NAS Gets a Higher Education

by

Vic Sangveraphunsiri
Vice President of Engineering
FIA Storage Systems

Engineering New Ideas

At Chulalongkorn University, one of Thailand's premier educational institutions, it is the Department of Engineering's charter that all engineering graduates be well versed in the role of computers and related technologies in engineering applications. As a university, Chulalongkorn has also assumed the role of being a transfer agent for new technology to the industry at large. At the center of these goals is the Engineering Computer Center (ECC). Established in 1985 as the university's technology hub, the ECC is comprised of: ENGINET, a faculty network with over 2000 outlets utilizing Fast Ethernet connectivity; Internet servers; related peripherals, and nine microcomputer rooms. The ECC plays a vital role in Chulalongkorn University's engineering curriculum, providing students and faculty with a variety of computer-related engineering applications and resources.

In order to provide a more comprehensive, IT-assisted education, Chulalongkorn's engineering faculty allocated a budget of $5 million toward new information technology investments in the ECC. Specifically, the investments aligned with the university's goal of promoting a flexible learning mode. The flexible learning approach would supplement traditional classroom instruction by utilizing Internet-based facilities for distance learning. By having access to a variety of learning methods, students were afforded broader opportunities to benefit from their engineering education.

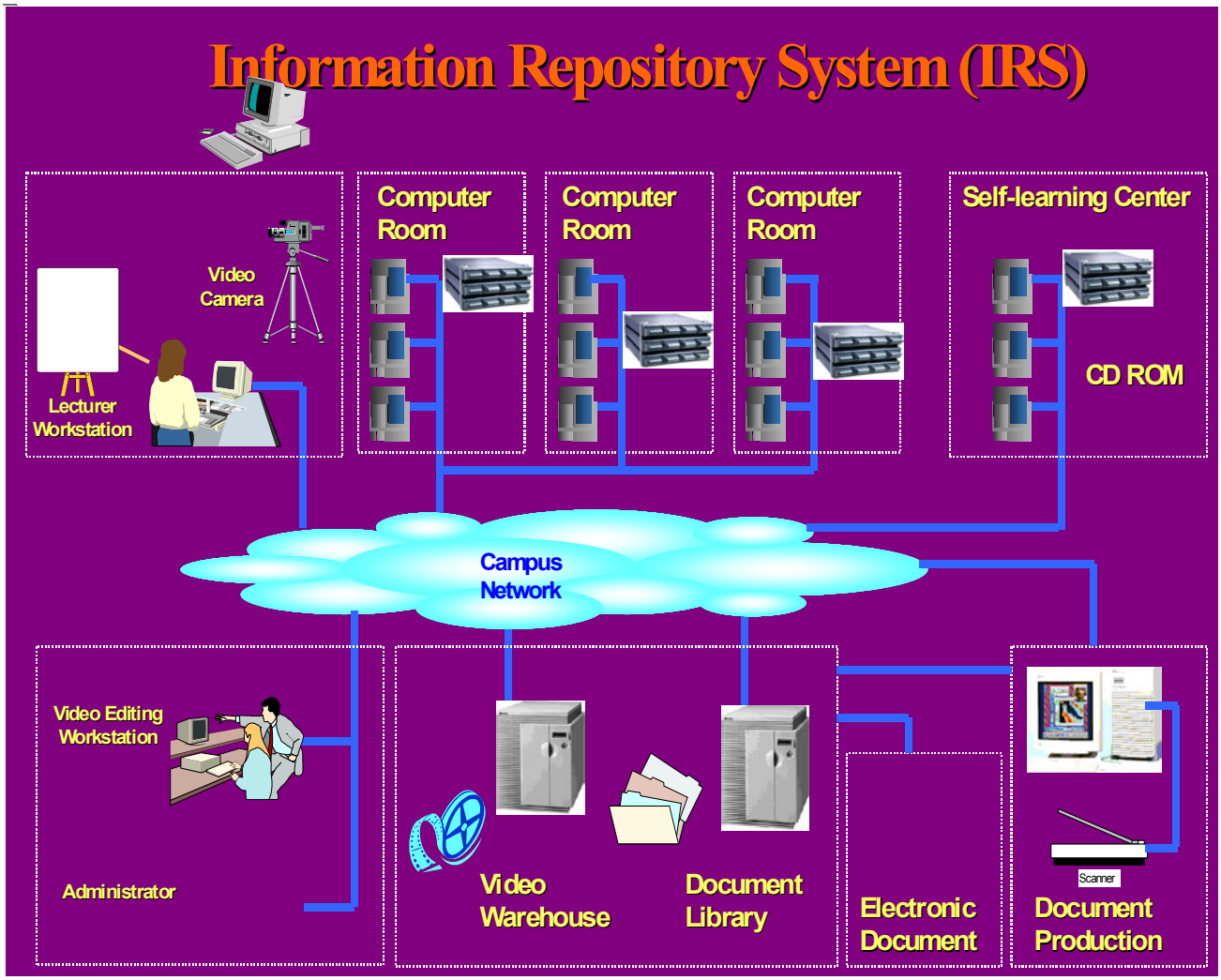

Figure 1. Engineering Computer Center at Chulalongkorn University

Studying the Value of NAS

A thorough evaluation of the ECC revealed the need for an extension of the current network infrastructure and the use of more efficient network management tools. These IT investments would be crucial in supporting the implementation of distance learning. The faculty planned to offer more than 100 subjects on the network as web-based courses. Over 4,500 students would require access to these courses, in addition to supplemental course files supplied by professors, on the network. With the massive amounts of data that would need to be stored and accessed, network storage would be a critical component of the new IT infrastructure. After reviewing different storage options against their pre-determined criteria of cost, reliability, security, and performance, the

faculty selected the POPnetserver 2000 network-attached storage (NAS) device from FIA Storage Systems.

The low investment cost of the POPnetserver, relative to the ECC's requirements, made it an attractive option. The faculty determined that a minimum of 300-500 MB of network storage needed to be allocated for each student. With over 4,500 students to support, this would require the implementation of close to 100 NAS systems. Servers were priced at two to three times the cost of the POPnetserver, meaning that purchasing enough servers to provide capacity comparable to the NAS systems would have been a very expensive proposition. Actual operating costs were another major consideration. The simplicity of the NAS system translated into the conservation of IT resources overall. No expert network engineer or IT professional was required to install or maintain the system. Each system could be set up and configured by a person of any skill level in less than 15 minutes using POPassist software, the POPnetserver's Windows-based user interface. With web management capabilities, users could also manage storage resources remotely over the Internet.

Reliability was also an important consideration. Any downtime or system failures would not only disrupt the network, but the students' educational experience as well. The POPnetserver offered redundancy features that were important to the university, such as multiple RAID options that included: RAID 5 (distributes data and parity across all drives and can tolerate the loss of one drive); RAID 0 (one large virtual drive with data striped across all physical drives); or RAID 1, (the second set of drives duplicates the first set for maximum data protection). Additionally, the POPnetserver offered a built-in sequential multi-kernel boot technique. Should the primary boot sector fail, this technique would allow the POPnetserver to boot from any drive within the system.

Reliability and security were also enhanced by the POPnetserver's storage management software utilities, including backup/restore and data replication. POP DataReplicator software provides the ECC with secure, automated backup and restoration of course files to any POPnetserver system within the network. The software resides on each PC and provides continuous backup of any combination of files and folders in real time. The utility's synchronous replication, which requires that data be written to the client PC before the write operation completes on the NAS device, ensures the highest level of data currency at any given time.

Lastly, the performance of the NAS system was a key deciding factor. With thousands of students requesting course files simultaneously, the speed at which data is

delivered is crucial. The POPnetserver is completely dedicated to storage and provides continuous data availability to all users. By virtue of relocating storage onto its own independent platform, the system also reduces the burden on application servers so applications can be processed more quickly and efficiently.

Going the Distance

Distance learning presents an interesting challenge, as well as enormous potential benefits, to educational institutions worldwide. It is part of Chulalongkorn's vision to be at the forefront of this transition. Universities that have the required network infrastructure in place will be much better equipped to meet the technology demands presented by distance learning. By effectively meeting Chulalongkorn University's selection criteria, the POPnetserver NAS system should serve as a sound technology investment, contributing to an enriched academic environment for all students.

About the Author

Vic Sangveraphunsiri is vice president of engineering for FIA Storage Systems, where he is responsible for directing product line strategy and development. He has a distinguished 24-year background in the computer electronics and networking industry that includes management positions with Advanced Logic Research, Inc. (ALR), Gateway and Texas Instruments. Mr. Sangveraphunsiri currently holds four patents for storage and processor system technology, and has one patent pending for fibre storage technology. He graduated from the University of Louisville, Kentucky, with a Bachelor's degree in Electrical Engineering, and also holds a Master's degree in Electrical and Electronic Engineering from the University of Cincinnati, Ohio.