

Life4HeatRecovery: Valorisation of waste heat recovery sources

The Aalborg demo case

October 2020 – *June 2024*





THE AALBORG DEMO



Demonstration of a complete state-of-the-art waste heat recovery system including a highly efficient 2-phase passive on-chip server cooling.

The main objectives:

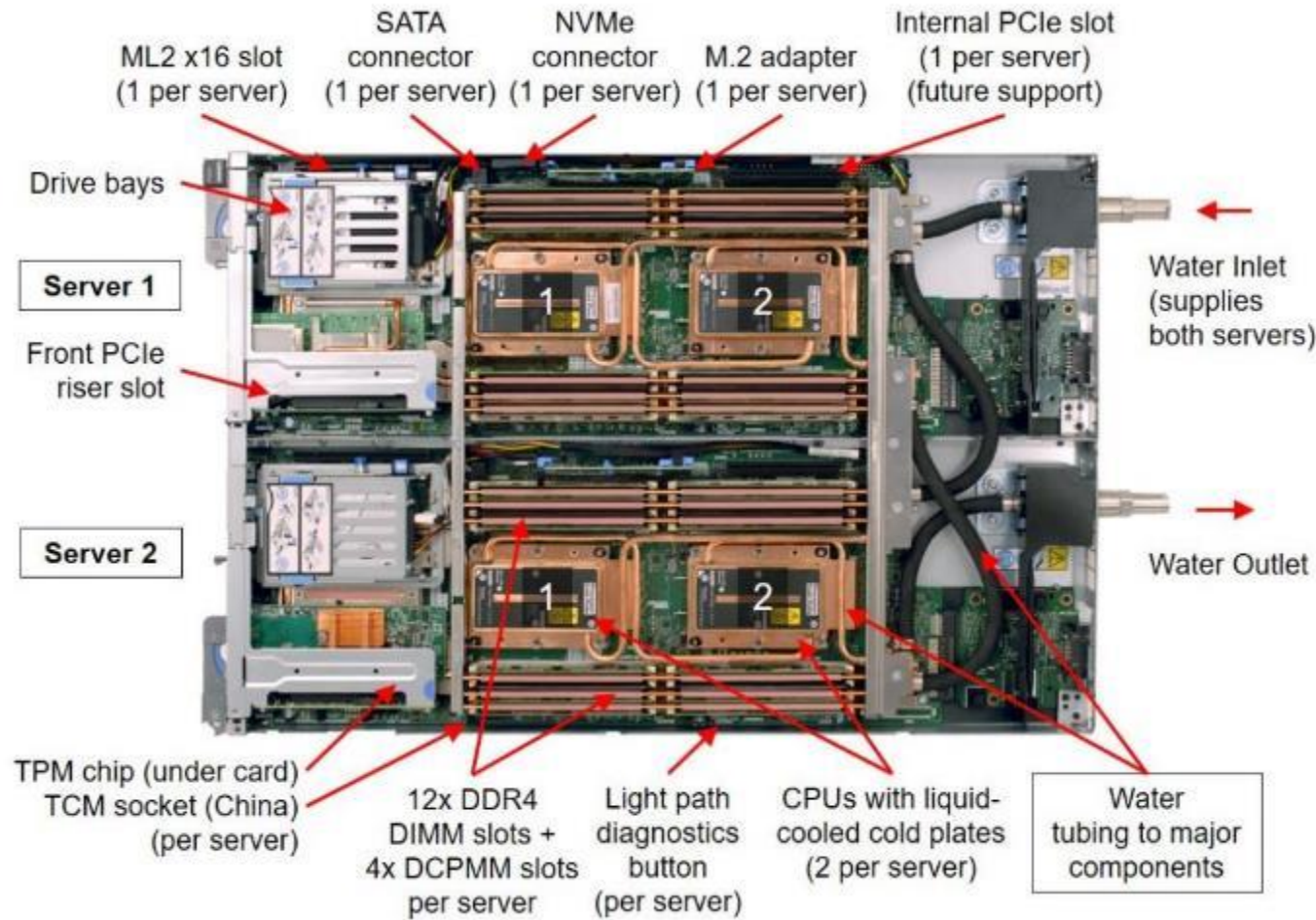
- Waste heat system layout that enables a connection both to district heating grid and office building (central heating).
- Reduce Data Center power consumption for cooling by min. 20%.
- Increase output temperature for heating to min. 65°C





Demonstration at the tier 3
AAU Data Center (DC3)

Innovation in server cooling



Liquid server cooling (Lenovo, Dell, HP and Asetek)

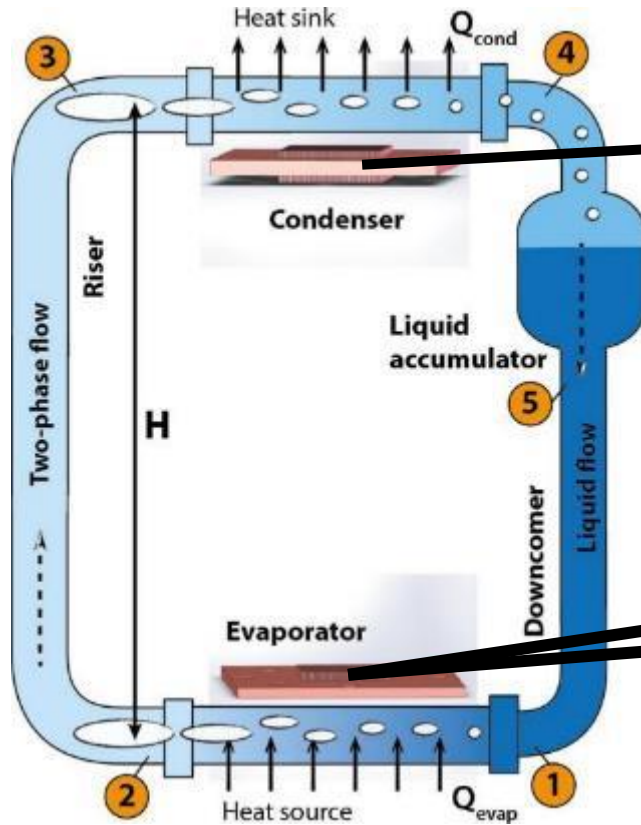


Liquid/Heat pipe server cooling (Microsoft)



Immersion server cooling (Submer)

Two-phase passive cooling



heatflow
Thermal Management – Disruptive Innovation



Benefits using passive server cooling

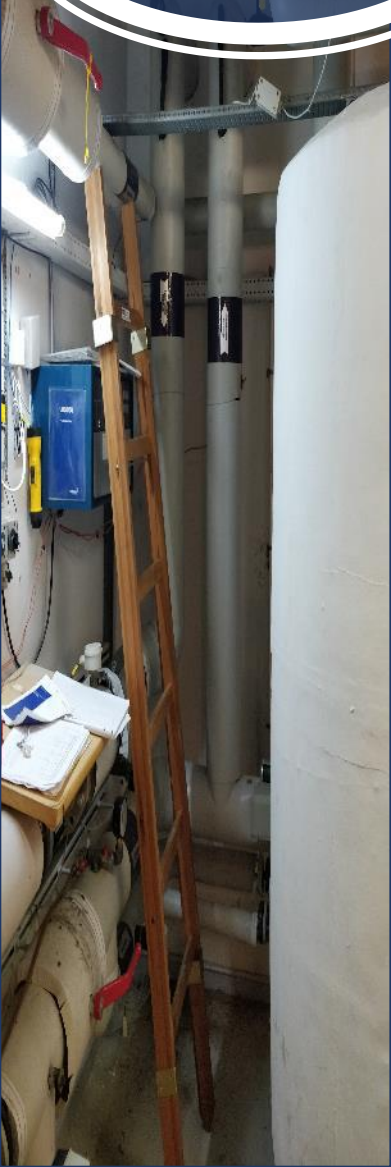
- Self-regulating closed loop system
- No power needed for CPU/GPU/DIMM cooling
- Can increase power densities Reduced power for air cooling
- No water connections in servers
- High supply temp. to DH (increased heat pump efficiency)

HPe DL380p 2U server used in demo

Demo room with servers installed



Demo site installations

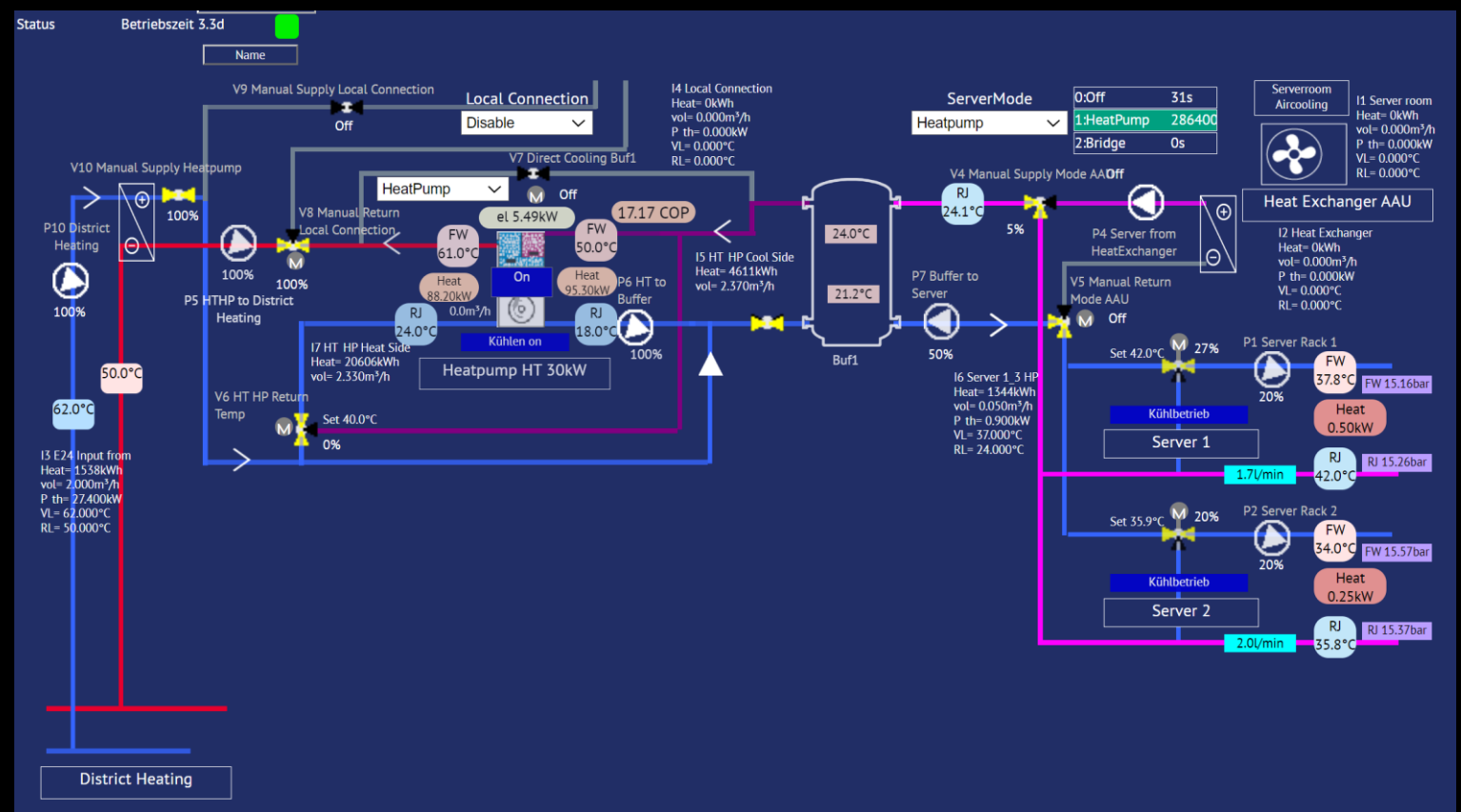


- Heat pump commissioned
 - Tricky to startup due to low water flow
 - Work around on safety sensors
 - Enisyst modbus control (start/stop)
- Insulation, personal safety +50degC
- Future improvements: Insulation of pipes



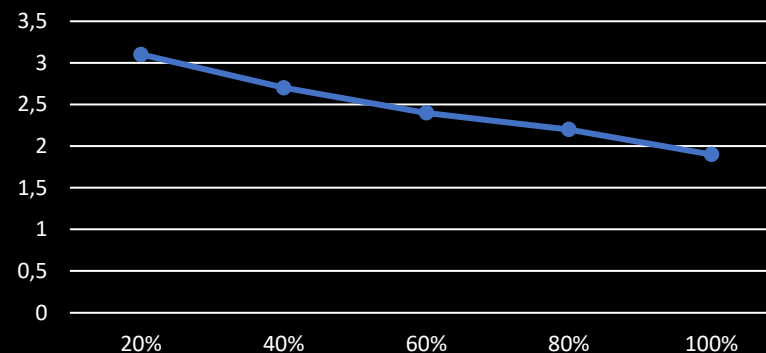


Finding our pumping power for the pumps

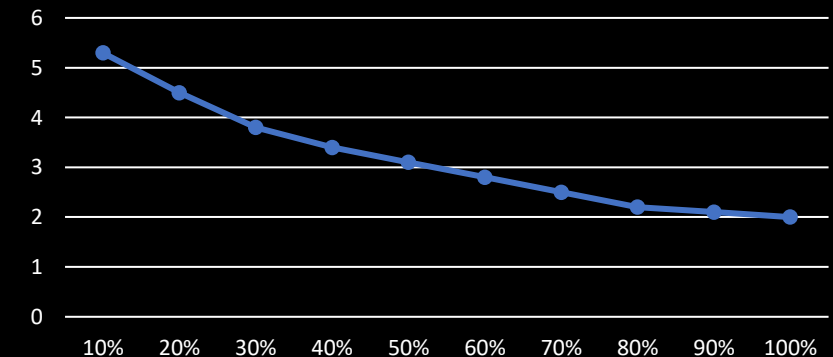


- Optimum pump speed
- Done without Server 2 loop active

dT- Pump no. 1



dT- Pump no.7



HPe Server start-up

- 10 successfully started
- Efficient CPU cooling
- PDU power measurement is missing
- Increased the room temp. with 10 degC.





Thank you

