

Data Center Direct-to-chip Cooling Market by Type (Single Phase, Two Phase), Coolant Type (Water-Glycol-based Coolants, Dielectric Fluids, Refrigerants), End User (Hyperscale Data Centers, Colocation Providers, Enterprises), and Region - Global Forecast to 2032

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Abstracts

The data center direct-to-chip cooling market is projected to grow from USD 3.33 billion in 2026 to USD 17.31 billion by 2032, at a CAGR of 26.5% over the forecast period. The global data center direct-to-chip cooling market is also being driven by the increasing need for thermal precision and component-level heat management in advanced computing systems. The compact design of modern processors, together with their increased processing power, results in heat generation at specific points, which prevents traditional room-sized or rack-sized cooling systems from achieving constant temperature control. Direct-to-chip cooling addresses this challenge by delivering coolant directly to heat-generating components, allowing for better temperature control while reducing thermal hotspots that adversely affect performance and hardware lifespan. Data center operators are adopting advanced cooling systems that provide dependable temperature control because their business operations require them to minimize downtime and maintain continuous service. The expansion of edge computing and latency-sensitive applications is further contributing to demand, as smaller and distributed data centers require efficient cooling solutions that can operate within limited space and infrastructure constraints. The combination of these two factors, together with the current need for higher processing efficiency and system reliability, is driving data centers worldwide to implement direct-to-chip cooling solutions.

“By type, the single phase segment is estimated to hold the largest share, in terms of

value.”

The data center direct-to-chip cooling market will see its largest share from single-phase systems because they have become widely used, proven reliable, and work well with current data center systems. Single-phase cooling systems are currently the most commercially mature and widely deployed solutions, making them the preferred choice for both hyperscale operators and enterprise data centers transitioning toward liquid cooling. The adoption rate of these products has increased because their design enables simpler installation and easier maintenance, and their components do not require phase changes to function. The systems permit operators to scale their deployments because they can be integrated into existing server architectures and facility designs without major design changes. Their market dominance is further strengthened by standardized components, existing supply chains, and data center engineers who have experience with these products. Single-phase systems now provide computing power, except that they only use basic operational needs, while their single-phase systems provide the basic operational requirements that data centers need to operate their systems.

“By coolant type, the water-glycol-based coolants segment is estimated to hold the largest share, in terms of value.”

The water glycol-based coolants segment is estimated to hold the largest share, in terms of value, in the data center direct-to-chip cooling market due to its widespread industry acceptance, cost-effectiveness, and strong operational reliability across diverse data center environments. The existing use of these coolants in traditional liquid cooling and HVAC systems establishes them as a safe option that operators can trust when they switch to direct-to-chip cooling, leading to rapid adoption in operations. Water glycol mixtures deliver optimal thermal conductivity together with system protection, resulting in benefits that include corrosion resistance, freeze protection, and performance stability across different operating conditions. This makes them suitable for large data center deployments that require both stable operations and dependable performance over extended periods. The product's handling simplicity, existing supply chain networks, and compatibility with current system infrastructure all contribute to reduced implementation challenges, which lower total expenses and enhance their market leadership position. Data centers that need expandable cooling systems that have already proven their effectiveness will encourage operators to select coolant solutions that deliver both performance benefits and operational knowledge, resulting in water glycol coolants maintaining their position as the market leader during the forecast period.

“By end user, the hyperscale segment is estimated to hold the largest share, in terms of value.”

The hyperscale segment is estimated to hold the largest share, in terms of value, in the data center direct to chip cooling market due to the massive scale of investments and the continuous expansion of large cloud and technology companies operating globally. Hyperscale data center operators deploy thousands of high-performance servers within a single facility, producing extreme heat levels that require advanced direct to chip cooling systems for efficient heat management. These operators are at the forefront of adopting liquid cooling technologies as they prioritize performance optimization, energy efficiency, and long-term cost savings at scale. Hyperscale companies possess sufficient financial resources to make substantial investments in next-generation cooling systems, which they will implement in their upcoming facilities instead of utilizing gradual system enhancements. The growing need for cloud computing, artificial intelligence, machine learning, and data-intensive applications has resulted in the expansion of hyperscale facilities, which drives up requirements for premium cooling systems. Hyperscale operators are implementing more efficient cooling technologies to lower energy consumption and enhance their sustainability performance, making direct to chip solutions beneficial. The hyperscale segment reaches its highest market value during the forecast period because it combines extensive system deployments with significant financial investments and the use of cutting-edge technologies.

Break-up of primary participants for the report:

By Company Type: Tier 1 – 20%, Tier 2 – 40%, and Tier 3 – 40%

By Designation: C-Level Executives– 10%, Directors– 70%, and Others – 20%

By Region: North America – 45%, Asia Pacific – 25%, Europe – 20%, Middle East & Africa – 5%, and South America – 5%

Vertiv Group Corp. (US), Super Micro Computer, Inc. (US), Modine Manufacturing Company (US), DCX Liquid Cooling Systems (Poland), and Schneider Electric (France) are the key players in the data center direct-to-chip cooling market. These players have adopted various strategies, including agreements, joint ventures, and expansions, to increase their market share and business revenue.

Research Coverage:

The report defines, segments, and projects the size of the data center direct-to-chip cooling market by type, coolant type, end user, and region. It strategically profiles the key players and comprehensively analyzes their market share and core competencies. It also tracks and analyzes competitive developments, such as expansions, agreements, and acquisitions undertaken by them in the market.

Reasons to Buy the Report:

The report is expected to help market leaders/new entrants by providing the closest approximations of revenue for the data center direct-to-chip cooling market and its segments. This report is also expected to help stakeholders gain a deeper understanding of the market's competitive landscape, acquire valuable insights to enhance their business positions, and develop effective go-to-market strategies. It also enables stakeholders to understand the market's pulse and provides information on key market drivers, restraints, challenges, and opportunities.

The report provides insights into the following pointers:

Analysis of critical drivers (Increasing Heat Density from AI & HPC Workloads, Superior Thermal Efficiency Compared to Air Cooling, Growing Demand for Energy-efficient Data Centers, Increasing Rack Power Density in Hyperscale Data Centers), restraints (High Initial Capital Investment, Complex Integration with Existing Infrastructure, Limited Standardization Across Vendors), opportunities (Rapid Growth of AI, Generative AI, and GPU-based Computing, Expansion of Edge Data Centers with High Compute Density, Integration with Waste Heat Recovery Systems), and challenges (Skill Gap in Installation and Maintenance, Infrastructure Complexity and Space Constraints, Reliability and Long-term Maintenance Concerns) influencing the growth of the data center direct-to-chip cooling market

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities in the data center direct-to-chip cooling market

Market Development: Comprehensive information about lucrative markets – the report analyzes the data center direct-to-chip cooling market across varied regions

Market Diversification: Exhaustive information about new products, various types, untapped geographies, recent developments, and investments in the data center direct-to-chip cooling market.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and product offerings of leading players such as Vertiv Group Corp. (US), Super Micro Computer, Inc. (US), Modine Manufacturing Company (US), DCX Liquid Cooling Systems (Poland), Schneider Electric (France), and others are the key players in the data center direct-to-chip cooling market.

Contents

1 INTRODUCTION

- 1.1 STUDY OBJECTIVES
- 1.2 MARKET DEFINITION
- 1.3 STUDY SCOPE
 - 1.3.1 MARKETS COVERED AND REGIONAL SCOPE
 - 1.3.2 INCLUSIONS AND EXCLUSIONS
 - 1.3.3 YEARS CONSIDERED
- 1.4 CURRENCY CONSIDERED
- 1.5 UNIT CONSIDERED
- 1.6 LIMITATIONS
- 1.7 STAKEHOLDERS

2 EXECUTIVE SUMMARY

- 2.1 KEY INSIGHTS AND MARKET HIGHLIGHTS
- 2.2 KEY MARKET PARTICIPANTS: SHARE INSIGHTS AND STRATEGIC DEVELOPMENTS
- 2.3 DISRUPTIVE TRENDS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET
- 2.4 HIGH-GROWTH SEGMENTS
- 2.5 REGIONAL SNAPSHOT: MARKET SIZE, GROWTH RATE, AND FORECAST

3 PREMIUM INSIGHTS

- 3.1 ATTRACTIVE OPPORTUNITIES FOR PLAYERS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET
- 3.2 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER
- 3.3 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE
- 3.4 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION
- 3.5 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY

4 MARKET OVERVIEW

- 4.1 INTRODUCTION
- 4.2 MARKET DYNAMICS
 - 4.2.1 DRIVERS
 - 4.2.1.1 Rising AI, HPC, and hyperscale workloads

- 4.2.1.2 Increasing rack power density
- 4.2.1.3 Energy efficiency and sustainability goals
- 4.2.2 RESTRAINTS
 - 4.2.2.1 High initial capital investment
 - 4.2.2.2 Integration complexity in existing data centers
 - 4.2.2.3 Lack of standardization
- 4.2.3 OPPORTUNITIES
 - 4.2.3.1 Expansion of edge and modular data centers
 - 4.2.3.2 Innovation in coolant technologies and microfluidics
 - 4.2.3.3 High-density computing and chip innovation
- 4.2.4 CHALLENGES
 - 4.2.4.1 Leakage and reliability risks
 - 4.2.4.2 Cooling of non-chip components
- 4.3 UNMET NEEDS AND WHITE SPACES
 - 4.3.1 UNMET NEEDS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET
 - 4.3.2 WHITE SPACE OPPORTUNITIES
- 4.4 INTERCONNECTED MARKETS AND CROSS-SECTOR OPPORTUNITIES
 - 4.4.1 INTERCONNECTED MARKETS
 - 4.4.2 CROSS SECTOR OPPORTUNITIES
- 4.5 EMERGING BUSINESS MODELS AND ECOSYSTEM SHIFTS
 - 4.5.1 EMERGING BUSINESS MODELS
 - 4.5.2 ECOSYSTEM SHIFTS
- 4.6 STRATEGIC MOVES BY TIER 1/2/3 PLAYERS
 - 4.6.1 KEY MOVES AND STRATEGIC FOCUS

5 INDUSTRY TRENDS

- 5.1 PORTER'S FIVE FORCES ANALYSIS
 - 5.1.1 THREAT OF NEW ENTRANTS
 - 5.1.2 THREAT OF SUBSTITUTES
 - 5.1.3 BARGAINING POWER OF SUPPLIERS
 - 5.1.4 BARGAINING POWER OF BUYERS
 - 5.1.5 INTENSITY OF COMPETITIVE RIVALRY
- 5.2 MACROECONOMICS INDICATORS
 - 5.2.1 INTRODUCTION
 - 5.2.2 GDP TRENDS AND FORECAST
 - 5.2.3 DATA CENTER INDUSTRY
 - 5.2.4 TRENDS IN GLOBAL DATA CENTER COOLING INDUSTRY
 - 5.2.5 MANUFACTURING INDUSTRY

- 5.2.6 TRENDS IN GLOBAL HYPERSCALE AND AI DATA CENTER INDUSTRY
- 5.3 VALUE CHAIN ANALYSIS
- 5.4 ECOSYSTEM ANALYSIS
- 5.5 ENERGY SUSTAINABILITY FOR DATA CENTERS
 - 5.5.1 SUSTAINABLE DATA CENTERS USING DIRECT-TO-CHIP COOLING
 - 5.5.2 ISSUES IN DEVELOPING COUNTRIES
- 5.6 KEY CONFERENCES AND EVENTS, 2026–2027
- 5.7 TRENDS AND DISRUPTIONS IMPACTING CUSTOMER BUSINESS
- 5.8 INVESTMENT AND FUNDING SCENARIO
- 5.9 CASE STUDY ANALYSIS
 - 5.9.1 CASE STUDY 1: PERFORMANCE EVALUATION OF TWO-PHASE DIRECT-TO-CHIP LIQUID COOLING COMBINED WITH AIR COOLING FOR DATA CENTERS
 - 5.9.2 CASE STUDY 2: A PATH TO COMMISSIONING OF DIRECT-TO-CHIP LIQUID COOLING FOR HYPERSCALE DATA CENTERS USING EXPERIMENTAL AND CFD TECHNIQUES

6 KEY TECHNOLOGICAL ADVANCEMENTS, AI-DRIVEN IMPACT, AND FUTURE APPLICATIONS

- 6.1 KEY EMERGING TECHNOLOGIES
 - 6.1.1 TWO-PHASE DIRECT-TO-CHIP COOLING
 - 6.1.2 ADVANCED COLD PLATE DESIGN
- 6.2 ADJACENT TECHNOLOGIES
 - 6.2.1 MICROCHANNEL LIQUID COOLING
 - 6.2.2 MICROCONVECTIVE LIQUID COOLING
- 6.3 FUTURE APPLICATIONS
 - 6.3.1 AI-OPTIMIZED HYPERSCALE DATA CENTERS
 - 6.3.2 EDGE & DISTRIBUTED DATA CENTERS
 - 6.3.3 HYBRID COOLING IN EXISTING DATA CENTERS
 - 6.3.4 HIGH-PERFORMANCE COMPUTING (HPC) & AI CLUSTERS
 - 6.3.5 SUSTAINABLE & ENERGY-EFFICIENT DATA CENTERS
- 6.4 IMPACT OF AI/GEN AI ON DATA CENTER DIRECT-TO-CHIP COOLING MARKET
 - 6.4.1 TOP USE CASES AND MARKET POTENTIAL
 - 6.4.2 BEST MARKET PRACTICES
 - 6.4.3 CASE STUDIES OF AI IMPLEMENTATION IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET
 - 6.4.4 READINESS OF COMPANIES TO ADOPT GENERATIVE AI IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET
- 6.5 SUCCESS STORIES AND REAL-WORLD APPLICATIONS

- 6.5.1 VERTIV: AI-READY LIQUID COOLING INFRASTRUCTURE DEPLOYMENT
- 6.5.2 SCHNEIDER ELECTRIC: END-TO-END LIQUID COOLING ECOSYSTEM
- 6.5.3 COMPUDYNAMICS: COMPLEX LIQUID COOLING FOR HIGH DENSITY RACKS AT A HYPERSCALE DATA CENTER IN NC

7 SUSTAINABILITY AND REGULATORY LANDSCAPE

- 7.1 REGIONAL REGULATIONS AND COMPLIANCE
 - 7.1.1 REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS
 - 7.1.2 US
 - 7.1.3 EUROPE
 - 7.1.4 CHINA
 - 7.1.5 JAPAN
 - 7.1.6 INDIA
 - 7.1.7 SINGAPORE
 - 7.1.8 OPEN COMPUTE PROJECT (OCP): A STANDARD FOR DATA CENTER BUILDINGS
- 7.2 SUSTAINABILITY INITIATIVES
 - 7.2.1 CARBON IMPACT AND ECO APPLICATIONS OF PROPYLENE OXIDE
- 7.3 SUSTAINABILITY IMPACT AND REGULATORY POLICY INITIATIVES
- 7.4 CERTIFICATIONS, LABELING, AND ECO STANDARDS

8 CUSTOMER LANDSCAPE & BUYER BEHAVIOR

- 8.1 DECISION-MAKING PROCESS
- 8.2 KEY STAKEHOLDERS AND BUYING CRITERIA
 - 8.2.1 KEY STAKEHOLDERS IN BUYING PROCESS
 - 8.2.2 BUYING CRITERIA
- 8.3 ADOPTION BARRIERS & INTERNAL CHALLENGES
- 8.4 UNMET NEEDS IN VARIOUS END-USE INDUSTRIES
- 8.5 MARKET PROFITABILITY
 - 8.5.1 REVENUE POTENTIAL
 - 8.5.2 COST DYNAMICS
 - 8.5.3 MARGIN OPPORTUNITIES IN KEY APPLICATIONS

9 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COOLANT TYPE

- 9.1 INTRODUCTION

9.2 WATER-GLYCOL-BASED COOLANTS

9.2.1 INCREASING DEMAND FOR SCALABLE AND EASY-TO-MAINTAIN COOLING SOLUTIONS TO INCREASE DEMAND

9.3 DIELECTRIC FLUID

9.3.1 RISING NEED FOR SAFE AND HIGH-PERFORMANCE COOLING IN ADVANCED DATA CENTERS TO BOOST MARKET

9.4 REFRIGERANTS

9.4.1 GROWING FOCUS ON ADVANCED COOLING TECHNOLOGIES FOR HIGH-DENSITY WORKLOADS TO INCREASE DEMAND

10 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE

10.1 INTRODUCTION

10.2 SINGLE-PHASE

10.2.1 GROWING PREFERENCE FOR SIMPLER AND COST-EFFECTIVE LIQUID COOLING SOLUTIONS TO BOOST MARKET GROWTH

10.3 TWO-PHASE

10.3.1 RISING NEED FOR HIGH-EFFICIENCY COOLING IN HIGH-DENSITY COMPUTING ENVIRONMENTS TO SUPPORT MARKET EXPANSION

11 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER

11.1 INTRODUCTION

11.2 HYPERSCALE DATA CENTERS

11.2.1 RAPID EXPANSION OF LARGE-SCALE CLOUD INFRASTRUCTURE AND HIGH-DENSITY COMPUTING TO FUEL MARKET GROWTH

11.3 COLOCATION PROVIDERS

11.3.1 RISING DEMAND FOR SCALABLE AND HIGH-PERFORMANCE SHARED DATA CENTER FACILITIES TO SUPPORT MARKET GROWTH

11.4 ENTERPRISES

11.4.1 INCREASING DIGITAL TRANSFORMATION AND ADOPTION OF HIGH-PERFORMANCE IT INFRASTRUCTURE TO INCREASE DEMAND

12 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION

12.1 INTRODUCTION

12.2 NORTH AMERICA

12.3 US

12.3.1 RAPID AI INFRASTRUCTURE EXPANSION TO SUPPORT MARKET

GROWTH

12.4 CANADA

12.4.1 SUSTAINABLE DATA CENTER DEVELOPMENT AND COLD CLIMATE ADVANTAGE DRIVING LIQUID COOLING ADOPTION

12.5 MEXICO

12.5.1 RISING HYPERSCALE INVESTMENTS AND WATER-EFFICIENT COOLING REQUIREMENTS TO BOOST MARKET

12.6 ASIA PACIFIC

12.7 CHINA

12.7.1 RAPID AI INFRASTRUCTURE EXPANSION AND DOMESTIC SEMICONDUCTOR ECOSYSTEM INTEGRATION TO DRIVE MARKET

12.8 JAPAN

12.8.1 HIGH DENSITY URBAN DATA CENTER DEPLOYMENTS AND ENERGY EFFICIENCY MANDATES TO DRIVE DEMAND

12.9 INDIA

12.9.1 EXTREME CLIMATIC CONDITIONS AND LARGE-SCALE HYPERSCALE INVESTMENTS TO INCREASE DEMAND

12.10 SOUTH KOREA

12.10.1 HYPERSCALE AI DATA CENTER INVESTMENTS AND SEMICONDUCTOR-DRIVEN COMPUTE INTENSITY TO SUPPORT MARKET GROWTH

12.11 MALAYSIA

12.11.1 RISING HYPERSCALE INVESTMENTS AND TROPICAL CLIMATE-DRIVEN COOLING REQUIREMENTS TO BOOST MARKET

12.12 SINGAPORE

12.12.1 HYPERSCALE EXPANSION AND STRONG SUSTAINABILITY MANDATES TO FUEL ADOPTION

12.13 AUSTRALIA

12.13.1 STRONG AI INFRASTRUCTURE GROWTH AND STRICT SUSTAINABILITY REGULATIONS TO SUPPORT MARKET GROWTH

12.14 REST OF ASIA PACIFIC

12.15 EUROPE

12.16 GERMANY

12.16.1 STRINGENT ENERGY EFFICIENCY REGULATIONS AND WASTE HEAT REUSE MANDATES DRIVING ADVANCED COOLING ADOPTION

12.17 FRANCE

12.17.1 STRONG HYPERSCALE INVESTMENTS AND SUSTAINABILITY-DRIVEN DATA CENTER EXPANSION TO BOOST MARKET EXPANSION

12.18 UK

12.18.1 AI INFRASTRUCTURE DEVELOPMENT AND GOVERNMENT SUPPORT

FOR ENERGY-EFFICIENT DATA CENTERS TO INCREASE ADOPTION

12.19 REST OF EUROPE

12.20 MIDDLE EAST & AFRICA

12.20.1 GCC COUNTRIES

12.21 SAUDI ARABIA

12.21.1 AI INFRASTRUCTURE INVESTMENTS AND EXTREME CLIMATE DRIVING ADOPTION OF ADVANCED COOLING TECHNOLOGIES

12.22 REST OF GCC COUNTRIES

12.22.1 GROWING DIGITAL INFRASTRUCTURE DEVELOPMENT AND RISING NEED FOR ENERGY-EFFICIENT COOLING TO BOOST MARKET

12.23 SOUTH AFRICA

12.23.1 RISING HYPERSCALE INVESTMENTS, AI INFRASTRUCTURE EXPANSION, AND FOCUS ON ENERGY AND WATER-EFFICIENT COOLING TO BOOST MARKET

12.24 REST OF MIDDLE EAST & AFRICA

12.25 SOUTH AMERICA

12.26 BRAZIL

12.26.1 LARGE-SCALE HYPERSCALE INVESTMENTS AND RENEWABLE ENERGY-DRIVEN DATA CENTER EXPANSION TO BOOST MARKET

12.27 REST OF SOUTH AMERICA

13 COMPETITIVE LANDSCAPE

13.1 INTRODUCTION

13.2 KEY PLAYERS' STRATEGIES/RIGHT TO WIN

13.3 REVENUE ANALYSIS

13.4 MARKET SHARE ANALYSIS, 2025

13.4.1 RANKING OF KEY MARKET PLAYERS, 2025

13.4.2 MARKET SHARE ANALYSIS, 2025

13.4.2.1 Vertiv Group Corp. (US)

13.4.2.2 Super Micro Computer, Inc. (US)

13.4.2.3 Modine Manufacturing Company (US)

13.4.2.4 DCX Liquid Cooling Systems (Poland)

13.4.2.5 Schneider Electric (France)

13.5 BRAND/PRODUCT COMPARISON

13.5.1 VERTIV

13.5.2 SUPERMICRO

13.5.3 MODINE

13.5.4 DCX

- 13.5.5 SCHNEIDER ELECTRIC
- 13.6 COMPANY VALUATION AND FINANCIAL METRICS
- 13.7 COMPANY EVALUATION MATRIX: KEY PLAYERS, 2025
 - 13.7.1 STARS
 - 13.7.2 EMERGING LEADERS
 - 13.7.3 PERVASIVE PLAYERS
 - 13.7.4 PARTICIPANTS
 - 13.7.5 COMPANY FOOTPRINT: KEY PLAYERS, 2025
 - 13.7.5.1 Company footprint
 - 13.7.6 REGION FOOTPRINT
 - 13.7.7 TYPE FOOTPRINT
 - 13.7.8 COOLANT TYPE FOOTPRINT
 - 13.7.9 END USER FOOTPRINT
- 13.8 COMPANY EVALUATION MATRIX: STARTUPS/SMES, 2024
 - 13.8.1 PROGRESSIVE COMPANIES
 - 13.8.2 RESPONSIVE COMPANIES
 - 13.8.3 DYNAMIC COMPANIES
 - 13.8.4 STARTING BLOCKS
 - 13.8.5 COMPETITIVE BENCHMARKING: STARTUPS/SMES, 2025
 - 13.8.5.1 Detailed list of key startups/SMEs
 - 13.8.5.2 Competitive benchmarking of key startups/SMEs
- 13.9 COMPETITIVE SCENARIO
 - 13.9.1 PRODUCT LAUNCHES
 - 13.9.2 DEALS
 - 13.9.3 EXPANSIONS

14 COMPANY PROFILES

- 14.1 MAJOR PLAYERS
 - 14.1.1 VERTIV GROUP CORP.
 - 14.1.1.1 Business overview
 - 14.1.1.2 Products offered
 - 14.1.1.3 Recent developments
 - 14.1.1.3.1 Product launches
 - 14.1.1.3.2 Deals
 - 14.1.1.3.3 Expansions
 - 14.1.1.4 MnM view
 - 14.1.1.4.1 Key strengths
 - 14.1.1.4.2 Strategic choices

- 14.1.1.4.3 Weaknesses and competitive threats
- 14.1.2 SUPER MICRO COMPUTER, INC.
 - 14.1.2.1 Business overview
 - 14.1.2.2 Products offered
 - 14.1.2.3 Recent developments
 - 14.1.2.3.1 Deals
 - 14.1.2.3.2 Expansions
 - 14.1.2.4 MnM view
 - 14.1.2.4.1 Key strengths
 - 14.1.2.4.2 Strategic choices
 - 14.1.2.4.3 Weaknesses and competitive threats
- 14.1.3 MODINE MANUFACTURING COMPANY
 - 14.1.3.1 Business overview
 - 14.1.3.2 Products offered
 - 14.1.3.3 Recent developments
 - 14.1.3.3.1 Product launches
 - 14.1.3.3.2 Deals
 - 14.1.3.3.3 Expansions
- 14.1.4 DCX LIQUID COOLING SYSTEMS
 - 14.1.4.1 Business overview
 - 14.1.4.2 Products offered
 - 14.1.4.3 Recent developments
 - 14.1.4.3.1 Product launches
 - 14.1.4.4 MnM view
 - 14.1.4.4.1 Key strengths
 - 14.1.4.4.2 Strategic choices
 - 14.1.4.4.3 Weaknesses and competitive threats
- 14.1.5 SCHNEIDER ELECTRIC
 - 14.1.5.1 Business overview
 - 14.1.5.2 Products offered
 - 14.1.5.3 Recent developments
 - 14.1.5.3.1 Deals
 - 14.1.5.3.2 Expansions
 - 14.1.5.4 MnM view
 - 14.1.5.4.1 Key strengths
 - 14.1.5.4.2 Strategic choices
 - 14.1.5.4.3 Weaknesses and competitive threats
- 14.1.6 FLEX LTD.
 - 14.1.6.1 Business overview

- 14.1.6.2 Products offered
- 14.1.6.3 Recent developments
 - 14.1.6.3.1 Deals
- 14.1.7 COOLIT SYSTEMS
 - 14.1.7.1 Business overview
 - 14.1.7.2 Products offered
 - 14.1.7.3 Recent developments
 - 14.1.7.3.1 Product launches
 - 14.1.7.3.2 Deals
 - 14.1.7.3.3 Expansions
- 14.1.8 NVENT
 - 14.1.8.1 Business overview
 - 14.1.8.2 Products offered
 - 14.1.8.3 Recent developments
 - 14.1.8.3.1 Deals
 - 14.1.8.3.2 Expansions
- 14.1.9 KAORI HEAT TREATMENT CO., LTD.
 - 14.1.9.1 Business overview
 - 14.1.9.2 Products offered
- 14.1.10 ZUTACORE, INC.
 - 14.1.10.1 Business overview
 - 14.1.10.2 Products offered
 - 14.1.10.3 Recent developments
 - 14.1.10.3.1 Product launches
 - 14.1.10.3.2 Deals
- 14.1.11 ICEOTOPE PRECISION LIQUID COOLING
 - 14.1.11.1 Business overview
 - 14.1.11.2 Products offered
 - 14.1.11.3 Recent developments
 - 14.1.11.3.1 Product launches
 - 14.1.11.3.2 Deals
 - 14.1.11.3.3 Expansions
- 14.1.12 BOYD
 - 14.1.12.1 Business overview
 - 14.1.12.2 Products offered
- 14.1.13 TAISOL ELECTRONICS CO., LTD.
 - 14.1.13.1 Business overview
 - 14.1.13.2 Products offered
- 14.1.14 WIWYNN CORPORATION

- 14.1.14.1 Business overview
- 14.1.14.2 Products offered
- 14.1.15 INSPUR CO., LTD.
 - 14.1.15.1 Business overview
 - 14.1.15.2 Products offered
- 14.1.16 LENOVO
 - 14.1.16.1 Business overview
 - 14.1.16.2 Products offered
 - 14.1.16.3 Recent developments
 - 14.1.16.3.1 Product launches
 - 14.1.16.3.2 Deals
- 14.1.17 ACCELSIUS LLC
 - 14.1.17.1 Business overview
 - 14.1.17.2 Recent developments
 - 14.1.17.2.1 Product launches
- 14.1.18 STULZ GMBH
 - 14.1.18.1 Business overview
 - 14.1.18.2 Products offered
 - 14.1.18.3 Recent developments
 - 14.1.18.3.1 Product launches
- 14.1.19 RITTAL GMBH & CO. KG (FRIEDHELM LOH GROUP)
 - 14.1.19.1 Business overview
 - 14.1.19.2 Products offered
 - 14.1.19.3 Recent developments
 - 14.1.19.3.1 Product launches
 - 14.1.19.3.2 Deals
- 14.1.20 DELTA POWER SOLUTIONS
 - 14.1.20.1 Business overview
 - 14.1.20.2 Products offered
 - 14.1.20.3 Recent developments
 - 14.1.20.3.1 Deals
- 14.1.21 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES)
 - 14.1.21.1 Business overview
 - 14.1.21.2 Products/Solutions/Services offered
 - 14.1.21.3 Recent developments
 - 14.1.21.3.1 Product launches
 - 14.1.21.3.2 Deals
 - 14.1.21.3.3 Expansions
 - 14.1.21.3.4 Other developments

- 14.1.22 CHILLDYNE, INC.
 - 14.1.22.1 Business overview
 - 14.1.22.2 Products/Solutions/Services offered
 - 14.1.22.3 Recent developments
 - 14.1.22.3.1 Product launches
 - 14.1.22.3.2 Deals
- 14.1.23 MALICO INC.
 - 14.1.23.1 Business overview
 - 14.1.23.2 Products/Solutions/Services offered
- 14.2 OTHER PLAYERS
 - 14.2.1 KOOLANCE, INC.
 - 14.2.2 GIGA-BYTE TECHNOLOGY CO., LTD.
 - 14.2.3 OPTICOOOL TECHNOLOGIES
 - 14.2.4 SEGUENTE INC.
 - 14.2.5 COOLCENTRIC

15 RESEARCH METHODOLOGY

- 15.1 RESEARCH DATA
 - 15.1.1 SECONDARY DATA
 - 15.1.1.1 List of key secondary sources
 - 15.1.1.2 Key data from secondary sources
 - 15.1.2 PRIMARY DATA
 - 15.1.2.1 Key data from primary sources
 - 15.1.2.2 Key industry insights
 - 15.1.2.3 List of primary participants
 - 15.1.2.4 Breakdown of primary interviews
- 15.2 MARKET SIZE ESTIMATION
 - 15.2.1 BOTTOM-UP APPROACH
 - 15.2.2 TOP-DOWN APPROACH
- 15.3 DEMAND-SIDE ANALYSIS
- 15.4 SUPPLY-SIDE ANALYSIS
 - 15.4.1 CALCULATIONS FOR SUPPLY-SIDE ANALYSIS
- 15.5 GROWTH FORECAST
- 15.6 DATA TRIANGULATION
- 15.7 RESEARCH ASSUMPTIONS
- 15.8 RESEARCH LIMITATIONS
- 15.9 RISK ASSESSMENT
- 15.10 FACTOR ANALYSIS

16 APPENDIX

16.1 DISCUSSION GUIDE

16.2 KNOWLEDGESTORE: MARKETSANDMARKETS' SUBSCRIPTION PORTAL

16.3 CUSTOMIZATION OPTIONS

16.4 RELATED REPORTS

List Of Tables

LIST OF TABLES

TABLE 1 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: IMPACT OF PORTER'S FIVE FORCES

TABLE 2 GDP PERCENTAGE CHANGE, BY KEY COUNTRIES, 2021–2029

TABLE 3 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: ROLES OF COMPANIES IN ECOSYSTEM

TABLE 4 DATA CENTER COOLING LIQUID MARKET: LIST OF CONFERENCES AND EVENTS, 2026–2027

TABLE 5 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: TOP USE CASES AND MARKET POTENTIAL

TABLE 6 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: BEST PRACTICES

TABLE 7 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: CASE STUDIES OF GEN AI IMPLEMENTATION

TABLE 8 NORTH AMERICA: LIST OF REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 9 EUROPE: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 10 ASIA PACIFIC: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 11 ROW: REGULATORY BODIES, GOVERNMENT AGENCIES, AND OTHER ORGANIZATIONS

TABLE 12 CERTIFICATIONS, LABELING, AND ECO STANDARDS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET

TABLE 13 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS, BY END USER (%)

TABLE 14 KEY BUYING CRITERIA, BY END USER

TABLE 15 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: UNMET NEEDS IN KEY END-USE INDUSTRIES

TABLE 16 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 17 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 18 SINGLE-PHASE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2021–2025 (USD MILLION)

TABLE 19 SINGLE-PHASE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 20 TWO-PHASE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY

REGION, 2021–2025 (USD MILLION)

TABLE 21 TWO-PHASE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 22 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2021–2025 (USD MILLION)

TABLE 23 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 24 HYPERSCALE DATA CENTERS: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2021–2025 (USD MILLION)

TABLE 25 HYPERSCALE DATA CENTERS: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 26 COLOCATION PROVIDERS: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2021–2025 (USD MILLION)

TABLE 27 COLOCATION PROVIDERS: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 28 ENTERPRISES: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2021–2025 (USD MILLION)

TABLE 29 ENTERPRISES: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 30 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2021–2025 (USD MILLION)

TABLE 31 DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY REGION, 2026–2032 (USD MILLION)

TABLE 32 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2021–2025 (USD MILLION)

TABLE 33 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2026–2032 (USD MILLION)

TABLE 34 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 35 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 36 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2021–2025 (USD MILLION)

TABLE 37 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 38 US: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 39 US: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 40 CANADA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 41 CANADA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 42 MEXICO: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 43 MEXICO: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 44 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2021–2025 (USD MILLION)

TABLE 45 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2026–2032 (USD MILLION)

TABLE 46 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 47 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 48 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2021–2025 (USD MILLION)

TABLE 49 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 50 CHINA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 51 CHINA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 52 JAPAN: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 53 JAPAN: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 54 INDIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 55 INDIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 56 SOUTH KOREA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 57 SOUTH KOREA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 58 MALAYSIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 59 MALAYSIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY

TYPE, 2026–2032 (USD MILLION)

TABLE 60 SINGAPORE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 61 SINGAPORE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 62 AUSTRALIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 63 AUSTRALIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 64 REST OF ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 65 REST OF ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 66 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2021–2025 (USD MILLION)

TABLE 67 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2026–2032 (USD MILLION)

TABLE 68 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 69 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 70 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2021–2025 (USD MILLION)

TABLE 71 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 72 GERMANY: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 73 GERMANY: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 74 FRANCE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 75 FRANCE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 76 UK: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 77 UK: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 78 REST OF EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 79 REST OF EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 80 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2021–2025 (USD MILLION)

TABLE 81 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2026–2032 (USD MILLION)

TABLE 82 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 83 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 84 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2021–2025 (USD MILLION)

TABLE 85 MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 86 SAUDI ARABIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 87 SAUDI ARABIA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 88 REST OF GCC COUNTRIES: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 89 REST OF GCC COUNTRIES: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 90 SOUTH AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 91 SOUTH AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 92 REST OF MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 93 REST OF MIDDLE EAST & AFRICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 94 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2021–2025 (USD MILLION)

TABLE 95 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY COUNTRY, 2026–2032 (USD MILLION)

TABLE 96 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 97 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 98 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET,

BY END USER, 2021–2025 (USD MILLION)

TABLE 99 SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY END USER, 2026–2032 (USD MILLION)

TABLE 100 BRAZIL: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 101 BRAZIL: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 102 REST OF SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2021–2025 (USD MILLION)

TABLE 103 REST OF SOUTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET, BY TYPE, 2026–2032 (USD MILLION)

TABLE 104 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: OVERVIEW OF STRATEGIES ADOPTED BY KEY PLAYERS, 2021–2026

TABLE 105 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DEGREE OF COMPETITION, 2025

TABLE 106 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: REGION FOOTPRINT

TABLE 107 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: TYPE FOOTPRINT

TABLE 108 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: COOLANT TYPE FOOTPRINT

TABLE 109 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: END USER FOOTPRINT

TABLE 110 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DETAILED LIST OF KEY STARTUPS/SMES

TABLE 111 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: COMPETITIVE BENCHMARKING OF KEY STARTUPS/SMES

TABLE 112 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: PRODUCT LAUNCHES, JANUARY 2021–MARCH 2026

TABLE 113 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DEALS, JANUARY 2021–MARCH 2026

TABLE 114 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: EXPANSIONS, JANUARY 2021–MARCH 2026

TABLE 115 VERTIV GROUP CORP.: COMPANY OVERVIEW

TABLE 116 VERTIV GROUP CORP.: PRODUCTS OFFERED

TABLE 117 VERTIV GROUP CORP.: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 118 VERTIV GROUP CORP.: DEALS, JANUARY 2021-MARCH 2026

TABLE 119 VERTIV GROUP CORP: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 120 SUPER MICRO COMPUTER, INC.: COMPANY OVERVIEW

TABLE 121 SUPER MICRO COMPUTER, INC.: PRODUCTS OFFERED

TABLE 122 SUPER MICRO COMPUTER, INC.: DEALS, JANUARY 2021-MARCH 2026

TABLE 123 SUPER MICRO COMPUTER, INC.: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 124 MODINE MANUFACTURING COMPANY: COMPANY OVERVIEW

TABLE 125 MODINE MANUFACTURING COMPANY: PRODUCTS OFFERED

TABLE 126 MODINE MANUFACTURING COMPANY: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 127 MODINE MANUFACTURING COMPANY: DEALS, JANUARY 2021-MARCH 2026

TABLE 128 MODINE MANUFACTURING COMPANY: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 129 DCX LIQUID COOLING SYSTEMS: COMPANY OVERVIEW

TABLE 130 DCX LIQUID COOLING SYSTEMS: PRODUCTS OFFERED

TABLE 131 DCX LIQUID COOLING SYSTEMS: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 132 SCHNEIDER ELECTRIC: COMPANY OVERVIEW

TABLE 133 SCHNEIDER ELECTRIC: PRODUCTS OFFERED

TABLE 134 SCHNEIDER ELECTRIC: DEALS, JANUARY 2021-MARCH 2026

TABLE 135 SCHNEIDER ELECTRIC: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 136 FLEX LTD.: COMPANY OVERVIEW

TABLE 137 FLEX LTD.: PRODUCTS OFFERED

TABLE 138 FLEX LTD.: DEALS, JANUARY 2021-MARCH 2026

TABLE 139 COOLIT SYSTEMS: COMPANY OVERVIEW

TABLE 140 COOLIT SYSTEMS: PRODUCTS OFFERED

TABLE 141 COOLIT SYSTEMS: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 142 COOLIT SYSTEMS: DEALS, JANUARY 2021-MARCH 2026

TABLE 143 COOLIT SYSTEMS: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 144 NVENT: COMPANY OVERVIEW

TABLE 145 NVENT: PRODUCTS OFFERED

TABLE 146 NVENT: DEALS, JANUARY 2021-MARCH 2026

TABLE 147 NVENT: EXPANSIONS, JANUARY 2021-MARCH 2026

TABLE 148 KAORI HEAT TREATMENT CO., LTD.: COMPANY OVERVIEW

TABLE 149 KAORI HEAT TREATMENT CO., LTD.: PRODUCTS OFFERED

TABLE 150 ZUTACORE, INC: COMPANY OVERVIEW

TABLE 151 ZUTACORE, INC.: PRODUCTS OFFERED

TABLE 152 ZUTACORE, INC.: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 153 ZUTACORE, INC.: DEALS, JANUARY 2021-MARCH 2026

TABLE 154 ICEOTOPE PRECISION LIQUID COOLING: COMPANY OVERVIEW

TABLE 155 ICEOTOPE PRECISION LIQUID COOLING: PRODUCTS OFFERED

TABLE 156 ICEOTOPE PRECISION LIQUID COOLING: PRODUCT LAUNCHES,
JANUARY 2021-MARCH 2026

TABLE 157 ICEOTOPE PRECISION LIQUID COOLING: DEALS, JANUARY
2021-MARCH 2026

TABLE 158 ICEOTOPE PRECISION LIQUID COOLING: EXPANSIONS, JANUARY
2021-MARCH 2026

TABLE 159 BOYD: COMPANY OVERVIEW

TABLE 160 BOYD: PRODUCTS OFFERED

TABLE 161 TAISOL ELECTRONICS CO., LTD.: COMPANY OVERVIEW

TABLE 162 TAISOL ELECTRONICS CO., LTD.: PRODUCTS OFFERED

TABLE 163 WIWYNN CORPORATION: COMPANY OVERVIEW

TABLE 164 WIWYNN CORPORATION: PRODUCTS OFFERED

TABLE 165 INSPUR CO., LTD.: COMPANY OVERVIEW

TABLE 166 INSPUR CO., LTD.: PRODUCTS OFFERED

TABLE 167 LENOVO: COMPANY OVERVIEW

TABLE 168 LENOVO: PRODUCTS OFFERED

TABLE 169 LENOVO: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 170 LENOVO: DEALS, JANUARY 2021-MARCH 2026

TABLE 171 ACCELSIUS LLC: COMPANY OVERVIEW

TABLE 172 ACCELSIUS LLC: PRODUCTS OFFERED

TABLE 173 ACCELSIUS LLC: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 174 STULZ GMBH: COMPANY OVERVIEW

TABLE 175 STULZ GMBH: PRODUCTS OFFERED

TABLE 176 STULZ GMBH: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026

TABLE 177 RITTAL GMBH & CO. KG: COMPANY OVERVIEW

TABLE 178 RITTAL GMBH & CO. KG: PRODUCTS OFFERED

TABLE 179 RITTAL GMBH & CO. KG: PRODUCT LAUNCHES, JANUARY
2021-MARCH 2026

TABLE 180 RITTAL GMBH & CO. KG: DEALS, JANUARY 2021-MARCH 2026

TABLE 181 DELTA POWER SOLUTIONS: COMPANY OVERVIEW

TABLE 182 DELTA POWER SOLUTIONS: PRODUCTS OFFERED

TABLE 183 DELTA POWER SOLUTIONS: DEALS, JANUARY 2021-MARCH 2026

TABLE 184 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES): COMPANY
OVERVIEW

TABLE 185 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES):

PRODUCTS/SOLUTIONS/SERVICES OFFERED**TABLE 186 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES): PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026****TABLE 187 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES): DEALS, JANUARY 2021-MARCH 2026****TABLE 188 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES): EXPANSIONS, JANUARY 2021-MARCH 2026****TABLE 189 LIQUIDSTACK HOLDING B.V. (TRANE TECHNOLOGIES): OTHER DEVELOPMENTS, JANUARY 2021-MARCH 2026****TABLE 190 CHILLDYNE, INC.: COMPANY OVERVIEW****TABLE 191 CHILLDYNE, INC.: PRODUCTS/SOLUTIONS/SERVICES OFFERED****TABLE 192 CHILLDYNE, INC.: PRODUCT LAUNCHES, JANUARY 2021-MARCH 2026****TABLE 193 CHILLDYNE, INC.: DEALS, JANUARY 2021-MARCH 2026****TABLE 194 MALICO INC.: COMPANY OVERVIEW****TABLE 195 MALICO INC: PRODUCTS/SOLUTIONS/SERVICES OFFERED****TABLE 196 KOOLANCE, INC.: COMPANY OVERVIEW****TABLE 197 GIGA-BYTE TECHNOLOGY CO., LTD.: COMPANY OVERVIEW****TABLE 198 OPTICOOOL TECHNOLOGIES: COMPANY OVERVIEW****TABLE 199 SEGUENTE INC.: COMPANY OVERVIEW****TABLE 200 COOLCENTRIC: COMPANY OVERVIEW**

List Of Figures

LIST OF FIGURES

FIGURE 1 DATA CENTER DIRECT-TO-CHIP COOLING MARKET SEGMENTATION AND REGIONAL SCOPE

FIGURE 2 KEY INSIGHTS AND MARKET HIGHLIGHTS

FIGURE 3 GLOBAL DATA CENTER DIRECT-TO-CHIP COOLING MARKET, 2026–2032

FIGURE 4 MAJOR STRATEGIES ADOPTED BY KEY PLAYERS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET (2020–2025)

FIGURE 5 DISRUPTIVE TRENDS IMPACTING GROWTH OF DATA CENTER DIRECT-TO-CHIP COOLING MARKET

FIGURE 6 HIGH-GROWTH SEGMENTS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET

FIGURE 7 ASIA PACIFIC TO EXHIBIT FASTEST GROWTH DURING FORECAST PERIOD

FIGURE 8 RAPID ADOPTION OF AI, ML, AND BLOCKCHAIN TECHNOLOGIES TO CREATE LUCRATIVE OPPORTUNITIES FOR MARKET PLAYERS

FIGURE 9 HYPERSCALE DATA CENTERS TO BE LARGEST SEGMENT DURING FORECAST PERIOD

FIGURE 10 SINGLE PHASE TO LEAD OVERALL MARKET DURING FORECAST PERIOD

FIGURE 11 NORTH AMERICA TO DOMINATE GLOBAL DATA CENTER DIRECT-TO-CHIP COOLING MARKET

FIGURE 12 CHINA TO BE FASTEST-GROWING MARKET DURING FORECAST PERIOD

FIGURE 13 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DRIVERS, RESTRAINTS, OPPORTUNITIES, AND CHALLENGES

FIGURE 14 ESTIMATED GLOBAL DATA CENTER CAPACITY DEMAND

FIGURE 15 INCREASE IN POWER DENSITIES IN DATA CENTERS (KW PER RACK)

FIGURE 16 DATA CENTER POWER DENSITIES, BY DEPLOYMENT TYPE (KW PER RACK)

FIGURE 17 POWER USAGE EFFECTIVENESS

FIGURE 18 GROWTH OF GLOBAL EDGE DATA CENTERS MARKET

FIGURE 19 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: PORTER'S FIVE FORCES ANALYSIS

FIGURE 20 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: VALUE CHAIN ANALYSIS

FIGURE 21 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: ECOSYSTEM

ANALYSIS**FIGURE 22 TRENDS AND DISRUPTIONS IMPACTING CUSTOMER BUSINESS****FIGURE 23 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: INVESTMENT AND FUNDING SCENARIO, 2019–2024****FIGURE 24 FUTURE APPLICATIONS OF DATA CENTER DIRECT-TO-CHIP COOLING MARKET****FIGURE 25 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DECISION-MAKING FACTORS****FIGURE 26 INFLUENCE OF STAKEHOLDERS ON BUYING PROCESS, BY END USER****FIGURE 27 KEY BUYING CRITERIA, BY END USER****FIGURE 28 ADOPTION BARRIERS & INTERNAL CHALLENGES****FIGURE 29 SINGLE-PHASE TO BE FASTER-GROWING SEGMENT DURING FORECAST PERIOD****FIGURE 30 HYPERSCALE DATA CENTERS TO BE FASTEST-GROWING SEGMENT DURING FORECAST PERIOD****FIGURE 31 NORTH AMERICA TO ACCOUNT FOR LARGEST MARKET SHARE DURING FORECAST PERIOD****FIGURE 32 NORTH AMERICA: DATA CENTER DIRECT-TO-CHIP COOLING MARKET SNAPSHOT****FIGURE 33 ASIA PACIFIC: DATA CENTER DIRECT-TO-CHIP COOLING MARKET SNAPSHOT****FIGURE 34 EUROPE: DATA CENTER DIRECT-TO-CHIP COOLING MARKET SNAPSHOT****FIGURE 35 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: REVENUE ANALYSIS OF KEY COMPANIES, 2020–2024****FIGURE 36 RANKING OF KEY PLAYERS IN DATA CENTER DIRECT-TO-CHIP COOLING MARKET****FIGURE 37 DATA CENTER DIRECT-TO-CHIP COOLING MARKET SHARE ANALYSIS, 2025****FIGURE 38 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: BRAND/PRODUCT COMPARISON****FIGURE 39 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: EV/EBITDA****FIGURE 40 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: EV/REVENUE****FIGURE 41 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: YEAR-TO-DATE (YTD) PRICE TOTAL RETURN AND FIVE-YEAR STOCK BETA OF KEY MANUFACTURERS****FIGURE 42 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: COMPANY EVALUATION MATRIX (KEY PLAYERS), 2025**

FIGURE 43 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: COMPANY FOOTPRINT

FIGURE 44 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: COMPANY EVALUATION MATRIX (STARTUPS/SMES), 2025

FIGURE 45 VERTIV GROUP CORP.: COMPANY SNAPSHOT

FIGURE 46 SUPER MICRO COMPUTER, INC.: COMPANY SNAPSHOT

FIGURE 47 MODINE MANUFACTURING COMPANY: COMPANY SNAPSHOT

FIGURE 48 SCHNEIDER ELECTRIC: COMPANY SNAPSHOT

FIGURE 49 FLEX LTD.: COMPANY SNAPSHOT

FIGURE 50 NVENT: COMPANY SNAPSHOT

FIGURE 51 KAORI HEAT TREATMENT CO., LTD.: COMPANY SNAPSHOT

FIGURE 52 TAISOL ELECTRONICS CO., LTD.: COMPANY SNAPSHOT

FIGURE 53 WIWYNN CORPORATION: COMPANY SNAPSHOT

FIGURE 54 INSPUR CO., LTD.: COMPANY SNAPSHOT

FIGURE 55 LENOVO: COMPANY SNAPSHOT

FIGURE 56 DELTA POWER SOLUTIONS: COMPANY SNAPSHOT

FIGURE 57 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: RESEARCH DESIGN

FIGURE 58 MARKET SIZE ESTIMATION METHODOLOGY: BOTTOM-UP APPROACH

FIGURE 59 MARKET SIZE ESTIMATION METHODOLOGY: TOP-DOWN APPROACH

FIGURE 60 MAIN MATRIX CONSIDERED TO ASSESS DEMAND FOR DATA CENTER DIRECT-TO-CHIP COOLING

FIGURE 61 STEPS CONSIDERED TO ANALYZE SUPPLY OF DATA CENTER DIRECT-TO-CHIP COOLING

FIGURE 62 DATA CENTER DIRECT-TO-CHIP COOLING MARKET: DATA TRIANGULATION

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