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FORSCHUNGSZENTRUM

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Centre

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European Fusion Computer Comes to Jülich

The European Fusion Development Agreement (EFDA) has charged its member Forschungszentrum Jülich with constructing and operating a new supercomputer, which will help to understand the complex physical effects taking place inside the ITER fusion reactor.

The concept for the supercomputer Bull HPC-FF was drawn up by a team from the Jülich Supercomputing Centre, and optimized and implemented together with the partner companies Bull, Intel, Mellanox and ParTec.

The HPC-FF (High Performance Computing – for Fusion) supercomputer is a best-of-breed system. It will consist of 1,080 computing nodes each equipped with two Nehalem EP Quad Core processors from Intel. The grand total of 8,640 processors will have a clock rate of 2.93 GHz each. They will be able to access about 24 terabytes of total main memory and will be water-cooled. The total computing power will be 101 teraflop/s.

Infiniband ConnectX QDR from the Israeli company Mellanox will be used as the network. The administrative infrastructure is based on servers of the type NovaScale R422-E2 from the French supercomputer manufacturer Bull, who will supply the system and integrate it at Jülich. The cluster operating system "Parastation" will be supplied by the Munich software company ParTec. HPC-FF will be closely coupled to the Jülich 200-teraflop system, JuRoPA, so that if required fusion researchers can access computing power totalling 300 teraflop/s. HPC-FF is being funded by the European Commission (EURATOM), the member institutes of EFDA and Forschungszentrum Jülich. All EFDA member institutes will have access to the new Jülich supercomputer.

For more information see press release from Forschungszentrum Jülich at *http://www.fz-juelich.de/jsc/news/pmjan09*.

Interruptions of JSC Supercomputer Operations

For the Jülich Supercomputing Centre (JSC) and its users, the year 2009 is beginning with the expansion of supercomputing capacities at Forschungszentrum Jülich.

Shortly before Christmas 2008, the Gauss Centre for Supercomputing secured funding for the first petaflop supercomputer in Germany from the German federal government and the federal state of North Rhine-Westphalia. Subsequent to this, Forschungszentrum Jülich signed a contract with IBM for upgrading the JUGENE computer. The first components have since arrived and work on installing them has begun.

In parallel to the installation of the petaflop computer, the first six months of the year will see the construction of the JUROPA-JSC computer, a cluster of Intel Nehalem processors with a peak performance of 200 teraflop/s. JUROPA-JSC will replace the JUMP computer. In the same period, another similar computer, HPC-FF, with a peak performance of 100 teraflop/s will be installed for European fusion research.

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For JSC, the parallel installation of three supercomputers means a very active alteration period, which also involves extending the power supply system and integrating a water-cooling facility into the infrastructure.

Work on the infrastructure and on upgrading JUGENE and the JUST storage system will unfortunately also lead to interruptions in the operation of JUGENE and, to a lesser extent, JUMP.

The first two-week shutdown is planned from **21 February, 12:00, to 9 March, 10:00**. During this time, work on the JUST storage system will mean that neither JUGENE nor JUMP will be in operation and there will be no access to data. In other words, the following data systems will not be available: HOME, ARCHIVE, WORK, and DEISA.

During the last week of April, JUGENE will be taken out of operation in order to convert the racks to water cooling and integrate them into the entire system. Following this, work will begin on the system and the approval process. If all goes according to plan, the upgraded JUGENE system will be back in operation by 1 July 2009.

In order to compensate for the downtime on JUGENE during the granting period 2008/2009, all users whose projects have been approved for computing time will be granted access to the upgraded version of JUGENE during the months of July, August and September 2009 without any further application process. The compensation quota is equivalent to three times the granted monthly quota. Projects that have been approved follow-up computing time for the period 2009/2010 may use their compensation quota over the full granting period.

Furthermore, JSC will do its best to provide computing time on other IBM BlueGene/P systems during the period from March to June 2009 in order to allow a limited degree of program development. However, concrete arrangements have yet to be made.

We do not plan to offer users compensation for the two-week downtime of JUMP. When the JUROPA-JSC computer goes online at the end of the current granting period, these users will have access to an additional supercomputer resource.

During the course of the installation, it may become necessary to change the planned shutdown phases. Should this be the case, JSC will inform its users in good time.

JSC is aware of the restrictions that users will face as a result of the expansion measures. It has, however, done its best to keep the downtimes to a minimum. Once the installations have been completed, users will have access to a unique network of petaflop computers.

Up-to-date information about the status of the supercomputers can be found at: *http://www.fz-juelich.de/jsc/news* and *http://www.fz-juelich.de/jsc/scstatus*
(Contact: Jutta Docter, ext. 6763)

No Backup/Restore/Archive with TSM

Due to the reconstruction of the JUST storage system as part of the supercomputer expansion programme, the TSM servers will not be available for two weeks. Therefore, there will be no access to TSM backup copies or archive data. We plan to shut down the servers from 21 February, 12:00, to 9 March, 10:00. You can find up-to-date information about the status of the TSM servers at:
http://www.fz-juelich.de/jsc/tsmstatus

NIC Project one of the Scientific Breakthroughs of 2008

The NIC Research Group "Elementary Particle Physics" headed by Zoltan Fodor published a paper in the 21 November 2008 issue of "Science" that is already regarded as a milestone by many physicists. Under the title "Ab Initio Determination of Light Hadron Masses", they report on a breakthrough in computer simulations which allowed them to tackle the numerically challenging fundamental theory of strong interactions. Experimentalists can only observe composite particles like the nucleons (protons, neutrons) everyday matter is made of. However, the underlying theory known as quantum chromodynamics or QCD is formulated in terms of quarks and gluons and their interactions, the latter giving rise to the actually observed masses. The NIC group was able to calculate the masses of the proton and of a few other particles, known as Σ, Λ, Δ, Σ^*, Ξ^*, Ω. The calculation is "ab initio", that is without any uncontrolled approximation. This result further corroborates the correctness of QCD in describing strong interactions. At the same time, it demonstrates the capability of the leadership-class supercomputer JUGENE (IBM BlueGene/P) to deliver the performance needed for high-end massively parallel applications. This work has now been voted one of the "top 10 scientific breakthroughs of the year 2008" by the editors of "Science". Further information can be found at:
http://www.bmw.uni-wuppertal.de/Home.html
(Contact: Dr. Stephan Dürr, ext. 5655)

Events

3rd VI-HPS Tuning Workshop
Date: 16 - 20 February 2009, 09:00 - 17:00
Venue: Ausbildungsraum 1, Jülich Supercomputing Centre
Details: *http://www.fz-juelich.de/jsc/vi-hps-tw3*

Winter School "Multiscale Simulation Methods in Molecular Sciences"
Date: 2 - 6 March 2009
Venue: VR-Rotunda, Jülich Supercomputing Centre
Details: *http://www.fz-juelich.de/conference/wsms/*

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