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PRESS RELEASE

Eurotech delivers to the University of Regensburg QPACE2, a top500 QCD system

Amaro, Regensburg – 14 July 2015. Eurotech, a leading provider of embedded and supercomputing technologies, today announced to have completed the installation of a new supercomputer prototype at the University of Regensburg. The new system finalizes the 2 year research project QPACE2, which aimed to design and build a new generation QCD machine based on a novel HPC architecture flexible enough to fit Lattice QCD and a wide range of other applications.

The supercomputer has entered the June 15 top500, bringing to the acknowledged list a system dedicated to Lattice QCD computation.

In the project, funded by the D.F.G. (Deutsche Forschungsgemeinschaft – German Research Foundation), Eurotech R&D and the University of Regensburg scientists collaborated to design the complete system, including electronic boards, server architecture, network, mechanics and cooling. This effort resulted in an innovative HPC architecture and a supercomputing prototype, the QPACE2 machine, which excels in energy efficiency, performance and density.

"We worked very hard to design and deploy the new QPACE2 architecture" – says Prof. Dr. Tilo Wettig of the Institute of Theoretical Physics at the University of Regensburg – "We are happy that the prototype machine is now up and running in Regensburg. We thank Eurotech for the collaboration that made this possible."

The prototype machine in Regensburg has 64 nodes connected via Infiniband, with a total peak performance of 310 TFlop/s in double precision. It also has a very high density: 8 nodes fit in 3 height units of a 19-inch rack. Each node having a DP peak performance of 4.8 TFlop/s, this means a density of 12.8 TFlop/s per height unit.

Each node of the system has 4 Intel® Xeon Phi™ coprocessors version 7120X, a dual-port FDR Infiniband card (Mellanox Connect-IB), and a low-power Intel Xeon CPU (E3-1230L v3), all components connected by a PCIe switch. In QPACE2 the coprocessors perform all calculations leaving to the CPUs only the system management services task: this is one of the unique characteristics of the system and one that significantly reduces cost and energy consumption, with the additional value of simplifying programming.

The QPACE 2 system employs a novel liquid-cooling concept developed by Eurotech, the Aurora Direct Hot Liquid Cooling gen 2, based on lighter and thinner cold plates. This new technology allows for year-round free cooling in any climate zone, significantly cutting cooling costs and increasing the density of the system.

The University Of Regensburg developed a custom code that achieves strong scaling to at least 1024 KNCs for typical problem sizes used in Lattice QCD.

"We are delighted that our long term collaboration with the University of Regensburg on the QPACE 2 project has reached this important milestone" - states Fabio Gallo, general manager HPC at Eurotech - "The combined efforts of Eurotech and U. Regensburg have resulted in a highly innovative system concept, with best-in-class density and energy efficiency"

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Eurotech designs, manufactures and sells HPC systems similar to QPACE2 under its Aurora Hi√e brand. The Hi√e systems are optimized for accelerated workloads and they can be configured with different modules offering a choice of accelerators (Nvidia Tesla or Intel Phi), and processors (Intel x86 or APM X-Gene ARM-64) as well as storage, graphic and other capabilities. Auora Hi√e systems excel for energy efficiency and density, delivering more than 1 PFlop/s with an efficiency of above 5 GFlop/s per Watt

The Aurora Hi√e supercomputer extends the versatile architecture used in QPACE2 for usage in computational biology and chemistry, seismic, rendering, deep learning, data analytics and CAE.

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