SOLUTION BRIEF

SUPERMICRO DELIVERS SCALABLE SYSTEMS TO SIMULATE PRODUCTS AND PHYSICAL PROCESSES AT ANY SCALE: FROM CHIPS TO CITIES

Accelerate Innovation, Reduce Costs, and Improve Product Quality With Supermicro Scalable GPU Systems and Ansys Physics Solvers With the NVIDIA Omniverse™ Digital Twin Real-Time Simulations

Executive Summary

Elevate your design process and unlock faster outcomes by combining digital twins with physics simulation. Supermicro, in partnership with Ansys, empowers engineers to push the boundaries of innovation and simulation. By combining cutting-edge hardware with industry-leading simulation software, organizations can deploy scalable solutions that accelerate design cycles, optimize performance, and reduce time-to-market.

Technologies Solving Problems

Supermicro Scalable GPU systems, powered by NVIDIA GPUs, make the following easy to deploy:

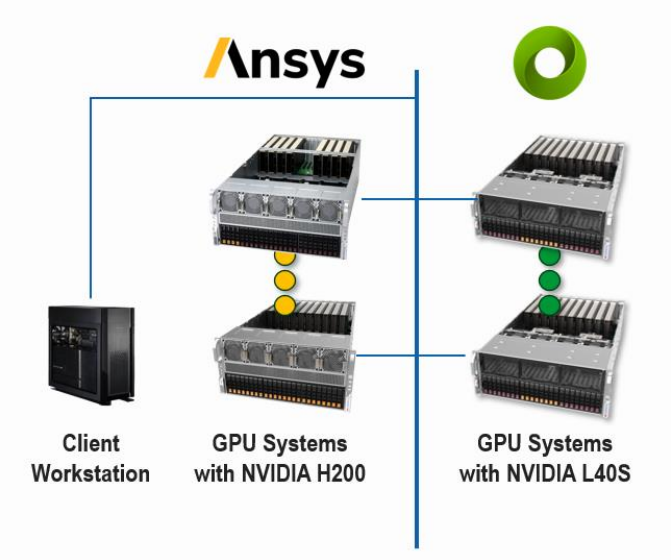
- Simulate at Any Scale: From nanoscale chip design to city-scale infrastructure planning, Supermicro solutions handle simulations of any complexity.
- Accelerate Innovation: Leverage the power of AI and machine learning to optimize designs and identify potential issues early in the development process.
- Reduce Costs: Minimize physical prototyping and testing expenses by validating designs virtually.
- Enhance Product Quality: Deliver superior products by ensuring optimal performance and reliability through rigorous simulation.

Supermicro offers a comprehensive range of high-performance computing solutions tailored to the needs of engineers and scientists:

- Workstations: Ideal for individual users, providing powerful computing capabilities for design and simulation.
- GPU Optimized Servers: Scalable systems that deliver exceptional performance for demanding workloads, including AI, machine learning, and HPC.

Key Benefits of Supermicro's Solutions:

- Unparalleled Performance: Leverage the latest generation of NVIDIA GPUs to accelerate simulation workloads.
- Flexible Scalability: Easily scale your infrastructure to meet evolving needs.
- Energy Efficiency: Optimize power consumption and reduce operational costs.
- Robust Reliability: Ensure continuous operation with advanced cooling and power management technologies.



Supermicro's collaboration with Ansys delivers a powerful combination of hardware and software solutions. By leveraging the strengths of both companies, we enable our customers to achieve groundbreaking results.

Combining Ansys physics simulation with digital twins of the real-world multiplies the power of simulation to create new technologies and products. Solutions can be developed much faster, with higher quality, and adaptable to changes in the real world. This combination of real-world simulation and physics simulation works in the nano-scale world of semiconductor chips, handheld devices, autonomous vehicles, robot operations in factories, and wireless communication at the city and Earth scale.

To enable the multiplicative power of using Ansys simulation and NVIDIA Omniverse, Supermicro delivers a set of scalable platforms to support both applications, running on bare metal modes or in a virtualized environment.

Ansys Physics Solvers

Ansys offers an extensive set of physics solvers and simulation capabilities to solve real-world engineering problems. Below is a subset of the offering and how these solvers would interoperate with NVIDIA Omniverse real-world environment simulation. Depending on the scope of the problem, Ansys physics solvers require high-performance CPUs in a single system to thousands of systems. In place of CPUs, GPUs can significantly accelerate Ansys solver computation and reduce the number of systems.

Simulation	Ansys Solver	NVIDIA Omniverse Environment
5G/6G/Communication	Ansys Perceive EM™	Cities, Buildings, Inside Buildings
Air/fluid flow, Thermal flow	Ansys Fluent®	Inside Buildings, Vehicles, Systems
Gen-AI Based Simulation	Ansys SimAI™	Multiple environments
Electromagnetic, Thermal, Electro-Mechanical	Ansys Electronics Desktop (AEDT)™	Multiple environments
Optical	Ansys Speos®	Vehicles
Autonomy	Ansys AVxcelerate Autonomy™, Ansys AVxcelerate Sensors™	Vehicles, Robots

NVIDIA Omniverse for Real-World Simulation with Digital Twins

Adopting the open-source standard OpenUSD, NVIDIA Omniverse brings in a vast number of real-world scenarios for different applications. OpenUSD provides the standards for digital twins of real-world objects and phenomena that other applications create to interact in the same simulated real-world scenario.

NVIDIA Omniverse runs in a distributed environment. A small implementation runs in a workstation and can quickly scale to a very large environment using a cluster of servers with graphics-oriented GPUs. With the advances in generative AI, compute-oriented GPUs are also incorporated into the Omniverse environment.

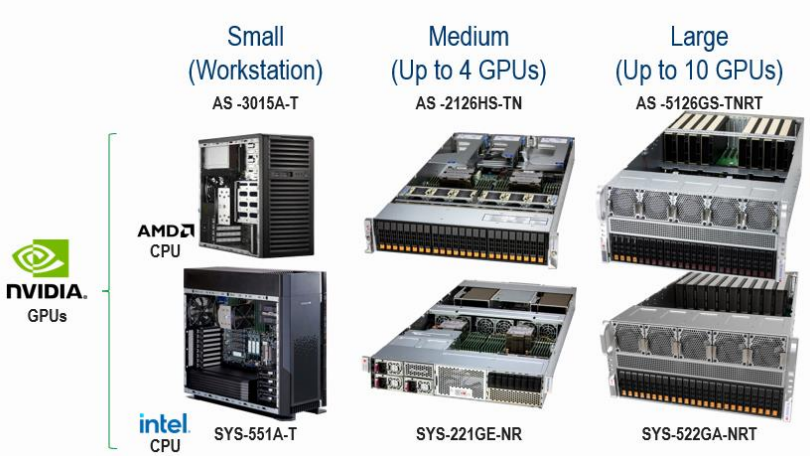
	Ansys AVxcelerate Autonomy™	Ansys Perceive EM™	Ansys SimAI™	Ansys Fluent®	Ansys Electronics Desktop (AEDT)™	Ansys Speos®
	-	YES	YES	-	-	-
	YES	YES	YES	YES	YES	YES
	YES	YES	YES	YES	YES	YES
	YES	YES	YES	YES	YES	YES
	YES	-	-	YES	YES	-

Ansys Physics Solvers and NVIDIA Omniverse

Ansys has enabled many of the company's physics solvers, from Ansys Perceive EM™ to Ansys Fluent® to Ansys Speos® and eventually all solvers to run in the NVIDIA Omniverse environment. Being able to run physics solvers in a real-world simulation provided by NVIDIA Omniverse, Ansys makes it much faster for engineers by seeing the mutual interactions of their devices, whose behaviors are simulated by the Ansys physics solvers with the real world. Running in simulation allows for much faster adjustments of parameters and designs to find the best solution. Furthermore, engineers can get the best solution even faster by applying Generative AI and AI search.

Supermicro Scalable Computing for Ansys Physics Solvers and NVIDIA Omniverse Digital Twins

Supermicro offers a wide range of systems that support Ansys physics solvers and NVIDIA Omniverse. These systems can run bare-metal Linux for cluster deployment or run virtualized environments, such as VMware, to support Windows and Linux virtual machines. Windows-based workstations provide entry-level support for Ansys and NVIDIA.



Supermicro offers the following choices to support up to **8 NVIDIA L40S or RTX GPUs** to run Ansys physics solvers and NVIDIA Omniverse. NVIDIA H100/H200 GPUs could be used to run Ansys physics solvers.

4U / 5U 4th/5th Gen AMD EPYC™ Processors	4U / 5U 4th/5th Gen Intel Xeon Scalable Processors
AS -4124GS-TNRT, AS -5126GS-TNRT	SYS-421GE-TNRT, SYS-521GE-TNRT, SYS-522GA-NRT
Up to 6TB of memory	Up to 8 TB of memory
4 x NVMe U.2	8-24 x NVMe U.2
12 x PCIe Gen 5.0 x16 slots, 1 x PCIe Gen 5.0 x8 slot	13 x PCIe Gen 5.0 x16 slots

Example Configuration	**SYS-421GE-TNRT for Omniverse Capable Deployment X13 4U 8GPU 4th Gen Intel Xeon Scalable Proccesors PCIE 5.0 DUAL ROOT SYS**	
Component	**Description**	**Qty**
CPU	SPR 8462Y+ 2P 32C 2.8G 300W(32/2.6/270,24/3/270)60M	2
System Memory	64GB DDR5 5600 ECC REG---MEM-DR564L-CL02-ER56	16
Boot Drive	Micron 7450 PRO 960GB NVMe PCIe 4.0 M.2 TCG Opal 2.0, 1DWPD	2
Storage	Kioxia CD8 3.84TB NVMe PCIe 4x4 2.5" 15mm SIE 1DWPD,HF,RoHS	4
NVIDIA GPU	NVIDIA Ada L40S 48GB GDDR6 PCIe Gen 4th---GPU-NVL40S	8
Networking	NVIDIA PCIe 1-port IB and Ethernet 400GbE OSFP Gen5x16 CX7, RoHS	4
Bluefield-3 SuperNIC (DPU)	NVIDIA BlueField-3 BF3220 DPU 200GbE dual port Crypto Enable	1
DPU Support	NVIDIA ENT Business Standard Support Services for ADPTR-BF,3 Years	1
Supermicro System Management	Data Center Management Package (per node license)	1

Example Configuration	**SYS-521GE-TNRT for Ansys with GPU Acceleration X13 4U 8GPU 4th Gen Intel Xeon Scalable Processors PCIE 5.0 DUAL ROOT SYS**	
Component	**Description**	**Qty**
CPU	SPR 8462Y+ 2P 32C 2.8G 300W(32/2.6/270,24/3/270)60M	2
System Memory	64GB DDR5 5600 ECC REG---MEM-DR564L-CL02-ER56	16
Boot Drive	Micron 7450 PRO 960GB NVMe PCIe 4.0 M.2 TCG Opal 2.0, 1DWPD	2
Storage	Kioxia CD8 3.84TB NVMe PCIe 4x4 2.5" 15mm SIE 1DWPD,HF,RoHS	4
NVIDIA GPU	NVIDIA H200 NVL GPU	8
NVIDIA NVLink Bridge	NVLINK Bridge Board For Hopper GPU 4-way Passive	2
Networking	NVIDIA PCIe 1-port IB and Ethernet 400GbE OSFP Gen5x16 CX7, RoHS	4
Bluefield-3 SuperNIC (DPU)	NVIDIA BlueField-3 BF3220 DPU 200GbE dual port Crypto Enable	1
DPU Support	NVIDIA ENT Business Standard Support Services for ADPTR-BF,3 Years	1
Supermicro System Management	Data Center Management Package (per node license)	1

Conclusion

Join the Simulation Revolution: Discover how Supermicro's solutions can transform your design process. Contact us today to learn more and explore the possibilities.

Supermicro offers a wide range of systems that run Ansys physics and NVIDIA Omniverse. For more information:

- Supermicro Workstations
- Supermicro GPU Servers
- Ansys physics solvers
- NVIDIA Omniverse

SUPERMICRO

As a global leader in high performance, high efficiency server technology and innovation, we develop and provide end-to-end green computing solutions to the data center, cloud computing, enterprise IT, big data, HPC, and embedded markets. Our Building Block Solutions® approach allows us to provide a broad range of SKUs, and enables us to build and deliver application-optimized solutions based upon your requirements.

ANSYS

For more than 50 years, Ansys software has enabled innovators across industries to push boundaries with the predictive power of simulation. From sustainable transportation and advanced semiconductors, to satellite systems and life-saving medical devices, the next great leaps in human advancement will be powered by Ansys.