AI Server Immersion Cooling



Overview

Immersion cooling absorbs 100% of rack heat — but room cooling remains essential for air quality and humidity management.

Key Takeaways

Immersion cooling submerges AI servers in non-conductive liquid to efficiently dissipate heat, enabling higher density, energy savings, and sustainable data center operations.

How Immersion Cooling Works

Immersion cooling involves placing servers directly into a dielectric coolant, a non-conductive fluid that absorbs heat from CPUs, GPUs, memory, and power electronics far more efficiently than air. The heat is then transferred to a heat exchanger or condenser, depending on the system design. This eliminates the need for fans, heatsinks, and complex airflow management, simplifying data center infrastructure.

There are two main types: Single-phase immersion cooling: The coolant remains liquid throughout the process. Warm fluid circulates through a heat exchanger and returns cooled to the tank. Two-phase immersion cooling: The coolant boils at a low temperature when heated, vapor rises, condenses on a heat exchanger, and returns as liquid.

This method offers higher heat transfer efficiency but is more complex and costly.



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Benefits for A

I WorkloadsAI servers, especially GPU-dense systems, generate extreme heat due to high power density, often exceeding 40 kW per rack. Immersion cooling provides: Superior thermal management: Eliminates thermal throttling, allowing maximum performance. Higher hardware density: Supports more compute power in the same footprint.

Energy efficiency: Reduces cooling energy consumption, achieving PUE

Article Content

Immersion cooling systems: Advantages and

Immersion cooling absorbs 100% of rack heat — but room cooling remains essential for air quality and humidity management. Rack densities are

AI Server Liquid Cooling: Cold Plates & Immersion

As AI server TDP surges past 1000W, traditional air cooling fails. Explore cold plate and immersion liquid cooling technologies. Get a Free DFM from Ecotherm.

Optimizing AI Performance with Immersion Cooled Data Centers

The Cisco-GRC solution reduces environmental impact through innovative immersion cooling and optimized infrastructure. By replacing traditional air-cooling with efficient immersion technology,

Liquid cooling best practices for AI data centers

Discover liquid cooling best practices for AI data centers, including design, deployment, maintenance, and sustainability benefits.

Data Center Liquid Cooling: The AI Heat Solution

In two-phase immersion cooling, a server is dunked into a vat of liquid. The liquid actively boils next to the heat-producing

AI-driven cooling technologies for high-performance data centres:

This study presents a comprehensive, system-wide review of next-generation cooling technologies, including direct liquid cooling, immersion cooling, two-phase systems, spray and jet

Data Center Liquid Cooling for AI Workloads (2026) · KAD

An engineering-focused overview of cold plate and immersion liquid cooling in 2026, driven by 1,000W+ AI accelerators like NVIDIA Blackwell and Rubin.

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Microsoft Unveils Immersion Cooling to Solve AI Heat Bottleneck | The ...

Microsoft''s new system uses a two-phase immersion cooling approach where server components are submerged in a special fluid that boils at a low temperature, carrying heat away from

Liquid Cooling Deployments Triple as AI Server Densities

Direct-to-chip and immersion cooling installations surged 200% year-over-year as rack densities for AI workloads push beyond 100 kW per rack.

Immersion Cooling Server

Immersion cooling is a highly power-efficient solution that addresses the increasing heat in servers by submerging them in dielectric coolant. It offers a greener alternative to air cooling with improved PUE

Immersion Cooling Data Centers | Hyperscale Builds 2025

Learn why immersion cooling is moving mainstream in hyperscale data centers. Explore benefits, adoption trends, and how AI drives high-density

Datacenters that make sense | Liquid Cooling at Scale | Submer

Company specializing in immersion liquid cooling solutions for data centers. We create liquid-cooled datacenters that scale smarter, run cleaner and cost less.

Two-Phase Liquid Immersion Cooling Servers Market Analysis

The dynamic Two-Phase Liquid Immersion Cooling Servers Market is rapidly evolving as organizations prioritize efficiency, innovation, and resource optimization.

Data center liquid cooling in 2025

Data centre liquid cooling interest surges for AI; direct to chip leads dense racks, while legacy under 10kW lags.

Direct-to-Chip vs Immersion Cooling

Reviewed by Yoan Guyon, Managing Director at gbc engineers AI and HPC servers have pushed rack power from 5 to 15 kW to 50 kW, 100 kW or more. At those densities, traditional air

Rack-Scale Liquid Cooling Solutions | Supermicro

Dive into Liquid Cooling Server solutions, providing efficient thermal management. Ideal for high-performance computing, ensuring optimal operation.

Liquid Cooling: The 2026 Mandate for 100kW AI Racks

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In 2026, liquid cooling is mandatory for 100kW AI data centers. Learn how key partnerships are solving the power crisis and shaping the future of cooling.

Liquid, Immersion, Hybrid: The Cooling Architectures

AI workloads are pushing data center cooling beyond air. Explore why liquid, immersion, and hybrid cooling architectures are emerging as the

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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