



KOREA ADVANCED INSTITUTE OF SCIENCE & TECHNOLOGY SUN PLATFORM DELIVERS

Company/Organization

- Korea Advanced Institute of Science & Technology
www.kaist.ac.kr

Vertical Market

- Education & Research

Key Challenges

- Establish a technology platform to support KAIST's goal of becoming one of the world's top 10 universities.
- Develop a campus-wide research archive and search capability.
- Provide an IT infrastructure to support thousands of concurrent users.

Solution

- Migrate from legacy HP-UX platform to a high-performance Sun Fire™ 15K server running on the Solaris™ Operating System.

Business Results

- 10 times faster processing speeds.
- Supports more than 4,000 concurrent users during peak times.
- 50% decrease in operating expenses.
- 100% ROI in 24 months.

The Korea Advanced Institute of Science & Technology (KAIST), which is affiliated with Korea's Ministry of Science & Technology, plans to transform itself into one of the world's top 10 universities by 2010.

As part of this long-term strategy, in 2003 KAIST purchased a Sun Fire™ 15K server to establish a technology platform to upgrade the institute's administration system. KAIST selected the Sun Fire server due to its stability and high availability. Since going online, the UNIX®-based Sun Fire 15K server has been utilized to integrate school affair service systems, providing the foundation for system expansion to meet major global competition.

KAIST, the Hub of Daeduck Campus

Located within Daejeon city, the Daeduck research and development (R&D) campus, which is the home of KAIST, is 10 times the size of Yeouido, a suburb of Seoul. KAIST has abundant technological expertise with 10 percent of the nation's doctorates and strong financial support. The institute receives over 30 percent of the government's R&D budget and has attracted 56 private as well as governmental R&D institutions such as Electronics & Telecommunications Institute and the Korea Atomic Energy Research Institute.

One of the most important reasons for developing this national R&D hub is to attract excellent technical personnel. It is estimated that more than 10,000 people with master's or doctoral degrees work within the Daeduck R&D campus. KAIST has earned a stellar reputation for attracting and developing technical personnel. In fact, KAIST has played an important role as an ideal institution for training distinguished technicians and providing technical support for neighboring businesses. Moreover, the institute conducts many high-profile technology-related research projects for the Korean government and supports business startup operations while building its infrastructure for college-focused venture business startups such as Qunix Computer Inc.



KAIST's World-class Information Infrastructure

The institute introduced Gigabit Ethernet network connectivity in 2001, which now provides online access to more than 30,000 international research journals for faculty, students, researchers and other employees. KAIST is now advancing a next-generation project to establish a 'ubiquitous campus' search capability. To provide the base system, KAIST successfully completed its libraries integration project in 2002 and launched its automated school affairs administration systems in 2003 to help ensure its international competitiveness. KAIST recently embarked on a project to fortify its administrative operations platform for next-generation projects by replacing its existing Hewlett Packard (HP) systems with Sun™ server technology.

By standardizing on a Sun Fire™ 15K server running the Solaris™ Operating System, the Korea Advanced Institute of Science & Technology was able to support a growing demand for improved IT services while allowing the institute to reduce its expenses and maximize its ROI.

The KAIST infrastructure has become an essential factor for evaluating the efficiency of the campus businesses and colleges. Since the institute was established by the Korean government to train world-class experts who will lead the information era of the future, KAIST demands a much higher level of IT support than any other domestic university. When all school affair services were Web-enabled in 2003, the data volumes related to academic services such as credit inquiry, lecture application and book lending began to gradually increase. KAIST also wanted to upgrade its server platforms because its Web homepage, which used to provide only limited capabilities and services, had evolved into a multi-functional portal that provided a variety of information about online classes, school departments and campus organizations.

These changes to and demands on the institute's IT infrastructure have made it clear that the two HP T600 server systems introduced in 1997 were insufficient to sustain the surging requirements of its users. One of the key reasons was that the HP-UX systems did not consistently support software upgrades. Another issue was that, during busy academic periods such as entrance, enrollment and registration,

large numbers of concurrent users needed to access the same system at the same time. Stability and high availability were primary concerns for the new systems. One important consideration that arose was the integration between data and platforms, since the KAIST computer systems supported several applications — such as Web application

servers, school affairs and administration — on the HP-UX platform, while its Web site ran on the Solaris platform. The development environment for KAIST's Web site ran Apache Web Server software, while the Web application server ran on BEA WebLogic Server software. In addition, many applications that had been developed by the institute's in-campus research organization, Center for Advanced Information Systems (CAIS), required an integrated platform to operate efficiently. Aside from the technical issues, KAIST wanted to reduce expenses while maximizing ROI during the reconfiguration of its infrastructure.

As these problems began to mount, it was clear that the HP-UX systems lacked the resources to support the workload. "We were concerned that HP-UX would not be the best platform for building our next-generation IT platform," recalls Noh Boo Sool, Manager of Academic Information Center. That's when KAIST started to consider the introduction of a much more stable and flexible platform.

Sun Fire 15K Server: Best Choice for Integrating School Administrative Systems

To address these issues, in July, 2003, KAIST convened its 'e-Campus committee', which is an advisory group of eight information/communication professors. This committee spent the next two months conducting benchmark evaluations of various platforms for supporting the school administration's requirements. The candidates were HP Superdome 64-way, IBM pSeries 690 and Sun Fire 15K servers. This was an important competition for all three vendors since KAIST enjoyed a nationwide reputation as Korea's top science and engineering college. When Sun emerged as the victor, the award was recorded as one of the largest reference sales in central Korea.

“The Sun Fire™ 15K server provides KAIST with an excellent foundation for serving the IT needs of our campus. We are confident that the Sun Fire 15K server will help KAIST to achieve its goal of becoming one of the world’s top 10 universities.”

Noh Boo Sool

Manager of Academic Information Center,
Korea Advanced Institute of Science & Technology

The high-performance Sun Fire 15K server was rated the optimal system for school affair services during the assessment. According to Noh, “The Sun Fire 15K server with fifth-generation fault-isolated Dynamic System Domains satisfies all the requirements for integrating our campus administration and school affair automation systems. The Sun Fire 15K server also delivers abundant availability and hot-swappable components, which are essential for the main system that interacts with our next-generation school affairs management systems.”

Mainframe Levels of High Availability and Stability

To support its IT requirements, KAIST needed its systems to support 4,000 to 5,000 concurrent users, particularly during peak times like registration and entrance examinations. This requirement was addressed by the Sun Fire 15K server’s automated Dynamic System Domains function. This automated capability allows system managers to control system overloads by writing simple code scripts. System managers can also allot system resources as required and deal with abrupt increases in concurrent users by letting the system board dynamically move one domain to another. In addition, the Sun Fire 15K server proved to have the ability to manage security issues that KAIST had defined as one of its most important requirements. Security is easily addressed by utilizing the Sun Fire server’s multiple task management capability to redistribute roles with the system controller, restrict data access and control both domains and platforms.

Another important aspect of this project involved migrating the 3TB Sybase database used by the institute’s existing school affairs administration to the Sun Fire 15K server. KAIST had full confidence in Sun consultant’s ability to handle the database migration based on their proven experience with similar Sybase-related projects at Kyobobook Inc. and Samsung Life Insurance. Kyobobook’s enterprise-wide data warehouse was completed in 2002 with the Sun Enterprise™ 6500 server running the Solaris Operating System. Sun had also earned a reputation for successfully supporting data warehouse projects for Samsung Life Insurance, with 1.2TB of raw data and 2TB of Sybase-related data. As part of the database transfer, KAIST worked with Sun consultants to partition the Sun Fire 15K server into 4 physical domains and then allocated its 28 CPUs into 8 for school affairs, 16 for administration and 4 for Web application server and Web respectively. Sun also worked with KAIST to upgrade the Sun Fire server’s chassis, CPU and memory board through the Sun Upgrade Advantage Program, which helped to reduce errors during the data transfer. “Based on our past experience with Sun, we were confident that the Sun team would be able to successfully drive this Sybase migration,” says Noh.

System Speed Now 10 Times Faster

The system analysis project began in September, 2003, and was completed in mid-November, 2003. The KAIST team met with Sun consultants weekly to develop a design plan for its next-generation infrastructure. After testing the system’s stability for two weeks, KAIST conducted the last simulation in December. The new computer system, which was optimized with system patches and software updates, was finally brought online in January, 2004.

An important outcome of this project has been a more flexible IT environment that can cope with rapid changes in system conditions and that allows KAIST to provide better quality of service. School affairs and other administrative systems that faculty and students shared were integrated by using the open-standards environment of the Solaris Operating System, which helped enable traffic management to deal with large number of simultaneous users while also supporting a number of Web services. From a business perspective, KAIST was able to leverage its Sun platform to decrease operating expenses by 50 percent while achieving 100 percent ROI in 24 months.

KAIST now plans to maximize its administration efficiency by utilizing its data center-class systems for improving existing school affairs management practices, leveraging information more effectively and decreasing the number of inquiries requiring response. 2005 will be the first year that KAIST will be able to support its long-term ubiquitous campus project. To attain this goal, KAIST is working on next-generation software projects by installing new applications and group wares.

“Our speed and stability have improved dramatically. In fact, we measured the time for processing speed as 10 times faster than before, especially during registration of spring semester of 2004, when our new system was launched,” said Noh. He concludes, “The Sun Fire 15K server provides KAIST with an excellent foundation for serving the IT needs of our campus. We are confident that the Sun Fire 15K server will help KAIST to achieve its goal of becoming one of the world’s top 10 universities.

Learn More

For more information on KAIST, visit kaist.ac.kr. And for more information on Sun, please visit sun.com.

Sun Technology

- Sun Fire 15K server
- Solaris Operating System

Sun Services

- Sun consultants for database and server migration services.
- Enterprise installation services.
- SunSpectrum Platinum™ support agreement.

Third-Party Products

- Sybase database