ACCELSIUS

NEUCOOL™

Use Cases

ENTERPRISE

Overview

An on-premises, enterprise-class data center implementing a high-performance computing solution will need 210kW of total heat removal in a new facility.

Challenges

The facility's increased rack capacity, higher compute workloads, and additional heat generated per CPU/GPU require a transition from air cooling to liquid cooling. Both immersion and 2-phase, direct-to-chip liquid cooling options must be evaluated to determine which offers the best performance and cost-efficiency.

Solution

Based on the data center's need for ease of integration into existing structures; thermal headroom for scaled expansion; cost benefits; and operational and regulatory concerns, the best solution was the Accelsius NeuCool 2-phase, direct-to-chip liquid cooling system in three racks, each equipped with an in-rack iPCU running 70kW/rack.

Results

REDUCED CAPEX

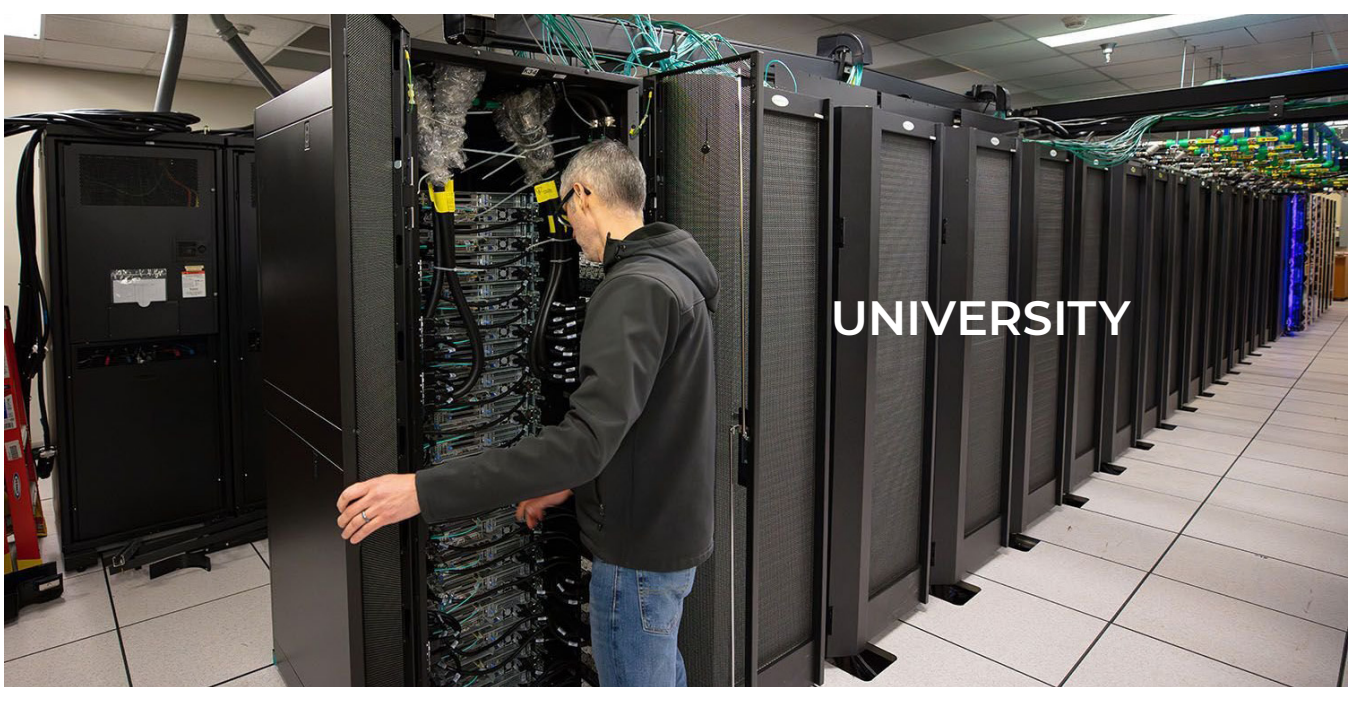
- **$88,000 saved** on liquid cooling cost of the NeuCool Platform versus 2-phase immersion
- **$15,000+ avoided** for not installing a slab to support an immersion tank and lift system required to service the equipment
- **No need for 1,300 liters of immersion tank coolant** (at a cost of $26,000) that is subject to unpredictable and impending EU regulations
- **NeuCool liquid cooling uses only 30 liters of coolant** per rack (at a cost of only $600)

REDUCED OPEX

- **$5,200 saved** in annual coolant replacement costs versus 2-phase immersion

OTHER

- **No special training and personal protective equipment** needed to manage an immersion tank and system



UNIVERSITY

Overview

A 15-year-old, university campus data center has access to sufficient electrical power, but it is nearing its current traditional HVAC-based cooling capacity. A large research project requires the addition of 40 new servers, networking, and storage that will total 100kW of power and the ability to cool the new servers.

Challenges

The expanded system must be installed and ready to use within two months, but the quoted delivery time for new CRACs delivery is six months.

Solution

Within six weeks, the data center deployed two NeuCool Platform racks with a cooling capacity of 50kW/rack, operating at ASHRAE 45 (45°C unchilled facility water), and utilizing only a small portion of the existing HVAC capacity to cool non-CPU/GPU components in the servers and rack.

Results

REDUCED OPEX

- **$32K saved in Year 1** on energy costs
- **In Year 4, accrued energy cost savings recoup the CapEx difference** in deploying a liquid cooling solution versus adding HVAC capacity

OTHER

- **Headroom increased** for future server/rack and performance expansion
- **Critical project timelines were met** with advanced, high-performance servers (chips) and demanding AI/ML workloads without consuming >50% more space, and incurring higher energy and water usage
- **229,000 kWh of energy saved per year** by deploying liquid cooling, allowing that power to support future research projects

WATER-RESTRICTED

Overview

A 10MW greenfield data center for AI learning will be built in the Southwest US.

Challenge

Local government water usage restrictions cap the amount of water the data center can consume in the course of its operations.

Solution

The data center chose 200 NeuCool-equipped racks (each supporting 50kW/rack), using ASHRAE 45 facility water.

Results

Compared to air cooling, NeuCool liquid cooling yielded:

REDUCED OPEX

- **$3.3M/year saved** in energy costs
- **$115,000 saved** in annual water costs

EXCELLENT ROI

- **28-month payback** on difference between air cooling and NeuCool solution

OTHER

- **Zero water consumed** (versus 150M+ liters/year)
- **Future compute growth enabled** by limiting energy used for cooling
- **Real estate costs saved** by building more densely
- **60% less kWH used annually** (24,207,100 kWh)

Sources:

The Green Grid TCO v3 v4 Calculator and Handbook

STULZ and CoolIT Systems Direct Liquid Cooling Webinar