

Supermicro Liquid Cooling Tower

Solution Summary

Worldwide, the amount of energy that data centers consume is increasing yearly. A significant portion of this is to cool the servers and storage systems. With the increased use of servers dedicated to AI training, traditional air cooling costs are skyrocketing, requiring liquid cooling to be considered. In fact, liquid cooling may be the only viable technology moving forward with the current trajectory of increasing TDP at the server and rack level. The ability of forced air systems to remove the heat generated in the entire data center requires significant investments in computer room air conditioning infrastructure, significantly increasing the TCO of a data center. Liquid cooling is significantly more efficient at the data center level and requires an entire solution to cool the systems. The Supermicro green computing total solution now includes a state-of-the-art integrated liquid cooling tower as part of the overall infrastructure.

The Supermicro Liquid Cooling Tower solution is versatile and energy efficient at removing the heat produced by today's latest servers. The system is optimized to transport and remove the heat from today's most powerful AI servers. Supermicro is pioneering a way to obtain a complete AI solution, from the servers to the cooling infrastructure.

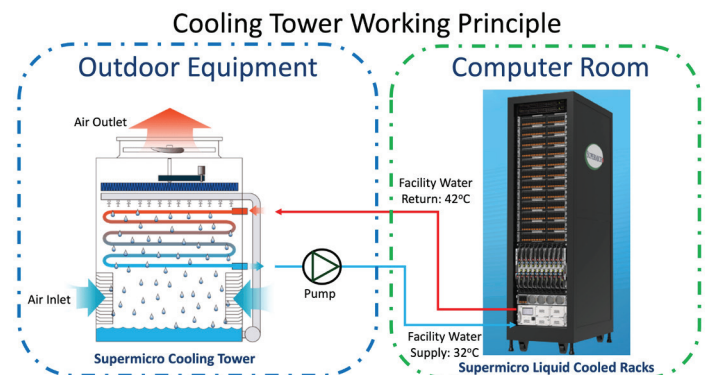


The Supermicro Liquid Cooling Tower is designed for the modern data center with the following capabilities:

- Closed Loop Design
- Modular Design – available in different sizes with multiple cell configurations up to reach a maximum of 10MW per unit
- Each cell can used separately, enabling cooling tower redundancy
- Optimized for liquid cooling workloads
- High Temperature Fills (>60C) – Higher temperature water can be returned to the cooling tower.
- High Temperature range enabling higher efficiency
- Low power consumption – 6.2kW/MW of cooling
- Low Water consumption – 6.2GPM/MW of cooling
- Long Lifetime: 15-20years with epoxy coated Stainless Steel for corrosion prevention
- Quick deployments (weeks, not months)

How Does the Supermicro Liquid Cooling Tower Solution Work?

1. Warm facility water is circulated by pumps through each Supermicro Liquid Cooled Racks, removing the heat from the coolant loop and cooling the servers. The heat is transferred from the coolant to the warm water through the CDU heat exchanger, and, as a result, the water exits at a higher temperature.
2. The cooling tower cools the warm water down to a temperature at which the water can be returned to the racks, and the cycle is then repeated.



The Supermicro Cooling Tower is a closed type cooling tower that integrates a heat exchanger instead of a classical open type cooling tower for which an external heat exchanger is necessary. In a closed loop cooling tower, the process water (water loop that is cooled down by the cooling tower) transfers heat to the environment by flowing through heat transfer tubes called coils. Water is sprayed over the hot surface of the coils and evaporates in the air moved by the cooling tower fan, creating a cooling effect for the process water flowing within the coils. The process water and sprayed water never come in contact with each other. The process water is clean from all the pollution from the air and the buildup of water residues.

Factors that Affect the Capacity of the Supermicro Liquid Cooling Tower

1. The temperature of the water supplied to the rack depends on the rack configuration.
2. Temperature and humidity of the outside air are generally characterized by the wet bulb temperature, defined as the lowest temperature at which air can be cooled by the evaporation of water into the air.

Examples of Supermicro Liquid Cooling Solutions

Lawrence Livermore National Laboratory “Ruby”

- COVID-19 Research
- 1,528 nodes (Intel® Xeon®) with Intel Deep Learning Boost
- Ranked #79 on November 2020 Top500 List

Cooling Type – **Liquid to Liquid (Direct Liquid Cooling)**

Press Release: [Supermicro Scalable Liquid-Cooled Supercomputing Cluster Deployed at Lawrence Livermore National Laboratory for COVID-19 Research](#)



Osaka University – SQUID

- 1,520 general-purpose CPU nodes (3rd Gen Intel® Xeon® Scalable Processors)
- 42 GPU nodes (NVIDIA A100)
- Supermicro SuperBlades®
- Ranked #57 on Green500 List and #67 on Top500 List in June 2021

Cooling Type – **Liquid to Liquid (Direct Liquid Cooling)**

[Read More About Osaka University and Supermicro Servers](#)

For more information about Supermicro Liquid Cooling Solutions, please visit <https://www.supermicro.com/liquidcooling>

Read the Supermicro Liquid Cooling Solution Guide: [https://www.supermicro.com/solutions/Solution-Brief Supermicro Liquid Cooling Solution Guide.pdf](https://www.supermicro.com/solutions/Solution-Brief%20Supermicro%20Liquid%20Cooling%20Solution%20Guide.pdf)

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