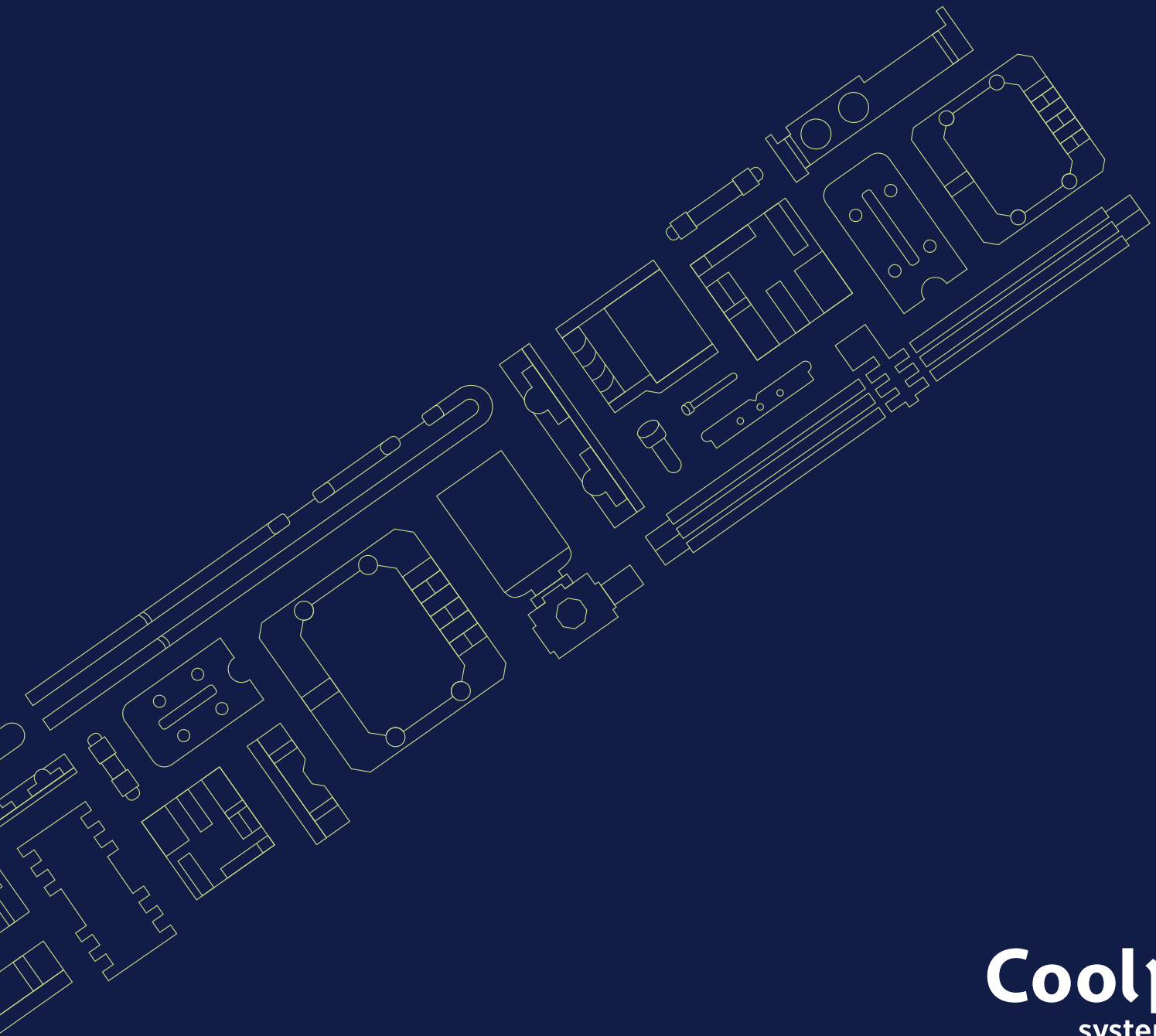# Rack DLC

RELIABLE DIRECT LIQUID COOLING FOR THE
WORLD'S MOST DEMANDING DATA CENTERS

CoolIT
systems™

Direct Liquid Cooling

UNLOCKING DATA CENTER POTENTIAL

CoolIT Systems Rack DLC™ solutions manage challenging heat loads and deliver the high density, efficiency and performance required by today's demanding data centers.

Direct Liquid Cooling (DLC) utilizes the exceptional thermal conductivity of liquid to provide dense cooling to targeted areas. This technology lowers OpEx by reducing the dependence on fans and expensive air handling systems while increasing the performance and density of data center installations.

This technology is compatible with most existing data center infrastructure making it the ideal choice for today's leaders in data center design.

The Benefits

PERFORMANCE

Facilitate peak performance for higher powered or overclocked processors.

DENSITY

Enable 100% utilization of existing rack and data center spaces.

EFFICIENCY

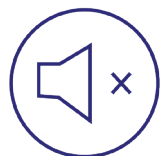Benefit from a significant reduction in total data center energy consumed.

SAVINGS

Generate immediate and measurable OpEx benefits and reduce overall TCO.

SCALABILITY

Enable quick and easy data center expansion to manage rising heat loads.

ACOUSTICS

Relieve employees from the disruption of loud server fans.

We Are The OEM Partner

HERE TO ADD VALUE TO YOUR END USERS

Whether you are an OEM or Hyperscale leader looking for products that enable your technology to perform at its peak, or a data center operator needing reliable products to reduce energy costs and OpEx, CoolIT Systems Rack DLC platform is equipped to support any server, rack configuration and data center environment. Utilizing Rack DLC's three module approach, customers work directly with CoolIT's engineering experts to select components specific to their needs. It's as easy as 1, 2, 3.

OpEx
(annualized)

Rack Density
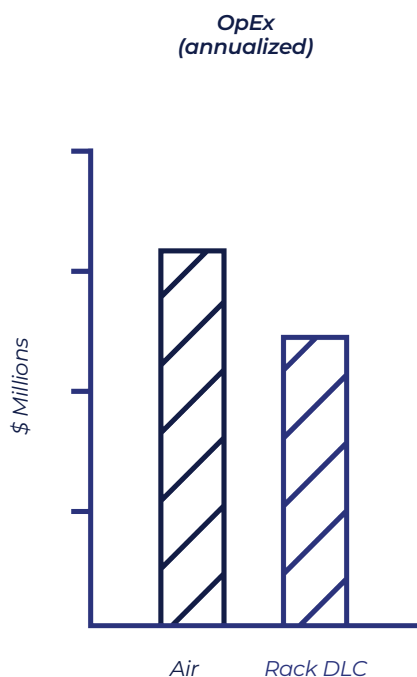
22% REDUCTION

Operating Expenses
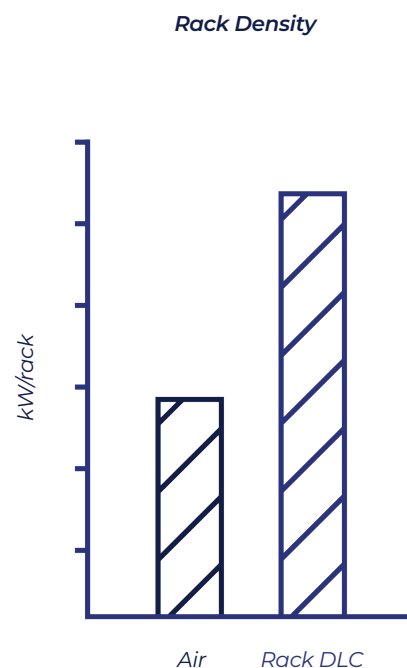
80% INCREASE

Rack Capacity

OEM Solutions

FLEXIBLE MODULES COMBINE TO FIT YOUR NEEDS

PASSIVE COLDPLATE LOOP

Liquid cool any combination of CPU, GPU and RAM components within any server. Passive coldplate loops include the necessary coldplates, tubing and quick disconnects.

RACK MANIFOLD

Rack DLC Manifolds manage liquid distribution between the CDU and any number of Passive Coldplate Loops. Customizable to suit any server or rack environment.
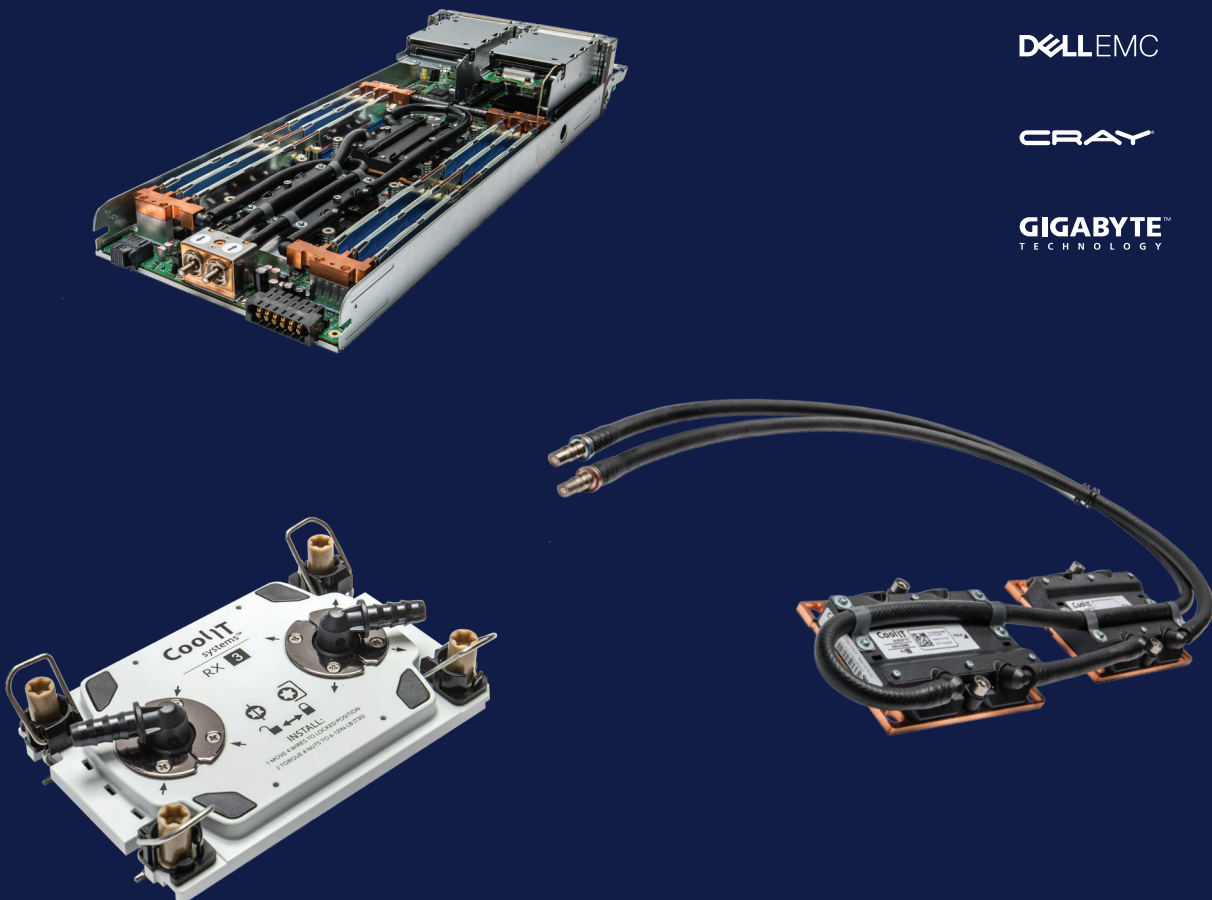
COOLANT DISTRIBUTION UNIT (CDU)

CoolIT Systems Rack DLC CDUs offer a variety of designs including CHx (liquid-to-liquid), AHx (liquid-to-air) and custom options. Featuring a low pressure, centralized pumping system, heat exchanger and advanced control system.

We Build For The Best

DIRECT LIQUID COOLING SOLUTIONS ENGINEERED TO OPTIMIZE SERVER DENSITY AND PERFORMANCE
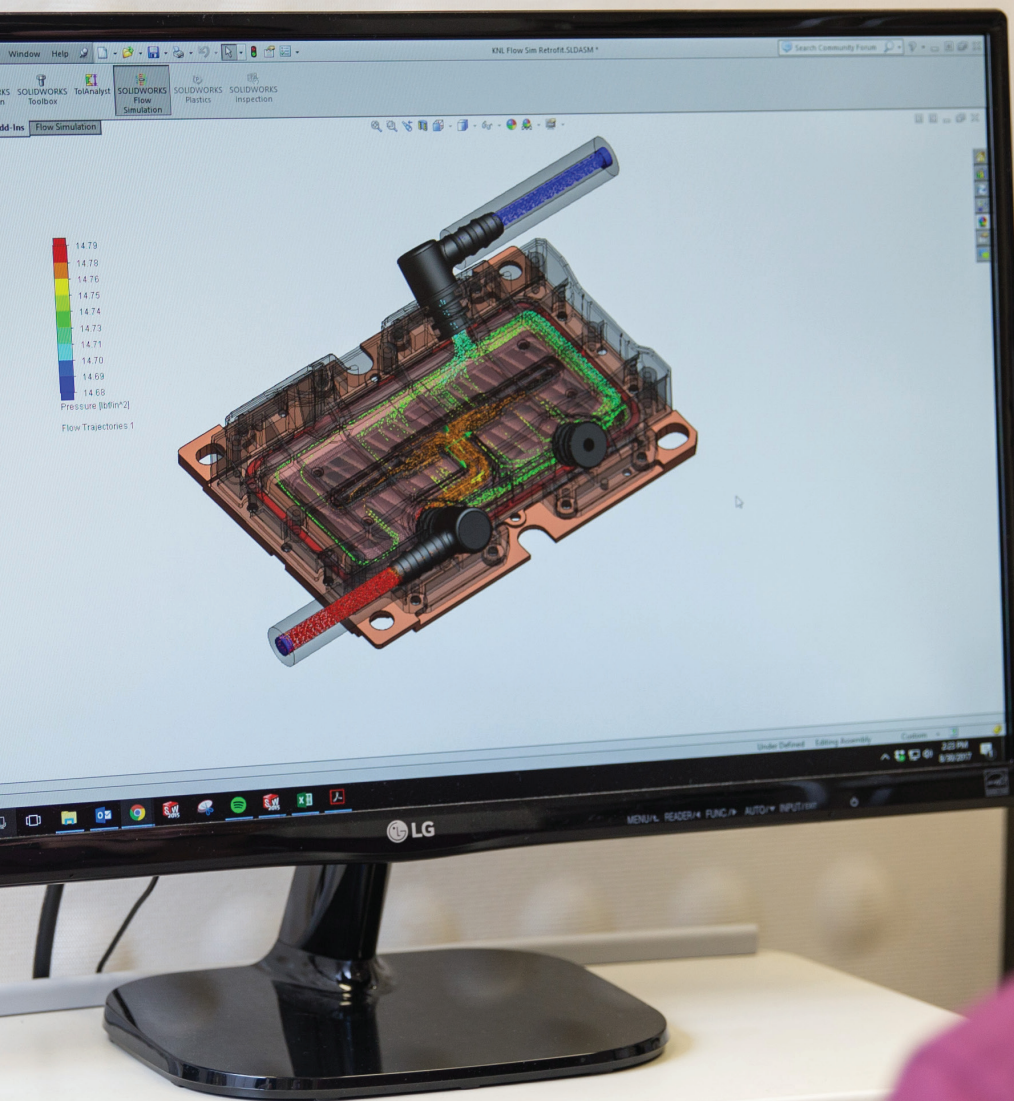
Coolant Distribution For Any Data Center Need

LOW PRESSURE CHx AND AHx CDUs BUILT TO MEET THE INCREASING DEMANDS OF TODAY'S DATA CENTERS. RELIABILITY, PERFORMANCE, AND INTELLIGENCE ARE THE CORE OF COOLIT CDUs.
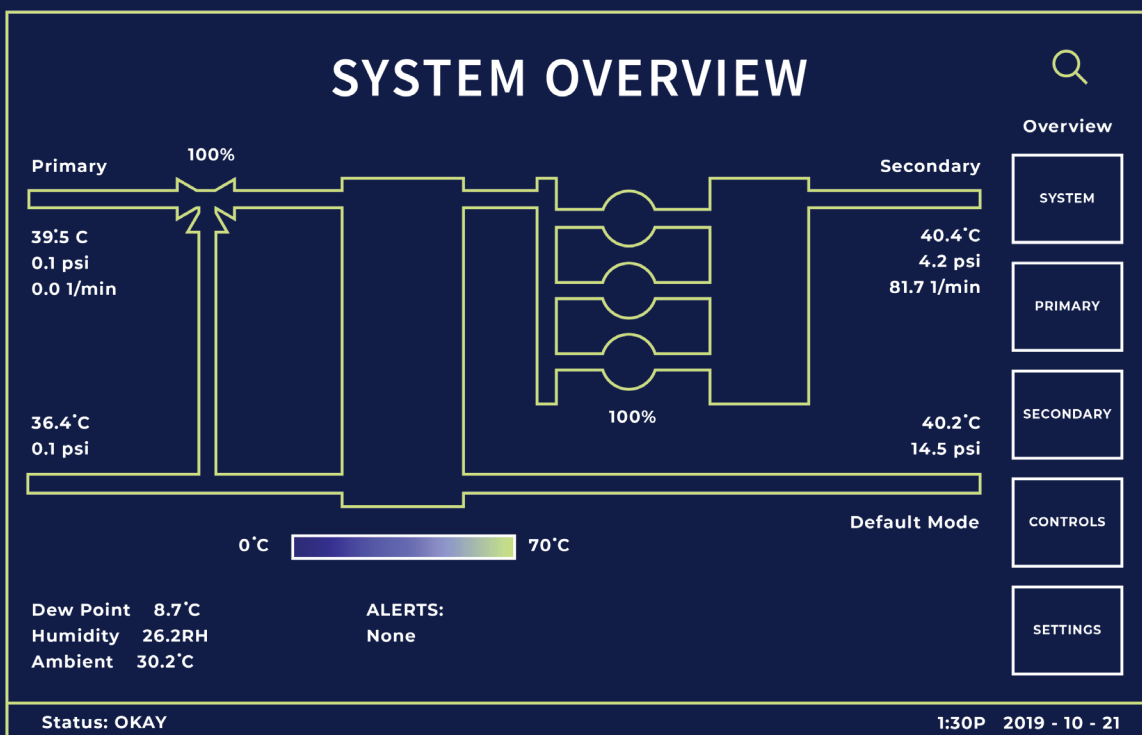
Adaptive and Intelligent Controls

COMMAND2 MANAGES THE ENTIRE LIQUID COOLING ECOSYSTEM

· Built-in autonomous controls and monitoring

· Sophisticated safety features

· Comprehensive system reports (SNMP, Email, System Logging)

· Touch Screen and Web Interface interaction

· Advanced alerts (Leak Detection, High Pressure/Temperature, Low Fluid)

· Master/slave protocol allows multiple CDUs to be linked and controlled as one

SYSTEM OVERVIEW

Overview

Primary	Secondary
100%	
39.5 C	40.4°C
0.1 psi	4.2 psi
0.0 1/min	81.7 1/min
36.4°C	40.2°C
0.1 psi	14.5 psi
100%	

SYSTEM

PRIMARY

SECONDARY

Default Mode

CONTROLS

0°C ██████ 70°C

SETTINGS

Dew Point   8.7°C
Humidity   26.2RH
Ambient   30.2°C

ALERTS:
None

Status: OKAY   1:30P   2019 - 10 - 21

People Building For People

WE ARE AN EXTENSION OF YOUR OPERATIONS

- Site planning and review

- On site installation and commissioning

- Ongoing preventive maintenance plans

- Flexible response time options

- Global service network to 157 countries

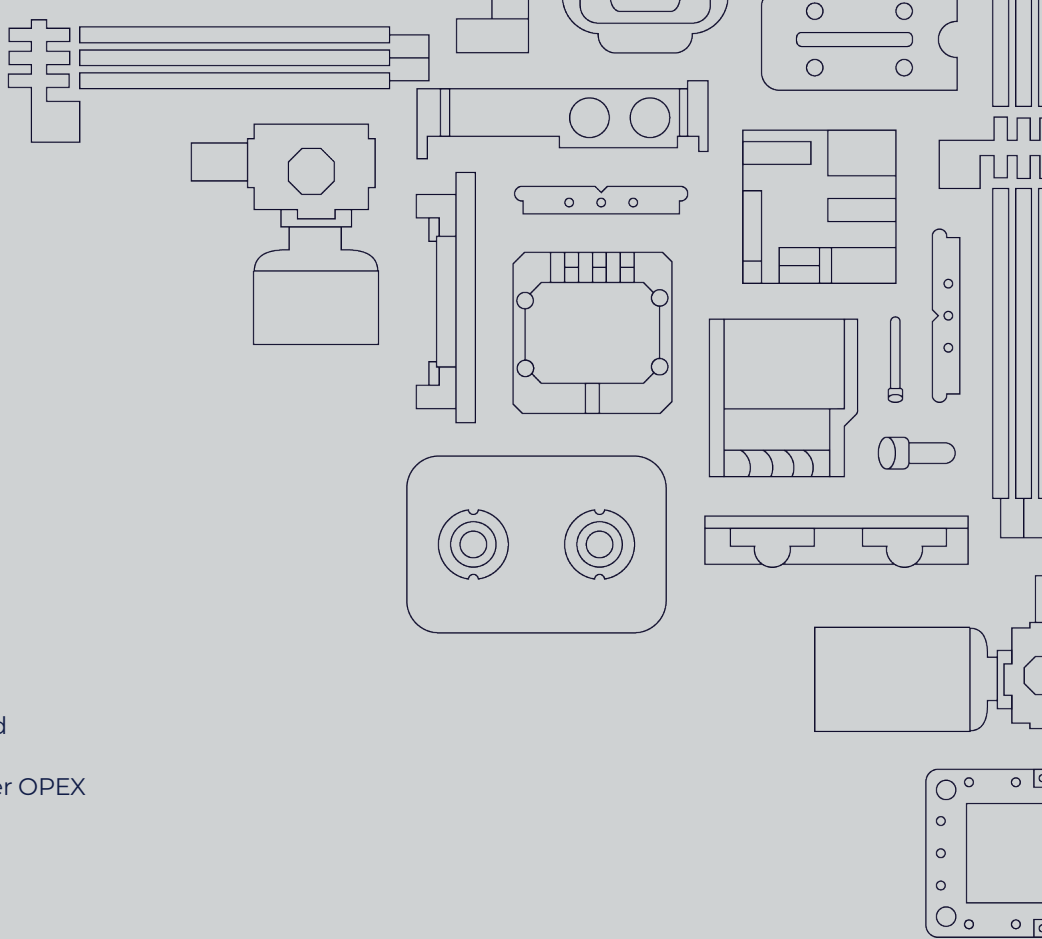# Liquid Cooling The World's Fastest Academic Supercomputer: **Frontera**

OBJECTIVE: *ENABLE HIGH DENSITY COMPUTE RACKS WITHIN EXISTING INFRASTRUCTURE AND FLOOR SPACE.*

Frontera is the fifth most powerful supercomputer in the world, and the fastest supercomputer on a university campus. It replaces the Blue Waters system as the leadership-class system in NSF's cyberinfrastructure ecosystem.

HPC SETUP

- 8,008 liquid cooled Dell PowerEdge C6420 servers across 91 racks

- 9 CoolIT Systems Rack DLC CHx750 CDUs

- 91 stainless steel 54U Rack Manifolds in each rack, featuring dry-break quick disconnect technology

- 91 Rear Door Heat Exchangers

- 3 underfloor secondary fluid networks

RESULTS

- 5.5 MW total heat load managed

- Significantly lowered data center OPEX

- Reduced noise pollution

- Ranked #5 on TOP500 list

- World's fastest academic supercomputer

With a successfully installed CoolIT Systems Rack DLC solution, Frontera draws on the power of over 16,000 processors and 448,448 cores spread over 8,008 compute nodes to achieve a peak performance of 38.7 PetaFLOPS. According to TACC, to match what Frontera can compute in just one second, a person would have to perform one calculation every second for about a billion years.

"Without Direct Liquid Cooling and the resulting performance increases, Frontera would not have been able to achieve the #5 ranking on the Top 500 list."

**- NATHANIEL MENDOZA, MANAGER, NETWORKING, SECURITY
& OPERATIONS, TEXAS ADVANCED COMPUTING CENTER**

Poznan Supercomputing and Networking Center

OBJECTIVE: *DOUBLE COMPUTE CAPACITY WITHIN EXISTING INFRASTRUCTURE AND FLOOR SPACE*

HPC SETUP

• 1.8 petaFLOPS cluster

• 2 CoolIT Systems Rack DLC™ CHx650 CDUs

• CPU, RAM and VRM Passive Coldplate Loops

• 30kW per rack

• 40 - 45°C primary fluid supply temperature

• Huawei E9000 chassis

• Huawei CH121 server

• 1,232 Huawei blade servers across 19 racks
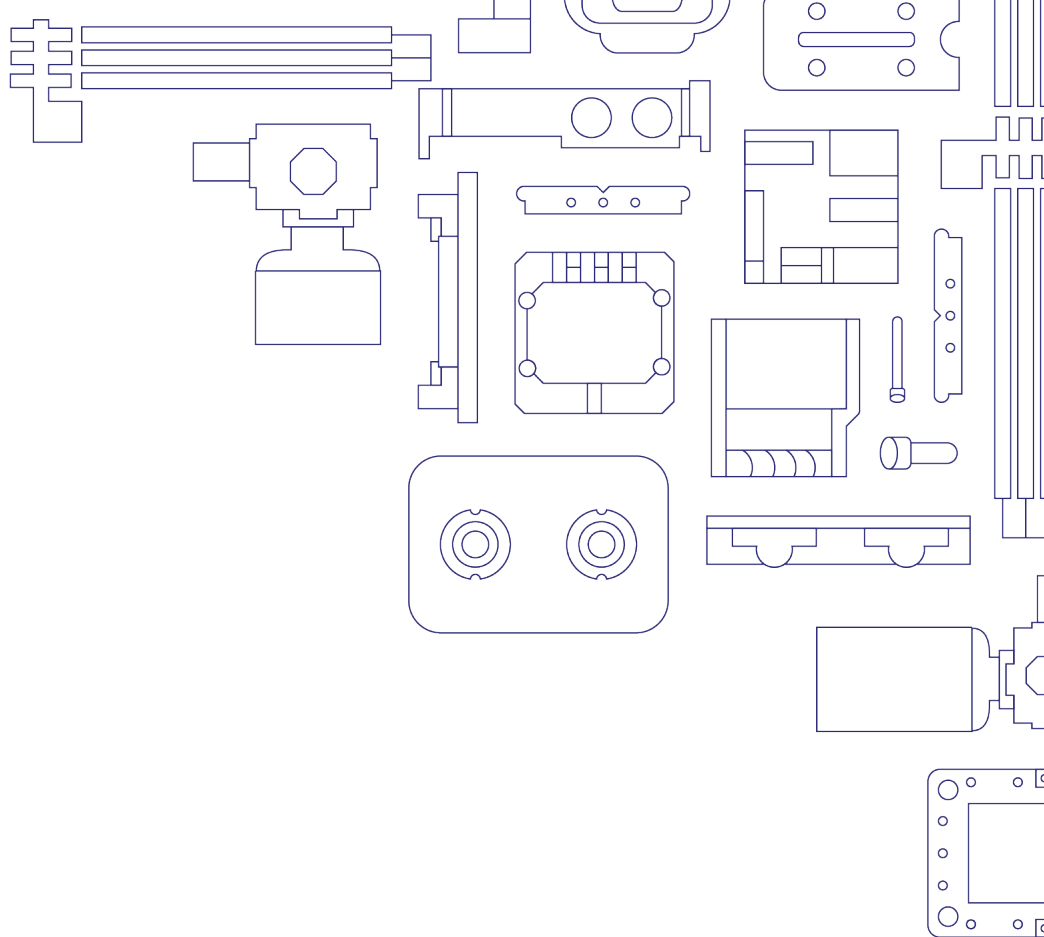
RESULTS

- 85% of total IT load managed by liquid cooling

- 75% fan speed reduction

- Waste energy reused to heat surrounding buildings

- Ranked on TOP500 and Green500 lists

- Greenest supercomputer in Poland

"Reducing energy usage and lowering operating costs are permanently on our checklist when planning for new High Performance Computing clusters. Liquid cooling is the most efficient way to achieve our objectives and we are seeing excellent results and reliability from the combined Huawei and CoolIT Systems cluster."

**- RADOSLAW JANUSZEWSKI, IT SPECIALIST, PSNC**

Canadian Hydrogen Intensity Mapping Experiment (CHIME)

OBJECTIVE: *ENABLE HIGH-DENSITY GPU-INTENSIVE SERVERS WITHIN CONTAINERIZED DATA CENTER*

Canada's newest and largest radio telescope, the Canadian Hydrogen Intensity Mapping Experiment (CHIME), formally launched on September 7, 2017 at the Dominion Radio Astrophysical Observatory.

HPC SETUP

- 256 General Technics GT0180 custom 4u servers across 26 racks

- 26 CoolIT Systems Rack DLC™ CHx40 CDUs

- Stainless steel Rack Manifold modules in each rack, featuring dry-break quick disconnect technology

- CPUs: Intel® Xeon® Processor E5-2620 v3

- GPUs: Dual AMD FirePro S9300x2
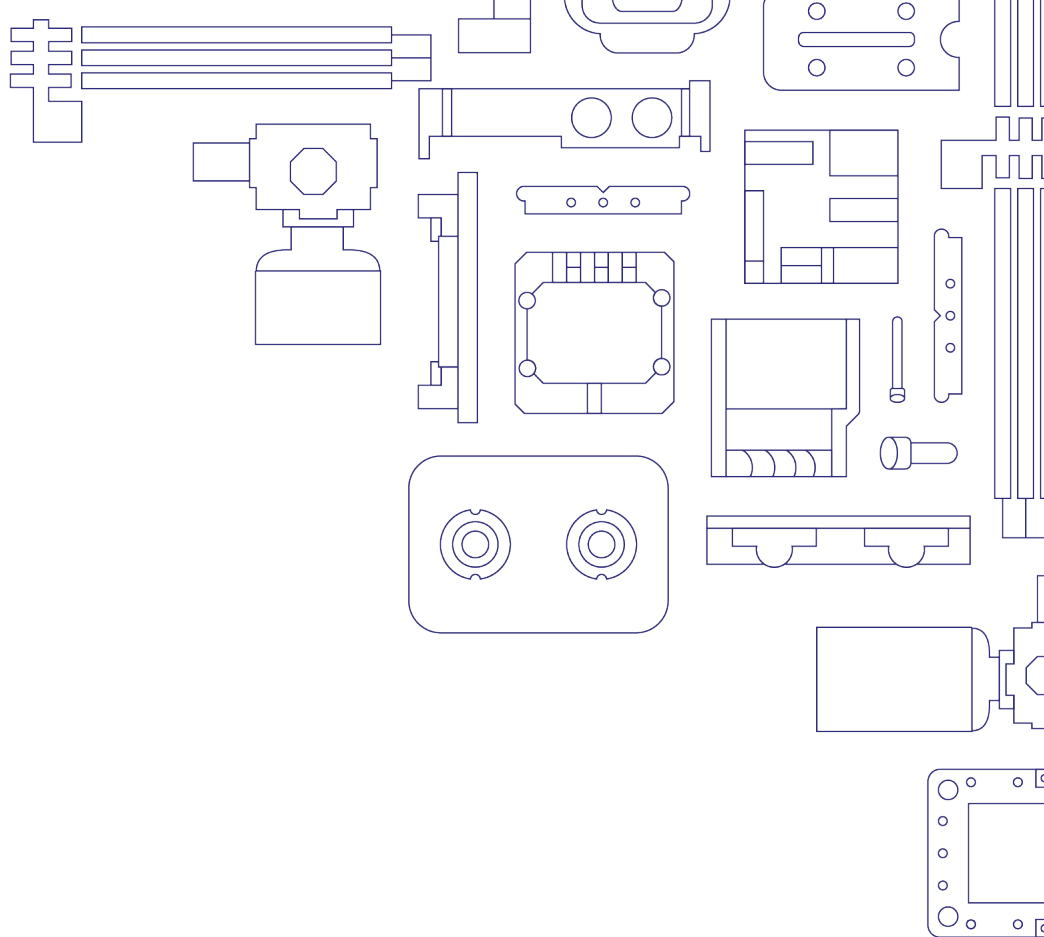
RESULTS

- 100% of total IT load managed by liquid cooling

- 183kW total heat load managed

- Significantly lowered data center OpEx

- Reduced noise pollution

- Significant reduction in vibration and radio frequency noise

"We chose to work with CoolIT Systems because their solutions are modular and robust, and as a result the most flexible and efficient for our situation. With the custom liquid cooling solution, we can drastically reduce CHIME's energy consumption and squeeze additional processing out of the GPUs."

- DR. KEITH VANDERLINDE, UNIVERSITY OF TORONTO

Notes

sales@coolitsystems.com www.coolitsystems.com 1.866.621.2665

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