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Liquid Cooling for AI Data Centers Market Forecasts to 2034 – Global Analysis By Cooling Type (Direct-to-Chip Liquid Cooling, Immersion Cooling, Rear Door Heat Exchangers, Cold Plate Cooling, Hybrid Liquid Cooling and Other Cooling Types), Component, Cooling Fluid Type, Technology, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Liquid Cooling for AI Data Centers Market is accounted for $14 billion in 2026 and is expected to reach $95 billion by 2034 growing at a CAGR of 27% during the forecast period. Liquid Cooling for AI Data Centers involves using liquid-based thermal management systems to dissipate heat from high-performance AI hardware. These systems replace or complement air cooling to handle the extreme thermal loads of AI servers, GPUs, and accelerators. Benefits include improved energy efficiency, reduced operational costs, and higher computing density. Adoption is driven by the rapid growth of AI workloads, cloud computing, and sustainability goals. Innovative solutions include direct-to-chip cooling, immersion cooling, and hybrid liquid-air systems for scalable and efficient AI data centers.

Market Dynamics:

Driver:

Increasing heat in AI workloads

Large-scale AI models and high-performance computing generate significant heat, which traditional air cooling systems struggle to manage. Liquid cooling offers superior

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thermal efficiency, enabling stable performance under heavy workloads. Enterprises are adopting these systems to ensure reliability and reduce downtime. The need for sustainable cooling solutions also aligns with energy efficiency goals. This growing heat challenge positions liquid cooling as a critical driver of market growth.

Restraint:

Limited technical expertise availability

Implementing advanced cooling systems requires specialized knowledge in design, installation, and maintenance. Many enterprises lack trained personnel to manage liquid cooling infrastructure effectively. This shortage increases reliance on external vendors and raises operational costs. Smaller firms face greater challenges in adopting these systems due to resource constraints. As a result, limited expertise continues to slow widespread adoption despite strong demand.

Opportunity:

Adoption in hyperscale data centers

Hyperscale operators are expanding globally to support AI workloads, cloud services, and edge computing. Liquid cooling enables higher density deployments by efficiently managing thermal loads. Partnerships between cooling technology providers and hyperscale operators are accelerating innovation. Rising demand for sustainable and scalable infrastructure strengthens this opportunity. As hyperscale facilities grow, liquid cooling is expected to play a pivotal role in their expansion.

Threat:

Alternative cooling technologies emerging

Innovations such as immersion cooling, advanced air systems, and hybrid solutions are gaining traction. These alternatives offer competitive efficiency and lower upfront costs in some cases. Enterprises may hesitate to commit to liquid cooling due to uncertainty about long-term viability. Rapid technological evolution increases competition among cooling methods. This dynamic landscape creates challenges for liquid cooling providers to maintain market leadership.

Covid-19 Impact:

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The COVID-19 pandemic had a mixed impact on the liquid cooling market. Supply chain disruptions and workforce limitations slowed production and delayed installations. However, the surge in digital services, remote work, and AI adoption boosted demand for data center infrastructure. Enterprises accelerated investments in cooling systems to ensure reliability under rising workloads. The pandemic also highlighted the importance of energy-efficient and resilient infrastructure.

The direct-to-chip liquid cooling segment is expected to be the largest during the forecast period

The direct-to-chip liquid cooling segment is expected to account for the largest market share during the forecast period owing to its efficiency in managing heat directly at the processor level. This method ensures precise thermal control for CPUs, GPUs, and AI accelerators. Enterprises prefer direct-to-chip systems for their reliability and scalability. Continuous innovation in cold plate design and fluid management strengthens adoption. Hyperscale data centers are increasingly deploying this technology to support AI workloads.

The two-phase cooling segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the two-phase cooling segment is predicted to witness the highest growth rate as it offers superior efficiency by leveraging phase-change mechanisms to dissipate heat. This technology reduces energy consumption and enhances cooling capacity for high-density deployments. Enterprises are adopting two-phase systems to support next-generation AI workloads. Partnerships between cooling providers and semiconductor firms are accelerating innovation. Regulatory focus on sustainability further supports adoption.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share supported by strong hyperscale data center presence, advanced technology infrastructure, and high adoption of AI workloads. The U.S. leads with major cloud providers investing in liquid cooling solutions. Government-backed initiatives for energy efficiency further accelerate adoption. Robust supply chains and established vendors strengthen regional leadership. Rising demand for AI-driven services ensures continued growth.

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Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR due to rapid digitalization, expanding hyperscale facilities, and rising AI adoption across emerging economies. Countries such as China, India, and South Korea are investing heavily in data center infrastructure. Regional startups are entering the cooling market with innovative solutions. Expanding demand for cloud services and smart city initiatives fuels adoption. Government-backed programs supporting sustainable infrastructure further strengthen growth.

Key players in the market

Some of the key players in Liquid Cooling for AI Data Centers Market include Schneider Electric, Vertiv Holdings, Stulz GmbH, Rittal GmbH & Co. KG, Green Revolution Cooling, Submer Technologies, Asetek, LiquidStack, CoolIT Systems, Motivair Corporation, Fujitsu Limited, IBM Corporation, Dell Technologies, Hewlett Packard Enterprise, Lenovo Group and Cisco Systems.

Key Developments:

In August 2025, LiquidStack introduced two-phase immersion cooling systems for AI workloads. The innovation reinforced its role in advanced thermal management and strengthened adoption in Asia-Pacific.

In May 2025, GRC partnered with Dell Technologies to integrate immersion cooling into enterprise AI servers. The collaboration reinforced efficiency and strengthened GRC's role in sustainable cooling.

Cooling Types Covered:

- Direct-to-Chip Liquid Cooling
- Immersion Cooling
- Rear Door Heat Exchangers
- Cold Plate Cooling

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- Hybrid Liquid Cooling
- Other Cooling Types

Components Covered:

- Cooling Units
- Pumps & Circulation Systems
- Heat Exchangers
- Cooling Fluids
- Piping & Connectors
- Monitoring & Control Systems
- Other Components

Cooling Fluid Types Covered:

- Water-Based Fluids
- Dielectric Fluids
- Synthetic Fluids
- Mineral Oils
- Fluorocarbon-Based Fluids
- Other Fluids

Technologies Covered:

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- Single-Phase Cooling
- Two-Phase Cooling
- AI-Optimized Thermal Management
- Smart Cooling Systems
- Energy-Efficient Cooling Technologies
- Other Technologies

End Users Covered:

- Hyperscale Data Centers
- Cloud Service Providers
- Colocation Providers
- Enterprise Data Centers
- High-Performance Computing Centers
- Other End Users

Regions Covered:

- North America
  - United States
  - Canada
  - Mexico
- Europe

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- United Kingdom
- Germany
- France
- Italy
- Spain
- Netherlands
- Belgium
- Sweden
- Switzerland
- Poland
- Rest of Europe

Asia Pacific

- China
- Japan
- India
- South Korea
- Australia
- Indonesia
- Thailand

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- Malaysia
- Singapore
- Vietnam
- Rest of Asia Pacific

South America

- Brazil
- Argentina
- Colombia
- Chile
- Peru
- Rest of South America

Rest of the World (RoW)

- Middle East
  - Saudi Arabia
  - United Arab Emirates
  - Qatar
  - Israel
  - Rest of Middle East
- Africa
  - South Africa

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Egypt

Morocco

Rest of Africa

What our report offers:

Market share assessments for the regional and country-level segments

Strategic recommendations for the new entrants

Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

Strategic recommendations in key business segments based on the market estimations

Competitive landscaping mapping the key common trends

Company profiling with detailed strategies, financials, and recent developments

Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

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SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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Note: Tables for North America, Europe, APAC, South America, and Rest of the World

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(RoW) are also represented in the same manner as above.

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