



# SUPERMICRO AND INTEL TOGETHER IMPROVE DATA CENTER EFFICIENCY WITH INCREASED PERFORMANCE AND HIGHER VM DENSITY USING SUPERMICRO X14 HYPER SERVERS AND INTEL® XEON® 6 PROCESSORS

*Four Node Cluster Delivered Up to 3.17X the Throughput, Supporting Twice as Many VMs compared to 3<sup>d</sup> Gen Intel Xeon Scalable Processors*



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## Executive Summary

As data volumes grow and become more vital to operations, older servers—limited by fewer CPU cores and outdated architectures—can constrain performance and scalability, resulting in costly data center sprawl. New Supermicro X14 Hyper servers, featuring Intel Xeon 6 processors, provide a smart, AI-ready upgrade that improves database access and VM counts, boosting overall data center efficiency.

## Methodology

To evaluate the impact of upgrading to newer servers, the HammerDB TPROC-C benchmark was run on two solutions



configured with Microsoft SQL Server (MS SQL) and MySQL. This benchmark uses five common database transaction types to simulate an online transaction processing (OLTP) workload. Higher transaction throughput—reflected in metrics like new orders per minute (NOPM)—directly demonstrates that the backend hardware can reliably scale to support more customers, enable greater staff and database activity, accelerate business operations, and ultimately deliver a better user experience with increased revenue potential.

**Latest Solution: Supermicro X14 Hyper with Intel Xeon 6 processors**

- 4× 1U Supermicro [SYS-122H-TN](#) servers, each with 2× Intel Xeon 6737P processors, 1 TB of RAM, M.2 boot, four storage drives, baseboard management controllers (BMC), and dual 100Gb networking (VMware vSAN nodes)<sup>1</sup>
- 1× 2U Supermicro [SYS-222H-TN](#) controller server with 2× Intel Xeon 6760P and 1TB RAM

**Legacy Solution: Servers with 3rd Gen Intel Xeon Scalable processors**

- 4× 2U previous-generation servers, each with 2× 3rd Gen Intel Xeon Silver 4314 processors, 512 GB of RAM, and dual 100Gb networking (vSAN nodes)
- Reflects a typical five-year hardware refresh cycle, the processor generation that most customers in the market are running today

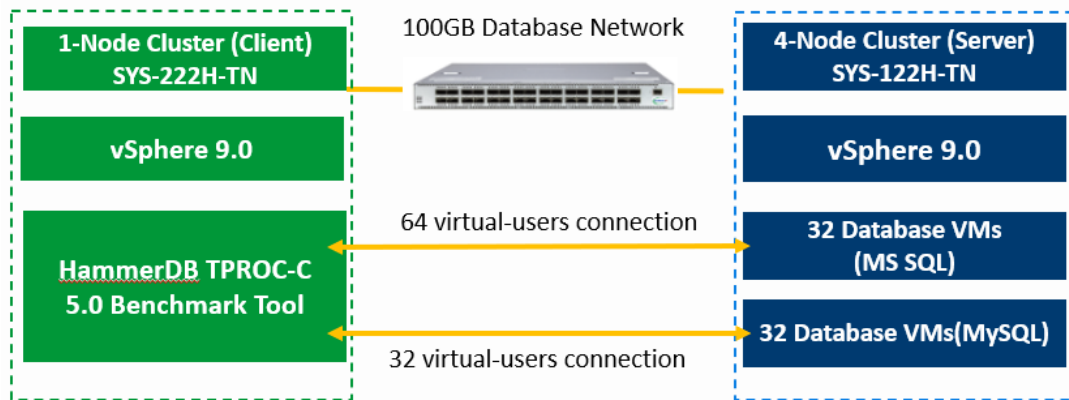


Figure 1 - Testbed diagram for the latest-gen Supermicro server cluster powered by Intel Xeon 6 processors.

## Results and Analysis

The solutions’ performance was assessed using configurations with MS SQL and MySQL databases sized at approximately 70GB, which would be representative of smaller-scale sizing for small businesses. The legacy solution ran older database versions, whereas the latest solution ran newer ones, a typical upgrade as part of modernization. HammerDB 5.0 TPROC-C testing was configured with a 10-minute ramp-up to reach a steady-state performance, and each test iteration ran at steady state for 15

<sup>1</sup> Software: All VMs: Ubuntu 22.04, HammerDB 5.0; Legacy VMs: Microsoft SQL Server 2019, MySQL 8.4.8; Latest-gen VMs: Microsoft SQL Server 2025, MySQL 9.5.0  
 Configurations: 4x Inspur Servers M50CYP2SBSTD with 2x Intel(R) Xeon(R) Silver 4314, VMware ESXi, 9.0.0.0.2475529, 512 GB memory, 135 TDP (W), HT/SMT: On, TurboBoost: On, Motherboard: M50CYP2SBSTD, BIOS: SE5C620.86B.01.01.0010.250109185, Network: Intel Ethernet Controller E810-C for QSFP, Storage: 2x Intel SSDPE2KE032T8 3.2TB NVMe SSD, VM details - 1-16 vCPUs, 1 socket per VM, 1 NUMA node (set to Assigned on power on), 0.5-48GB memory; 4x Supermicro SYS-122H-TN with 2x Intel(R) Xeon(R) 6737P, VMware ESXi, 9.0.0.0.2475529, 512GB memory, 270 TDP (W), HT/SMT: On, TurboBoost: On, Motherboard: X14DBM-SP, BIOS: 1.4, Network: Nvidia ConnectX-5 Ex EN 2x 100G QSFP28, Storage: 4 x KIOXIA KCMYXRUG1T92 1.92TB NVMe SSD; VM details - 1-32 vCPUs, 1 socket per VM, 1 NUMA node (set to Assigned on power on), 0.5-48GB memory.

minutes. The TPROC-C workload was configured with 800 warehouses in both databases; TPROC-C used 64 virtual users for MS SQL testing and 32 for MySQL testing. For both solutions, each server had 8 vCPUs and 64GB RAM.

Under these conditions, the Supermicro X14 Hyper cluster supported up to 3.17 times as many NOPM as the older hardware. This means that a single new four-node cluster could do the work of more than three older four-node clusters—with performance to spare.

*Table 1 - Normalized Performance Comparison of Four-Node Clusters*

Four-Node Performance Metric	Legacy (3rd Gen Intel Xeon Scalable)	X14 Hyper (Intel Xeon 6)
Normalized MS SQL NOPM <sup>2</sup>	1	<b>2.45</b>
Normalized MySQL NOPM <sup>2</sup>	1	<b>3.17</b>
Database VMs in each configuration	16	<b>32</b>

### Support More Database Work

When organizations rely on Microsoft SQL Server or MySQL, performance directly impacts everyday work. Staff can access data faster, enabling quicker decisions and more productivity, and customers may have better experiences, too.

The stronger performance of the new Supermicro and Intel solution can support organizations both today and tomorrow. For customers currently satisfied with the performance of their legacy servers, they can maintain the same level of performance with fewer new servers. Conversely, customers can maintain their current fleet size while upgrading to achieve better performance and gain headroom to accommodate more concurrent users and heavier analytics workloads as data stores grow. In other words, customers can future-proof their infrastructure and leave more computing space open for AI initiatives and the technologies of tomorrow.

### Scaling Database VMs Efficiently

Higher VM density enables organizations to run more database workloads on each server while maintaining strong performance. The Supermicro X14 Hyper servers, powered by Intel Xeon 6 processors, supported 32 database VMs, compared to 16 on the legacy solution—doubling VM capacity within the same footprint. This increased VM count enables organizations to support more users and workloads per server as demands grow.

<sup>2</sup> Performance results are based on testing by Principled Technologies as of 03/16/2026 and may not reflect all publicly available updates. Results may vary. Results have not been reviewed by VMware review panel.

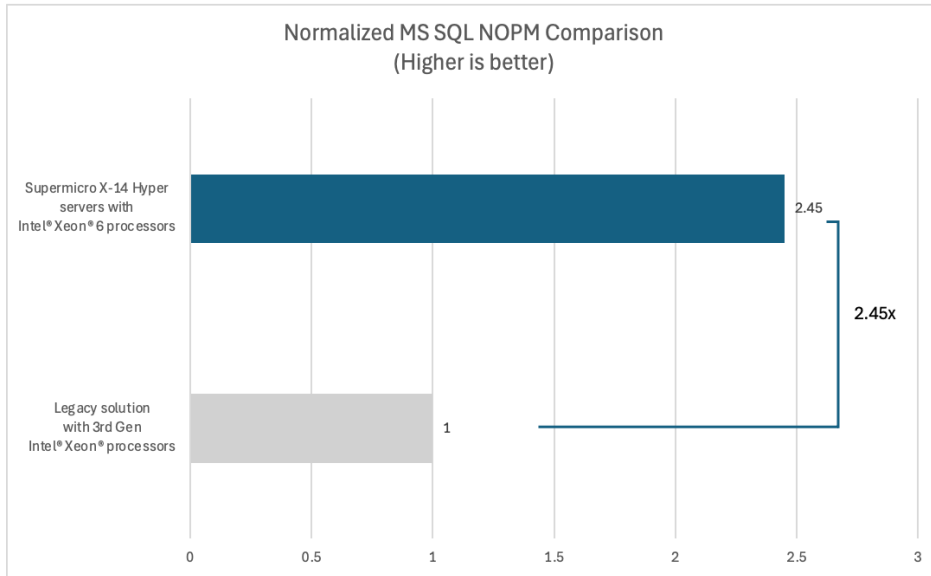


Figure 2 - The Supermicro cluster, powered by Intel Xeon 6 processors, supported almost 2.5 times the MS SQL new orders per minute of the legacy cluster using 3rd Gen Intel Xeon Scalable processors

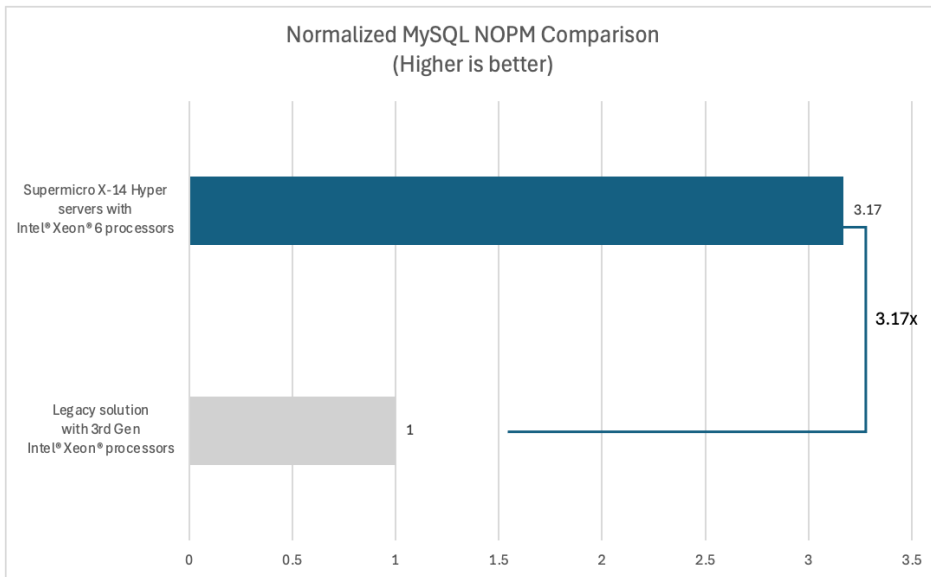


Figure 3 - The Supermicro cluster, powered by Intel Xeon 6 processors, supported more than 3 times the MySQL new orders per minute of the legacy cluster using 3rd Gen Intel Xeon Scalable processors.

### Reducing Licensing Costs with Fewer Virtual Cores

With the Enterprise edition of SQL Server, customers pay per core, with a minimum of 4 cores. Customers modernizing with Supermicro and Intel Xeon 6 can cut licensing costs while maintaining the MS SQL VM count, but reducing the virtual core count. Additional TPROC-C testing with MS SQL showed that downsizing from 8 vCPUs on the legacy cluster to 6 vCPUs on the four-node, AI-ready Supermicro Hyper X14 cluster reduced MS SQL licensing costs while boosting performance.

Table 2 - Normalized performance comparison of four-node clusters after downsizing vCPU count

Four-Node Performance Metric	Legacy (3rd Gen Intel Xeon Scalable)	X14 Hyper (Intel Xeon 6)
Normalized MS SQL NOPM <sup>2</sup>	1	<b>1.11</b>
vCPU count	8	6

### Customers Choose the X14 Hyper Platform:

The SYS-122H-TN and SYS-222H-TN are built for virtualization, enterprise database workloads, and more—with a flexible design that allows IT teams to stretch the hardware as requirements grow.

- Massive performance gains: Intel Xeon 6 with P-cores provides increased core counts and doubled memory bandwidth, allowing for faster database query execution and reduced latency.
- Flexible storage layouts for performance and durability: X14 Hyper offers flexible 8, 16, or 24 front hot-swap NVMe/SAS/SATA bays plus 2 internal M.2 NVMe slots. The platform supports RAID 0/1/5/10 with Intel VROC, making it easier to separate data, logs, and boot storage while balancing speed and resilience.
- Cost optimization (TCO): SQL Server often requires large memory footprints that lead to high hardware costs. Memory tiering can reduce the total cost of ownership by up to 40% by using cheaper NVMe storage for "cold" memory pages while keeping "hot" active data in expensive DRAM.
- Hardware-backed key protection: The TPM protects the private keys required for TLS 1.3, ensuring that authentication keys for SQL Server instances remain secure and tamper-proof.
- Ready for AI and GPU workloads today: By supporting GPUs and AI accelerators without performance tradeoffs, additional expansion slots let organizations run AI analytics or inference alongside virtualized database workloads—without disrupting VM density or database performance—so customers can evolve their database environments with AI capabilities as needs grow, without replacing the server.
- Built-in cryptographic and data compression acceleration at no extra cost: Intel QuickAssist Technology (QAT) is built directly into the Xeon 6 processor, boosting database compression, decompression, and encryption tasks by offloading these tasks from the CPU without requiring a separate GPU or accelerator card; customers get AI-ready infrastructure as part of the standard server.

### Interpreting the Results

Testing shows that upgrading to the new Supermicro and Intel solution can deliver meaningful improvements for SQL Server and MySQL workloads. By modernizing with newer technologies, increasing transactional throughput, and doubling the number of databases per server, organizations can:

- Improve customer experiences and satisfaction with faster, more consistent application performance
- Increase staff productivity by enabling faster access to key data and services, helping them stay in the flow of their work
- Analyze larger volumes of data faster, a vital capability as businesses amass more useful data and put it to work
- Boost overall data center efficiency by supporting more concurrent database workloads per server, creating headroom for AI-driven initiatives and other data-intensive technologies

## Summary

- There is greater VM density potential with measurable performance gains, as testing showed that the Supermicro X14 Hyper solution powered by Intel Xeon 6 supported 2x the database VMs while delivering up to 3.17x the transactional throughput (in NOPM) than the older-gen solution.
- Supporting more database VMs per server allows organizations to run more workloads within the same footprint while maintaining strong per-VM performance.
- Higher transactional throughput enables systems to process more work in less time, helping organizations support more users and sustain performance as database demand grows.
- Advances in memory bandwidth, high-speed I/O, and flexible system architecture help ensure the platform can handle increasing data volumes and evolving workloads, including AI-driven and data-intensive applications.

## For More Information:

Supermicro Hyper Servers: <https://www.supermicro.com/en/products/hyper>

Intel Xeon 6 Processors: <https://www.intel.com/content/www/us/en/products/details/processors/xeon.html>

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