



Tokyo Institute of Technology

The Tokyo Institute of Technology (TITech) wanted to leverage its experience in proprietary systems and transition to an advanced, open system. By introducing SUSE® Linux Enterprise Server, the university successfully developed a highly interoperable and scalable grid cluster system accessible to all students, as well as other universities.

Overview

Tokyo Institute of Technology is one of the world's leading science and technology universities, having received acclaim in both Japan and internationally for its outstanding achievements and high educational standards. The university has over 125 years of history and more than 10,000 undergraduate and graduate students.

Challenge

As in many other technology-focused, research-led institutions, TITech wanted to build its supercomputing capabilities by integrating disparate computing models and provide access to a broader group of users. The university aimed to create a "supercomputer for everyone."

TITech envisioned building a supercomputer grid system that functioned as the central computing resource on the campus, giving all of its more than 10,000 students, from freshmen to graduate-level researchers, open access to one of the most advanced supercomputers in the world.

By providing access to the new system, called TSUBAME (Tokyo-tech Supercomputer and Ubiquitously Accessible Mass-storage Environment), TITech intended to broaden

students' use of advanced technology, as well as improve their productivity and global competitiveness.

The main challenge the university faced in creating its system was less in developing a proprietary solution from scratch, than in taking advantage of generally available technologies, such as open source and various packaged software, while achieving a supercomputer's superior performance and scalability.

Solution

The university reviewed various software and hardware platforms with the goal of finding the best usability, interoperability, performance, and scalability. Based on these criteria, the university selected SUSE Linux Enterprise Server.

"SUSE Linux Enterprise Server was the best operating system for us," said Professor Satoshi Matsuoka, Head of the Research and Education Infrastructure Department, Global Scientific Information and Computing Center, Tokyo Institute of Technology. "In addition to delivering the superior performance necessary for our large-scale system, the platform is flexible enough to support a heterogeneous environment comprised of

Tokyo Institute of Technology at a glance

Japan's world-class science and technology university

■ Industry:

Education

■ Location:

Japan

■ Solutions:

SUSE Linux Enterprise Server

■ Results:

- Expanded user capacity from 100 to more than 10,000 students
- Increased computing power by 200 percent
- Improved competitiveness, making its supercomputer capabilities number one in Asia

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Satoshi Matsuoka

*Professor,
Research and Education
Infrastructure Department,
Global Scientific Information
and Computing Center
Tokyo Institute of Technology*



“Choosing SUSE Linux Enterprise Server was clearly a strategic decision for us. We were confident that SUSE Linux Enterprise Server would enable us to provide students with secure, ubiquitous access, while delivering the performance and scalability needed to offer additional services in the future.”

Satoshi Matsuoka

*Professor, Research and Education Infrastructure Department,
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Windows, open systems, and numerous software packages, and it is easy-to-use as well. We also knew that a Novell® Linux solution supports three of the world's most powerful supercomputers.”

For the five-month project, the university centralised its system around the latest SunFire® X4600 server. TSUBAME runs 22 ISV solutions and six open source applications. The massive yet easy-to-use grid system provides computing power to all students at the university.

Thanks to TSUBAME, the university has accelerated its work on a variety of complex scientific problems, ranging from analysing the molecular structure of proteins and studying the effect of natural disasters and their preventive measures, to simulating nano science and carbon nano tubes. TSUBAME's openness will also support various international and joint industry-academia projects.

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Results

By implementing SUSE Linux Enterprise Server, the university clearly achieved its objectives. It was able to extend computing

resources from approximately 100 specialists to more than 10,000 students, as well as other universities.

“Creating a ‘supercomputer for everyone’ meant that usability was just as important as performance, availability, and scalability,” said Matsuoka. “SUSE Linux Enterprise Server even provides access to our super-computer from outside the university, creating a truly user-friendly environment.”

In terms of performance and scalability, delivering 85 Teraflops of computing power sees TSUBAME rank number nine in the world (based on November 2006 Top 500 ranking) and number one in Asia among supercomputers. The system also features 655 nodes and 10,480 CPUs, the most of any PC cluster-based supercomputer in the world. The university plans to boost the system's performance to exceed 100 Teraflops, making it the most powerful supercomputer outside the United States.

In the coming months and years, the Tokyo Institute of Technology envisions increasing the system's computational power and further opening its computing resources up to other universities.

“By developing the fastest, open-access computer in Japan, the university is getting visitors from not only the research community but from the private sector as well,” said Matsuoka. “By opening up the system to the private sector, we believe the university is providing an important social service.”



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