New Cell-Based HPC Cluster System for GRS

On 1 July 2008, the German Research School for Simulation Sciences (GRS) acquired a high-performance computer system based on the latest implementation of the Cell Broadband Engine (Cell/B.E.) architecture. This IBM system with 35 compute nodes, 8 GB memory per node, InfiniBand interconnect, and a total computational capability of 7 Tflop/s is deployed in Jülich and will be operated by the Jülich Supercomputing Centre.

The compute cluster is based on IBM BladeCenter QS22 nodes, which incorporate two PowerXCell 8i processors. This type of processor contains a set of special-purpose processing cores which can be used as computational accelerators to raise the PowerPC processor performance to a peak double precision floating point performance of 108.8 Gflop/s. The PowerXCell 8i processor reflects recent trends in processor architecture related to multi-core processors with specialised functions.

Experience with cell processors has been gained in Jülich since the beginning of 2007, when the JUICE project (JUelich Initiative CEll cluster) was established. Cell-specific implementations of applications, e.g. the Lanczos eigenvalue algorithm and the multigrid method, were developed and documented. The new cluster – called JUICEnext – will help to investigate new programming methodologies, models, and techniques. Existing compute-intensive simulation codes will be adapted to exploit the computational accelerators of the PowerXCell 8i with the aim of achieving significant performance improvements. For further information see:
http://www.fz-juelich.de/jsc/juice
(Contact: Willi Homberg, ext. 2424)

PRACE Prepares for Petaflop/s Systems

PRACE, Partnership for Advanced Computing in Europe, selected a broad range of promising architectures for petaflop/s class systems to be deployed in 2009/2010. On the recommendation of external reviewers, the European Commission accepted the PRACE proposal to acquire and deploy the corresponding prototypes.

PRACE analysed key scientific applications and mapped them to suitable architectures. Accompanied by a market analysis, six prototypes were selected. "Our objective is to build the best set of prototypes for preparing a timely and seamless deployment of production systems in 2009/2010.", says work package leader François Robin from CEA.

The prototypes will be used to evaluate the architectures with regard to application performance and scalability, as well as total cost of ownership and energy consumption. They will be installed and evaluated by the following PRACE partner sites:

BSC	IBM Cell/Power6 hybrid system
CEA and FZJ	Intel Nehalem thin-node cluster
CSC and CSCS	CRAY XT5 MPP at CSC
FZJ	IBM Blue Gene/P
HLRS	NEC SX-9 and x86-based hybrid system
NCF	IBM Power6 fat-node cluster at SARA

In addition to testing applications, these prototypes will be used for the evaluation of management software for the distributed infrastructure, assessment of different architectures in near-production situation, preparing benchmarks for future petascale systems, scaling and optimising libraries and codes, and defining technical requirements and procurement procedures of the PRACE petaflop/s production systems for 2009/2010. Additional information can be found at: *http://www.prace-project.eu*
(Contact: Dr. Thomas Eickermann, ext. 6596).

Successful UNICORE Summit 2008

The 4th UNICORE Summit took place on 28 August 2008 as a workshop at the Euro-Par conference in Las Palmas de Gran Canaria, Spain. As an invited speaker Emilio Benfenati from the Istituto Mario Negri, Laboratory of Environmental Chemistry and Toxicology, Milan, talked about "Grid Approaches for Industrial Chemicals and Pharmaceutical Applications". The specialist part of the workshop contained five presentations of research papers in the area of data-related topics, workflows and middleware benchmarking. The workshop concluded with a demonstration of the new UNICORE graphical client based on the Eclipse framework and its workflow capabilities. In the demonstration, a work-flow using three supercomputers from DEISA was successfully executed. As in past years, the accepted papers will be published in the series "Lecture Notes in Computer Science" (2007: LNCS 4854, 2006: LNCS 4375) from Springer Verlag. The detailed programme and all presentations can be found at: *http://www.unicore.eu/summit/2008*
(Contact: Dr. Achim Streit, ext. 6576)

First Bachelors of Scientific Programming

At the end of summer semester 2008, the first students on the "Scientific Programming" course graduated from the University of Applied Sciences Aachen/Jülich. For this course, students are also required to train as mathematical technical software developers (MATSE), and most of them were based at Forschungszentrum Jülich. The theoretical part of the MATSE qualification is organised as lecture courses at JSC and is part of the bachelor course. Both the vocational and academic training are designed to last three years. 26 students finished their apprenticeship at the end of August. Only a few days later, fifteen of them passed their exams and were awarded their bachelor degree within the scheduled period of six semesters. The other eleven students are expected to complete their studies by the end of September 2008.

During the apprenticeship, the students were trained in different institutes at Jülich, and at external partner companies. In the past three years, they acquired skills in mathematics and computer science and concluded their study with a bachelor dissertation.

In addition to the bachelor's degree, the University of Applied Sciences Aachen offers a following master's course in Technomathematics jointly with Forschungszentrum Jülich for successful graduates. More than half the bachelor graduates intend to apply for the master's course to extend their knowledge in applied mathematics and computational science and engineering.
(Contact: Prof. Paul Jansen, ext. 6430)

PI-casso Workplace for JARA

A new visualisation system, called PI-casso, was installed at JSC in July 2008. PI-casso is a transportable, medium-sized back-projection system with a screen size of 1.2 m x 0.9 m. It is driven by two DLP projectors with a resolution of 1400 x 1050 pixels. To enable stereoscopic images, the system is equipped with polarising filters and glasses. An optical tracking system allows the detection of the movements of the user's head and of tracked input devices and can be used for 3D interactions.

PI-casso is designed to bring stereoscopic visualisation systems closer to the scientist. As the system is relatively small and transportable, it can potentially be installed in every institute, close to the users' workplaces.

PI-casso has been installed within the framework of the Aachen-Jülich Research Alliance JARA, section JARA-SIM. In a joint project with the Virtual Reality Group of the Centre for Computing and Communication at RWTH Aachen University, multiple PI-casso workplaces, sited in Aachen and Jülich, will be coupled in an immersive visualisation network (ivNet). This will enable JARA scientists to access remote data for a collaborative visualisation.
(Contact: Dr. Herwig Zilken, ext. 1498)

Jülich GRS Building under Construction

Adjacent to the Jülich Supercomputing Centre, work started in August at a new construction site. This is where the Jülich building for the German Research School for Simulation Sciences (GRS) will be erected. It will house a computer-equipped lecture room, two conference rooms, six rooms for students, 14 offices for faculty, and an administrative block. The new building is planned to be finished in summer 2009. Another building for GRS is being constructed in Aachen.

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