



Press Release:

Tokyo Institute of Technology to Deploy the Largest “Supercomputing Grid” in Japan

Nov. 16th, 2005

The Tokyo Institute of Technology is announcing today that it will deploy a “Supercomputing Grid” centered around a supercomputing cluster of the highest performance in Japan at the time of its deployment in April 2006, and will quickly ramp up the capabilities to become the first supercomputer to exceed the 100 Teraflops mark outside of the United States by late Spring of 2006.

Points of Interest

- 85 TeraFlops (trillion floating point operations per second) to be deployed by March, 2006, to become the fastest supercomputer in Japan, with plans to upgrade the capability to over 100 TeraFlops by late Spring of 2006.
- To be the core infrastructure of the “Titech Campus Grid,” and expected to be ranked among the top 5 computers in the world in the June 2006 Top500® (<http://www.top500.org/>).
- With superior cost performance and high affinity with modern desktop environment, the new supercomputing grid will be utilized extensively in grand challenge problem solving in a variety of research areas such as bio-science, nano-science, environmental as well as disaster (prevention) simulations, allowing for high productivity thereby accelerating a variety of important scientific research.

Abstract

The overall system integration has been awarded to NEC, who will combine a fleet of Sun Fire™ x64 servers with 10,480 AMD Opteron™ processor cores, Sun and NEC storage technologies, Voltaire's Infiniband network, as well as ClearSpeed SIMD acceleration boards to construct a supercomputing cluster to serve as the core computing fabric of the “Titech Campus Grid” being lead by Professor Satoshi Matsuoka of the Global Scientific Information and Computing Center. The machine will be the world's largest and fastest supercomputing cluster as measured by core CPU count and peak performance, respectively, initially achieving 85 Teraflops in the March 2006 deployment, with planned increases to beyond 100 Teraflops with the installation of additional ClearSpeed accelerator boards by late Spring of 2006. Moreover, with supplemental deployment of NEC's vector nodes, the overall infrastructure will become



the so-called “hybrid supercomputer” that will facilitate applications spanning from legacy to the most modern ones, all accessible from a standard desktop environment.

The system will also facilitate over 21 TeraBytes of memory, as well as 1.1 Petabytes of hard disk storage, again besting all other machines outside of the United States; in fact, the expectation is to use the abundant resources establish a new usage model of supercomputers that will not only be internal to an institution, but rather, will allow fostering of international as well as industry-academia collaborations among the scientists in different organizations. As such, the Institute hopes to establish recognition as the leading site in the Asia-Pacific region with respect to supercomputing and grid technologies with the new supercomputing grid, paving the way for active contributions in fundamental software, application and architectural research towards the 10 PetaFlops-class supercomputing project undergoing planning as the core national infrastructural project in Japan by the Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Application Areas

The overwhelming performance of the system will allow for accelerating a variety of complex grand-challenge scientific problems that are undergoing research at the Tokyo Institute of Technology, such as analyzing the molecular structure of proteins, simulated bloodflow diagnosis in human brains, modeling of the generation mechanism of Earth and planetary magnetic field and their long term effects, analysis of the effect of natural disasters and their preventive measures, to nanoscience simulation of carbon nanotubes. Moreover the deployment of grid middleware being developed by the Japanese National Research Grid Initiative (NAREGI) (<http://www.naregi.org>), also being sponsored by MEXT, the supercomputing grid is expected to host various international as well as industry-academia cross-organizational projects as a part of the Japanese national grid infrastructure.

Contacts

Professor Satoshi Matsuoka
Research Infrastructure Division
Tokyo Institute of Technology
Tel&Fax: +81-3-5734-3876
matsu@is.titech.ac.jp
<http://www.titech.ac.jp>

**General Affairs Division, Evaluation and
Public Relations Division**
Tokyo Institute of Technology
TEL: +81-3-5734-2975
FAX: +81-3-5734-3661
kouhou@jim.titech.ac.jp

Professor Takayuki Aoki
Global Scientific Collaboration Division
Tokyo Institute of Technology
TEL: +81-3-5734-3667
FAX: +81-3-5734-3276
taoki@gsic.titech.ac.jp



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