

CASE STUDY 1: Intel Cherry Creek Cluster

Liquid Cooling a Supercomputer



HPC Setup

- ▶ CoolIT Rack DCLC™ AHx35 (no facility water)
- ▶ Supermicro FatTwin (4-node GPU front I/O)
- ▶ 7 chassis per rack
- ▶ 28 servers per rack
- ▶ Intel Xeon Processors and Coprocessors
- ▶ 3x Intel Xeon Phi and 2x Intel Xeon CPU's
- ▶ Featured 9,936 cores
- ▶ TrueScale Infiniband
- ▶ Cluster to run live at SC13, Denver CO



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Results

- ▶ Achieved peak performance of 131.2 Teraflops
- ▶ Less than 75kW of power consumed
- ▶ Cluster ran live at SC13 Denver, CO
- ▶ Awarded:
 - ▶ #400 on Top500 Supercomputers list
 - ▶ #41 on Green500 list
- ▶ Cluster now housed at SWITCH data center for UNLV
- ▶ Overall power savings enables a 24% decrease in annual operating expenses and ROI in less than 1 year



CASE STUDY 2: Poznan Supercomputing and Network Center

Via system integrator ITprojekt

HPC Setup

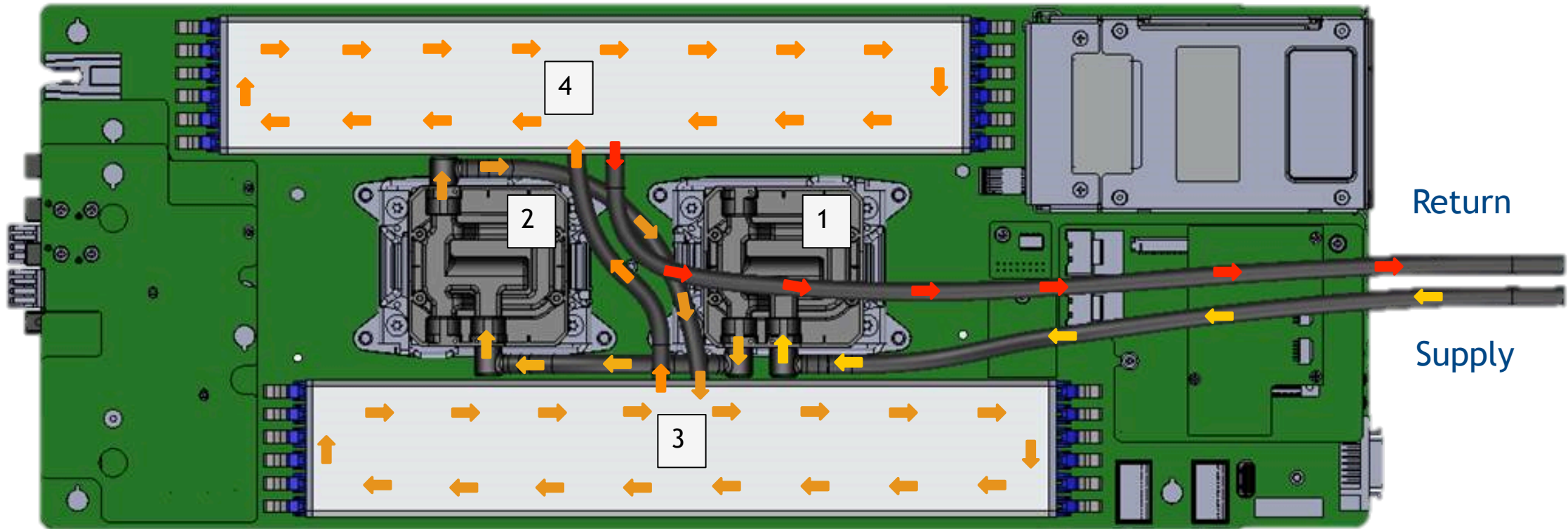
- ▶ CoolIT Systems Rack DCLC™ CHx40
- ▶ Chassis: Huawei E9000 chassis
- ▶ Server: Huawei CH121
- ▶ Xeon E5-2697 v3
- ▶ Memory Modules: DDR4 8GB
- ▶ Brantley EP Motherboard
- ▶ 128 servers in 3 racks
- ▶ CPU and Memory cooled by liquid



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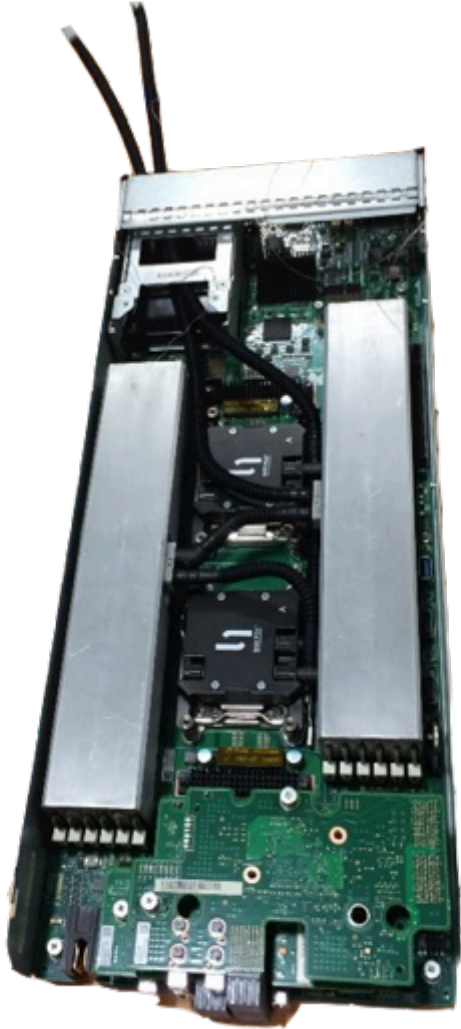
Via system integrator ITprojekt

Liquid Path

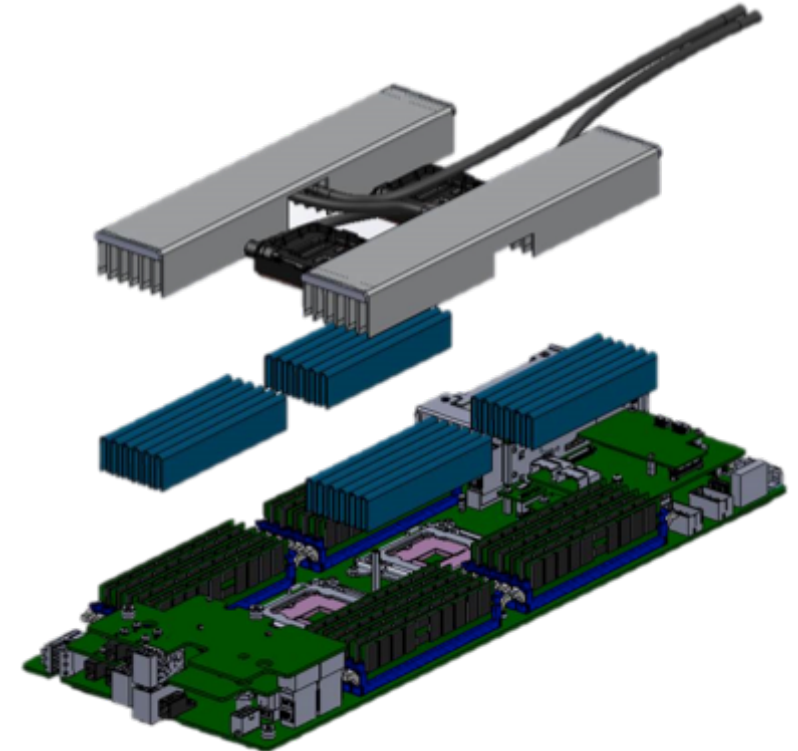


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| Huawei E9000 CH121 Performance Linpack Test | | |
|---|------|------|
| Ambient | 28.6 | 28.9 |
| Secondary Coolant (C) | 17 | 40 |
| Mem 1 (C) | 30.6 | 47.3 |
| Mem 2 (C) | 31.2 | 48.5 |
| CPU 1 (C) | 33 | 53 |
| CPU 2 (C) | 38 | 58 |
| Flow/Node (lpm) | 0.5 | 0.5 |
| Fan Response | 25% | 25% |



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Results

- ▶ 30kW per rack (3 racks)
- ▶ 910 GFLOPS per node (116 TFLOPS total)
- ▶ 40°C primary fluid supply temperature
- ▶ 80% of total IT load managed by liquid cooling
- ▶ 75% fan speed reduction (run at minimum)
- ▶ First ever Huawei liquid cooled cluster developed
- ▶ First DLC machine installed at PSNC

