

CASE STUDY

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TIERPOINT SUPPORTS DEPLOYMENT OF HIGH-DENSITY DDC SCALABLE S-SERIES DATA CENTER CABINETS DESIGNED FOR AI ANYWHERE

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TIERPOINT SUPPORTS DEPLOYMENT OF HIGH-DENSITY DDC SCALABLE S-SERIES DATA CENTER CABINETS DESIGNED FOR AI ANYWHERE

DDC helps deploy HPC and AI solution for TierPoint, in a new state-of-the-art data center that was the lowest cost to build, faster to deploy, and less costly to run.

HIGH-DENSITY GPUs

CHALLENGE

The client requires the deployment of significant GPUs for AI workloads that produce massive varying amounts of heat and energy. Traditional data centers were not designed to support the operating demands of this next-level IT system.

S SERIES

SOLUTION

DDC scalable S-Series award-winning data center cabinets and DCIM monitoring software



RESULTS

- Lowest cost to build, faster to deploy, and less costly to run
- Allows equipment to cycle between 5kW - 52kW per rack on demand
- Lower PUE than alternative solutions
- Dense GPU deployment
- Closed loop system for reduced water usage with no evaporation



DDC helped TierPoint future-proof the data center, making it scalable, sustainable, dependable, and high-performing for years to come.

DDC remains, in our viewpoint, the best solution to deliver a data center at the density and power cycling flexibility we need. We have been unable to find any other solution that could actually do what this equipment does, and we think we've continued to look at everything."

**-David Foster, Chief Data Center Officer
at TierPoint**

The acceleration and widespread adoption of artificial intelligence (AI) and high-performance computing (HPC) technologies require a new approach to data center design. TierPoint is a digital transformation leader helping clients all over the United States solve their most complex IT challenges with state-of-the-art cloud and colocation services. As both the IT advisor and administrator, TierPoint is leading the way in providing future-proof data center solutions.

When a customer came to TierPoint to help develop a new ultra-high-density data center to support massive AI and HPC workloads, TierPoint had been operating three HPC centers in the US. TierPoint chose to continue its partnership with DDC Cabinet Technology (DDC), the global leader in scalable data center-to-edge AI Anywhere solutions that feature patented Dynamic Density Control™ (DDC) cabinet technology, to support this expansion. In designing this new facility, DDC helped TierPoint future-proof the datacenter, making it scalable, sustainable, dependable, and high-performing for years to come.



MODULAR DESIGN

DENSITY MATTERS

CHALLENGE

TierPoint needed to accommodate hundreds of connected state-of-the-art servers containing multiple high-density graphics processing units (GPU) to help their client support compute-heavy AI and HPC workloads. The entire interconnected server ecosystem works together to provide ultra-high-speed computational power. Each server in the data center – and each individual GPU – must maintain approximately the same low temperature to operate effectively. And due to the massive computational workloads being processed, the volume of heat produced by GPUs makes this very challenging.

The TierPoint team knew that a traditional data center design would not be able to accommodate the high-density load they intended to build. Historically, data centers have utilized in-room air conditioning to manage the temperature of a massive space. Naturally, variances in temperature occur throughout the room which affect each individual server. “Picture 100 people crossing a mountain that are all tethered to each other on a trail. You only move as fast as the slowest one,” explained Keith Markley, former Executive Vice President of Operations at TierPoint and now CEO of DDC Cabinet Technologies. “So, if you’ve got a bunch of these GPUs with inlet temperatures of 68 degrees and others that are 78 degrees, you have equipment running slower than other equipment. You have equipment that wants to run fast, but it can only process as fast as that slowest piece of equipment in those racks.” Many data centers designed for AI and HPC workloads supplement air conditioning with liquid cooling that submerges the equipment in non-conductive liquid. Liquid submersion can also be problematic due to the high level of maintenance required, massive amount of liquid introduced on the data center floor, and risk of leakage.





Lowest Cost to Build
Faster to Deploy
Less Costly to Run

SIDE-BY-SIDE COST AND PERFORMANCE COMPARISON: CONTAINMENT, HEAT EXCHANGE, DDC CABINETS

TierPoint manages 40 data centers across the United States. They recently used their extensive network of engineering partners from across their facilities to conduct an in-depth side-by-side analysis of a 16-megawatt augmentation to an existing data center. During the study, they compared the costs and benefits of hot and cold aisle containment, rear door heat exchangers, and DDC S-Series Cabinets.

The team analyzed a wide variety of areas:

Rack/Cabinet Density	IT Floor Space Requirements
Airflow / CFM Management	Mechanical Space Requirements
Data Center Power Construction Cost	Electrical Space Requirements
Data Center Mechanical Construction Costs	Fire Protection Costs

They also calculated the total overall deployment cost on Day 1 and the ongoing data center operating cost (PUE/WUE).

The results were significant. Containment was the most expensive construction option, with rear door heat exchange 20% lower in construction costs, while DDC S-Series were 30% lower. DDC also came in lowest in monthly PUE with a 44% savings over containment – and in annual power costs, with a 12% savings over containment.

TierPoint Case Study – Actual Cost Results: 16MW Project

CONTAINMENT	REAR DOOR XCHANGE	DDC S-SERIES
<ul style="list-style-type: none"> • Final All In Construction Cost: <ul style="list-style-type: none"> - Most Expensive • 16MW @ .06kWh <ul style="list-style-type: none"> - Equal - Most Expensive PUE/ Month • Estimated Annual Power Cost: <ul style="list-style-type: none"> - Most Expensive 	<ul style="list-style-type: none"> • Final All In Construction Cost: <ul style="list-style-type: none"> - 20% Reduction Over Containment • 16MW @ .06kWh <ul style="list-style-type: none"> - Equal - 29% PUE/Month Reduction Over Containment • Estimated Annual Power Cost: <ul style="list-style-type: none"> - 8% Savings Over Containment 	<ul style="list-style-type: none"> • Final All In Construction Cost: <ul style="list-style-type: none"> - 30% Reduction Over Containment • 16MW @ .06kWh <ul style="list-style-type: none"> - Equal - 44% PUE/Month Reduction Over Containment • Estimated Annual Power Cost: <ul style="list-style-type: none"> - 12% Savings Over Containment

Dynamic monitoring and management keeps equipment energy usage stable and predictable

DDC S-Series cabinets use proprietary DCIM software to conduct real-time monitoring of conditions within the cabinet and adjust water and airflow dynamically to meet needs at any given time, which the other solutions compared do not offer. Dynamic monitoring and management keeps equipment energy usage stable and predictable and allows S-Series cabinets to have some of the lowest PUEs in the industry, saving customers on annual costs year after year.

Here are the areas DDC S-Series outperformed containment and heat exchange.

DDC S-SERIES BENEFITS vs. Containment and Heat Exchange	BENEFITS EXPLAINED
Highest Density	<ul style="list-style-type: none"> • Highest density support @ 85kW • Superior temperature control, with front and back airflow management • DDC dynamic response adjusted for large swings in kW load within seconds
Lowest Cost to Install	<ul style="list-style-type: none"> • A smaller footprint reduces numerous cost areas • Reduced or eliminated cost for fire suppression, air handlers, raised floor, etc. • Rapid deployment reduces overall construction time and cost
Lowest Operating Cost	<ul style="list-style-type: none"> • Eliminating make-up water with a closed-loop system greatly reduces operating cost • Dynamic resource allocation reduces energy cost and energy waste, lowering PUE
Superior Performance	<ul style="list-style-type: none"> • Airflow management at the front of the server enables better hardware management and performance • Sealed cabinets and dynamic density response reduces temperature variations and component failures – helping hardware last longer
Security & Sound Control	<ul style="list-style-type: none"> • Cabinet enclosures provide additional physical security and access control • Sound attenuation improves data center environment and reduces hearing risks
Better Operating Model	<ul style="list-style-type: none"> • Dual fan system ensures adequate airflow even with extensive cabling work • Higher density support reduces cable lengths, saving significant cost

S

SERIES

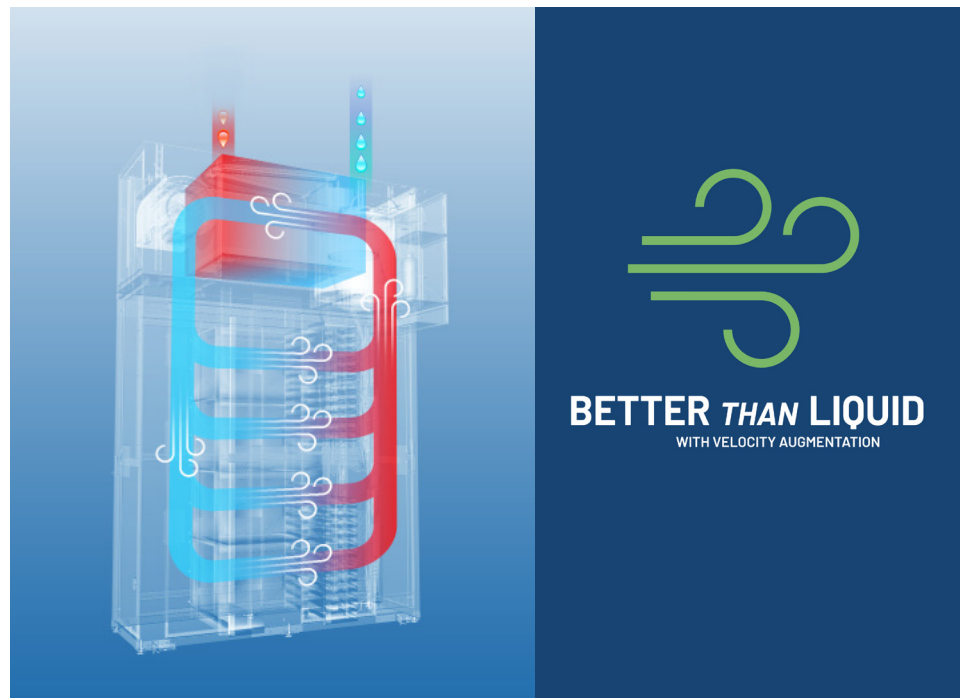
DDC also came in lowest in annual power costs, saving 12% over containmentment and 5% over rear door heat exchange.

SOLUTION

TierPoint chose to deploy ultra-high-density colocation services for its customer using DDC Scalable S-Series data center cabinets. The new state-of-the-art AI Anywhere data center facility is 26,000 square feet and will contain 324 S-Series cabinets.

Markley explained the reason TierPoint chose to partner with DDC for this project, "Alternative solutions that involve cooling infrastructure, rear door heat exchangers, fans, room balancing, and all these thermal dynamics; they are unbelievably expensive, archaic, hard to manage, and don't achieve the intended outcomes. DDC offers a way to manage infrastructure that's less expensive to build, operates at much higher efficiency levels, is faster to install and manage, and actually deals with other problems like cabling and what I would call temperature balancing at the server level."

DDC combines the efficiency of water cooling with the risk-free flexibility of air. The Scalable S-Series data center cabinet platform provides TierPoint with the world's highest-density air-cooled system. The closed-loop, modular design means that each cabinet runs as its own individually monitored, cooled, and operated system. This allows TierPoint to easily scale infrastructure as their customer needs change, adding capacity as demand grows while reducing capital expenditure.



S

SERIES

FIRE SUPPRESSION

BIOMETRIC SECURITY

PROACTIVE EQUIPMENT
MONITORING

MANAGEMENT
SOFTWARE



Patented DDC DCIM software utilizes multiple sensors and data collection points within the cabinets to monitor their performance in real-time, eliminating stranded assets. The dynamic system provides in-the-moment airflow and temperature setpoint management, delivering better hardware performance and fewer component failures. "DCIM software not only monitors every single cabinet but it's also constantly optimizing to keep them all balanced in unison across any size build," comments Chris Orlando, Co-founder and Chief Strategy Officer of DDC Cabinet Technology. The open API integration and real-time reporting enables the TierPoint team to make accurate workload performance forecasts unavailable with traditional open-air cooling systems.

"DCIM software not only monitors every single cabinet but it's also constantly optimizing to keep them all balanced in unison across any size build."

- Chris Orlando, Co-founder and Chief Strategy Officer at DDC Cabinet Technology.

In addition to better than liquid performance, the S-Series also features fire suppression, biometric security, and proactive equipment monitoring and management via state of the art DCIM software. It enables a single pane of glass view of every single cabinet in the data center. TierPoint can also use the platform to monitor all of their DDC data centers running around the country or focus on an individual data center to see what's happening in real-time.



324 CABINETS

ULTRA HIGH-DENSITY

50 KILOWATTS PER
FULL-TIME LOAD

24 x 7

RESULTS

Since partnering with DDC and their AI Anywhere solutions on their new data center project, TierPoint will experience incredible results.

- **Superior performance:** Each one of the 324 cabinets will support 50 kilowatts per full-time load, running simultaneously 24 hours a day, 7 days a week.
- **Improved efficiency:** Dynamic cabinet temperature monitoring and adjustment ensures each GPU server will run at optimal performance levels at all times, increasing the productivity and efficiency of the entire data center.
- **Decreased water and energy usage:** Fans in each cabinet will use far less energy and virtually no net new water to cool the GPUs. Despite the ultra-high-density nature of the new TierPoint facility, it will be one of the world's most efficiently run data centers.
- **Low cost to build:** DDC cabinets will provide the lowest construction cost per watt to build among vendors, as analyzed by TierPoint.
- **Increased equipment uptime:** Consistent temperatures will result in more GPUs operating as designed.

“Not only do DDC cabinets offer a lower cost per watt to build, but there’s significantly more data processing output, which equates to more revenue for our customer. They provide better performance on the equipment at a lower cost to operate.”

**- David Foster, Chief Data Center Office
at TierPoint**

Learn more about DDC’s Scalable S-Series cabinet solution and future-proof your data center.

Phone +1.888.349.9994
Email info@ddc-cabtech.com
www.ddc-cabtech.com

