

CUSTOMER-REFERENCE:

Fraunhofer Heinrich Hertz Institute, HHI



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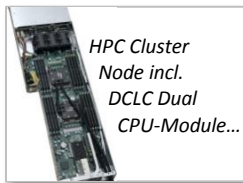
Contact: Fraunhofer Heinrich Hertz Institute, HHI
Wireless Communications and Networks Department
Mr. Dr. Lars Thiele
Head of System Level Innovations
Einsteinufer 37
10587 Berlin – Germany
Email: lars.thiele@hhi.fraunhofer.de
Phone: +49 30 31002-429

Project volume: approx. 2.400.000€

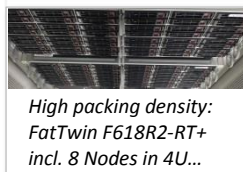
Project time: 2017

Project description: HPC clusters with particularly high packing density and high efficiency water cooling with the goal of drastically reducing the dependency on fans as well as cost-intensive air-conditioning and ventilation systems.

Project realization: The MUSTANG® systems HPC cluster consists of four fully equipped 19"/42U racks with 56 nodes per rack or 224 nodes total. All systems consist of "8 nodes in 4U" SuperMicro SuperSaver FatTwin F618R2-RT+ and each node is equipped with dual high performance Intel® Xeon® E5 2697A v4 with 16 cores at a clock frequency of 2.60GHz. The processors are equipped and cooled with Direct Contact Liquid Cooling (DCLC) CPU liquid coolers based on 40kW Rack CLC™ CHx40 heat exchange modules and manifolds from Cool IT Systems. Due to this technology the cooling is highly efficient which keeps the entire system temperature well below the maximums specified by Intel and allows an exceptionally uniform and effective heat extraction.



HPC Cluster
Node incl.
DCLC Dual
CPU-Module...



High packing density:
FatTwin F618R2-RT+
incl. 8 Nodes in 4U...

Per Node 512GB DDR4 LRDIMM and 12TB hard disk space is installed. The whole Cluster contains a total of 7,168 CPU cores, more than 114TB DDR4 memory, as well as 2,688TB hard disk space. The aggregated theoretical peak performance with these values is 295.94 TFLOPS (floating point operations per second). Network-wise, there is a particularly low latency 56GbE Mellanox ConnectX®-3 Pro EN interface with 10/40/56GbE switch technology. The cluster was assembled by the Cool It-certified MUSTANG® systems enterprise solution team of Memorysolution, and it was delivered turnkey-ready including DCLC cooling system.



Rear side with 1GB as
well 56GB/s network
and DCLC leads ...



Outdoor fan unit for
primary cooling circuit...



Picture 1-5: © by Daniel Menzel/Menzel IT Services GmbH

Memorysolution GmbH
Hafenstrasse 17
79206 Breisach
info@memorysolution.de
www.memorysolution.de
Fon: +49 7667 - 94 69-0

Amtsgericht: Freiburg
HRB 700126
USt.-ID: DE 814692757
Geschäftsführer: Gerald Diercks

Memorysolution GmbH
Niederlassung Bremen/MUSTANG® systems
Am Wolfsberg 7
28865 Lilienthal
rheinssen@memorysolution.de
Fon: +49 4298 - 46852-41

