

AI Data Center Cooling Market Forecasts to 2034 – Global Analysis By Cooling Technology (Air Cooling, Direct-to-Chip Liquid Cooling, Single-Phase Immersion Cooling, Two-Phase Immersion Cooling, Rear-Door Heat Exchangers, and Hybrid Cooling Systems), Cooling Component, Data Center Type, Rack Density, Application, End User, and By Geography

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Abstracts

According to Statistics MRC, the Global AI Data Center Cooling Market is accounted for \$21.9 billion in 2026 and is expected to reach \$45.3 billion by 2034 growing at a CAGR of 9.5% during the forecast period. AI data center cooling encompasses the technologies, components, and systems designed to manage heat generated by high-density AI computing infrastructure. The market includes cooling technologies such as air cooling, direct-to-chip liquid cooling, single-phase immersion cooling, two-phase immersion cooling, rear-door heat exchangers, and hybrid cooling systems. Cooling components include cooling distribution units, cold plates, immersion tanks, heat exchangers, pumps and manifolds, chillers and cooling towers, coolant distribution and piping systems, and leak detection and monitoring systems. These solutions are deployed in hyperscale, colocation, enterprise, and edge data centers across cloud service providers, hyperscale operators, enterprises, government institutions, and financial services. Growing AI adoption, increasing rack densities, and thermal management requirements are key drivers of market expansion.

Market Dynamics:

Driver:**Increasing rack densities and thermal management requirements for AI workloads**

The rapid increase in AI computing density and associated thermal management requirements is a primary driver for the AI data center cooling market. AI accelerators including GPUs generate significantly more heat than traditional CPUs, with rack densities reaching 50-100 kW or higher. Traditional air cooling cannot efficiently manage these thermal loads, necessitating advanced cooling solutions. Liquid cooling technologies offer superior heat transfer efficiency. As AI infrastructure deployments accelerate and rack densities increase, demand for advanced cooling solutions expands, supporting sustained market growth.

Restraint:**High implementation costs and complexity**

The significant costs associated with advanced cooling systems and implementation complexity represent a major restraint for the AI data center cooling market. Liquid cooling systems require substantial upfront investment in cooling distribution units, cold plates, and facility modifications. Retrofitting existing data centers for liquid cooling presents technical challenges. Operational complexity increases with liquid cooling systems. These cost and complexity barriers may constrain market growth, particularly for smaller data center operators.

Opportunity:**Development of sustainable and efficient cooling technologies**

Continuous innovation in sustainable and efficient cooling technologies presents significant opportunities for AI data center cooling market expansion. Two-phase immersion cooling offers superior heat transfer with lower pumping power. Warm water cooling enables heat reuse for district heating. Coolant formulations with improved thermal properties are being developed. As sustainability concerns grow and efficiency requirements increase, innovative cooling solutions capture growing market share.

Threat:**Technology transitions and infrastructure compatibility**

The rapid evolution of cooling technologies and compatibility challenges with existing

infrastructure pose significant threats to AI data center cooling market growth. Different cooling approaches may be optimal for different applications. Retrofitting existing facilities for new cooling technologies presents challenges. Technology uncertainty may delay investment decisions. These transitions and compatibility issues may affect market growth.

Covid-19 Impact:

The COVID-19 pandemic accelerated AI data center cooling market growth as data center construction and AI adoption increased. The pandemic highlighted the importance of digital infrastructure and accelerated investment in AI capabilities. Supply chain disruptions affected component availability. Post-pandemic, continued AI advancement and data center expansion have sustained strong demand for cooling solutions.

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, driven by its effectiveness in cooling high-power AI accelerators, compatibility with existing server form factors, and growing adoption by hyperscale and colocation providers. Direct-to-chip liquid cooling delivers coolant directly to heat-generating components through cold plates, offering superior thermal management. The segment benefits from rapid adoption in AI data centers. As AI rack densities increase, direct-to-chip liquid cooling maintains the largest cooling technology segment share.

The Two-Phase Immersion Cooling segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the Two-Phase Immersion Cooling segment is predicted to witness the highest growth rate, fueled by its superior heat transfer efficiency, ability to handle extreme rack densities, and growing adoption for the most demanding AI workloads. Two-phase immersion cooling uses phase-change fluids to absorb heat through boiling, offering exceptional thermal performance. The segment benefits from declining dielectric fluid costs and growing deployment experience. As AI densities increase beyond liquid cooling capabilities, two-phase immersion delivers the fastest cooling technology segment growth.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share, supported by the concentration of hyperscale data centers, AI technology companies, and advanced cooling technology providers. The United States leads regional growth with substantial AI data center construction requiring advanced cooling solutions. High concentration of technology innovation drives adoption. Well-established data center ecosystem supports market growth. With technology leadership and strong investment, North America maintains its dominant market position.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR, driven by rapid AI adoption, expanding data center infrastructure, and increasing investment in advanced cooling technologies across China, Japan, South Korea, and Southeast Asia. The region's large and growing digital economy creates substantial demand for AI cooling solutions. Government initiatives promoting AI development support market growth. As AI adoption and data center capacity expand, Asia Pacific delivers the fastest AI data center cooling market growth globally.

Key players in the market

Some of the key players in AI Data Center Cooling Market include Vertiv Holdings Co., Schneider Electric SE, Johnson Controls International plc, STULZ GmbH, Rittal GmbH & Co. KG, CoolIT Systems Inc., LiquidStack Inc., Submer Technologies, Iceotope Technologies Limited, Asetek A/S, Motivair Corporation, Delta Electronics, Inc., Munters Group AB, Trane Technologies plc, and Carrier Global Corporation.

Key Developments:

In June 2026, CoolIT Systems demonstrated a 15 kW high-density cold plate engineered for next-generation, high-wattage accelerated processors and dense AI accelerator blades.

In January 2026, Vertiv introduced updated configurations of its MegaMod HDX prefabricated power and liquid cooling modular infrastructure to support rapid multi-megawatt AI cluster deployments.

In November 2025, Schneider Electric signed a \$1.9 billion supply agreement with

Switch Data Centers to supply advanced thermal and power systems—including Uniflair chillers—for large-scale AI campuses across North America.

In June 2025, LiquidStack launched the GigaModular Coolant Distribution Unit platform, capable of scaling up to 10 MW per CDU module and hundreds of megawatts in aggregated high-density AI campuses.

Cooling Technologies Covered:

Air Cooling

Direct-to-Chip Liquid Cooling

Single-Phase Immersion Cooling

Two-Phase Immersion Cooling

Rear-Door Heat Exchangers

Hybrid Cooling Systems

Cooling Components Covered:

Cooling Distribution Units

Cold Plates

Immersion Tanks

Heat Exchangers

Pumps and Manifolds

Chillers and Cooling Towers

Coolant Distribution and Piping Systems

Leak Detection and Monitoring Systems

Data Center Types Covered:

Hyperscale Data Centers

Colocation Data Centers

Enterprise Data Centers

Edge and Modular Data Centers

Rack Density Covered:

Below 20 kW per Rack

20–50 kW per Rack

50–100 kW per Rack

Above 100 kW per Rack

Applications Covered:

AI Model Training

AI Inference

High-Performance Computing

Generative AI Infrastructure

Cloud Computing

Scientific Computing

End Users Covered:

Cloud Service Providers

Hyperscale Operators

Colocation Providers

Enterprises

Government and Research Institutions

Financial Services

Healthcare and Life Sciences

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

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

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)

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

Contents

1 EXECUTIVE SUMMARY

- 1.1 Market Snapshot and Key Highlights
- 1.2 Growth Drivers, Challenges, and Opportunities
- 1.3 Competitive Landscape Overview
- 1.4 Strategic Insights and Recommendations

2 RESEARCH FRAMEWORK

- 2.1 Study Objectives and Scope
- 2.2 Stakeholder Analysis
- 2.3 Research Assumptions and Limitations
- 2.4 Research Methodology
 - 2.4.1 Data Collection (Primary and Secondary)
 - 2.4.2 Data Modeling and Estimation Techniques
 - 2.4.3 Data Validation and Triangulation
 - 2.4.4 Analytical and Forecasting Approach

3 MARKET DYNAMICS AND TREND ANALYSIS

- 3.1 Market Definition and Structure
- 3.2 Key Market Drivers
- 3.3 Market Restraints and Challenges
- 3.4 Growth Opportunities and Investment Hotspots
- 3.5 Industry Threats and Risk Assessment
- 3.6 Technology and Innovation Landscape
- 3.7 Emerging and High-Growth Markets
- 3.8 Regulatory and Policy Environment
- 3.9 Impact of COVID-19 and Recovery Outlook

4 COMPETITIVE AND STRATEGIC ASSESSMENT

- 4.1 Porter's Five Forces Analysis
 - 4.1.1 Supplier Bargaining Power
 - 4.1.2 Buyer Bargaining Power
 - 4.1.3 Threat of Substitutes
 - 4.1.4 Threat of New Entrants

- 4.1.5 Competitive Rivalry
- 4.2 Market Share Analysis of Key Players
- 4.3 Product Benchmarking and Performance Comparison

5 GLOBAL AI DATA CENTER COOLING MARKET, BY COOLING TECHNOLOGY

- 5.1 Air Cooling
- 5.2 Direct-to-Chip Liquid Cooling
- 5.3 Single-Phase Immersion Cooling
- 5.4 Two-Phase Immersion Cooling
- 5.5 Rear-Door Heat Exchangers
- 5.6 Hybrid Cooling Systems

6 GLOBAL AI DATA CENTER COOLING MARKET, BY COOLING COMPONENT

- 6.1 Cooling Distribution Units
- 6.2 Cold Plates
- 6.3 Immersion Tanks
- 6.4 Heat Exchangers
- 6.5 Pumps and Manifolds
- 6.6 Chillers and Cooling Towers
- 6.7 Coolant Distribution and Piping Systems
- 6.8 Leak Detection and Monitoring Systems

7 GLOBAL AI DATA CENTER COOLING MARKET, BY DATA CENTER TYPE

- 7.1 Hyperscale Data Centers
- 7.2 Colocation Data Centers
- 7.3 Enterprise Data Centers
- 7.4 Edge and Modular Data Centers

8 GLOBAL AI DATA CENTER COOLING MARKET, BY RACK DENSITY

- 8.1 Below 20 kW per Rack
- 8.2 20–50 kW per Rack
- 8.3 50–100 kW per Rack
- 8.4 Above 100 kW per Rack

9 GLOBAL AI DATA CENTER COOLING MARKET, BY APPLICATION

- 9.1 AI Model Training
- 9.2 AI Inference
- 9.3 High-Performance Computing
- 9.4 Generative AI Infrastructure
- 9.5 Cloud Computing
- 9.6 Scientific Computing

10 GLOBAL AI DATA CENTER COOLING MARKET, BY END USER

- 10.1 Cloud Service Providers
- 10.2 Hyperscale Operators
- 10.3 Colocation Providers
- 10.4 Enterprises
- 10.5 Government and Research Institutions
- 10.6 Financial Services
- 10.7 Healthcare and Life Sciences

11 GLOBAL AI DATA CENTER COOLING MARKET, BY GEOGRAPHY

- 11.1 North America
 - 11.1.1 United States
 - 11.1.2 Canada
 - 11.1.3 Mexico
- 11.2 Europe
 - 11.2.1 United Kingdom
 - 11.2.2 Germany
 - 11.2.3 France
 - 11.2.4 Italy
 - 11.2.5 Spain
 - 11.2.6 Netherlands
 - 11.2.7 Belgium
 - 11.2.8 Sweden
 - 11.2.9 Switzerland
 - 11.2.10 Poland
 - 11.2.11 Rest of Europe
- 11.3 Asia Pacific
 - 11.3.1 China
 - 11.3.2 Japan

- 11.3.3 India
- 11.3.4 South Korea
- 11.3.5 Australia
- 11.3.6 Indonesia
- 11.3.7 Thailand
- 11.3.8 Malaysia
- 11.3.9 Singapore
- 11.3.10 Vietnam
- 11.3.11 Rest of Asia Pacific
- 11.4 South America
 - 11.4.1 Brazil
 - 11.4.2 Argentina
 - 11.4.3 Colombia
 - 11.4.4 Chile
 - 11.4.5 Peru
 - 11.4.6 Rest of South America
- 11.5 Rest of the World (RoW)
 - 11.5.1 Middle East
 - 11.5.1.1 Saudi Arabia
 - 11.5.1.2 United Arab Emirates
 - 11.5.1.3 Qatar
 - 11.5.1.4 Israel
 - 11.5.1.5 Rest of Middle East
 - 11.5.2 Africa
 - 11.5.2.1 South Africa
 - 11.5.2.2 Egypt
 - 11.5.2.3 Morocco
 - 11.5.2.4 Rest of Africa

12 STRATEGIC MARKET INTELLIGENCE

- 12.1 Industry Value Network and Supply Chain Assessment
- 12.2 White-Space and Opportunity Mapping
- 12.3 Product Evolution and Market Life Cycle Analysis
- 12.4 Channel, Distributor, and Go-to-Market Assessment

13 INDUSTRY DEVELOPMENTS AND STRATEGIC INITIATIVES

- 13.1 Mergers and Acquisitions

- 13.2 Partnerships, Alliances, and Joint Ventures
- 13.3 New Product Launches and Certifications
- 13.4 Capacity Expansion and Investments
- 13.5 Other Strategic Initiatives

14 COMPANY PROFILES

- 14.1 Vertiv Holdings Co.
- 14.2 Schneider Electric SE
- 14.3 Johnson Controls International plc
- 14.4 STULZ GmbH
- 14.5 Rittal GmbH & Co. KG
- 14.6 CoolIT Systems Inc.
- 14.7 LiquidStack Inc.
- 14.8 Submer Technologies
- 14.9 Iceotope Technologies Limited
- 14.10 Asetek A/S
- 14.11 Motivair Corporation
- 14.12 Delta Electronics, Inc.
- 14.13 Munters Group AB
- 14.14 Trane Technologies plc
- 14.15 Carrier Global Corporation

List of Tables

- Table 1 Global AI Data Center Cooling Market Outlook, By Region (2023–2034) (\$MN)
- Table 2 Global AI Data Center Cooling Market Outlook, By Cooling Technology (2023–2034) (\$MN)
- Table 3 Global AI Data Center Cooling Market Outlook, By Air Cooling (2023–2034) (\$MN)
- Table 4 Global AI Data Center Cooling Market Outlook, By Direct-to-Chip Liquid Cooling (2023–2034) (\$MN)
- Table 5 Global AI Data Center Cooling Market Outlook, By Single-Phase Immersion Cooling (2023–2034) (\$MN)
- Table 6 Global AI Data Center Cooling Market Outlook, By Two-Phase Immersion Cooling (2023–2034) (\$MN)
- Table 7 Global AI Data Center Cooling Market Outlook, By Rear-Door Heat Exchangers (2023–2034) (\$MN)
- Table 8 Global AI Data Center Cooling Market Outlook, By Hybrid Cooling Systems (2023–2034) (\$MN)
- Table 9 Global AI Data Center Cooling Market Outlook, By Cooling Component

(2023–2034) (\$MN)

Table 10 Global AI Data Center Cooling Market Outlook, By Cooling Distribution Units
(2023–2034) (\$MN)

Table 11 Global AI Data Center Cooling Market Outlook, By Cold Plates (2023–2034)
(\$MN)

Table 12 Global AI Data Center Cooling Market Outlook, By Immersion Tanks
(2023–2034) (\$MN)

Table 13 Global AI Data Center Cooling Market Outlook, By Heat Exchangers
(2023–2034) (\$MN)

Table 14 Global AI Data Center Cooling Market Outlook, By Pumps and Manifolds
(2023–2034) (\$MN)

Table 15 Global AI Data Center Cooling Market Outlook, By Chillers and Cooling
Towers (2023–2034) (\$MN)

Table 16 Global AI Data Center Cooling Market Outlook, By Coolant Distribution and
Piping Systems (2023–2034) (\$MN)

Table 17 Global AI Data Center Cooling Market Outlook, By Leak Detection and
Monitoring Systems (2023–2034) (\$MN)

Table 18 Global AI Data Center Cooling Market Outlook, By Data Center Type
(2023–2034) (\$MN)

Table 19 Global AI Data Center Cooling Market Outlook, By Hyperscale Data Centers
(2023–2034) (\$MN)

Table 20 Global AI Data Center Cooling Market Outlook, By Colocation Data Centers
(2023–2034) (\$MN)

Table 21 Global AI Data Center Cooling Market Outlook, By Enterprise Data Centers
(2023–2034) (\$MN)

Table 22 Global AI Data Center Cooling Market Outlook, By Edge and Modular Data
Centers (2023–2034) (\$MN)

Table 23 Global AI Data Center Cooling Market Outlook, By Rack Density (2023–2034)
(\$MN)

Table 24 Global AI Data Center Cooling Market Outlook, By Below 20 kW per Rack
(2023–2034) (\$MN)

Table 25 Global AI Data Center Cooling Market Outlook, By 20–50 kW per Rack
(2023–2034) (\$MN)

Table 26 Global AI Data Center Cooling Market Outlook, By 50–100 kW per Rack
(2023–2034) (\$MN)

Table 27 Global AI Data Center Cooling Market Outlook, By Above 100 kW per Rack
(2023–2034) (\$MN)

Table 28 Global AI Data Center Cooling Market Outlook, By Application (2023–2034)
(\$MN)

Table 29 Global AI Data Center Cooling Market Outlook, By AI Model Training
(2023–2034) (\$MN)

Table 30 Global AI Data Center Cooling Market Outlook, By AI Inference (2023–2034)
(\$MN)

Table 31 Global AI Data Center Cooling Market Outlook, By High-Performance
Computing (2023–2034) (\$MN)

Table 32 Global AI Data Center Cooling Market Outlook, By Generative AI Infrastructure
(2023–2034) (\$MN)

Table 33 Global AI Data Center Cooling Market Outlook, By Cloud Computing
(2023–2034) (\$MN)

Table 34 Global AI Data Center Cooling Market Outlook, By Scientific Computing
(2023–2034) (\$MN)

Table 35 Global AI Data Center Cooling Market Outlook, By End User (2023–2034)
(\$MN)

Table 36 Global AI Data Center Cooling Market Outlook, By Cloud Service Providers
(2023–2034) (\$MN)

Table 37 Global AI Data Center Cooling Market Outlook, By Hyperscale Operators
(2023–2034) (\$MN)

Table 38 Global AI Data Center Cooling Market Outlook, By Colocation Providers
(2023–2034) (\$MN)

Table 39 Global AI Data Center Cooling Market Outlook, By Enterprises (2023–2034)
(\$MN)

Table 40 Global AI Data Center Cooling Market Outlook, By Government and Research
Institutions (2023–2034) (\$MN)

Table 41 Global AI Data Center Cooling Market Outlook, By Financial Services
(2023–2034) (\$MN)

Table 42 Global AI Data Center Cooling Market Outlook, By Healthcare and Life
Sciences (2023–2034) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Rest of the World
(RoW) Regions are also represented in the same manner as above.

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