



CASE STUDY



The University of Pisa's Net-Zero Journey with ZutaCore's Waterless Direct Liquid Cooling

HyperCool® Delivered the Most Computing Power for the Money; Eliminated the Risk of Water Leakage and Reduced Energy Costs

Organization:	University of Pisa
Industry:	Higher Education
Challenge:	Cooling efficiency, rising energy demands, and net-zero sustainability targets
Solution:	ZutaCore Waterless Direct-to-Chip Liquid Cooling
Results:	Increased server utilization under full load Achieved 20kW cooling capacity per rack Completed installation in just 1 day Improved energy efficiency and operational flexibility

Project Background

Renowned for its rich history and academic excellence, the University of Pisa, established in 1343, has consistently embraced innovation and advancement, particularly in data center technology. In 2016, the university inaugurated its Green Data Center in San Piero a Grado. It came equipped with cutting-edge servers from Dell Technologies and processors from Intel, NVIDIA, and AMD, ready to support high-performance computing for scientific research.

However, this role also demanded powerful infrastructure that could handle heavy computational loads with efficiency and sustainability. To meet net-zero sustainability goals, the university needed to evolve beyond its existing hot-aisle water chiller system.

The Challenge

Inefficient cooling, rising energy costs, and pressure to meet net-zero sustainability targets demanded a solution — and urgency. Despite a state-of-the-art data center, the University of Pisa faced critical limitations:

- ◆ **Low cooling efficiency** restricted next-generation processors from operating under full load.
- ◆ Rising energy consumption made **net-zero sustainability goals** harder to achieve.
- ◆ It takes a scalable cooling solution to enhance power density and operational flexibility while **supporting future server upgrades**.

To overcome these challenges, the university sought a solution that could **enhance performance, energy efficiency, and scalability** without disrupting operations.



The HyperCool Solution

The University of Pisa partnered with ZutaCore® and certified partner Mactronics to implement HyperCool®, a waterless direct-to-chip, two-phase liquid cooling system.

Why HyperCool?

- ◆ Delivers **20kW cooling capacity per rack** to maximize power density
- ◆ **Supports processors up to 2800W** and beyond
- ◆ Operates at **low-pressure, without water**, for safety and efficiency
- ◆ Compatible with **both new and retrofitted** data centers
- ◆ Reduces power consumption for better Power **Usage Effectiveness (PUE)**

Swift Implementation

In a single day, Mactronics retrofitted **10 Dell R740XD and C6525 servers**. This rapid installation allowed the university to achieve immediate performance improvements with **minimal disruption** while preparing for future workloads.

Results

HyperCool enabled the University of Pisa to unlock major performance increases and prep infrastructure for future scalability:

Server Utilization	→ Full-load operation achieved
Rack Density	→ 20kW per rack cooling capacity
Installation Time	→ 10 servers retrofitted in 1 day
Energy Efficiency	→ Reduced cooling power consumption
Operational Flexibility	→ Scalable platform with support for next-gen servers



HyperCool makes it possible to run high-performance servers at full capacity without thermal throttling. For the University of Pisa, this translates into expanded research capabilities, improved operational efficiency, and a clear path toward sustainable growth.

Looking Ahead

The success of the initial deployment has prompted the University of Pisa to plan further adoption of ZutaCore HyperCool across its Green Data Center. As the University continues to invest in technological advancements, ZutaCore remains a key partner in their future-forward journey towards sustainability.



Maurizio Davini, CTO of the University of Pisa, praised the efficient transition, recognizing the potential of this system in enhancing power within the rack and enabling an energy-efficient leap towards next-generation servers.

Maurizio Davini, CTO, University of Pisa

The University's plans for continued investment signify their trust in ZutaCore's reliability, flexibility, and simple installation and management procedures. This project clearly showcased the powerful impact of waterless liquid cooling on modern data centers in higher education and research.

AI and HPC workloads will only continue to escalate their power demands. ZutaCore has set a new benchmark for operational efficiency and environmental responsibility with HyperCool. Institutions like the University of Pisa are enhancing their current capabilities while pioneering a path toward greener, more resilient data infrastructures that support next gen AI processors.

Will your organization be next?