Data Center Liquid Cooling Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

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Report description:

The data center liquid cooling market is expected to record a CAGR of 25.23% during the forecast period. Technological advancements have made liquid cooling simple to maintain, easily scalable, and affordable and have reduced liquid usage by more than 15% for data centers in built-in hot and humid climates and 80% in more excellent areas. The energy dedicated to liquid cooling can be recycled to heat buildings or water, effectively shrinking the carbon footprint of air conditioning due to the application of advanced engineering coolants.

Key Highlights
Other benefits of liquid cooling include higher capacity than air cooling, providing the same cooling with a much larger volume, reduced overall capacity requirement due to applying high-power density components directly, and efficient heat rejection. The dielectric liquid used in the direct liquid cooling method effectively absorbs heat. Hence, more hardware can be inserted into a smaller space, lowering the need for additional space to accommodate the hardware.
A green data center is where data is stored, managed, and distributed. The mechanical, lighting, electrical, and computer systems are planned to be as energy-efficient as possible while minimizing their adverse environmental effects. Innovative techniques and technologies are used in building and running green data centers. With the exponential growth and usage of the Internet, power consumption in data centers has increased significantly. Companies are under more pressure to adopt a green policy due to the environmental impact, rise in public awareness, higher cost of energy, and governmental action. These factors have made the development of sustainable data centers directly drive the data center liquid cooling market.
On the other hand, Operators of data centers wishing to employ cooling systems face substantial challenges due to the requirements for adaptability. Data centers are complex, with a vast server array, and they carry the uncertainty of quantity, timing, and location. When cooling at such a high density, many extra expenses are incurred. To satisfy the demands of the data center, it must be adaptable and scalable. Companies are worried if their current cooling systems can support the increased

server load in the future. This makes infrastructure changes frequent and pushes companies unwilling to invest much in newer cooling systems.
Furthermore, the COVID-19 epidemic has significantly increased the demand for data centers. As more employees work from home, video calls and VPN usage are rising. The use of telehealth applications by allied health practitioners is expanding.
In New York, telehealth visits have increased by 312%, as per Amwell. To keep entertained and in touch with loved ones, consumers are also heavily utilizing streaming services, which are becoming more readily available due to service providers like Verizon, who enhance their bandwidth capacity. Such industry changes have fueled the desire for cloud-based solutions, fueling demand for data centers and their related sectors.

Data Center Liquid Cooling Market Trends

Indirect Cooling is Anticipated to Account for a Significant Market Share

Direct-to-chip cooling, also known as indirect or liquid-to-chip cooling or cold plate cooling, is the most common liquid cooling method which transfers heat from the server to the outside using a chilled water loop and a coolant on a cold plate inside. Data centers are entering applications with unprecedented computation and core count demands in the modern era. These days, as traditional air cooling hits its limits, data center operators and owners must reconsider the growing density and the challenge offered.
High-performance, high-frequency, and intensive workload conditions, multi-core computing, including artificial intelligence (AI) and machine learning (ML), and end-to-end data center solutions are in high demand in data centers. Data center owners could meet various needs across the company due to the most recent advancements in indirect or direct-on-chip liquid cooling and system integrator services.
Indirect or direct-to-chip cooling utilizes liquid or phase-change heat-transfer mechanisms. It offers extensive power and heat dissipation at a minimum operating temperature. Furthermore, it allows it to work under operating conditions, and a processor can perform significantly faster than a processor cooled by other conventional means.
Many firms offer cold plate technology that can be implemented into new and existing servers. Direct-to-chip cooling technology often has a higher heat dissipation capability than backplane heat exchangers. A hybrid cooling approach is necessary because direct-to-chip cooling typically only removes 70-75 percent of the heat produced by the machinery in the frame.
The direct-to-chip-cooling trend is expected to continue in 2022 and increase significantly over the forecast period. The IT industry is researching new cooling technologies for heat sources directly contacting the processor. ZutaCore's direct-on-chip dielectric solutions enable efficient and sustainable cooling of increasingly powerful CPUs and GPUs. With this high-performance computing, power grows with new microprocessors and SoC (system on chip) architectures. This growth allows for more advanced processing, such as large-scale data analysis and immersive virtual reality experiences.

North America is Anticipated to Hold a Dominant Market Share

North America is an early adopter of newer technologies. The region saw a tremendous increase in the penetration of linked devices. Investors in data centers are increasingly funding direct-to-chip and liquid immersion cooling technologies. The worldwide development of 5G networks, of which the United States is one of the early adopters, has boosted the significance of edge data centers. Many American operators have begun investing in these centers, including EdgePresence, EdgeMicro, and American Towers.
The mobile data traffic has increased considerably over the years, from 1.26 exabytes per month of data traffic to 7.75 exabytes per month in 2021, as reported by Cisco Systems. According to Ericsson, the data traffic is expected to triple further by 2030.

Thus, the distributed cloud that can secure the low latency and high bandwidth required to connect to such a scale quickly is expected to come into action. Several technology giants address critical challenges while managing their server and computational needs. A major factor responsible for the rising densities is the rapid rise in data-crunching for AI.
The time people and businesses spend online is dramatically increasing in the United States. The country is the largest market for data center operations, and it is still expanding due to the increased data consumption by end users. There are now more facilities that can support exabytes of data created by commercial users and consumers due to the growing popularity of the Internet of Things (IoT), which is a significant driver for the US hyper-scale data center and enhances the need for a liquid cooling market. Direct-to-chip liquid cooling is growing in popularity in North America. On-site water treatment facilities with dual piping systems are included in the facilities that use water for cooling. Many vendors in the Southeastern and Western regions of the country are switching to water-cooled chillers, which have an economizer mode that enables partial facility cooling by using outside air. Additionally, Canada is continuously growing and providing more data center infrastructure solutions due to increased demand for efficient data centers, initiatives for ecological data center solutions, and substantial growth of power density across the region. According to Natural Resources Canada, around half of the energy consumed in a data center is utilized by computing servers, with a further 40% being attributable to cooling these servers. Furthermore, the climatic conditions of the cities in Canada are recorded with an annual temperature of 42.8 □F. This eliminates the need for extensive cooling systems in the data centers and, in turn, helps to reduce operational costs.

Data Center Liquid Cooling Market Competitor Analysis

The data center liquid cooling market is highly competitive and consists of several significant players like Alfa Laval AB, Asetek AS, Liquid Cool Solutions, Vertiv Co, etc. In terms of market share, few important players currently dominate the market. These leading firms have significant market shares and are concentrating on growing their clientele internationally. These businesses use strategic joint ventures to raise their market shares and profitability. Companies want specially developed fluids for their systems. For instance, Submer, a recent market entrant, created a coolant, especially for its technology. New competitors intensify the competition, which may induce them to make strategic and technological investments, expanding the market for highly effective technologies.

In May 2022, Intel launched a new initiative to address data center sustainability with a $700 million investment into a new research facility specializing in liquid and immersion cooling. Along with this, Intel unveiled the first immersion cooling reference design in the market to promote the use of the technology in data centers worldwide.

Additional Benefits:

The market estimate (ME) sheet in Excel format
3 months of analyst support

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