Shibaura Institute of Technology
Customer Success

8,000 students benefit from long term, large-scale Data Base & Application server consolidation

Solution
• Server Integration

Industry
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• PRIMEQUEST 440

Overview
Shibaura Institute of Technology (SIT) planned its migration to an Intel® Itanium® 2 server to coincide with relocation from its Shibaura campus to a new campus in Toyosu. An earlier migration, from mainframe to open system (Solaris/Windows) had already been completed, but further cost reductions were still being sought. SIT chose PRIMEQUEST because it enabled them to provide new services to students and alumni for more than 5 years into the future. In addition, PRIMEQUEST allowed SIT to consolidate all existing systems onto a single PRIMEQUEST 440.

Shibaura Institute of Technology
Shibaura Institute of Technology is one of the major engineering institutions in the Tokyo region. With 8,000 students now relocated at the new Toyosu campus (Pic.1), they also have a campus at Omiya and two related high schools. Their Information system needs include research systems, student service systems and administration systems, such as human resources and entrance examination processing.

Mr. Yamazaki, Director of the SIT information center (Pic.2), says “Despite Japan’s declining birth rate, computer resources and requirements for new systems are increasing. Providing good service to both students and alumni is essential if we are to attract the best candidates. We need to research each student’s entrance examination score, courses taken and career following graduation.”

The information center was founded at the same time as the system engineering faculty, in the 1990’s. It consists of a library, computing center and network department. Although not involved in the strategic management of the school they are expected to provide a wide range of data to the financial and administration departments. For this reason, providing proposals that closely follow information system trends is one of the most important jobs of the information center.

Mr. Yamazaki says “In recent times, administration and research systems tend to be operated on the same system. Plus we are expected to configure systems that can be used for more than 10 years.”

First migration, then systems consolidation
At the end of the 20th century, SIT undertook migration from their mainframe to open servers as a first step in system consolidation. Mr. Sofue, deputy manager of network services (Pic.3), says “At that time, we were using a mainframe and programs developed by professional programmers. The problem was the number of skilled maintenance engineers was decreasing. For this reason, we decided to migrate from the mainframe to an open system in line with campus relocation from Shibaura to Toyosu.

Mr. Yamazaki says, “Our mainframe generation users were anxious about replacing the mainframe” After migrating mainframe operations to open system (Solaris/Windows Servers), SIT faced difficulties in maintaining a distributed system.

Mr. Sofue says, “The expected computer resources required for new services and the migration of existing subsystems required more than 10 servers. Increasing the number of servers meant increases in maintenance costs. We thought it was impossible to maintain the OS and DB functions on an increasing number of servers given our existing resources”

Mr. Yamazaki says “Generally, universities including SIT tend to configure systems themselves. With the system changes we wanted to keep maintenance costs at the same level. In fact, we wanted to reduce the maintenance costs of the platforms.”
When SIT members were planning the server consolidation project, they quickly decided to introduce Oracle Database 10g as the database server and BEA WebLogic Server as the application Server; this would retain existing skills and ease legacy succession. They also considered using Solaris OS, but eventually decided on Windows Server 2003. Mr. Sofue says, “We considered using our SUN machines as Solaris servers but eventually turned this down due to low availability of mid-range models.”

In selecting IA servers, SIT decided to use the Fujitsu PRIMEQUEST 440 Itanium 2 server. Following an explanation from the Fujitsu development team, Mr. Yamazaki says “We thought PRIMEQUEST, with mainframe-class technology, was the right choice.” In fact, SIT had a relationship with Fujitsu from the mainframe era and knew that Fujitsu’s support service was reliable. Mr. Yamazaki says “It was difficult to undertake a complete verification of the entire university system without a cooperative vendor.”

Today, SIT connects both high schools, both campuses and an internet access point (IX) in Otemachi (Tokyo) using fibre. Connections used by students and academics have separate firewalls. Employees use applications via thin client (Windows Server 2003 Terminal Services). The system for students and academics is configured as a web application with access by Web browser.

SIT uses blades for front end processing and PRIMEQUEST for the backend. Mr. Yamazaki says “We choose PRIMEQUEST with its high scalability for longevity in IT use and loaded Oracle and WebLogic.”

SIT introduced PRIMEQUEST 440 with 12 Itanium 2 processors (Pic.4). PRIMEQUEST with Fujitsu’s unique chipset has virtualization capability at the hardware level. It can run different OS environments by grouping server resources such as processors, main memory and I/O devices into physical partitions.

Using this virtualization, SIT decided to divide the server into 3 partitions. One for the database server (Oracle), configured with 8 processors and 128GB of memory. The other two are for the application server (WebLogic) and are clustered, with 2 processors and 32GB of memory allocated to each. Also connected is a Fujitsu ETERNUS storage system via SAN (Storage Area Network).

Secure hardware with mainframe technology selected

School registration and other data, for all campuses, occupies almost 1 terra-byte of storage in the Oracle database. SIT allocated 2 partitions to the application server because they expect the processing workload to increase in line with the development of service systems for students and academics.

Windows Server 2003 was introduced as the OS. When asked if they are worried about handling Tera Byte sized databases on a Windows based system, Mr. Sofue who has long experience in system configuration says “Today, Windows server has become much more stable. Now there are no reboots caused by system hangs. Also, it is easier to hire good Windows engineers than to hire Solaris engineers.

New service quick to come on line

Even though SIT chose a large scale system, it was still difficult for them to consolidate all systems at once. They first decided to migrate the student information system which is the main SIT system. All migration was finished by the end of 2005. Now SIT enjoys the advantages of system consolidation, especially in resource management when adding new services.

Mr. Yamazaki says, “Previously, we didn’t make a proper migration plan. In the university, it is very difficult to decide on target dates for system release and what is to be introduced. On the other hand, we needed to meet the requirements of our users. When we first thought about migration from the mainframe to open servers, there were several different servers in the backend system and the system environment was very complicated.” Also the number of software licenses was increasing and becoming uneconomical. Mr. Yamazaki says “We not only consolidated those multiple servers but it also became possible to simplify the resource management.”

From 2006, course information could be displayed outside each classroom and student attendance managed by IC card. Planned is a Web-based course registering system and consolidation of other mission critical systems such as the issuing of various certificates. Mr. Sofue says “We are planning to configure the system to support each student’s career. We want to support not only students seeking jobs but also those who continue to study in graduate school. We are also working on several ideas for educational support and would like to provide more information to students. It is critical that we provide service menus that adjust to each student’s needs.”

Secured by Fujitsu.
Mr. Yamazaki says “We wish our students to think that the university is taking care of them, and is providing information and services to its stakeholders. We have to configure highly-scalable systems to achieve this. Although technology changes fast, we would like to continue to use the existing system for 5 years. We think that PRIMEQUEST with its performance and function, is the platform that will meet this requirement.”

**Diagram 1.** System overview of Shibaura Institute of Technology
Toyosu campus, Omiya campus, 2 associated high schools in Kashiwa and Itabashi and the internet access point in Otemachi(IX) are all connected by a fibre optic network to the centralized servers in Toyosu. SIT also installed a SAN(Storage Area Network) in the earthquake proof Toyosu campus and installed nearline storage in Otemachi.