

April 2nd, 2012

Information Technology Center, The University of Tokyo

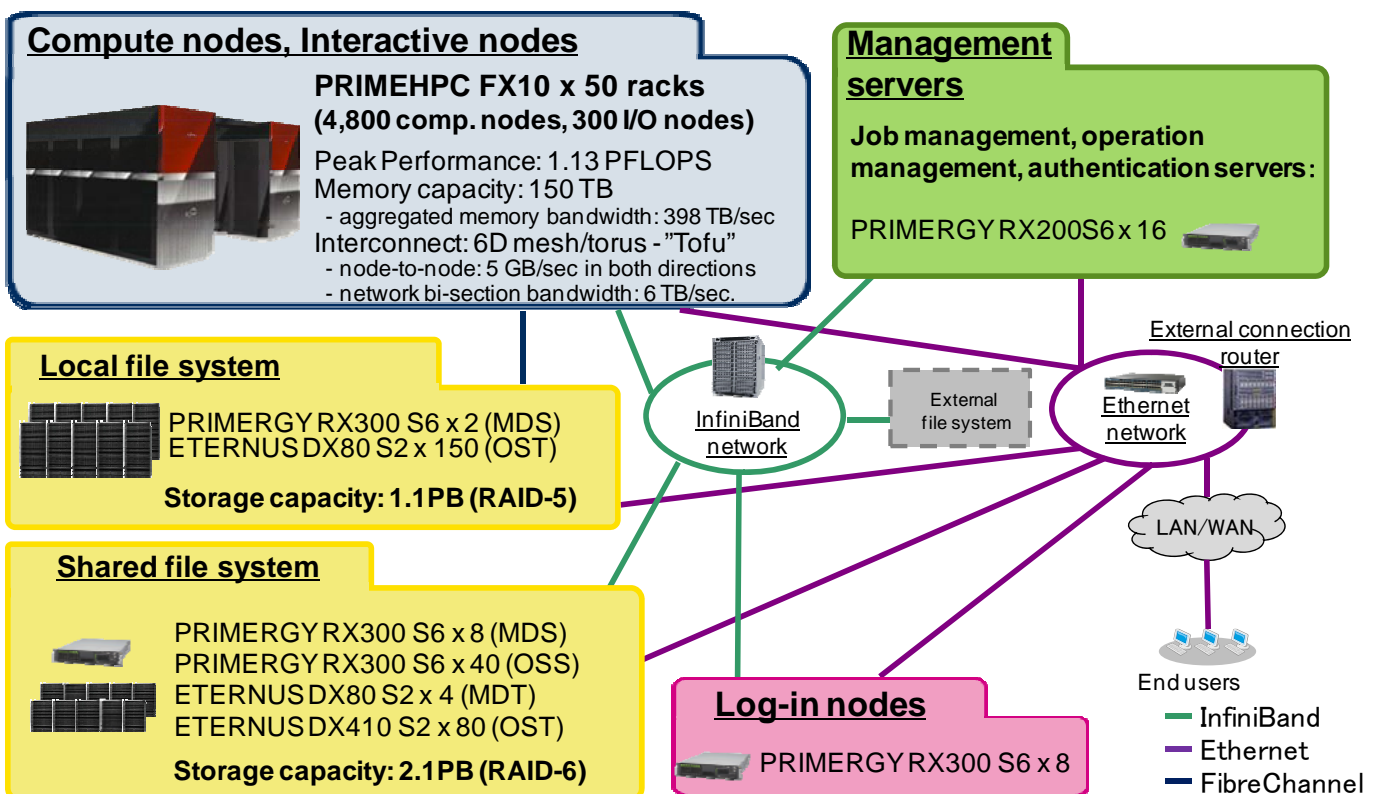
FX10 Supercomputer System (Oakleaf-FX) with 1.13 PFLOPS started operation at the University of Tokyo

On April 2nd, 2012, Supercomputing Division, Information Technology Center, The University of Tokyo (SCD/ITC/UT, <http://www.cc.u-tokyo.ac.jp/>) started its new supercomputer system (FX10 Supercomputer System (Oakleaf-FX)). Oakleaf-FX is a Fujitsu's PRIMEHPC FX10 massively parallel supercomputer with a peak performance of 1.13 PFLOPS. Oakleaf-FX is the first system, which is installed to a new building of SCD/ITC/UT in Kashiwa campus of the University of Tokyo. The new system is named after the area (Kashiwa-no-Ha = Leaves of Oak Trees) of Kashiwa campus.

The new system consists of 4,800 computing nodes of SPARC64TM IXfx processors based on SPARC64TM V9 specification with HPC-ACE (Arithmetic Computational Extensions). SPARC64TM IXfx is a successor of SPARC64TM VIIIfx for K computer in RIKEN Advanced Institute for Computational Science (AICS), and attains very high efficiency with 2 GFLOPS/W.

CPU	SPARC64 TM IXfx 1.848 GHz	SPARC64 TM VIIIfx 2.000 GHz
Number of Cores/Node	16	8
Size of L2 Cache/Node	12 MB	6 MB
Peak Performance/Node	236.5 GFLOPS	128.0 GFLOPS
Memory/Node	32 GB	16 GB
Memory Bandwidth/Node	85 GB/sec (DDR3-1333)	64 GB/sec (DDR3-1000)

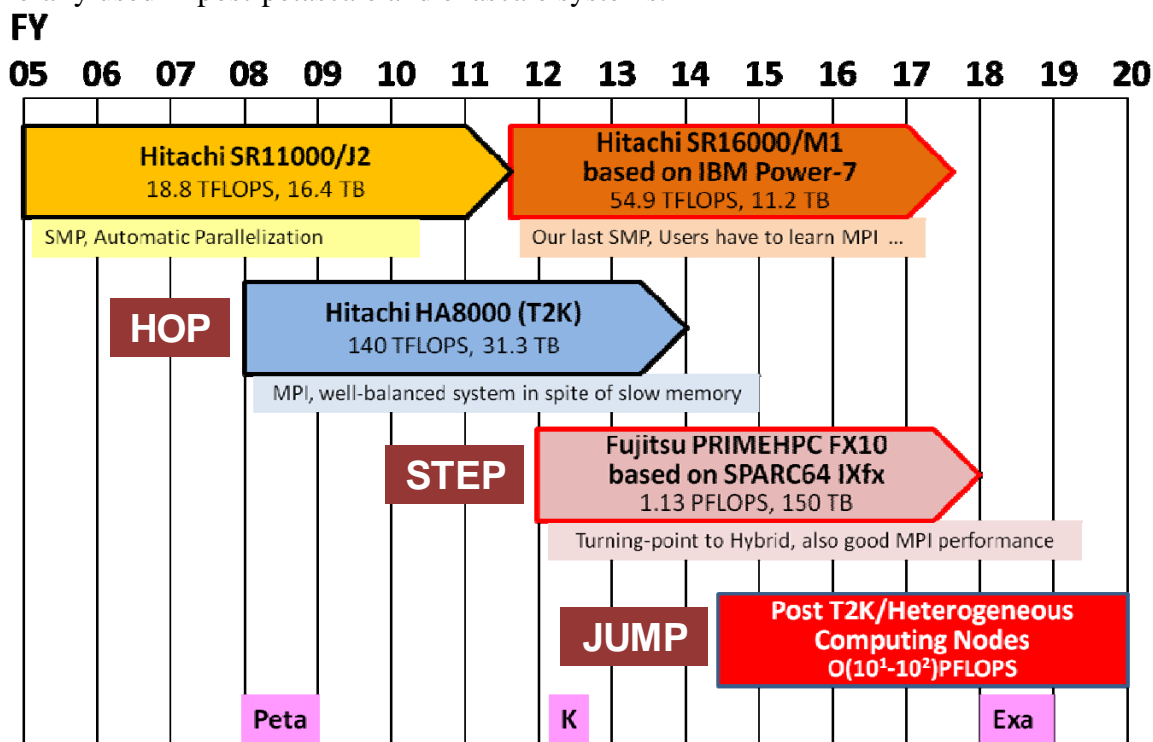
Total peak performance of the new system will be 1.13 PFLOPS, total memory capacity is 150 TB, and aggregate memory bandwidth is 398 TB/sec. 4,800 compute nodes are connected via 6-dimensional mesh/torus interconnect - "Tofu." New system has two file systems. One is a local file system for staging with 1.1 PB of capacity and 131 GB/sec of aggregate I/O performance, and the other is a shared system for storing data with 2.1 PB and 136 GB/sec.



SCD/ITC/UT (<http://www.cc.u-tokyo.ac.jp/>) was originally established as the Supercomputing Center of the University of Tokyo in 1965, which is the oldest academic supercomputer center in Japan. In 1999, Information Technology Center (ITC) was organized, and the Supercomputing Center became the Supercomputing Division (SCD) of ITC, with other three divisions. Information Technology Center, The University of Tokyo (ITC/UT) is a core organization of “Joint Usage/Research Center for Interdisciplinary Large-Scale Information Infrastructures” which consists of eight academic supercomputer centers in Japan. Moreover, it is also a part of HPCI (High-Performance Computing Infrastructure) operated by Japanese Government, which consists of facilities of academic supercomputer-centers in Japan and K computer in Kobe connected through network. SCD/ITC/UT provides services for operations of supercomputer systems and supporting more than 1,500 users from both of inside and outside of the university. SCD/ITC/UT has also consists of more than 10 faculty members, who are conducting advanced research and education related to HPC. SCD/ITC/UT has been operating two systems of supercomputers (Hitachi SR16000/M1 based on Power7 architecture with 54.9 TFLOPS of peak performance (Yayoi), and Hitachi HA8000 Cluster System (T2K/Tokyo) with 140.1 TFLOPS). Finally SCD/ITC/UT operates three supercomputer systems from this April including FX10 (Oakleaf-FX).

Oakleaf-FX will contribute to advancement of various types of research and development activities by both of users of supercomputer systems and faculty members of SCD/ITC/UT. Oakleaf-FX will be introduced to HPC education program in the Graduate School of the University of Tokyo for future computational scientists. Oakleaf-FX will be operated so that priority is given to larger-scale jobs. Furthermore, new project, titled “large-scale HPC challenge” is also starting. Members of a group of accepted proposal can occupy entire computing nodes (4,800 nodes, 1.13 PFLOPS) of Oakleaf-FX for 24 hours. One proposal is selected per one month.

SCD/ITC/UT has been installing a new supercomputing system every three years. *Post T2K system* with heterogeneous computing nodes is expected to be $O(10^1-10^2)$ PFLOPS of peak performance, and will be installed in FY.2014 or FY.2015. Post T2K system is considered as a *post-petascale* system, and a milestone to *exascale* system, which is expected to be developed by the end of the decade. Oakleaf-FX also plays an important role for paradigm shift from single-level parallel programming models (e.g. pure MPI) to multi-level hybrid parallel programming models (e.g. MPI+OpenMP/CUDA/OpenCL/OpenACC etc.), which will be more generally used in post-petascale and exascale systems.



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