

CASE STUDY

SABEY DATA CENTERS ACHIEVES ON-DEMAND LIQUID COOLING FOR HIGH-DENSITY IT DEPLOYMENTS USING THE SMARTPLATE DIRECT-TO-CHIP SYSTEM

A self-contained, plug-and-play system provides practical and cost-effective liquid cooling for colocation customers with AI and High-Performance Computing (HPC) needs.

THE COMPANY

Based in Seattle, Washington, Sabey Data Centers is one of America's largest privately owned providers, with a portfolio of over four million square feet of mission-critical space. Sabey offers several different types of facilities – multi-tenant colocation, powered shell, and built-to-suit enterprise data centers.

"We are committed to operating our facilities as efficiently and sustainably as possible," says John Sasser, Chief Technology Officer at Sabey. "Historically, Sabey has been a pioneer in adopting new mission-critical technologies, such as hot-aisle containment. Looking ahead, we hope to continue to guide the data center industry towards more effective digital infrastructure standards."

THE CHALLENGE

Like most data center providers, Sabey has built its facilities according to American Society of Heating, Refrigerating, and Air-Conditioning Engineers' (ASHRAE's) thermal guidelines. The A1-A4 standards specify a recommended temperature range of 64.4°F to 80.6°F (18°C to 27°C) for air-cooled data processing environments.

But with the rise of Artificial Intelligence (AI) and High-Performance Computing (HPC), many colocation customers are now deploying high-density IT servers, which produce higher amounts of heat. The new ASHRAE H1 standards state that these environments must be cooled within a stricter temperature range of 64.4°F to 71.6°F (18°C to 22°C).

"For data center owners, the options for achieving ASHRAE's H1 standards in modern air-cooled facilities are not ideal,"

explains Sasser. "In some facilities, you can reduce air cooling set points and bring the facility's temperatures down to that narrow H1 range. This increases energy and water use, which also increases operational costs and reduces the facility's sustainability."

"Or you can upgrade the facility itself, which requires a large capital investment. You can build a separate data hall to house high-density IT deployments, or install a facility-wide liquid cooling system. But whichever solution you choose, you're increasing operational costs and energy use to provide proper cooling for what might be a small number of high-density IT servers."

THE SOLUTION

Sabey Data Centers is now recommending the JetCool SmartPlate™ System, a direct-to-chip liquid cooling system, to its colocation customers with high-density servers. The SmartPlate System provides on-demand, plug-and-play liquid cooling, allowing companies to deploy high-density IT footprints, even in facilities that don't have liquid cooling infrastructure.

"The SmartPlate System may eliminate the need for facilities to meet ASHRAE's H1 cooling standards in the first place," says Sasser. "Since it is a self-contained, closed-loop system, all the cooling takes place inside the server chassis. This means you don't need to lower a facility's air-cooling temperatures, or install an expensive data hall or an elaborate, open-loop liquid cooling system. The SmartPlate System provides adequate liquid cooling in an enclosed high-density server cabinet, while the surrounding data center continues to operate according to ASHRAE's traditional A1-A4 air cooling guidelines."

SABEY'S EVALUATION

Sabey conducted an evaluation of the SmartPlate System on a Dell PowerEdge R740XD server at its Columbia (Washington) data center. The table below shows the data collected, compared to traditional air cooling.

R740XD Server	Avg. Demand (W)	Avg. CPU Temp (°C)	Air Inlet Temp (°C)	Δ T°C (CPU to Inlet)
Air-Cooled	208W	39°C	22°C	17°C
JetCool	180W	32.5°C	21°C	11.5°C

BENEFITS FOR SABEY DATA CENTERS

EFFICIENT POWER UTILIZATION

In Sabey's evaluation, the server cooled by the SmartPlate System registered a 13.5% decrease in power consumption against air-cooled servers. Since the system's liquid coolant absorbs heat directly from electronic components through cold plates, it eliminates the need for intense airflow, which significantly reduces fan speeds.

*Note: While Sabey documented a savings of 560 watts - (20) 2U servers * 28 watts/server, Jetcool projects the SmartPlate System offers potential savings up to 4 kW per rack of power consumption with high-density IT deployments.*

OPTIMAL TEMPERATURE MANAGEMENT

On Dell PowerEdge servers, the SmartPlate System can cool advanced computing workloads more effectively than air cooling. As documented by Sabey, SmartPlate System enables a 32% decrease in temperature differential between the CPU and the inlet. The higher air intake temperatures provide an additional reduction in cooling energy usage.

OPERATIONAL & CAPITAL COST SAVINGS

Through reduced energy use, the SmartPlate System gives Sabey a cost savings in electricity and water expenses. Also, utilizing the SmartPlate System prevents Sabey from having to upgrade their facilities to provide liquid cooling to their colocation customers – which provides a savings in capital costs through “money not spent.”

SUSTAINABILITY

At a facility level, the SmartPlate System reduces energy use for IT cooling. Efficient server-level cooling reduces the overall heat generated by servers, which in turn reduces the workload on air handlers. This can lead to lower energy consumption and operational costs for cooling equipment, as air handlers don't need to work as hard to maintain optimal temperatures or provide as much airflow to the data hall.

BENEFITS FOR SABEY'S CUSTOMERS

1 EFFECTIVE COOLING FOR HIGH-DENSITY IT DEPLOYMENTS

The SmartPlate System's patented microconvective cold plate utilizes arrays of fluid jets to target hot spots on high-density IT processors cooling today's latest Intel, AMD, and NVIDIA chipsets. Its self-contained system cools up to 850W in a 1U server, and 1,200W in a 2U server, and can be easily deployed inside a 42U server cabinet.

2 EASY INTEGRATION AND SCALABILITY

As a self-contained, plug-and-play system, the SmartPlate System can be deployed in almost any high-density IT environment or mix-and-matched within a given cabinet. This gives Sabey's customers easy and cost-effective access to liquid cooling. Also, the SmartPlate System can easily be scaled up as customers add additional servers to their IT footprint in Sabey's data centers.

3 MAXIMUM SERVER DENSITY

The SmartPlate System allows Sabey's customers to deploy as many high-density IT servers as they need. Also, with a 13.5% reduction in power consumption, customers that utilize the SmartPlate System use less capacity in their IT footprint. This translates to space savings, and allows companies to deploy additional servers in Sabey's colocation facilities.

4 IMPROVED CHIP PERFORMANCE

With the SmartPlate System's liquid cooling, Sabey's customers achieve lower temperatures for high-density IT chips. This amplifies chip performance, allowing the chips to do more computations, while maximizing server lifetime and reliability.

5 LOWER COSTS THROUGH REDUCED ENERGY USE

By utilizing the SmartPlate System, Sabey is able to pass on its savings from reduced cooling costs to colocation tenants. Since customers pay for the electricity used by their IT footprint in Sabey's data centers, a 13.5% power reduction means a significant cost savings for them.

“As the data center industry transitions to liquid cooling, JetCool's SmartPlate System will help Sabey to bridge the gap,” says Sasser. “With investments in AI and HPC, more companies are looking for colocation facilities that can support high-density IT deployments. The SmartPlate System is a practical and cost-effective solution that allows Sabey's customers to deploy higher density servers without the expenses related to a full liquid cooling application, especially in existing air-cooled facilities. As we continue to lead the way in introducing efficient data center solutions, I believe the Smartplate System will be a great option for us.”