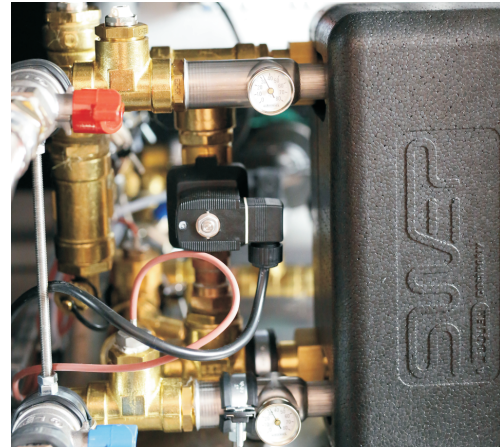


ColdCon®

Hot Water Cooling in the Data Center

- innovative cooling system with hot water cooling directly within the server
- energy saving by using free cooling and/or reusing waste heat
- outlet temperatures of up to 60 °C can be obtained
- system can be combined with latest technologies
- use of high-grade materials
- maximum safety thanks to use of leak-free connections
- maintenance-friendly design



Highlights

Hot Water Cooling

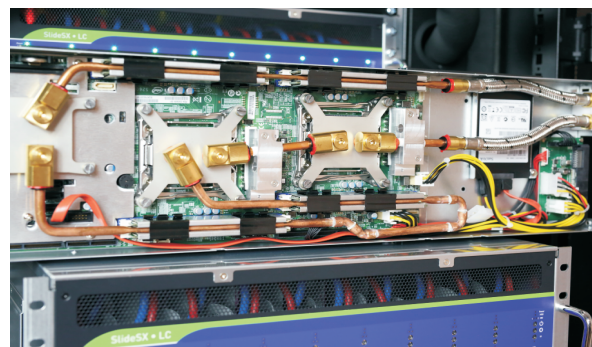
The optimal cooling is an important criterion for ensuring the maximum computing capacity of a HPC system. In existing computer systems installed, a major part of the available total energy has to be used for the generation of the necessary air conditioning and for the provision of cold. However, major energy savings and a highly improved performance of the system can be obtained if the waste heat can be recooled by means of free cooling and if the system can operate under optimal ambient conditions.

MEGWARE's ColdCon concept is designed to operate with hot water cooling at flow temperatures of 25 °C to 55 °C, depending on the processor used. This enables most of the energy required for re-cooling the cooling water – to 12 °C, for example – to be saved. In addition, free cooling can also be used at return flow temperatures above 35 °C, or at outlet temperatures of 55 °C to 60 °C, the waste heat can be used, either to support the heating system or to cool other systems with the help of an adsorption chiller.

Mode of Action

The ColdCon system operates essentially with direct water cooling. Fluid-cooled frigidors or heat receivers are used to directly extract the majority of the heat generated in the servers. Approx. 90-95 % of the heat generated can thereby be discharged into the water. The residual heat is cooled by means of convection.

The cooling components used are specifically designed for this hot water cooling solution. These are installed in the compute nodes on the processors, voltage regulators, chipsets, Omni-Path or Ethernet-adaptor (including onboard InfiniBand interface) and main memory modules.



ColdCon-Direct Cooling Concept

The hot water-cooled compute nodes are integrated in a specially designed rack. The racks equipped for direct cooling have a separate closed cooling cycle, which dispenses the heat output absorbed to the primary HVAC cooling cycle via a heat exchanger. When it comes to the secondary cycle, the infrastructure consists of an automatically controlled control valve, a pump with adjustable flow rate, a freely programmable control unit and a remote maintenance interface. In the case of the primary cycle, a controllable flow restrictor is used for the flow and a temperature sensor for the return flow.

For integration of our SlideSX-LC HPC compute platform, the inlet and outlet incl. flexible hoses, is arranged laterally on the cabinet front for each chassis. On the front of each SlideSX-LC chassis is a connector for the flow and return, which means that each SlideSX-LC chassis can be separated from the internal cooling cycle at any time for maintenance purposes. The connectors lock automatically



when connected and are drip-proof and leak-free when separated. Within the cabinet, the cooling cycle functions in line with the Tichelmann principle, thereby enabling the even distribution of pressure and equal volume flows within each SlideSX-LC slot. The combination with water-cooled power supplies and networks switches (available as an option) leads to a completely fan-less system. Together with thermally isolated racks the heat emission to the data center can be reduced to a minimum.

Due to the excellent cooling performance and flexible temperature ranges within the nodes, the ColdCon architecture can be configured to suit various environmental parameters and applications.



Fig.: Example of a ColdCon system with direct water-cooled compute nodes at the University of Greifswald

We are pleased to submit you a detailed equipment and price offer.
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