# SUPERMICRO X13 SERVERS SHOW 82% PERFORMANCE GAIN & POWERFUL VIRTUAL MACHINES FOR AN AGILE & EFFICIENT VIRTUALIZED FUTURE

*Supermicro X13 Servers Demonstrate Excellent Performance for HCI*



*Supermicro X13 BigTwin® Multi-Node Server and Hyper Server*

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## Executive Summary

In today's rapidly evolving technological landscape, businesses constantly seek ways to stay ahead of the curve. The key to success relies on agility and swiftly bringing products and services to market. However, this demands a robust and flexible IT infrastructure that can adapt to the dynamic needs of modern enterprises. A critical question is whether the current infrastructure has the agility to keep pace with evolving business requirements.

To overcome physical infrastructure constraints, industries are increasingly turning to virtualization, which offers remarkable flexibility and optimized resource utilization. Virtualization enables businesses to enhance resource efficiency, lower operational costs, and improve scalability. However, capitalizing on these benefits requires robust, versatile, and energy-efficient systems tailored for virtualized environments.

Supermicro provides an extensive array of virtualization-ready systems designed to meet diverse business needs. Supermicro's product range includes compact rack-mount servers ideal for smaller setups, as well as multi-node configurations suited for the most demanding tasks. For specialized requirements, Supermicro offers systems equipped with GPUs for graphics-heavy applications and PetaScale systems for extensive data processing tasks.

Our latest Supermicro X13 systems are engineered to deliver exceptional performance with increased Thermal Design Power (TDP), enabling them to manage more intensive workloads while ensuring enhanced power efficiency. This capability leads to a more cost-effective Total Cost of Ownership (TCO) and a substantial enhancement in IT capabilities, making Supermicro's solutions an optimal choice for modern virtualized infrastructures.

The Supermicro X13 systems simplify deployment across virtualized environments, from core infrastructure to software-defined storage (SDS). This translates to significant advantages – greater agility, enhanced efficiency, and a sharper competitive edge in the digital era. By choosing Supermicro, customers are not just upgrading; they are investing in a future-proof foundation for their virtualized business.

Supermicro understands the critical role of a robust and adaptable virtualized environment. That's why Supermicro offers a comprehensive portfolio of next-generation systems specifically designed to integrate seamlessly and thrive within virtualized infrastructure. These solutions ensure seamless adoption of the latest technologies, empowering customers to stay ahead of the curve without encountering compatibility roadblocks.

## Solution Architecture

Virtualization has become a foundation for most data centers, and VMware leads the way in performance and innovation through new architectures for virtual infrastructures. Supermicro shares the same commitment to provide top-performance systems to support virtual environments. Supermicro has achieved this by consistently delivering advanced systems built with the latest technologies and committing to being the first to market. By leveraging the virtualized technology, customers can enjoy the benefits of the infrastructure deployment in the isolated VM (Virtual Machine) to fulfill business needs like the conceptual sketch below.
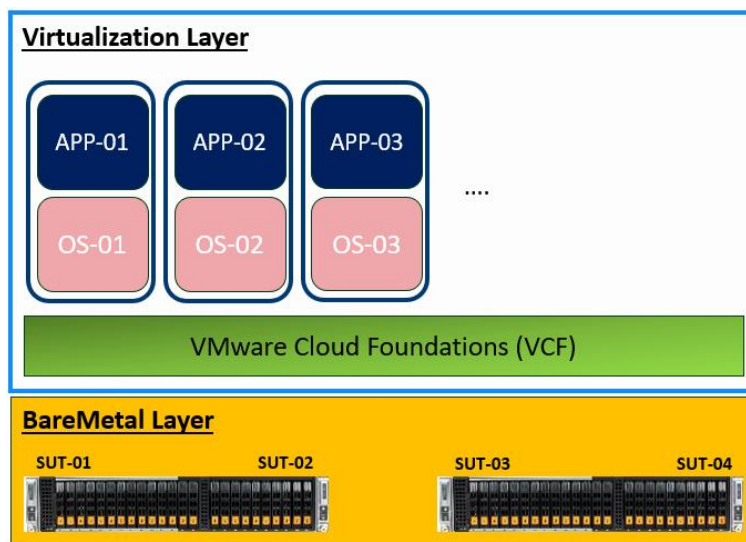
*Figure 1 – High-Level Architecture of a Virtualized Infrastructure*

Supermicro diligently tests and certifies our extensive server portfolio with VMware, ensuring consistent presence on the VMware Hardware Compatibility List (HCL). This certification assures enterprises that Supermicro servers will perform to expectations. Our hardware is designed for seamless integration with the latest VMware technologies, maximizing performance and reducing compatibility issues.

In partnership with VMware Cloud Foundation (VCF), Supermicro's X13 servers deliver a comprehensive hyperconverged infrastructure (HCI) solution tailored for modernizing data centers and deploying contemporary, container-based applications. VCF unifies components such as vSphere for compute, vSAN for storage, and NSX for networking into a standardized, automated, and validated framework. This integration simplifies the management of essential software-defined infrastructure resources.

This powerful combination provides a consistent infrastructure and operations model that is adaptable to on-premises, edge, or public cloud deployments. With exceptional performance, density, and flexibility, the Supermicro X13 portfolio stands out as the premier choice for virtualized environments.

For our VMmark benchmarks, the Supermicro X13 system was selected, which was validated and tested on the VMware compatibility website. Currently, Supermicro has 15+ SKUs validated for vSAN ESA ReadyNode Configurations. This extensive selection of validated systems enables users to achieve:

- High Flexibility - For users seeking flexible system configuration, the Supermicro X13 Hyper delivers exceptional scalability. It accommodates up to 8 PCIe cards and 24 NVMe storage drives within a single system.

- High-Density Choice - If higher compute density is a priority, the X13 BigTwin system is a great candidate that packs 2 to 4 powerful nodes into a compact 2U chassis while giving high-compute density with two powerful nodes, and each node with 12 NVMe storage drives in a 2U2N system.

- Budget and Balance Choice - If customers are planning to begin deploying their virtualized infrastructure with budgetary consideration, X13 CloudDC is a great starting kit. It is a single processor with flexible IO options and 10 NVMe storage drives in a 1U system.

## Virtualized Infrastructure Benchmark - VMmark

The introduction of a virtualization layer between hardware and software adds a potential performance overhead. Therefore, rigorous testing of performance and scalability is essential in virtualized environments. VMmark is a valuable tool provided by VMware and offers a standardized way to aggregate the standard workloads into a tile to benchmark the performance of a virtualized infrastructure. The standard "Tile" and "Score" based benchmark allows for apples-to-apples comparisons between hardware configurations and vendors, making it easier to choose the right system. The VMmark benchmark creates 19 VMs (Virtual Machines) in a "Tile," and each tile contains different standard workloads, including Web – Static x 8 VMs, Web- Elastic x 6 VMs, e-Commerce x 4 VMs, and an idle VM. During the test, VMmark adds tiles until the processor gets saturated. The benchmark  Supermicro, with its extensive portfolio of systems, leverages VMmark benchmark results to help customers select the perfect solution based on their specific workload and performance needs.
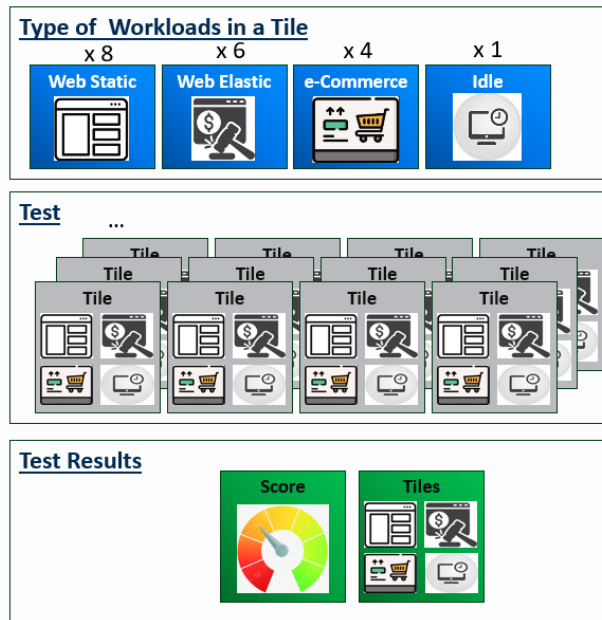


*Figure 2 – VMmark Benchmark Mechanism Overview*

## Virtualized Infrastructure Benchmark Deployment

To simulate the customer's use cases in the virtualized infrastructure deployment and leverage the VMmark benchmark tool to evaluate the performance of the X13 cluster. The reference architecture below uses the Supermicro X13 BigTwin as the System Under Test (SUT) to demonstrate the deployment setup of the VMmark benchmark. The key encompasses the following:

- Windows Management Host: Facilitates the tester's working environment for interaction with the virtualized infrastructure.

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- NFS Storage: Stores the Virtual Machine (VM) deployment package during test initialization and VM backup packages during VMware vMotion test cases

- SUT: Comprising target test systems (E.g., X13 BigTwin in the diagram) equipped with VMware ESXi and vCenter, providing essential functionalities for the virtualized infrastructure environment

- Clients: Systems utilized to simulate client users, generating standard workload (such as web browsing, adding products to shopping cart  to the SUT cluster
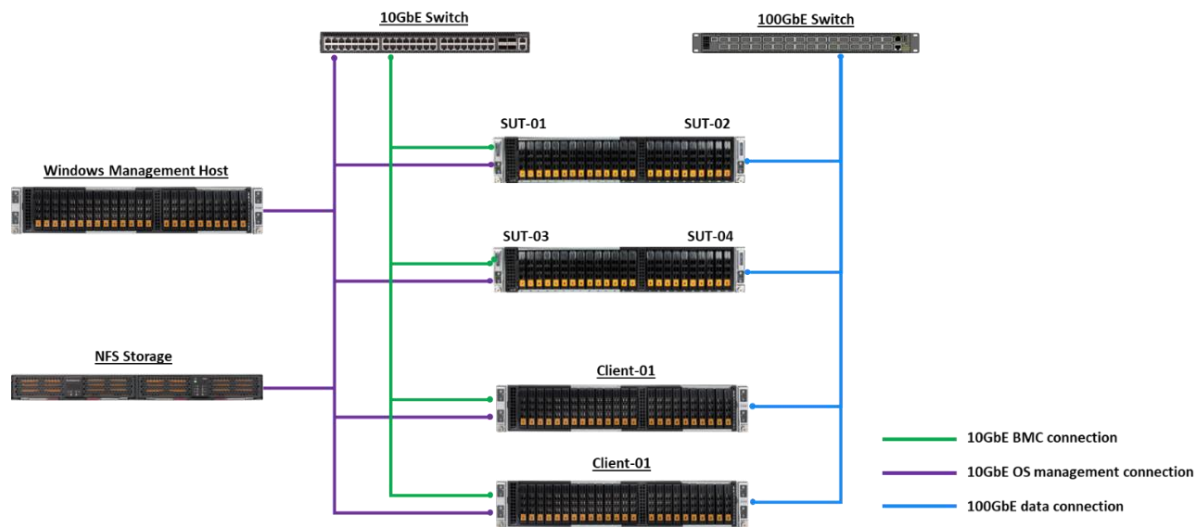


*Figure 3 – Supermicro VMmark Reference Architecture*

## Performance of the Solution

The standardized VMmark benchmark test reveals significant improvements in both performance and Total Cost of Ownership (TCO) of the Supermicro X13 BigTwin system. The Supermicro X13 BigTwin system performed 82% better compared to X11 systems, with an overall VMmark score of 18.12 @ 17 tiles. This means that in a compact 2U system with two nodes, users can host 340 VMs that will perform 55% faster than previous generations. This result translates to better performance per dollar.

The Supermicro X13 BigTwin system can significantly improve resource utilization and optimize the data center footprint by packing more virtual machines (VMs) onto fewer, more powerful nodes. These advancements deliver substantial cost reductions in hardware, power consumption, and potentially vSAN licensing for deployments. Additionally, the increased performance enables faster application response times and improved overall user experience for applications running on vSAN.

By leveraging the VMmark benchmark tool to evaluate the virtualized infrastructure performance of X13 (with 5th Gen Intel Xeon Processors) and X11 (with 2nd Gen Intel Xeon Processors), there are several outcomes on X13 can be expected:

## Gen over Gen Improvement

Here, the Supermicro X13 BigTwin was chosen, and the Supermicro X11 BigTwin in the Gen over Gen comparison was used to demonstrate the performance of three generations of servers.

- X13 delivers 82% improvement in overall VMmark score. This performance gain translates to significantly faster, smoother performance for each virtual machine. Thanks to its advanced architecture, X13 clusters can support 114 more VMs than the previous generation. That's a total of 323 VMs, enabling users to consolidate workloads and maximize resource utilization.
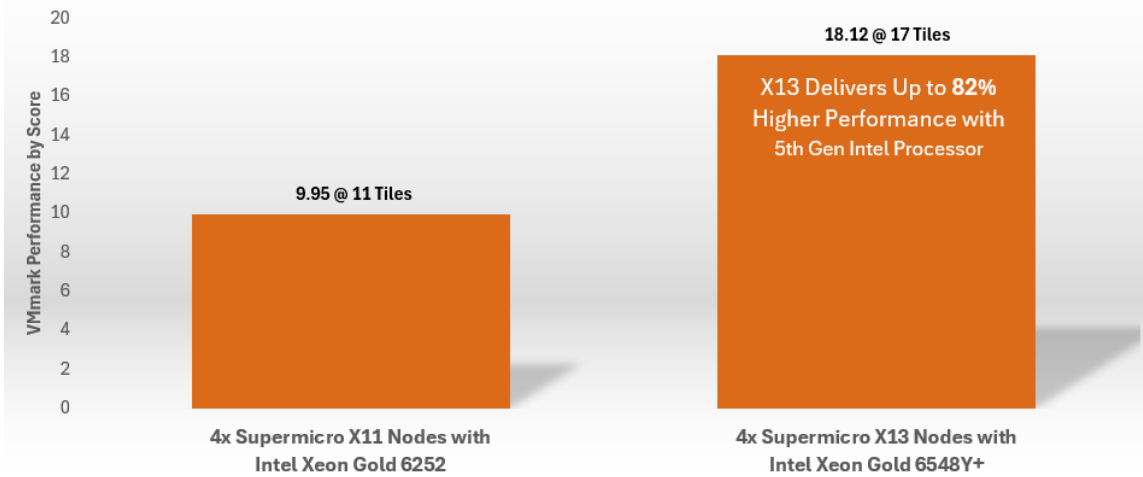
*Figure 4 - Performance Improvement Compared to Previous Generation*

- The Supermicro X13 systems deliver up to 47% higher VMmark performance per dollar compared to the previous generation. With 5th Gen Intel Xeon Processors, X13 delivers higher performance at a lower cost.
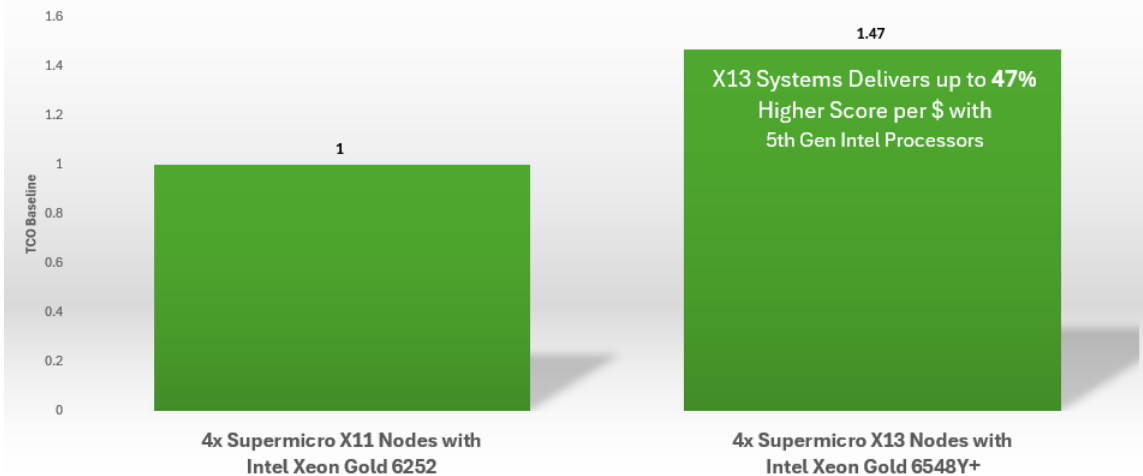
*Figure 5 - Performance per Dollar Compared to Previous Generations*

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## Supermicro X13 Servers Provide the best performance with 5th Gen Intel Xeon 6548Y+

By using 5th Gen Intel Xeon processors in the Supermicro X13 Hyper system, it can support up to 19 tiles combination workloads and reach an overall score of 21.01 in the virtualized infrastructure benchmark, which is the best performance with 5th Gen Intel Xeon 6548Y+ processor as of the data on Apr. 28, 2024 and the official VMware - VMmark benchmark result website.
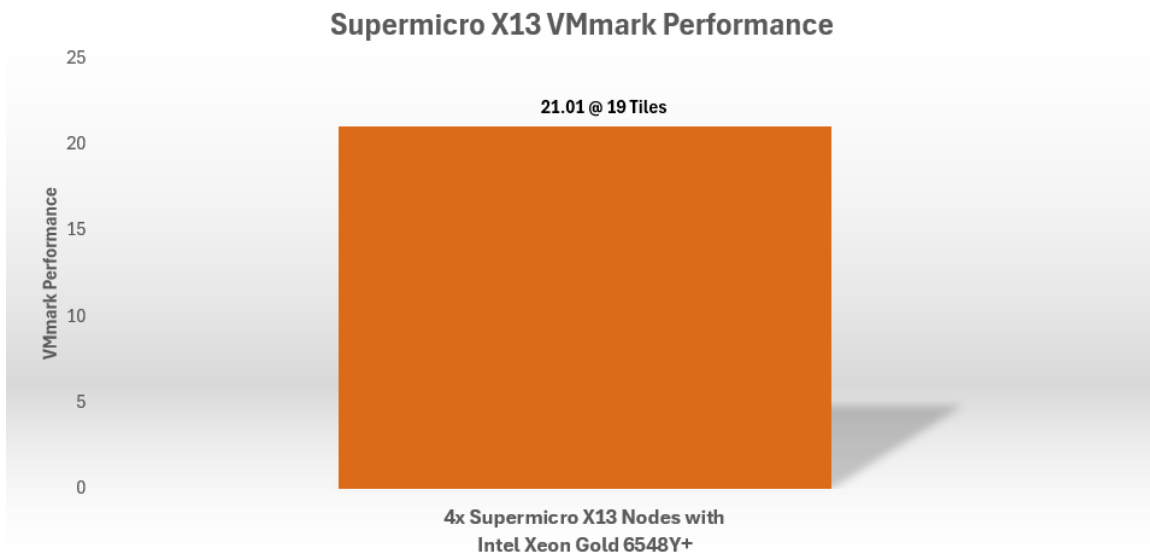


*Figure 6 - Highest Performance Score with 5th Gen Intel Xeon 6548Y+ Processor*

## Conclusion and Summary

Supermicro offers a robust selection of X13 servers validated for VMware environments, giving users peace of mind that Supermicro hardware will seamlessly integrate with the latest VMware technologies and perform optimally. This validation is achieved through Supermicro's testing and certification processes, guaranteeing their presence on the VMware Hardware Compatibility List (HCL). By choosing Supermicro, users can minimize compatibility concerns and focus on maximizing the performance of virtualized workloads.

Within the Supermicro X13 portfolio, Supermicro offers a range of servers designed to fit customers' specific needs. If maximizing flexibility in system configuration is a priority, the X13 Hyper system is the ideal choice. It can accommodate up to 8 PCIe cards and 24 NVMe storage drives in a single system, allowing users to change the configuration to their exact requirements. On the other hand, if high compute density is a priority, the X13 BigTwin system is the perfect solution. This space-saving 2U chassis packs two to four powerful nodes, each capable of housing 12 NVMe storage drives, delivering exceptional processing power in a compact design. Finally, for those starting their virtualized infrastructure journey, budget is a key consideration, and the Supermicro X13 CloudDC server offers a compelling solution. This single-processor system provides flexible IO options and ample storage capacity with 10 NVMe drives in a 1U form factor, making it an ideal entry point.

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Validated for VMware environments, Supermicro's X13 server lineup offers a powerful and versatile range of solutions to address performance, density, and budget requirements.

## References

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For more information: www.supermicro.com

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