AI Liquid-Cooled Switch



Overview

Exploring the Future of AI Networking: Liquid-Cooled Switches. Cisco is leading this innovation with ongoing R&D into direct-to-chip liquid-cooled switc.

Key Takeaways

AI liquid-cooled switches use direct-to-chip or cold plate cooling to manage extreme heat in high-density AI data centers, enabling higher performance, efficiency, and reliability. Why Liquid Cooling is NeededAI workloads generate unprecedented heat due to high-bandwidth, high-density switches and optical transceivers. Traditional air cooling struggles to dissipate heat from modern switches, especially as power consumption and heat flux density of ASICs and optical components have increased dramatically over the past decade.

Liquid cooling directly extracts heat from chips, maintaining optimal operating temperatures and preventing throttling or failures.

Cooling Methods

Cold Plate (Direct-to-Chip) Cooling: A copper or aluminum plate is mounted on the switch ASIC or optical module. Coolant circulates through micro-channels, transferring heat to a secondary loop connected to a Cooling Distribution Unit (CDU). This method preserves standard server form factors and allows incremental upgrades in existing data centers.

Immersion Cooling: Components are submerged in dielectric fluids, achieving maximum thermal efficiency with PUE values as low as 1. 02–1. 05.

Hybrid Systems: High-TDP components like GPUs or AI switches are liquid-cooled, while lower-power devices remain air-cooled.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Benefits of Liquid-

Cooled Switches

Higher Performance and Density: Supports 400G, 800G, and beyond, enabling denser fabrics and larger AI clusters within the same rack footprint. Energy Efficiency: Can reduce power consumption by 5–50% compared to air cooling, depending on design and deployment. Reliability and Maintenance: Eliminates fans, reducing vibration and failure rates, and separates liquid and electrical circuits to prevent damage in case of leaks.

Operational Flexibility: Supports modular designs like Arista's fully liquid-cooled racks and Arista XPO pluggable optical modules, allowing high-bandwidth upgrades without replacing entire switches.

Industry Developments

Cisco is developing direct-to-chip liquid-cooled switches capable of maintaining top throughput while reducing energy costs and enabling denser AI fabrics. Arista is designing liquid-cooled racks supporting up to 32 AI fabric switches, optimized for high-density deployments and improved reliability.

NVIDI

A and other vendors have introduced liquid-cooled solutions for high-power AI networking, including cold plate designs for optical modules and switches.

Arista XP

O Modules integrate liquid-cooled cold plates to support 400W+ optical modules, delivering up to 204. 8Tbps per Open Rack Unit, significantly increasing front-panel density.

Adoption Trends

By 2026, liquid cooling adoption in new AI data centers has reached approximately 22%, driven by extreme rack power density, energy costs, and sustainability goals. Cold plate liquid cooling dominates the market, accounting for roughly 65% of deployments.

As A

I workloads continue to grow, liquid-cooled switches are becoming a baseline requirement rather than an optional enhancement. ConclusionAI liquid-cooled switches are essential for modern high-performance data centers. They provide efficient heat management, higher density, energy savings, and improved reliability, enabling the deployment of large-scale AI clusters that would be impossible with traditional air-cooled systems.

Vendors like Cisco, Arista, and NVIDIA are leading the development of these solutions, making them increasingly accessible for next-generation AI infrastructure.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Article Content

Exploring the Future of AI Networking: Liquid-Cooled Switches ...

Cisco is leading this innovation with ongoing R&D into direct-to-chip liquid-cooled switching platforms. By connecting you to this technology path before launch, we invite you to assess, plan, and pave the

Deep Dive: Liquid-Cooled AI Switches for the Next Generation

This article delves into the design difficulties and solutions for liquid-cooled switches, while also exploring the potential of liquid cooling technology in promoting innovation of network devices.

Arista developing liquid-cooled network switches

“In conclusion, AI data centers need liquid-cooled switches,” Bechtolsheim said at Hot Interconnects. “This reduces power consumption and failure rates, while enabling scale-out networking.”

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

H3C''s Core Liquid Cooling Breakthrough: Redefining 800G Switch ...

To address this challenge, the H3C S9827 series switches introduce the innovative Adaptive Contact liquid cooling architecture. At its core lies the exclusive patented Dual-Floating

Cisco targets high-speed AI networking with 102.4Tbps

Cisco said the systems deliver 102.4Tbps switching speeds and are aimed at customers building large AI fabrics. The new systems will be available

Cisco''s Liquid-Cooled 51.2T Switch: Next-Generation Data Center ...

Cisco''s 51.2T liquid-cooled switch represents a significant leap forward in data center technology. By integrating direct-to-chip liquid cooling, the company is not only pushing the

Arista touts liquid cooling, optical tech to reduce power consumption ...

Arista Networks shared some of its plans to deliver liquid-cooled switches and racks that can significantly reduce power consumption in enterprise AI networks.

Liquid-cooled switch delivers 102.4 Tbps switching capacity per chip

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Designed for AI/cloud data center and high-performance computing (HPC) applications, the product addresses high-speed connectivity requirements for generative AI, large-scale

Built like a startup, scaled like Cisco: Transforming data

Explore how Cisco built a direct-liquid-cooled switch using a startup mentality to solve AI data center energy and cooling challenges.

NVIDIA/Mellanox MMS4A00-XM-FLT/MMS4C10-XM

This design achieves higher integration, lower power consumption, and greater port density. The transceiver is ideal for 1.6T liquid-cooled switch-to-switch

Power and Cooling Solutions for Data Center

Power and Cooling Solutions for AI Computing AI workloads demand massive computing power and generate significant heat. Delta''s integrated power and

AI Networking Battle: Nvidia, Arista, Dell & HPE Updates

Explore the latest AI networking news: Nvidia''s PC maker rumors, Arista''s Q4 revenue, new XPO liquid-cooled optics, and the $140B data center

Arista Introduces Next-Generation 1.6Terabit Portfolio for AI Fabrics ...

By unlocking the on-chip resources and the features of the Tomahawk ® 6 silicon while maintaining software consistency with Arista EOS or Open NOS, the switches are transformed into a unified rack

Juniper QFX Series Switches | HPE

Explore the Juniper QFX Series Switches portfolio QFX5250 High-performance liquid-cooled Ultra Ethernet Transport ready switch, built on Broadcom Tomahawk 6 with 102.4 Tbps bandwidth

Why liquid cooling will dominate AI data centres in 2026

As AI power demands surge into 2026, liquid cooling is becoming the essential technology keeping data centres efficient, stable, and future-ready.

NVIDIA Vera Rubin NVL72: Full Specs & Platform Breakdown

NVIDIA announced the Vera Rubin platform at GTC 2026. Vera Rubin is a seven-chip, five-rack AI supercomputer architecture designed for agentic AI workloads. The platform is in full

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

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Although each generation offers significantly more computing power for each watt, full liquid-cooled AI compute infrastructure enables data centers to dramatically reduce cooling energy

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

Contact Us

Continue your research online:

Website: https://fdsoluciones.es
Technical inquiry: https://fdsoluciones.es/project-enquiry.html

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

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved