Generative AI SuperCluster
With 256 NVIDIA HGX™ H100/H200 GPUs, 32 4U Liquid-cooled Systems

Scalable Compute Unit Built For Large Language Models
- Doubling compute density through Supermicro's custom liquid-cooling solution with up to 40% reduction in electricity cost for data center
- 256 NVIDIA H100/H200 GPUs in one scalable unit
- 20TB of HBM3 with H100 or 36TB of HBM3e with H200 in one scalable unit
- 1:1 networking to each GPU to enable NVIDIA GPUDirect RDMA and Storage for training large language model with up to trillions of parameters
- Customizable AI data pipeline storage fabric with industry leading parallel file system options
- Supports NVIDIA Quantum-2 InfiniBand and Spectrum™-X Ethernet platform
- Certified for NVIDIA AI Enterprise Platform including NVIDIA NIM microservices

Building Blocks for Highest Density Generative AI Infrastructure Deployment
In the era of AI, a unit of compute is no longer measured by just the number of servers. Interconnected GPUs, CPUs, memory, storage, and these resources across multiple nodes in racks construct today's artificial Intelligence. The infrastructure requires high-speed and low-latency network fabrics, and carefully designed cooling technologies and power delivery to sustain optimal performance and efficiency for each data center environment. Supermicro’s SuperCluster solution provides foundational building blocks for rapidly evolving Generative AI and Large Language Models (LLMs). The full turn-key data center solution accelerates time-to-delivery for mission-critical enterprise use cases, and eliminates the complexity of building a large cluster, that used to be only achievable through intensive design tuning and time-consuming optimization of supercomputing.

4U 8-GPU System, Liquid-cooled
Supermicro 4U liquid-cooled system with NVIDIA HGX H100/H200 8-GPU doubles the density of the 8U air-cooled system. Our custom direct-to-chip (D2C) cold plates keep both GPUs and CPUs at optimal temperature for sustained maximum performance. Supermicro cooling distribution unit (CDU) and manifold (CDM) are the main arteries for distributing cooled liquid to the cold plates, enabling up to 40% reduction in electricity costs for the entire data center, reducing server noise, and saving data center space.

The NVIDIA HGX H100/H200 8-GPU equipped system is ideal for training Generative AI. The high-speed interconnected GPUs through NVIDIA® NVLink®, high GPU memory bandwidth and capacity are the key for running large language (LLM) models cost effectively. The SuperCluster creates a massive pool of GPU resources acting as one AI supercomputer.

Plug-and-Play, Reduce Lead-time
The SuperCluster design with the 4U liquid-cooled systems comes with 400Gb/s networking fabrics and non-blocking architecture. The 8 nodes per rack and 32-node cluster operate as a scalable unit of compute providing a foundational building block for Generative AI Infrastructure.

Whether fitting an enormous foundation model trained on a dataset with trillions of tokens from scratch, or building a cloud-scale LLM inference infrastructure, the spine and leaf network topology allows it to scale from 32 nodes to thousands of nodes seamlessly. With fully integrated liquid-cooling out of the box, Supermicro's proven testing processes thoroughly validate the operational effectiveness and efficiency before shipping. Customers receive plug-and-play scalable units for rapid deployment.
**Node Configuration**

SYS-421GE-TNHR2-LCC / AS-4125GS-TNHR2-LCC

- **Overview**: 4U Liquid-cooled System with NVIDIA HGX H100/H200 8-GPU
- **CPU**: Dual 5th/4th Gen Intel® Xeon® or AMD EPYC™ 9004 Series Processors
- **Memory**: 2TB DDR5 (recommended)
- **GPU**: NVIDIA HGX H100/H200 8-GPU (80GB HBM3 or 141GB HBM3e per GPU)
- **Networking**: 8x NVIDIA HGX H100/H200 Tensor Core GPUs
- **Storage**: 30.4TB NVMe (4x 7.6TB U.3)  
  3.8TB NVMe (2x 1.9TB U.3, Boot) [Optional M.2 available]
- **Power Supply**: 4x 5250W Redundant Titanium Level power supplies

*Recommended configuration, other system memory, networking, storage options are available.

**32-Node Scalable Unit**

SRS-48GPU-AI- LCSU

- **Overview**: Fully integrated liquid-cooled 32-node cluster with 256 NVIDIA H100/H200 GPUs
- **Compute Fabric Leaf**: 8x SSE-MQM9700-NS2F, 64-port NVIDIA Quantum-2 InfiniBand 400G NDR, 32 OSFP ports switch
- **Compute Fabric Spine**: 4x SSE-MQM9700-NS2F, 64-port NVIDIA Quantum-2 InfiniBand 400G NDR, 32 OSFP ports switch
- **In-band Management Switch**: 3x SSE-MSN4600-CS2FC 64-port 100GbE QSFP28, 2U switch
- **Out-of-band Management Switch**: 2x SSE-G3748R-SMIS, 48-port 1Gbps Ethernet ToR management switch
- **Switch**: 1x SSE-F3548SR, 48-port 10Gbps Ethernet ToR management switch
- **Rack and PDU**: 5x 48U 750mm x 1200mm PDU, 18x 415V 60A 3Ph
- **Liquid Cooling**: 4x Supermicro 80kW capacity CDU with redundant PSU and dual hot-swap pumps

*Recommended configuration, other network switch options and rack layouts are available, including configuration supporting NVIDIA Spectrum-X Ethernet.

*Login node may be required. NVIDIA Unified Fabric Manager (UFM) node optional.

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