Comput Sci Res Dev (2014) 29:95–96
DOI 10.1007/s00450-012-0231-3

EDITORIAL

Editorial for the third international conference on energy-aware high performance computing

Timo Minartz · Thomas Ludwig

Published online: 30 August 2012

The June 2012 TOP500 list's first rank named Sequoia, the IBM BlueGene/Q system installed at the Department of Energy's Lawrence Livermore National Laboratory achieved an impressive 16.32 petaflop/s on the Linpack benchmark using 1,572,864 cores with a power input of about 8 MW. Its operation would produce an annual electricity bill of more than 8 million Euros based on German price levels. At the same time, the U.S. Department of Energy publishes roadmaps in its Exascale Computing Initiative and puts 20 MW as a "practical power limit" for a future Exaflops computer by the end of this decade. We are thus more than a factor of 60 away from our performance goal but today's technology uses almost half of the acceptable power target.

This situation calls for an intensified research in the field of energy efficiency technology, also called Green IT which has found its way into High Performance Computing. Only a few years ago, the community considered HPC as the Formula 1 of computing and ignored the fact of dramatically rising operational costs. However, as with these race cars, we conceived means to reduce power consumption and at the same time increase the speed. HPC also is beginning to learn from the field of embedded systems where battery-powered hardware always requires special mechanisms to reduce power consumption during phases of low performance demand.

In 2010 we started this new conference series EnA-HPC in order to bring researchers, vendors, and HPC center administrators together. Its purpose is to discuss the status and future of energy awareness in high performance computing.

Fields of interest cover all abstraction layers, from the lowest level of hardware technology, via operating system, compiler and application issues to facility technology like air conditioning, sensor technology and heat reuse. A comprehensive effort at all these levels is necessary to yield the overall energy reduction required to enable Exaflops computers to be operational by the end of this decade—as predicted by the TOP500 list.

For this third edition of our conference on Energy-Aware High Performance Computing the submissions cover several of the abstraction levels mentioned above and thus represent world-wide research efforts in high performance computing: hardware architecture, application issues, heterogeneous programming and modeling and evaluation of energy consumption. This variety guarantees a good coverage of crucial research questions. The ideas presented will trigger inspiring discussion during the event. We hope to contribute to a successful cooperation between vendors and users of HPC equipment and foster more research in this field of green HPC.

The organizers express their gratitude to all contributors to this journal. Their research efforts will render High Performance Computing economically and ecologically sustainable. We thank the program committee members as well as all reviewers for their efforts in selecting an attractive content for this journal and for the conference.

Hamburg, September 2012

Program committee members:

- Thomas Ludwig (chair), University of Hamburg, Hamburg, Germany

T. Minartz (✉) · T. Ludwig
Department Informatics, Scientific Computing, University of Hamburg, Bundesstraße 45a, 20146 Hamburg, Germany
e-mail: timo.minartz@informatik.uni-hamburg.de

T. Ludwig
e-mail: t.ludwig@computer.org

- Timo Minartz (co-chair), University of Hamburg, Hamburg, Germany
- Laurent Lefevre, INRIA, University of Lyon, Lyon, France
- Dzmitry Kliazovich, University of Luxembourg, Luxembourg
- Matthias Müller, Technische Universität Dresden, Dresden, Germany
- Jean-Marc Pierson, Universität Paul Sabatier, Toulouse, France
- Simon McIntosh-Smith, University of Bristol, Great Britain
- Costas Bekas, IBM Research Zurich, Rueschlikon, Switzerland
- Cosimo Anglano, Universita del Piemonte Orientale, Alessandria, Italy