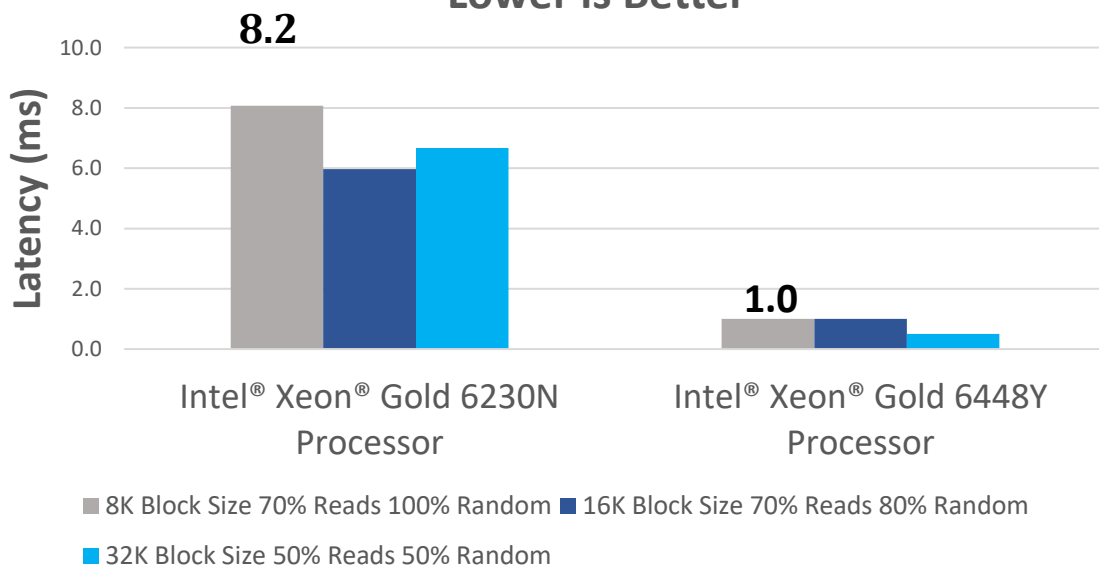
HCIBench Throughput

Higher is Better



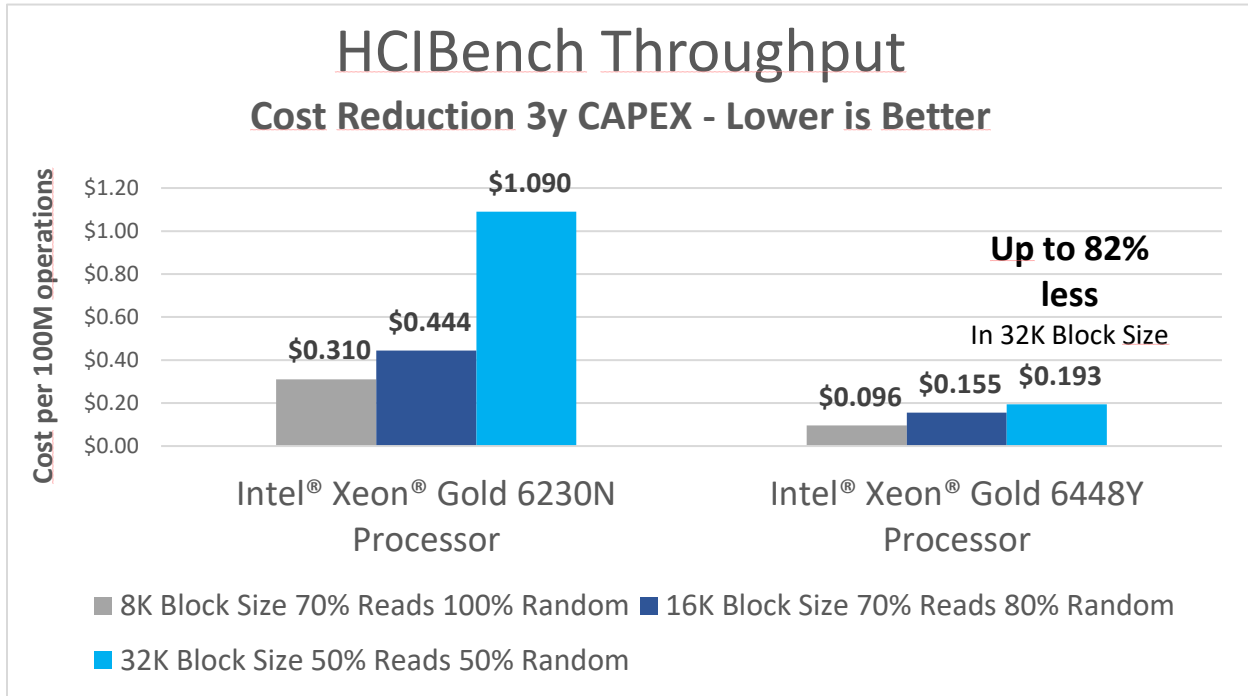
HCIBench Latency

Lower is Better



CAPEX Analysis – Performance Per Dollar

Its remarkable cost reduction signifies an important advancement in optimizing resource utilization, driving unparalleled efficiency, and reducing the total cost of ownership. Enterprises can channel their financial resources toward strategic growth initiatives and innovations by substantially decreasing the capital expenditure required for hardware, software, and infrastructure components.



Conclusion

The Supermicro X13 BigTwin with 4th Gen Intel Xeon Scalable Processors is an advanced hardware solution that offers numerous advantages when deployed in vSAN environments. The Supermicro X13 BigTwin is available in two highly flexible form factors: 2U 2 Node and 2U 4 Node. This design offers customers unparalleled options for achieving the perfect balance between flexibility and density in their environments. Whether the goal is to maximize the number of compute nodes within a limited space or achieve optimal node count within a specific rack, the Supermicro X13 BigTwin provides the ideal solution. This level of customization ensures that organizations can tailor their infrastructure to meet their precise requirements, empowering them to efficiently utilize resources while maintaining the desired level of scalability.

References

1. Supermicro X13 BigTwin <https://www.supermicro.com/en/products/system/bigtwin/2u/sys-221bt-dntr>
2. Supermicro X11 BigTwin <https://www.supermicro.com/products/system/2u/2029/SYS-2029BT-HNC0R.cfm>
3. vSAN Rady Node
 - a. [Supermicro X13 BigTwin SYS-221BT-DNTR](#)
 - b. [Supermicro X11 BigTwin SYS-2029BT-HNC0R](#)

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