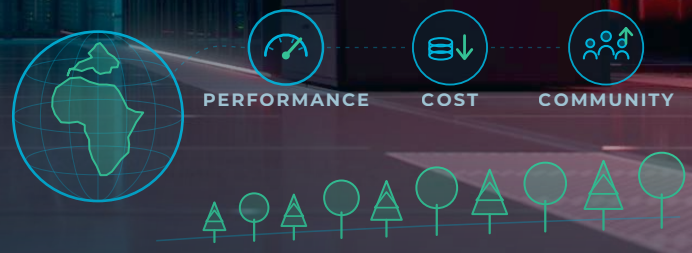
ZUTACORE

The Case for Two-Phase.

Waterless Two-Phase Cooling — Performance, Cost, Energy, Impact



Waterless at the Server

Little to No Maintenance

Low Risk by Design

Scales Without Redesign

Built for Next-Generation Densities

Next-generation accelerators have moved beyond what air and single-phase cooling can practically remove. ZutaCore® HyperCool® two-phase cooling provides the thermal headroom those roadmaps require: support for 4,000W+ at the chip, sustained clock speeds under continuous load, and a reduction in cooling energy of approximately three-quarters — all while using a dielectric fluid that removes heat by evaporation, with no water introduced at the server.

Thermal Headroom for the Roadmap

Accelerator TDPs now exceed the practical limits of air cooling. Two-phase supports 4,000W+ at the chip, allowing a facility to be sized by its power envelope rather than its cooling capacity.

Cooling Energy Returned to Compute

Approximately 74% less cooling energy and a pPUE of 1.03 in production. Electrical capacity not consumed by heat rejection remains available for revenue-generating workloads.

Sustained Performance Under Load

Phase change maintains junction temperature stability under continuous load, allowing accelerators to hold rated clock speeds and long-running jobs to complete to schedule.

The operational case is straightforward: **less fluid in motion**, less energy spent moving it, lower system pressure, and **no water introduced to the electronics at any point**. Evaporation carries substantially more energy per unit of fluid than a temperature rise alone, and the infrastructure reflects that difference.

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Where Two-Phase Pays Back.

Three Steps, One Sealed Loop

01

Heat Removed at the Source

A dielectric fluid evaporates on contact with the chip, absorbing substantial heat at near-constant temperature. No water or glycol enters the server.

02

Low Flow, Low Pressure Transport

Vapor carries the latent heat out of the rack, requiring markedly lower flow rates and smaller pipework than a liquid-only loop.

03

Sealed, Closed-Loop Recovery

The CDU condenses the vapor and returns it to the cold plate, responding dynamically to whatever the workload does next.

Six Outcomes, Significant Value Added

PROTECTION

Protection for Critical IT Assets

The dielectric fluid is non-conductive. A loss of containment does not compromise energized hardware, removing liquid cooling's principal failure mode.

MAINTENANCE

A Substantially Reduced Maintenance Burden

No filtration schedule, biocide dosing, inhibitor management or pH monitoring. Operational headcount does not scale with the size of the fleet.

CAPITAL

Accelerated Return on Deployed Capital

Deployment does not depend on a facility water loop. Racks commission into existing halls, allowing capital to begin returning earlier in the program.

SCALABILITY

Incremental, Demand-Led Scaling

Capacity is added rack by rack rather than in facility-sized increments, aligning expenditure with realized demand.

WATER

Site Selection Without Water Constraint

Zero liters at the server and no evaporative make-up. Water availability ceases to be a determining factor in site feasibility and permitting.

NOISE & COMMUNITY

Noise Halved, Exposure Cut

On NVIDIA HGX B300 we measured 10.7 dBA against air cooling — perceived loudness halved, and over 90% of the acoustic energy removed.

Built for the Workloads That Run Hottest.

One waterless architecture — from a pilot rack to a full AI factory.

- **HPC & Research**
- **Financial Services / HFT**
- **AI Factories / Neocloud**
- **Telco / Edge AI**
- **Enterprise AI / Hyperscalers**

Different Physics. Better Outcomes.

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ZutaCore, Inc. · 950 Tower Lane, Suite #120, Foster City, CA 94404