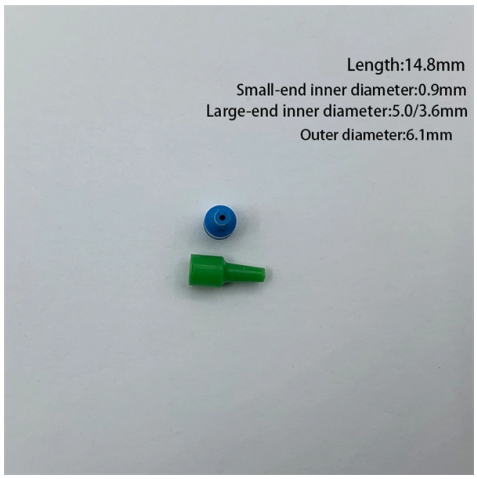
The Relationship Between Liquid-Cooled Servers and AI



Overview

Hotter Than a Hot Tub: The 45°C Breakthrough to Cool AI's Biggest. NVIDIA's newest AI servers can run their cooling liquid even hotter — up to 45 degrees.

Key Takeaways

Liquid cooling is essential for AI servers because it efficiently manages the extreme heat generated by high-density, power-hungry AI workloads, enabling higher performance, energy efficiency, and server density.

Why A

I Drives the Need for Liquid CoolingAI workloads, particularly generative AI and large-scale model training, require servers with multiple GPUs, CPUs, and DPUs, consuming 20 times more power than standard cloud servers and producing proportionally more heat per server. Traditional air-cooling systems are limited to around 15–25 kW per rack, whereas modern AI servers can demand 85–250 kW per rack, far exceeding air-cooling capabilities. This creates a “thermal wall” where conventional cooling cannot maintain safe operating temperatures, making liquid cooling the only viable solution for high-density AI environments.

How Liquid Cooling Works

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Liquid cooling systems typically use direct-to-chip cold plates or engineered fluids that absorb heat from processors and transfer it through a Technology Cooling System (TCS) loop to a Coolant Distribution Unit (CDU), which then rejects heat to facility water systems or outdoor chillers. These systems can transfer heat up to 3,500 times more effectively than air, dramatically improving cooling efficiency and reducing energy consumption. Hybrid approaches may still use air for secondary components, but liquid handles the majority of thermal load.

Benefits for AI Data Centers

Higher server density: Liquid cooling allows racks to operate at over 120 kW, supporting more GPUs per rack without overheating. Energy efficiency: Cooling energy consumption can drop by up to 40%, and water usage can be reduced by up to 60% when systems are optimized for higher temperature operation. Extended hardware lifespan: Efficient heat removal reduces thermal stress on components, lowering maintenance costs and downtime.

Scalability: Liquid cooling enables data centers to meet the surging demand for AI compute without requiring proportional increases in physical space or power infrastructure. Adoption TrendsLiquid-cooled AI servers are rapidly gaining adoption. In 2024, only 15% of AI servers were liquid-cooled, but projections indicate this will rise to 76% by 2026, driven by the need to support next-generation AI workloads.

While most data centers remain primarily air-cooled, hybrid and fully liquid-cooled designs are becoming standard for high-density AI deployments.

Conclusion

The relationship between liquid-cooled servers and AI is fundamentally driven by thermal management challenges.

As A

I workloads grow in complexity and power demand, liquid cooling is no longer optional—it is a critical enabler of performance, efficiency, and scalability in modern AI data centers.

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Article Content

Hotter Than a Hot Tub: The 45°C Breakthrough to Cool AI''s Biggest ...

NVIDIA''s newest AI servers can run their cooling liquid even hotter — up to 45 degrees Celsius, or 113 degrees Fahrenheit. That higher temperature limit is precisely what makes them more

Why liquid cooling will dominate AI data centres in 2026

Liquid cooling is essential for AI-driven data centres, efficiently managing the extreme heat generated by high-density AI server racks. It offers

Answering the top FAQs on AI and liquid cooling

Growing enterprise interest in deploying AI applications is accelerating demand for liquid-cooled servers. Liquids do a better job than air dissipating heat, and many new chips being deployed

Why Liquid Cooling Is the Future of AI Data Centers: Beyond the

Single-phase liquid cooling enables high-density server cooling, meeting the demands of AI and next-generation computing workloads. Optimizing liquid cooling architectures and choosing between

How Liquid Cooling Improves Efficiency in AI Data Centers

Liquid cooling improves efficiency in AI data centers by cutting power, reducing water use, and enabling high-density GPU workloads. Explore the 2026 case for AI infrastructure.

Why Liquid Cooling For AI Data Centers Is Harder Than It Looks

Liquid cooling is essential for AI data centers—but deploying it at scale requires advanced design, smart vendors and AI-powered operations to avoid costly downtime.

Hybrid Liquid Cooling: The Future of AI Data Center Thermal

Discover why hybrid liquid cooling is emerging as the only sustainable way to handle the extreme heat of AI workloads. Learn how this advanced cooling solution improves efficiency, reduces

Liquid cooling becoming essential as AI servers proliferate

In data centers with liquid cooling, typically only 10% of racks or fewer are using it. But as AI workloads are deployed at a runaway pace, liquid cooling is becoming increasingly popular.

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Liquid Cooling Integration on AI Server PCBs: Cold Plate, Manifold

This comprehensive guide explores the integration of cold plate cooling and manifold systems into AI servers, and dissects the rigorous board-level PCB design requirements necessary to support these

CoreWeave and Dell Technologies Extend Relationship to Deliver AI

CoreWeave will receive[1] liquid-cooled, fully-integrated Dell IR7000 racks with Dell PowerEdge XE9712 servers, supported by Dell''s AI professional services to optimize CoreWeave''s

The Cooling Crisis Facing Space Data Centers

Space data center cooling remains the biggest barrier to scaling orbital AI infrastructure.

Powering the AI Era: How ZTE Is Redefining Data Center Infrastructure

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Inside OCP Global Summit 2025: Power, Cooling, and the Emerging ...

This year''s discussions—from higher-voltage DC power to open liquid cooling—are shaping the blueprint for the next generation of AI factories. These architectures point toward a new

AI Server Market Size & Share, Statistics Report 2025-2034

Based on cooling technology, the AI server market is categorized into Air-cooled, Liquid-cooled, and Hybrid cooling systems. Air-cooled segment dominates the market with 68.4% share in 2024, and

Cisco Announces Silicon One G300, Advanced Systems and Optics

These advancements deliver a major leap forward in power-efficient, high-performance AI infrastructure. Cisco N9000 and Cisco 8000 102.4T Systems: powered by Silicon One G300, deliver

Dell Technologies Reimagines the Modern Data Center

Dell PowerEdge portfolio expands with eleven new servers that significantly improve data center efficiency across air-cooled and liquid-cooled

Liquid Cooling Vendor Market Leaves Operators Struggling

Six major liquid cooling acquisitions reshaped the market without simplifying it. Operators still face 15-plus vendors, incompatible specs, and no common standards.

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JetCool Launches Liquid-Cooled Dell PowerEdge XE7745 Server

High-Density Computing Solution: JetCool''s newly launched liquid-cooled Dell PowerEdge XE7745 server supports dual 5th Gen AMD EPYC processors and up to eight NVIDIA

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