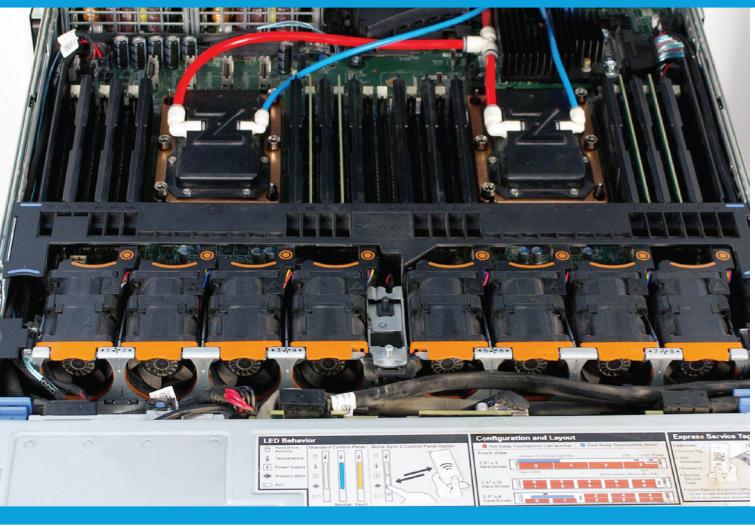
CHATSWORTH PRODUCTS

Liquid Cooling for High Performance Solutions



An innovative, two-phase, direct-to-chip liquid cooling solution. Delivers optimal performance for high power processors exceeding 2800W† with zero throttling, enabling sustained high efficiency even under the most intensive workload.

ZetaFrame® Integrated with ZutaCore® HyperCool® Direct-to-Chip Liquid Cooling.

Today, AI and other high-performance computing applications are driving the adoption of high-density racks in data centers. The exponential growth of data and rising demand for efficient, reliable infrastructure require innovative solutions.

- ZutaCore® leads the transformation with advanced two-phase direct-to-chip liquid cooling solutions, providing precision targeting of the primary heat source at the processor level to efficiently remove large amounts of heat.
- With self-regulating, on-demand cooling, it delivers the highest performance, ensures systems are future-ready, and supports densification through maximized space utilization.
- It supports technology transitions focused on reducing water, power, and land usage, addressing the growing priority of sustainability for decision-makers.
- ZutaCore's liquid cooling seamlessly integrates with CPI's ZetaFrame® Cabinet System, enabling simplified deployment while supporting higher compute densities.

Adopting a holistic hybrid cooling approach that integrates air containment and liquid cooling enables data centers to enhance performance and efficiency. Effective air containment optimizes liquid cooling, reduces energy consumption, and ensures reliable operations in high-density environments.

chatsworth.com

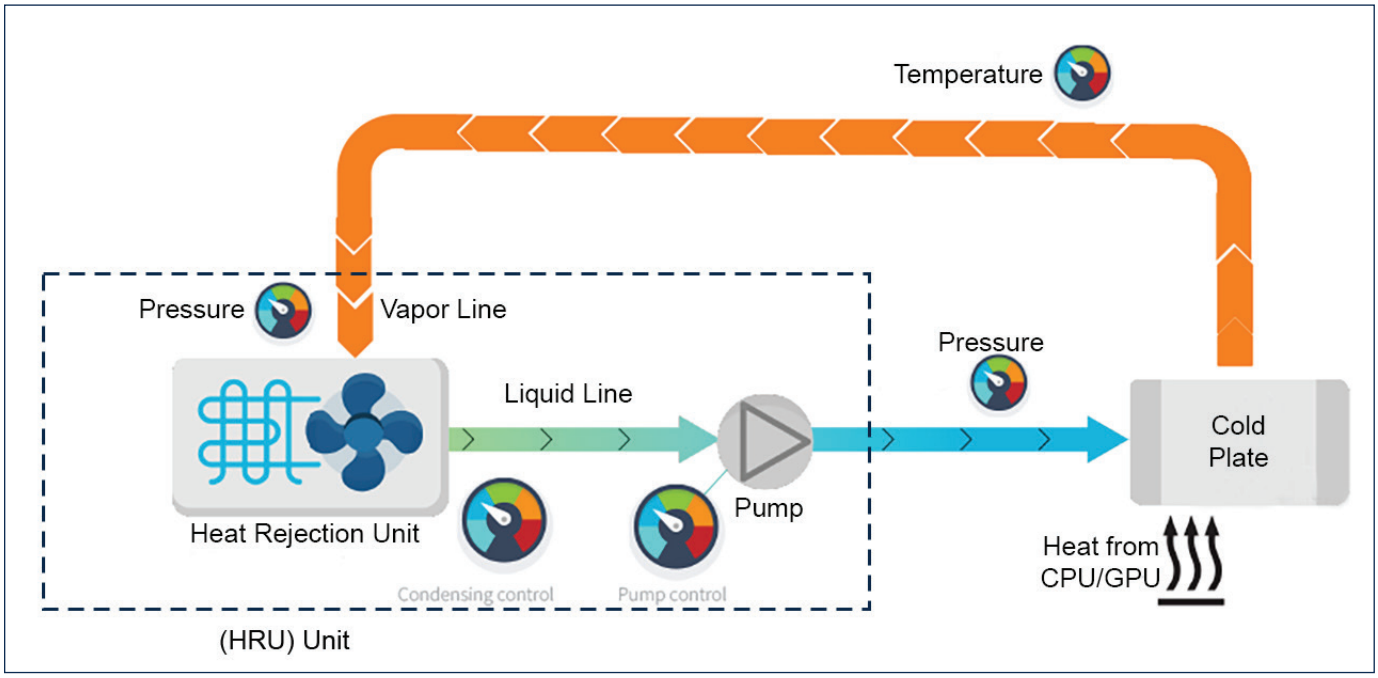
†Source: zutacore.com/solutions

Maximize Performance and Efficiency

with ZutaCore® HyperCool® Direct-to-Chip Technology

Key Features:

- **Two-Phase Direct-to-Chip Technology:** Efficiently cools the most powerful processors with self-regulating, on-demand cooling.
- **Enhanced Integration:** Seamlessly integrates with CPI's ZetaFrame® Cabinet System for simplified deployment.
- **Future-Ready Capability:** Engineered to meet next-generation Thermal Design Power (TDP) requirements for high-density workloads.
- **Waterless Technology Cooling System Loop:** Closed-loop cooling system that uses a non-conductive, non-corrosive fluid to eliminate the risk of electronic damage in the event of a leak.
- **Maximized Space Utilization:** Delivers high-density performance with increased watts per square ft.
- **Optimized Energy Efficiency:** Minimizes energy consumption for sustainable and cost-effective operation.
- **Lower TCO:** Accelerates deployment time and reduces operational costs, while minimizing energy consumption, and delivering the highest sustained performance.
- **Reduced Carbon Footprint:** Lowers energy consumption and enables 100% heat reuse, supporting sustainability and net-zero goals while significantly reducing CO2 emissions.



Liquid cooling supports:

- Higher TDPs
- Lower fan speed and noise
- Higher ambient temperature
- Optimized energy efficiency
- Reduced CO2 emissions
- Lower TCO
- Maximized space utilization
- Ease of maintenance

Water-based liquid cooling solutions are widely used today and can be effective for current technology and thermal demands. While generally safe under controlled conditions, the risk of leaks remains a concern, and over time, the limitations of water as a coolant may become apparent as technology evolves and power densities increase, challenging its long-term practicality.

The answer?

A direct-to-chip, waterless technology cooling system loop.

This system is highly effective at managing heat loads, enabling a lightweight, compact design while supporting higher-density processors. The waterless technology eliminates the risk to electronics in case of a leak, requires minimal monitoring, and the fluid is maintenace free.

This quote, featured in a ZutaCore case study, highlights the value of their HyperCool technology:

> ***When implemented on Intel technologies, we found ZutaCore's HyperCool to be a reliable, scalable, and cost-effective liquid cooling technology, well-suited for both brown and greenfield projects.***

Earl Dodd, Global HPC Business Practice Leader at WWT

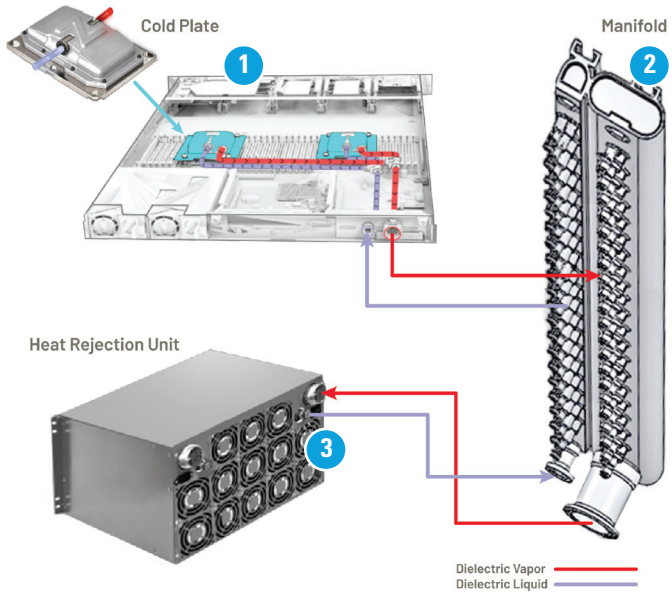
ZutaCore HyperCool:

Liquid Cooling, Without Water

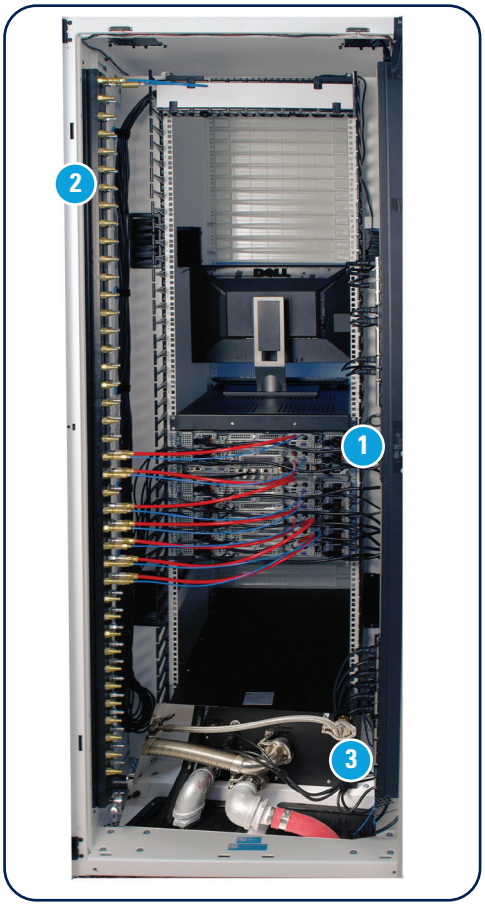
HyperCool is scalable and can be deployed in new or retrofit data centers. It supports up to 100kW per rack of computing power when used with a 6U in-rack cooling distribution unit. The innovative design of HyperCool allows heat reuse in the data center, producing the lowest PUE and highest efficiency in any climate.

HyperCool is a complete, closed-loop solution for cooling a server's heat-emitting components such as the CPU, GPU, and FPGA.

How the ZutaCore® HyperCool® Solution Works:



The system includes:



1. HyperCool Cold Plate (Server Kit):
   Assembled onto heat emitting components such as CPUs and GPUs.

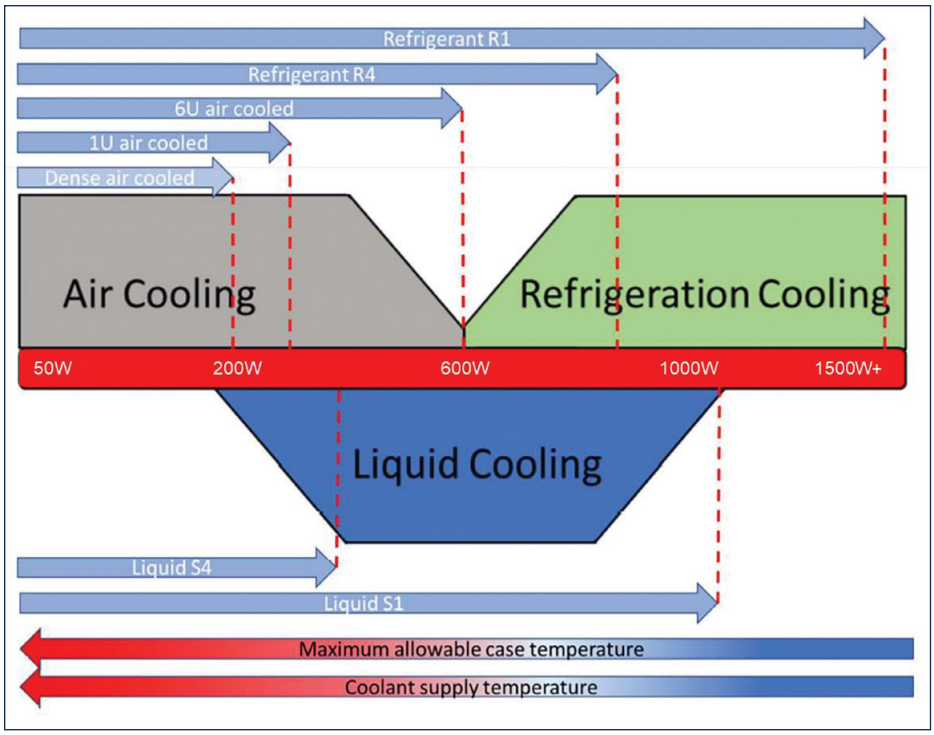
2. HyperCool Manifold:
   Self-contained manifold effectively distributes heat transfer fluid between the HRU and devices.

3. HyperCool Heat Rejection Unit (HRU):
   A self-contained system placed inside 19" cabinet which can manage compute densities up to 100 kW total thermal load.

- Software Defined Cooling (SDC) - not shown:
  The customer interface provides monitoring and control for the server CPUs and HRU units. It also provides server performance data and analytics, including temperatures, load, utilization, clock speed, fan speed, and power consumption.

Data Centers Are Feeling the Heat

The increasing power of modern chips and higher computing densities are generating unprecedented heat levels, pushing air cooling systems to the brink of their capacity.



Performance- and sustainability-minded operators alike are turning to liquid cooling. Water has a much higher specific heat capacity than air, making it a far better coolant than ambient air cooling. *Source: NVIDIA*

This insight from Equinix, featured in a ZutaCore case study, underscores the growing demand for innovative cooling solutions in data centers:

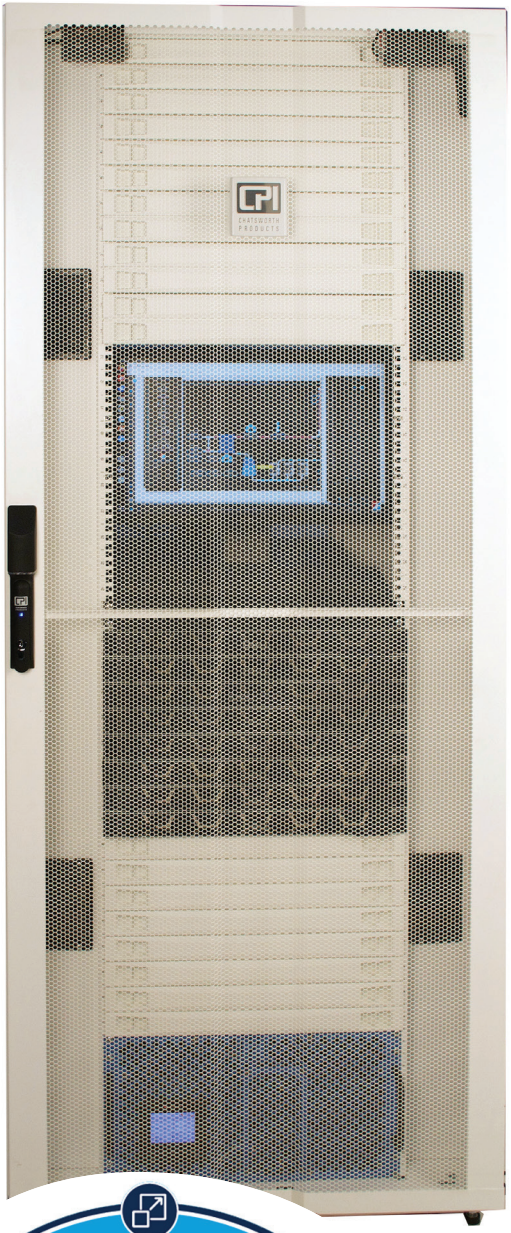
> ***With AI and other high-performance computing applications, the proportion of higher density racks in data centers is going up so unless we find a way to address these needs we will continue to miss growth areas. That's where liquid can come in.***

Suresh Pichai,
Director, Equinix

Seamless Integration with ZetaFrame® Cabinet System

Effectively protecting and powering technology starts with CPI's ZetaFrame® Cabinet System that uses a modular, holistic approach to integrate cable management, thermal management, power management, environmental monitoring, and access control. These solutions work together as a single-vendor turnkey platform that supports increasing power densities while reducing costs and optimizing efficiency, availability, security, and scalability for evolving enterprise-owned, multi-tenant, cloud hyperscale, and edge data centers.

Additionally, air containment and vertical exhaust ducts can further manage heat to optimize the supply airflow delivery path to equipment. These solutions provide maximum flexibility for mechanical design and efficiency, even over close-coupled air-cooling strategies such as row-based or door-based systems, at a fraction of their costs.



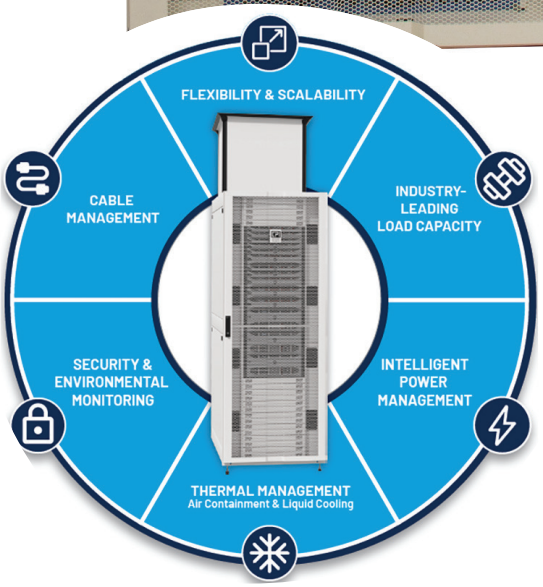
Benefits of integrating the ZutaCore solution into the ZetaFrame Cabinet System include:

Flexible Two-Phase Liquid Cooling Deployment: End-to-end solutions, including HRU-Air or HRU-Water options, ensure streamlined and efficient deployment for AI and HPC applications.

Consultation and Design Support: Expert guidance from initial assessment and design to installation and ongoing support, integrating systems seamlessly into ZetaFrame Cabinets and existing infrastructure.

Simplified Configuration and Integration: Preinstalled system components including HRU, manifold and hoses are consolidated under a single part number, factory installed and tested, and shipped on shock pallets for safe transit and hassle-free deployment.

Sustainable Packaging and Disposal: Supports sustainability goals by reducing carbon footprint through responsible packaging debris management, disposal, and recycling.



Get questions answered by one of CPI's friendly and knowledgeable Technical Support specialists. No matter what the nature of your request, CPI is ready to assist you.

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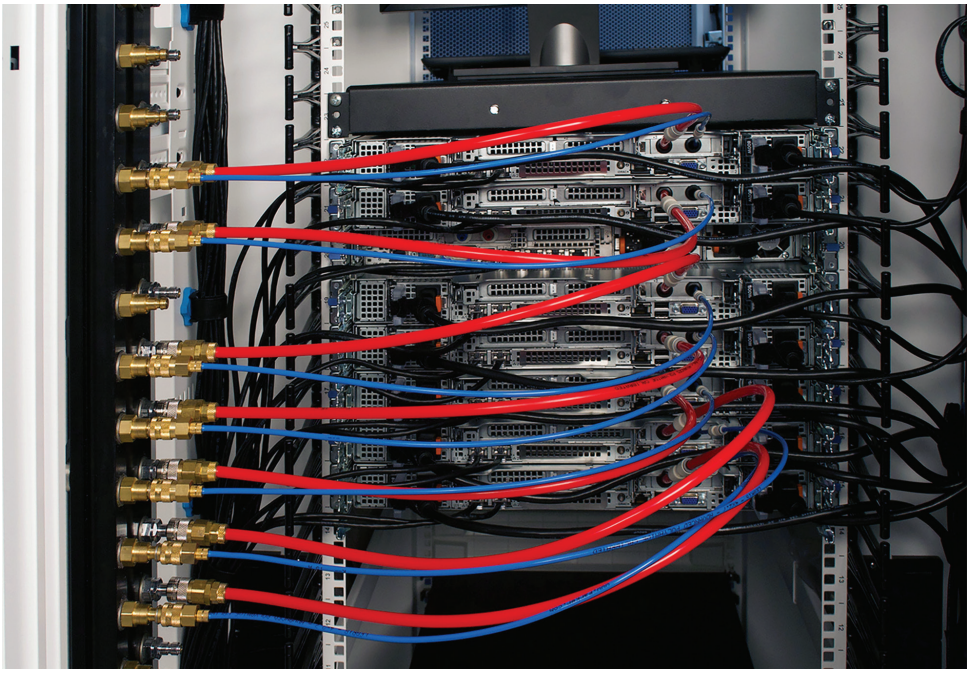
This quote is excerpted from a ZutaCore case study with Equinix, highlighting their innovative HyperCool solution:

> ***We've joined forces with ZutaCore for our first install into our production environment of their dielectric direct-on-chip (non-water) liquid-cooling technology. Their HyperCool solution is a simple, quick, and easy way to scale to help us advance our climate neutral data center goal.***

Zac Smith, Global Head of Edge Infrastructure Services at Equinix

For more information, please visit: http://www.zutacore.com



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