ETH Zurich, IBM and Paul Scherrer Institute researchers receive 2012 PRACE Award

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Today at the International Supercomputing Conference (ISC '12), researchers from the renowned Swiss University of Science and Technology (ETH Zurich), IBM Research - Zurich and The Paul Scherrer Institute (PSI), Switzerland's largest research center for natural and engineering sciences, received the 2012 PRACE Award.

The PRACE Award recognizes the best scientific paper in one of the following areas: a breakthrough in science achieved with high-performance computing resources, algorithms or implementations that achieve significant improvements in scalability, or novel approaches to performance evaluation on massively parallel architectures.

Yves Ineichen (ETH, IBM, PSI), Andreas Adelmann (PSI), Costas Bekas (IBM), Alessandro Curioni (IBM), and Peter Arbenz (ETH) received the award for their paper "A Fast and Scalable Low Dimensional Solver for Charged Particle Dynamics in Large Particle Accelerators."

"This paper demonstrates how high-performance computing can be used in real time to tune the operation of particle accelerators, which are invaluable tools for research in the basic and applied sciences, in fields such as materials science, chemistry, the biosciences, particle physics, nuclear physics and medicine," stated Prof. Richard Kenway, chairman of the PRACE Scientific Steering Committee.

The design, commissioning, and operation of particle accelerator facilities is a non-trivial task, due to the large number of control parameters and the complex interplay of several conflicting design goals.

"Although the paper focuses on particle accelerator simulations and optimization, the approach has a much broader scope for solving large-scale optimization problems found in the healthcare, financial services and automotive industries as well as for industrial machinery," explained Yves Ineichen, who is developing the solver for his PhD thesis at ETH Zurich, with the support of scientists from the Computational Sciences group at IBM Research – Zurich and the Paul Scherrer Institute.

Using an IBM BlueGene/P supercomputer, the researchers achieved strong and weak scalability improvements of two orders of magnitude for the most heavily used component of the optimization framework, which computes the evolving shape of the bunches of particles in the beam. This enables thousands of such calculations to be performed in a matter of minutes, creating close to online optimization capability.

More information: ibmresearchnews.blogspot.ch/20 … igh-performance.html

Provided by IBM