

Liquid Cooling for Heat Reuse: Center for Biological Sequence Analysis at Technical University of Denmark



Technical University of Denmark



The Challenge

The Center for Biological Sequence Analysis (CBS) at the Technical University of Denmark is striving towards CO₂ neutrality in its High Performance Computing (HPC) facility known as 'Computerome'. An equally important goal is provisioning these computational resources as efficiently as possible within a modular data center environment. CoolIT Systems accepted the challenge to deliver a liquid cooled system that dramatically lowers energy consumed for cooling and provides a workable system to recycle the waste heat from the servers.

The Solution

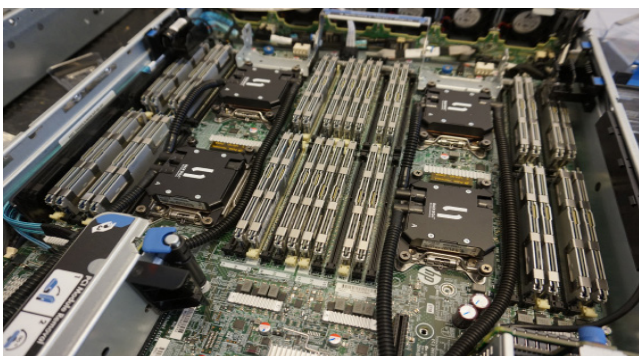
CoolIT Systems is addressing CBS's need to be CO₂ neutral in the university's HPC facility by replacing traditional air cooling with highly efficient liquid. The CBS solution combines rack mounted HP ProLiant DL560 Gen8 servers with CoolIT Systems direct contact liquid cooling and Rack DCLC™ CHx40 centralized pumping solution, to manage the dual CPU thermal load. The liquid is distributed directly to the processors through stainless steel manifolds that utilize all metal, dry-break quick connects for hot-swappable servicing of any single server. With 16,000+ cores and 92 TB memory, Computerome is now ranked 121 of the Top500 supercomputers in the world. The cluster, delivered by Go Virtual, accepts an inlet water temperature of 40°C and beyond to gain maximum efficiency. CBS enables waste heat recovery by routing the high temperature liquid from the servers to provide heat for the adjacent buildings and nearby town of Roskilde.

HPC Setup

- CoolIT Systems Rack DCLC™ CHx40
- Dual CPU liquid cooled server modules
- HP ProLiant DL560 Gen8 servers
- Intel® Xeon® Processor E5 4600v2 130Watt CPU's
- Modular data center
- 40°C primary fluid supply temperature

Results

- 72% of total IT load managed by liquid cooling
- 14kW total rack load (130watt CPU's x 108)
- 563 GFLOPS per server (at peak performance)
- Further results will be published after testing



“An important goal was provisioning these computational resources as efficiently as possible. CoolIT delivered a liquid cooled system that lowers the energy consumed for cooling and provides opportunities to reuse the waste heat from the servers.”

Peter Løngreen, Head of HPC,
CBS-DTU