



Technical University of Karlsruhe Advances R&D Work with High Performance Linux Cluster from HP

HP cluster to provide up to 11 TeraFLOPS of Computing Power for University's Scientific Supercomputing Center

GENEVA/KARLSRUHE, JUNE 21, 2004 – HP and the Technical University of Karlsruhe (TH) have signed a contract to build an Itanium 2-based high performance cluster of HP Integrity servers running Linux that will help significantly advance research and development work at the universities and research institutes in the state of Baden-Wuerttemberg, Germany.

The cluster will be unveiled today at the University of Karlsruhe, State of Baden-Wuerttemberg, Germany at the inauguration of the HPC (High Performance Computing) competence center, a newly founded organisation that is being driven by the Ministry of Science of the State Baden-Wuerttemberg to combine the expertise of the Supercomputing Centers of Stuttgart (HLRS) and Karlsruhe (SSCK) and to advance scientific and industrial computing.

The ultra-high performance supercomputing system is installed at the Scientific Supercomputing Center Karlsruhe (SSCK). In two years, the final configuration with a total of 1.200 CPU cores is expected to achieve a total peak computing power of about 11 teraFLOPS and to provide more than seven terabyte of main memory.

The high-availability system will be supplemented by a Lustre™-based¹ solution as a central 40 terabyte high performance parallel file system. The HP solution runs on the newly developed HP XC Cluster Management Software and has already started trial operations.

By providing the SSCK with an ultra-high performance supercomputing system, HP, Intel and the University of Karlsruhe demonstrate their joint commitment to high performance computing. This technology can be used to advance classical engineering sciences as well as life sciences, energy and environmental research, and technical grid computing.

Successive expansion to 340 nodes

The test phase of the clusters began in April 2004 and includes 16 HP Integrity rx2600 servers, each featuring two Itanium 2 CPUs. By early 2006, the overall system will be upgraded in two phases to a total of 334 nodes, which will use next generation Itanium CPUs with two or four processor cores each. In addition, six nodes featuring HP Integrity rx8640 servers with 16 next-generation Itanium 2 CPUs

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¹ The name Lustre is an association of Linux and Clusters. It is a novel storage and file system architecture and implementation suitable for very large clusters. Lustre is Open Source software developed and maintained by Cluster File Systems, Inc. under the GNU General Public License.

each will be integrated into the cluster by the end of the year, bringing the total up to 340 nodes. Each implementation phase offers the opportunity to integrate the latest market-ready technologies. The centrally managed nodes communicate via an ultra-high speed Quadrics interconnect with low latency and a concurrent bidirectional data rate of up to two Gbyte per second.

HP StorageWorks Scalable File Share – central 40 Tbyte file system

The HP StorageWorks Scalable File Share, Lustre™-based, solution will supplement the cluster with a central parallel file system, which will provide 40 terabytes of memory in its final configuration. This shared file system is optimised for use with large Linux clusters and ensures the highest levels of I/O performance. It is ultra-scalable, based on open standards and ensures easy and efficient management.

Redundant and separate systems ensure high availability

In order to enable the security and high availability of the cluster, certain functional areas are partitioned. In the unlikely event of a subsystem failure, any unaffected areas will remain fully functional. In addition all hardware and software components have an optimised redundant design. Additional high availability features will be implemented in the context of HP's cooperation with the SSC. This will include nodes with specific critical functions such as resource management, special leader nodes, the HP StorageWorks Scalable File Share server, and the nodes that provide external network functionality.

HP, University of Karlsruhe and Intel set up Competence Center

The Technical University of Karlsruhe, HP and Intel are jointly establishing the competence center for High Performance Technical Computing (HPTC³ - High Performance Computing Competence Center). The center will handle the integration of the cluster with the operating environment. This includes the implementation of functions that are not yet included in the software for the XC cluster, the monitoring of the cluster, and the protection of high availability for critical functions. At the center, the Technical University of Karlsruhe, HP and Intel will provide training and education, and the porting and optimisation of applications from Independent Software Vendors (ISVs). In addition, they will collaborate in the field of HPC applications on new, innovative research areas such as life sciences, environmental research, and technical grid computing.

About HP

HP is a technology solutions provider to consumers, businesses and institutions globally. The company's offerings span IT infrastructure, personal computing and access devices, global services and imaging and printing. For the four fiscal quarters ended April 30, 2004, HP revenue totaled \$76.8 billion. More information about HP (NYSE, Nasdaq: HPQ) is available at www.hp.com.