

# AI Ready: Immersion-Cooled Data Centers



The Cisco-Asperitas alliance addresses mounting data center power and cooling demands with an integrated immersion cooling solution that enables sustainable, high-performance computing from core to edge.

## Partner Alliance Solution Brief

Asperitas, a cleantech and high-tech company from Amsterdam, has partnered with Cisco to revolutionize data center efficiency and performance through their immersion cooling technology and Cisco's high-density compute infrastructure. This collaboration leverages Asperitas' Immersed Computing solutions and Cisco's UCS Compute platforms to deliver unparalleled energy efficiency, sustainability, and operational flexibility.

### About Cisco

Cisco (NASDAQ: CSCO) is the worldwide leader in technology that powers the internet. Cisco inspires new possibilities by reimagining your applications, securing your enterprise, transforming your infrastructure, and empowering your teams for a global and inclusive future

### About Asperitas

Asperitas is a cleantech company specializing in immersion cooling solutions for data centers. Founded in 2014, they launched their first cooling solution in 2017. Their Immersed Computing® technology supports high-density, energy-efficient data centers using total liquid cooling. Asperitas has won several international awards for its innovative technology and impact on the industry.

## The Challenge

Today's data centers are experiencing unprecedented pressures as digital transformation accelerates across industries. These challenges are pushing traditional infrastructure to its limits and demanding innovative solutions.

### Power and Cooling Demands

- Data centers currently consume approximately 1.5-2% of global electricity
- Up to 40% of data center energy consumption goes to cooling alone
- Traditional air-cooling systems struggle with densities above 15kW per rack

### Environmental Impact

- Data centers in the US alone consumed over  $5.13 \times 10^8$  m<sup>3</sup> of water in 2018
- Carbon emissions from data centers account for between 1% and 5% of global CO2 emissions
- 92% of S&P 500 companies now publish sustainability reports, increasing scrutiny on data center operations

### Infrastructure Limitations

- Traditional data center construction lead times are too long for current market needs
- Existing facilities are running out of power and space before achieving required density
- Mounting challenges from limited grid capacity, renewable energy access, and power infrastructure constraints.

### Technology Evolution

- Next-generation applications like AI, ML, and AR require ever-denser, more complex CPUs and GPU's that generate unprecedented heat
- Edge computing demands rapid deployment in remote and often harsh environments

## The Solution: Single Phase Immersion Cooling

The **Perpetual Natural Convection (PNC) platform**, is an immersion cooling solution designed to maximize data center efficiency and sustainability. This closed, water-cooled oil-immersion system leverages natural convection to circulate dielectric liquid, ensuring optimal thermal management with minimal energy consumption.

### Key Features



**Plug and Play Design:** The PNC platform is designed for ease of deployment, requiring only power, access to a water loop, and data connectivity. Its silent operation and minimal infrastructure needs provide high flexibility for various deployment sites and scenarios.



**High Density:** The Asperitas Universal Cassette (AUC) maximizes IT capacity by accommodating multiple physical servers. Each module can house 24 1U 21" wide servers and with 2 Universal Switching Cassettes, supporting up to 48 immersed servers.



**Convection Drives:** Equipped with two specially designed Convection Drives, the system facilitates forced water and natural oil flow, capable of transferring 24 kW of heat from the oil while maintaining optimal operating temperatures for all IT components.



**Monitoring:** Embedded autonomous control system continuously monitors the temperature state of the tank and reports any exceptions to the optimal cooling environment providing alerts and escalations and can isolate tanks flow and power systems to safeguard the compute and data center integrity.

### PNC Platform

*(Perpetual Natural Convection)*



**Ultra-low energy overhead :** Approximately only 100W overhead out of 44kW capacity per tank



**Simple to use:** Modular design. Managed remotely with automated safety control. Ready to run anywhere.



**Sustainable:** 10% less IT energy, 80% less physical footprint, 95% less cooling energy for data centers, 100% energy reuse ready.

