



Liquid-Cooling Total Solution

ACCELERATED TIME-TO-DELIVERY OF
PLUG-AND-PLAY LIQUID COOLED RACKS
WITH PROVEN QUALITY AND RELIABILITY

February 2025, v4

Why Supermicro Direct-to-Chip Cooling Solutions?



REDUCTION
in OPEX Savings
Over 5 Years
From DLC
Optimized Data
Center & DLC
GPU Servers*



REDUCTION
in Data Center
Server Noise



REDUCTION
in Operating
Costs Through
Lower Power
Req. at Server

- Broad range of modular cold plate designs
- Unique liquid-cooled server designs to double GPU density at server and rack level
- Cable routing design for optimizing cooling and maintenance
- Rack-scale validation of customer applications and environments to ensure the highest quality and satisfaction
- Plug-and-play data center level integration readiness
- Single-vendor total IT solution from design to delivery
- Full data center management software for monitoring and analysis of liquid-cooling components

** Simulated by Supermicro, May, 2024. Your results may vary.*

Scan the QR code to learn more about
Supermicro **Immersion** and **Rear Door Heat
Exchanger** liquid-cooling solutions!



World-Class Rack Manufacturing Facility

Based in Silicon Valley, complementing Supermicro's unwavering commitment to quality, sustainability, and minimizing turnaround time.

Rack Capacity

5,000+ /month
with 2,000/month liquid-cooling
capacity

Production, testing, and shipping for integrated full-scale liquid-cooled rack solutions

Network Speed Testing Environment

Up to
800 Gb/s

Complete testing environment with various network protocols, including InfiniBand and Ethernet

High Efficiency + Green Production Center

11MW
total capacity

Designed for high efficiency, reduced greenhouse gas emissions, minimized air pollutants, and reduced water use

Power at Scale

480vAC

Including 208V, 415V, 277V/480VAC for 3-phase & 48VDC-ready

Single-Vendor Proven Solution

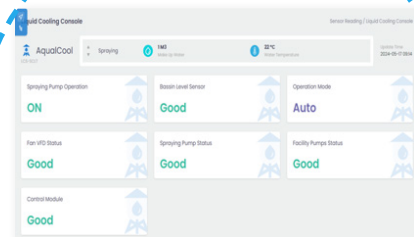
Supermicro provides total liquid-cooling solutions including hardware and management software. Supermicro delivers fully tested and validated solutions including servers, racks, networking, and liquid-cooling infrastructure, speeding up time to deployment and ensuring higher quality of the entire data center.



Cooling Tower



Rack Integration Service



**SuperCloud
Composer®**

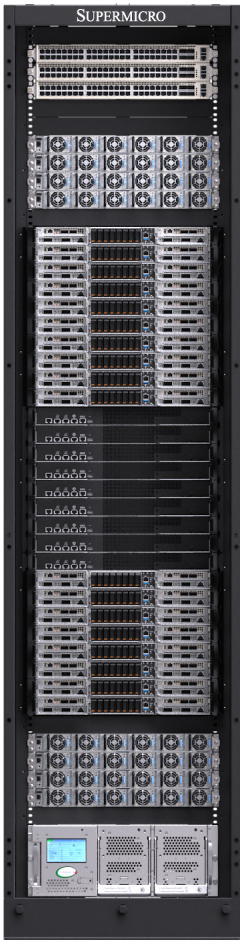


Liquid-Cooling Servers



Cooling Components

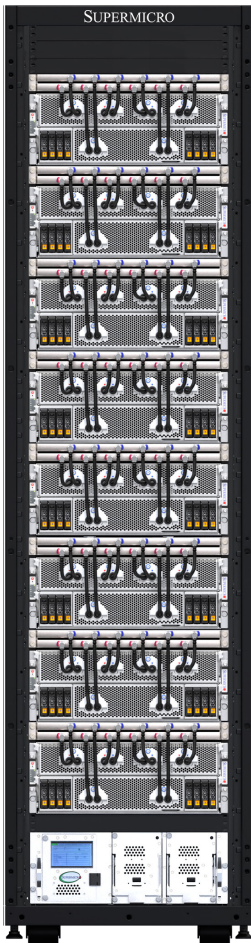
Liquid-Cooling Rack Sample Configurations - AI/LLM



NVIDIA GB200 NVL72

Up to 72 NVIDIA Blackwell GPUs/
18 compute nodes in a 50U rack

Product	Qty.
1U Liquid-cooled Server with 2 NVIDIA GB200 Grace Blackwell Superchips	18
33kW Power Shelves	8
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	2
NVLink Switch	9
In-band & Out-of-band Management Switch	1

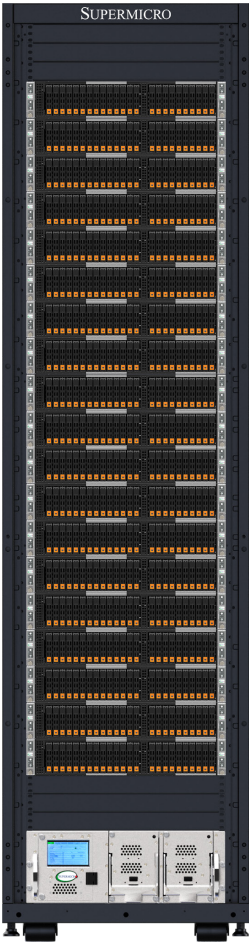


GPU Optimized Architecture

Up to 64 of the latest GPUs/
8 GPU servers in a 48U rack

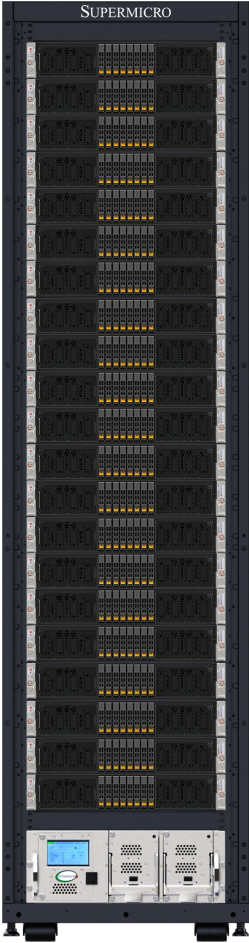
Product	Qty.
4U 8-GPU Server with NVIDIA HGX™ H100/H200 or AMD Instinct™ MI300X/MI325X	8
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Horizontal Cooling Distribution Manifold (CDM)	8
Switch	2
In-band & Out-of-band Management Switch	1

Liquid-Cooling Rack Sample Configurations - Enterprise



Industry-leading Multi-node Architecture
Up to 76 server nodes/
19 systems in a 48U rack

Product	Qty.
BigTwin®	19
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Switch	1



2U Flagship Rackmount Architecture
Up to 21 DP servers
in a 48U rack

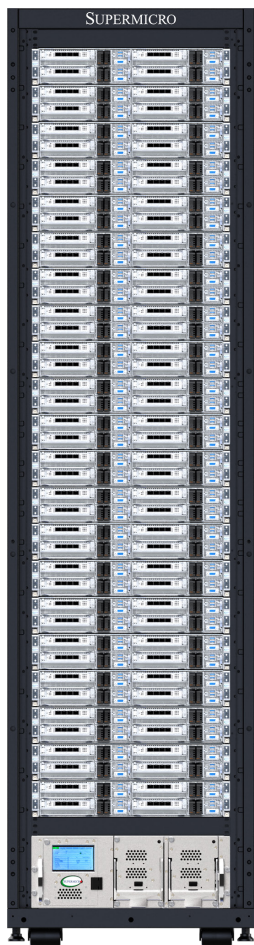
Product	Qty.
2U Hyper	21
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Switch	1



1U Flagship Rackmount Architecture
Up to 44 servers
in a 48U rack

Product	Qty.
1U Hyper	44
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Switch	1

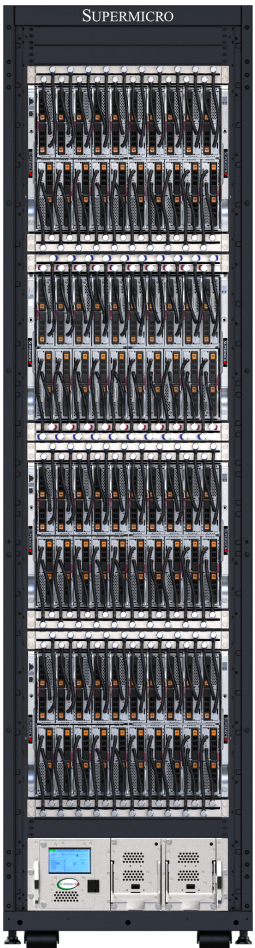
Liquid-Cooling Rack Sample Configurations - High Density HPC



Purpose-Built HPC-at-Scale Solution

Up to 84 server nodes/
21 systems in a 48U rack

Product	Qty.
FlexTwin™ Server (2U4N)	2
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Switch	1



1U Flagship Rackmount Architecture

Up to 80 server blades/
4 enclosures in a 48U rack

Product	Qty.
SuperBlade® Enclosure (8U20N)	4
DP SuperBlade® Sled	80
Cooling Distribution Unit (CDU)	1
Vertical Cooling Distribution Manifold (CDM)	1
Horizontal Cooling Distribution Manifold (CDM)	8
Switch	1

NVIDIA HGX™ Family *Flexible GPU Support*



HGX™ 8-GPU
SYS-422GA-NBRT-LCC
AS -4126GS-NBR-LCC
4U, NVIDIA HGX™ B200 8-GPU



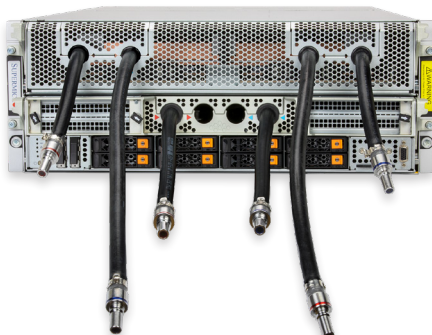
HGX™ 8-GPU
SYS-421GE-TNHR2-LCC
AS -4125GS-TNHR2-LCC
4U, NVIDIA HGX™ H100/H200 8-GPU

NVIDIA MGX™ Family

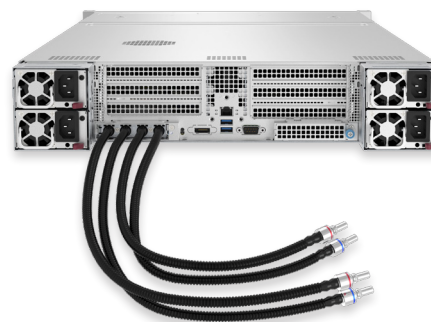


1U2N GH200
ARS-111GL-DNHR-LCC
1U2N, NVIDIA GH200 Grace™ Hopper Superchip

AMD Instinct™ Family



MI325X 8-GPU
AS-4126GS-NMR-LCC
4U 8-GPU, AMD Instinct™ MI325X



4 APU MI300A
AS-2145GH-TNMR
2U 4-APU, AMD Instinct™ MI300A

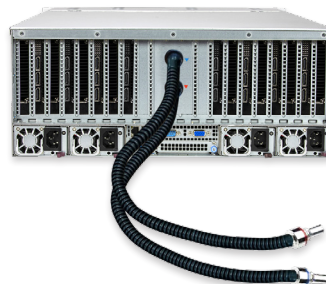
Server Families Supporting Optional Liquid-Cooling



4U HGX GPU



8U HGX/OAM GPU



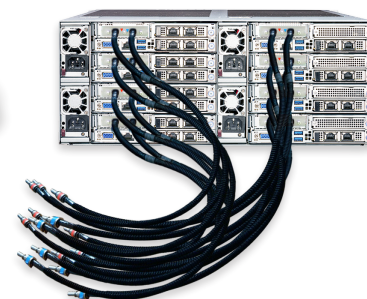
4U PCIe GPU



NVIDIA MGX™



2U4N FlexTwin™



4U4N / 4U8N FatTwin®



2U2N / 2U4N BigTwin®



SuperBlade®



1U / 2U Hyper

Supermicro Cooling Tower

The Supermicro Liquid-Cooling Solution now includes a complete Liquid-Cooling Tower infrastructure, which is designed to efficiently remove the heat produced by today's-and tomorrow's-most powerful CPUs and GPUs, including those for AI training and inferencing. Supermicro's pioneering total Liquid-Cooling Infrastructure enables customers to obtain everything that is required for a modern data center from a single vendor.



Supermicro Cooling Tower

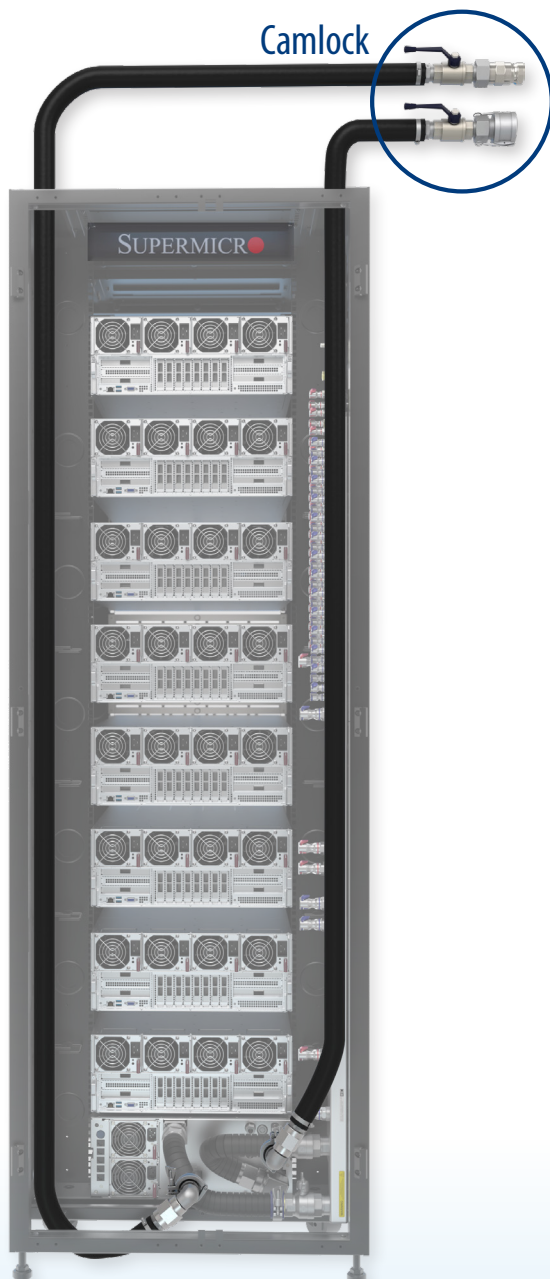
Benefits & Capabilities

- Modular design available in different sizes with multiple cell configurations up to a maximum of 10MW per unit and scalable up to multiple cell configurations from 5MW to hundreds of MW
- Each cell can be used separately, enabling cooling tower redundancy
- Closed-loop design to optimize system reliability
- High Temperature Fills ($>60^{\circ}\text{C}$) – Higher temperature water can be returned to the cooling tower enabling higher efficiency
- Low power consumption with 6.2kW/MW of cooling
- Low water consumption with 6.2GPM/MW of cooling
- Epoxy coated stainless steel preventing corrosion and rated for 20+ years
- Quick deployments based on facility readiness
- Management of cooling tower telemetry



Plug-And-Play Flexible Hose Kits

The Supermicro liquid-cooling rack solution includes standard 1.25-inch CDU hose kit connections. The hose kit design makes it easy to connect racks directly to data center's primary water supply or cooling tower. The Hose Kit ensures seamless integration with existing facility piping and provides the flexibility for future expansion to potentially lower data center upfront investment costs.



Benefits & Advantages

- Flexible length design to fit different rack and data center placements
- High liquid pressure tolerance with 10-bar rate
- Ball valves provide excellent sealing which can prevent facility water and coolant evaporation
- Universal camlock for seamless integration with existing facility piping
- Dummy-proof camlock design with one female and one male connector
- Preinstalled Hose Kit in rack for plug-and-play toolless deployment



Supermicro Hose Kits

High Performance, User-Friendly CDU

Supernano 4U Cooling Distribution Unit (CDU) contains the pumping system that circulates coolant to the cold plates, which carry heat away from CPUs, GPUs, and DIMMs.



Fast Maintenance & Advantages

- Automatic anti-condensation control
- Supports up to 45°C facility water
- Cooling capacity up to 100kW or 250kW
- In-Row configuration available to support up to 10 racks per CDU
- Maximum uptime and redundancy
- Peak operating efficiency
- N+1 hot-swappable pumps and PSUs
- Replace pumps in 2 minutes
- Replace PSU in 1 minute
- Intelligently monitor and manage the health of CDU using SCC



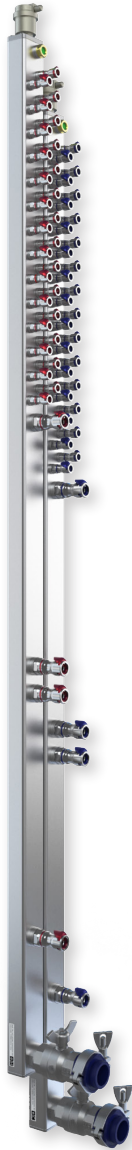
Dedicated Management & Advantages

- Intelligent CDU monitoring and control
- CDU physical assets information detection such as coolant pressure, flow rate, and leakage
- Flexible CDU touch panel and remote access
- Fully integrated with Supernano SuperCloud Composer® (SCC) software
- Real-time sensor reading
- Historical data available
- Intelligently monitor and manage the health of CDU using SCC

Cooling Components - CDM (Coolant Distribution Manifold)

CDM

Supplies cold coolant to each server and returns warm coolant back to the CDU. Supermicro offers vertical and horizontal CDMs for maximum configuration flexibility.



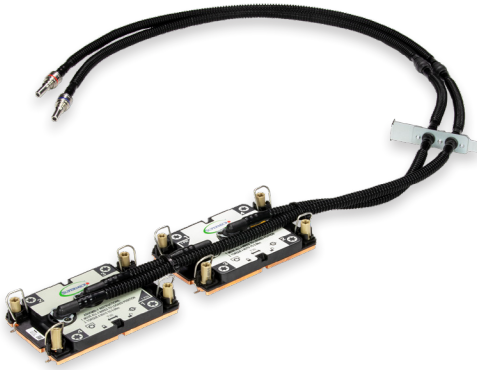
Benefits & Advantages

- Optimized flow distribution
- Supports 42U, 48U, and 52U rack configurations with customizable spacing and size Quick Disconnect Couplings (QDC)
- One-handed QDC operation
- Liquid level and air pressure sensors with sight glass
- Easy maintenance facilitated by user-friendly mounts



Modular Design Cold Plates

CPU, GPU, and DIMM cold plates designed for exceptional thermal performance and minimal pressure drop



CPU Cold Plate



GPU Cold Plate



DIMM Module

Benefits & Advantages

- Lower thermal resistance compared to industry-standard thermal mechanism specifications and design guidelines
- GPU cold plate also helps cool other related components that require liquid-cooling, such as GPU switches
- Advanced heat dissipation efficiency with micro-sized channels thinner than a human hair

CPU Cold Plate



Latest Intel® Xeon® Processors

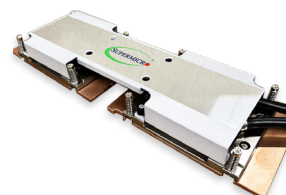


Latest AMD EPYC™ Processors

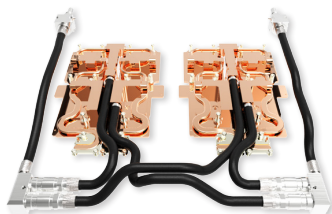
GPU Cold Plate



**NVIDIA HGX™ H100 8-GPU
NVIDIA HGX™ H200 8-GPU**

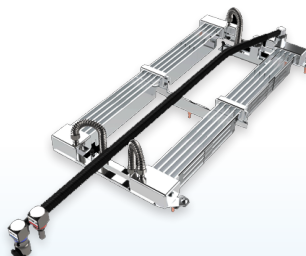


AMD Instinct™ MI325X



NVIDIA GB200 Grace™ Hopper Superchip

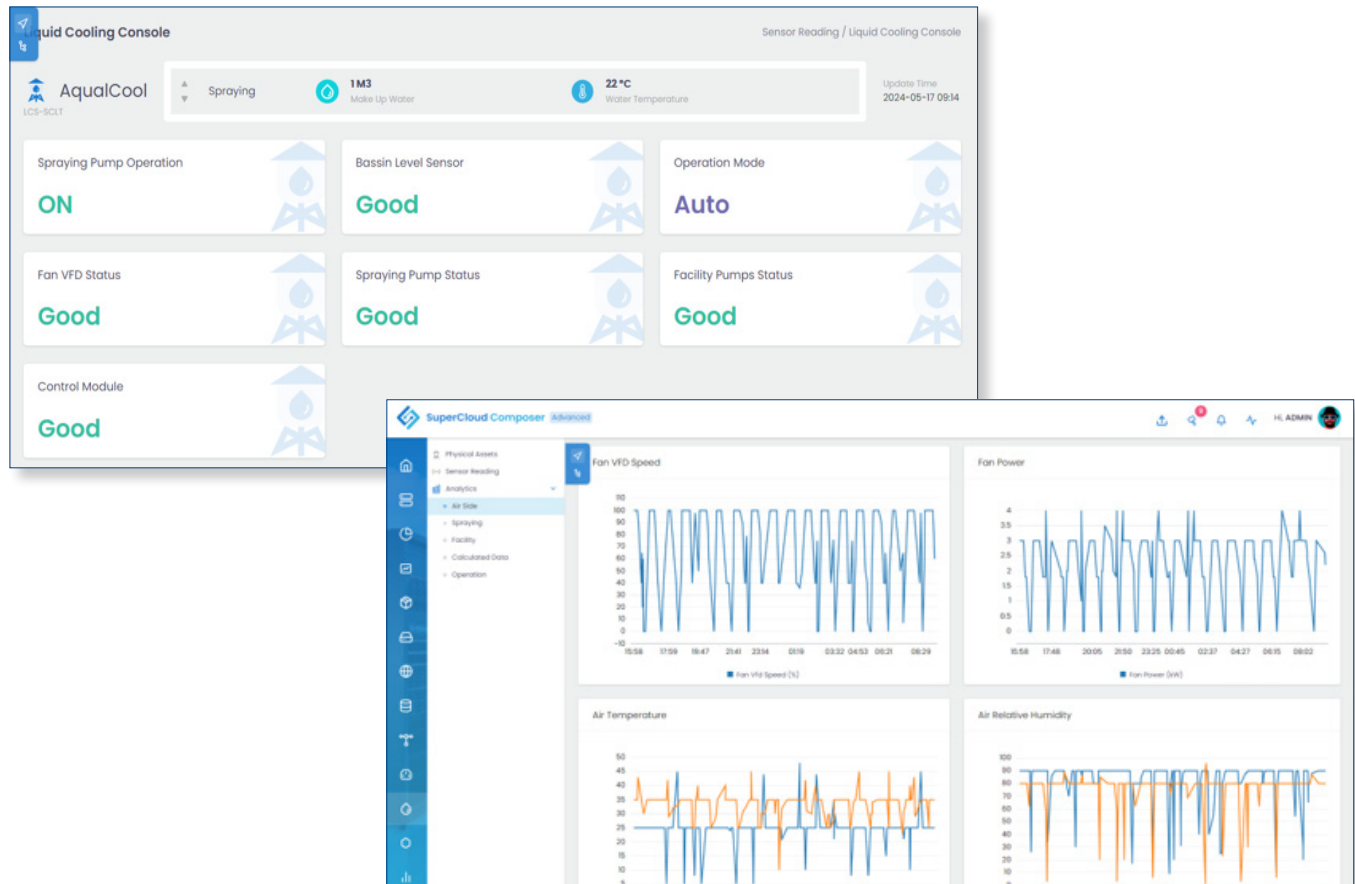
Memory Cold Plate



DDR5 DIMM

SuperCloud Composer® Software Management

SuperCloud Composer®'s LCCM (Liquid-Cooling Consult Module) interface is a powerful tool to collect vital information on physical assets and sensor data from CDUs (Cooling Distribution Unit) and cooling towers, including component health, pressure, humidity, temperature, pump status, and more. Data is represented in real-time, ensuring maximum operating efficiency of data centers for the sustainable future, supporting best in class compute power, PUE, CAPEX, and OPEX.



Benefits & Advantages

- Chip to DCIM management for liquid-cooling infrastructure under same console
- Intelligent policies to safeguard critical components such server nodes and cooling distribution units
- Scalable to manage up to 20K nodes
- Supports management of industry leading datacenter hardware technologies with meaningful telemetry and analytics
- Northbound Restful APIs to integrate with existing infrastructure

Scan to schedule
online demo!



Supermicro Liquid-Cooling Service Options

SMCI Service

- **Gold Service:** Supermicro “four-hour” onsite service is designed for rapid response to critical issues and emergencies, ensuring minimal downtime and swift resolution of problems.

OS4HR_x:

- **Silver Service:** Supermicro “next business day” onsite service provides extended support, ensuring timely response and resolution of issues without the immediate urgency.

OSNBD_x:

Onsite Installation

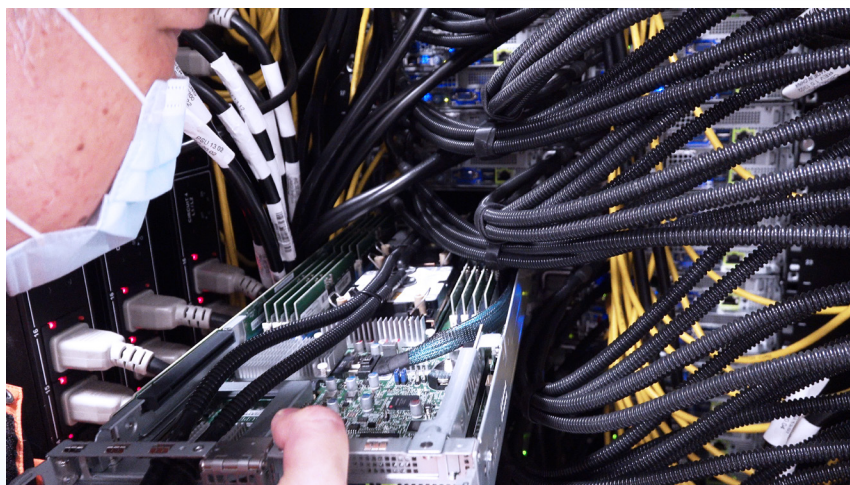
- Onsite installation service ensures the successful implementation of systems for operational readiness. Our service provides planning, installation, deployment, and operational testing.

OSINTS:

Maintenance

- Preventive maintenance is essential to continued reliable operation of liquid-cooling systems. Suggest maintenance be conducted at least once a year (or customized time period).

SMLCPM_x:



_x indicates time duration in years

“Data center liquid-cooling can be free, with a bonus”

Charles Liang

Founder and CEO of Supermicro

Designing and implementing a liquid-cooled data center reduces the overall cost of a data center, and as a bonus, reduces on-going electricity bills*

- Data center construction costs for power delivery infrastructure are lower for a liquid-cooled data center.
- Data center PUE is lower with a liquid-cooled data center. Significant ongoing cost reduction is realized with lower power bills

For More Information on Supermicro Liquid-Cooling Solutions

<https://www.supermicro.com/en/solutions/liquid-cooling>

https://www.supermicro.com/solutions/datasheet_Liquid_Cooling_Components.pdf

** Simulated by Supermicro, May, 2024. Your results may vary.*

Rack Plug-And-Play

- Industry's broadest portfolio of workload-optimized servers
- Rack scale plug-and-play service delivers complete, validated solutions within weeks
- Liquid-cooling rack production capacity up to 2,000 racks per month worldwide
- Made in the USA program
- Industry standard compliance for attestation of components throughout the entire supply chain

Rack Scale Solutions / Design / Production / Validation / Logistics and Service with 5,000+ Integrated Rack Solution Capacity per Month.

Flexible AC Power
(120/208/230/480VAC, Single/3-phase)
48VDC Power

Network Testing Environments
10/25/40/100/200/400/800 Gb/s

Air Cooling / Free Air Cooling /
Liquid-Cooling

Turnkey Data Center Solutions
Within Two Weeks

On-Site Deployment and On-Going
Support Available



Global Expansion

Providing Greater Economies of Scale and Accelerated Support to Data Center, Cloud Computing, AI, Enterprise IT, HPC, 5G, Hyperscale, and Embedded Solutions Customers Worldwide



Worldwide Headquarters
San Jose, California, USA



America

- Supermicro's Headquarters expansion: Over 1.5 million square foot **Green Computing Park** in San Jose, California signals the company's increasing leadership in the IT industry
- One of the largest high-tech R&D, manufacturing, and business hubs in Silicon Valley
- East Coast Sales and Service Office



APAC

Supermicro's **Asia Science and Technology Park** is a key milestone in the company's growth as a true global leader in the development of advanced, power saving computing technologies



Silicon Valley

Expanded manufacturing, command center



EMEA

Supermicro's system integration facility and services in The Netherlands serves the dynamic, rapidly growing EMEA market with localized supply and time-to-market advantages

Supermicro Worldwide

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Better

Better Performance
Per Watt and Per Dollar

Faster

First-to-Market Innovation with the
Highest Performance Server Designs

Greener

Reduced Environmental Impact
and Lower TCO



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