JÜLICH
FORSCHUNGSZENTRUM

JSCNews
Jülich
Supercomputing
Centre

No. 184 • April 2010

Towards 10^{18} – Foundation of Exascale Innovation Center

On 23 March 2010, Forschungszentrum Jülich and IBM signed the contract for a joint "Exascale Innovation Center" (EIC). EIC will develop hardware and software for an exascale supercomputer by the end of this decade. Exascale – which means a thousand times more performance than JUGENE or 1 exaflop/s – is the premier challenge for supercomputing worldwide. With exascale supercomputers it will be possible to perform simulations of unprecedented complexity. However, a great many challenges have to be tackled to achieve this goal.

Energy efficiency will be the most prominent challenge to be solved in order to create exascale supercomputers. In a successful collaboration with IBM Germany, the German Research Foundation's (DFG) Collaborative Research Centre for Hadron Physics and JSC developed the supercomputer QPACE, which was declared the world's most energy-efficient supercomputer last November. "With QPACE, we have managed to get a grip on energy consumption," says Prof. Thomas Lippert, director of the Jülich Supercomputing Centre. Further challenges are the development of the chip and processor technology towards the exascale level with respect to hardware and the improvement of algorithms with respect to software in order to run and use a supercomputer of this size. Jülich is contributing its outstanding expertise in the development of algorithms.

According to the schedule, a prototype of the new exascale supercomputer is expected to be available in 2015. Five scientists from the IBM development laboratory in Böblingen and five scientists from Jülich will be collaborating with a team of scientists at the IBM Watson Research Center in Yorktown Heights. The goal is to install an exascale-class system in Jülich by 2019. (Contact: Dr. Sabine Höfler-Thierfeldt, ext. 6765)

Blue Gene Extreme Scaling Workshop 2010

From 22 to 24 March, JSC organized its 2010 Blue Gene Scaling Workshop. Similar to the last workshop in October, the main focus was on application codes able to be scaled up during the workshop to the full Blue Gene/P system JUGENE, which consists of 72 racks with a total of 294,912 cores – still the highest number of cores available worldwide in a single system.

Interested application teams had to submit short proposals which were evaluated. Selection criteria were the required extreme scaling, the application-related constraints which had to be fulfilled by the JUGENE software infrastructure, and the scientific impact that the codes could produce. Ten high-quality proposals were selected. Participating teams came from Harvard University and Argonne National Laboratory in the U.S.A., CORIA in France, ETH Zürich in Switzerland, as well as from KIT, LRZ, ZIB, JSC, and the Universities of Marburg, Chemnitz, and Erlangen-Nürnberg.

Forschungszentrum Jülich GmbH
in der Helmholtz-Gemeinschaft
Jülich Supercomputing Centre
52425 Jülich I Germany

Phone +49 2461 61-6402

jsc@fz-juelich.de
www.fz-juelich.de/jsc

During the workshop, the teams were supported by JSC parallel application experts, the JUGENE system administrators and one IBM MPI expert. In addition, the participants shared their expertise and knowledge. More than half of the teams succeeded in submitting one or more successful full 72-rack jobs during the course of the workshop. Three more teams, where algorithmic or load balancing issues required the codes to run on a power-of-two number of cores, scaled their applications to 64 racks (262,144 cores). One team succeeded in running its program on only 32 racks (131,072 cores) due to a program bug which could not be resolved during the short time available at the workshop. A total of 392 jobs were launched using 138.72 rack days of the total 164 rack days reserved for the workshop. This is an 84 % utilization, which was only reached because of the extremely good stability of the system due to the excellent system support provided by JSC and IBM staff.

All experience gathered during the workshop will be summarized in a technical report. The results of the previous workshop were published as report FZJ-JSC-IB-2010-02, see *http://www.fz-juelich.de/jsc/docs/autoren2010/mohr1*.
(Contact: Dr. Bernd Mohr, ext. 3218)

Armin Seyfried Appointed Professor at Bergische Universität Wuppertal

In 2004, Armin Seyfried started work at JSC in the research fields of fire simulations and pedestrian dynamics. His activities since then have ranged from model development and experiments up to simulation. He thus combined his academic background as a computational physicist with his five-year experience in an engineering office for fire safety. As of 30 March 2010, Armin Seyfried has been appointed W2 professor in computer simulations for fire safety and pedestrian dynamics at Bergische Universität Wuppertal, retaining his position as a scientist at JSC ("Jülich Model"). During the last five years, cooperation between the department of civil engineering at Bergische Universität Wuppertal and JSC has been continuously extended by activities in teaching and research projects (DFG project on pedestrian dynamics, Hermes project). In his new position, Prof. Seyfried will strengthen this link by further joint research projects and the development of other civil engineering applications on the JSC supercomputers.
JSC wishes Armin all the best in his new position!

UNICORE Summit 2010

The 6th UNICORE Summit Workshop will take place at JSC from 18 to 19 May 2010. The UNICORE Summit 2010 refocuses on its original idea of providing a unique opportunity for UNICORE users, developers, administrators, researchers, service providers and decision-makers to share information and discuss new ideas and concepts. Future directions in Grid computing are covered in invited talks on "Data-Intensive Computing" and the "European Middleware Initiative" as well as a technical panel about "UNICORE – What's Next?". The programme and more information are available at *http://www.unicore.eu/summit/2010*.
(Contact: Dr. Achim Streit, ext. 6576)

1st SimLab Porting Workshop

From 9 to 11 June 2010, the first SimLab Porting Workshop will take place at JSC. SimLab is short for Simulation Laboratory, a community-oriented research and support structure for a particular scientific community. The aim of this workshop is to promote awareness of SimLab activities within these communities and to provide expert guidance in harnessing JSC's HPC facilities. Advanced porting techniques for both the supercomputers JUROPA and JUGENE will be presented and special attention will be given to specific HPC techniques used by the SimLabs Biology, Climate, Molecular Systems, and Plasma Physics. Computational methods as well as programming techniques will be covered by a combination of lectures and intensive hands-on tutorials during the first two days. Access to both machines will be provided during the workshop. On the third day, each SimLab will discuss future activities with community representatives, such as support activities and proposals, community-oriented development and workshops.

Further information can be found at:
http://www.fz-juelich.de/jsc/simlab-porting-workshop/.
(Contact: Dr. Lukas Arnold, ext. 2301)

Events

DEISA PRACE Symposium 2010
Date: 10 - 12 May 2010
Venue: Casa Mila, Barcelona, Spain
Information: *http://www.prace-project.eu/events/*

Introduction to the programming and usage of supercomputing resources at Jülich
Speakers: Representatives of IBM, Intel and ParTec; JSC staff members
Date: 17 - 18 May 2010, beginning at 13:00 on 17 May
Venue: Hörsaal, Jülich Supercomputing Centre
Registration: *B.Scheid@fz-juelich.de*, ext. 3893

UNICORE Summit 2010
Date: 18 - 19 May 2010
Venue: VR-Rotunda, Jülich Supercomputing Centre
Information: *http://www.unicore.eu/summit/2010*

Workshop on Advanced Debugging with Totalview
Speaker: Nikolay Piskun, Totalview Technologies
Date: 19 May 2010, 10:00 - 16:00
Venue: Hörsaal, Jülich Supercomputing Centre
Registration: *B.Mohr@fz-juelich.de*, ext. 3218

Editor: Dr. Sabine Höfler-Thierfeldt, ext. 6765