

JSCNews

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Blue Gene Extreme Scaling Workshop 2009

From 26 to 28 October, JSC hosted the 2009 event in its series of Blue Gene Scaling Workshops. This time, the main focus was on application codes able to scale-up to the full Blue Gene/P system JUGENE consisting of 72 racks with a total of 294,912 cores – the highest number of cores in a single system worldwide.

Interested application teams had to submit short proposals which were then evaluated. Selection criteria were: a high level of confidence that the code will scale across 294,912 cores (or at least a large proportion of this total); that the JUGENE infrastructure (OS, compilers, libraries) will support user requirements; and that the code could produce a high scientific impact. Ten high-quality applications were selected, among them two 2009 Gordon Bell Prize finalists. Applications came from Harvard University, Massachusetts Institute of Technology, Argonne National Laboratory, Rensselaer Polytechnic Institute, University of Edinburgh, Swiss Institute of Technology (Lausanne), Instituto Superior Técnico (Lisbon) as well as from MPG-IPP, DESY Zeuthen and JSC.

During the workshop, the teams were supported by four JSC parallel application experts, the JUGENE system administrators and one MPI expert from IBM. In addition, the participants shared their expertise and know-how. Every participating team succeeded in utilizing the full 72-rack system during the workshop, executing many smaller jobs to investigate the scaling prop-

erties of their applications along the way. A total of about 400 jobs were launched during the 2.5 days of the workshop with an average utilization of nearly 80 %. This high utilization is remarkable considering that the system was only partially available on the third day due to necessary hardware maintenance.

Many interesting results were achieved. For example, the Gordon Bell Prize finalist from Rensselaer Polytechnic Institute focused on a strong scaling study of their implicit, unstructured mesh-based flow solver. An adaptive, unstructured mesh with 5 billion elements was considered to model pulsatile transition to turbulence in an abdominal aorta aneurysm geometry that was acquired from the image data of a diseased patient. At full system scale, they obtained an overall parallel efficiency of 95 % relative to the 16-rack run which was the basis of their strong scaling study.

A technical report summarizing all experience obtained during the workshop will be published later this year.

(Contact: Dr. Bernd Mohr, ext. 3218)

Large-Scale Projects for GCS@JÜLICH

The second call for large-scale scientific projects by the Gauss Centre for Supercomputing (GCS) was issued in August. Projects are classified as "large-scale" if they require more than 5 % of the available CPU cycles on each member's high-end system. In the case of the petaflop supercomputer JUGENE in Jülich, this amounts

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to 24 rack months for a one-year application period. At its meeting in October, the NIC Peer Review Board – together with the review boards of the GCS partners HLRS and LRZ – decided to award large-scale project status to four additional projects: one from the field of fluid dynamics (Dr. J. Harting, University of Stuttgart), and three from elementary particle physics (Prof. Z. Fodor, University of Wuppertal; Prof. G. Schierholz, DESY Hamburg; Prof. S. Katz, Eötvös University, Budapest, Hungary). Together with the two projects awarded similar status in June, currently six large-scale scientific projects are working on JUGENE consuming more than 40 % of the available cpu cycles.

A new call for large-scale projects will be issued in February, see also <http://www.gauss-centre.eu/qauss-projects>. (Contact: Dr. Walter Nadler, ext. 2324)

Felix Wolf Appointed Professor at GRS

Having started at the JSC with his diploma thesis in 1997, Felix Wolf has worked at the JSC for around nine years. After completing his dissertation project in Jülich between 1999 and 2003, he spent two and a half years as a post-doctoral researcher at the University of Tennessee, before coming back in 2005 as head of the Helmholtz Young Investigators Group "Performance Analysis of Parallel Programs". As of 1 November 2009, Felix Wolf has been appointed W3 professor in computer science at the German Research School for Simulation Sciences (GRS) at the GRS site in Aachen. The GRS is a joint venture between Forschungszentrum Jülich and RWTH Aachen University. It combines the resources of a research centre and a university in a research school which, as an independent legal entity, may act autonomously in research and education. In his new position, Felix Wolf will carry on research on parallel performance analysis and offer courses on the development of parallel simulation software in the master's programme "Simulation Sciences". At the same time, he will continue to head the Helmholtz group and the associated projects in a part-time appointment at JSC until they are concluded. The performance-analysis toolset Scalasca, which is currently being developed by his group in Jülich in cooperation with the JSC Application Support Division, will become a joint project between Aachen and Jülich.

JSC congratulates Felix on his new position!

New JUVIS Visualization Cluster

JSC offers a new visualization service which was made possible by additional BMBF funding dedicated to the D-Grid project. The compute cluster named JUVIS is intended to be used as a parallel server for the visualization of scientific data. JUVIS allows the parallel processing of data as well as parallel rendering while the final image is displayed

on the desktop of the user's local workstation. The cluster has been procured, installed and tested at JSC and is now ready for operation. It consists of one login node, 16 compute nodes, and one fileserver with a 10.5 TB RAID system. In total, the compute nodes are equipped with 128 CPU cores (32 Quad-Core Intel Xeon Processors E5450, 3.00 GHz), 256 GB main memory and 8 high-end Nvidia Quadro FX 4600 GPUs.

In a first step, the visualization software ParaView has been installed on JUVIS. ParaView is an open-source, multi-platform data analysis and visualization application based on the Visualization Toolkit VTK. It is able to run in parallel on the new visualization cluster, allowing the processing and the remote visualization of very large data sets without the need to transfer the data to the local workstation. ParaView especially supports 3D applications, for example from computational fluid dynamics (CFD), plasma physics or astrophysics. Other visualization software may be installed on demand.

Further information about JUVIS can be found at:

<http://www.fz-juelich.de/jsc/cv/vislab/juvis>.

An introductory course is planned for early 2010.

(Contact: Dr. Herwig Zilken, ext. 1498)

New Publication

NIC Series No. 43: Towards the Confirmation of QCD on the Lattice – Improved Actions and Algorithms
Author: Stefan F. Krieg, JSC

Publications are available online at:

<http://www.fz-juelich.de/jsc/docs/>.

Events

Introduction to the programming and usage of the supercomputer resources at Jülich

Speakers: Representatives of IBM, Intel and ParTec, JSC staff members

Date: 26 - 27 November 2009, beginning on 26 Nov., 13:00

Venue: Hörsaal, Jülich Supercomputing Centre

Registration: H.Frank@fz-juelich.de, ext. 3893

Einführung in die parallele Programmierung mit MPI und OpenMP

Speakers: Marc-Andre Hermanns, Wolfgang Frings, JSC

Date: 11 - 13 January 2010, 8:30 - 18:00

Venue: Ausbildungsraum 1, Jülich Supercomputing Centre

Registration: http://java2.hlrs.de/ParProgWS_Registration/, the course in Jülich is "Course J".

If you would like to receive regular information on our events, please send an e-mail to jsc-events-join@fz-juelich.de.

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