



UNIVERSITY OF PITTSBURGH MAXIMIZES ITS INFORMATION

2005 COMPUTERWORLD HONORS CASE STUDY

EDUCATION & ACADEMIA

AN INNOVATIVE NEW INFORMATION LIFECYCLE MANAGEMENT PROJECT PROVIDES INCREASED ACCESS, HEIGHTENED PROTECTION AND BUSINESS CONTINUITY FOR STUDENT RECORDS AND ENTERPRISE ACADEMIC COMPUTER SYSTEMS FOR A METROPOLITAN MAIN CAMPUS AND FOUR REGIONAL CAMPUSES ACROSS THE STATE.. [20055367]

A Search for New Horizons



SUMMARY

The University of Pittsburgh has implemented a state-of-the-art EMC storage solution to bring its information lifecycle management (ILM) strategy to life. Serving the University's main campus in Pittsburgh and four regional campuses located across western Pennsylvania, Phase 1 of the ILM implementation provides increased access, heightened protection and business continuity for the University's student records and enterprise academic computer systems.

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APPLICATION

The University of Pittsburgh's Computing Services and Systems Development (CSSD) division has revamped an outdated mainframe environment and implemented a level of processing power and storage capabilities that are more often seen on Wall Street than in academic settings. Thanks to a pair of new storage area networks (SANs) and leading-edge storage management and business continuity software, the University's network operations and data center now delivers increased reliability and redundancy, improved network support and a greater level of integration and compatibility across the campus computing environment. Designed to enhance business continuity and provide the foundation for a broad information lifecycle management (ILM) strategy, the new infrastructure is located at a site several miles removed from the main campus. In the most fundamental sense, the new storage capabilities help guarantee the continuous, 24x7 access demanded in today's educational environment, which must not only support the student population (21,000 in Pittsburgh – 32,000 overall) and some 12,000 University faculty and staff, but also deliver IT capabilities for distance learning and international programs. The new infrastructure supports a variety of applications, including:

- Student Information System (SIS) – a PeopleSoft application that delivers easy access to student records and other information, while meeting the privacy and security requirements of the Gramm-Leach-Bliley Act and other federal regulations such as the Family Educational Rights and Privacy Act of 1974 (FERPA). The new SIS replaces an antiquated legacy mainframe system that was highly customized and no longer provided the level of service required by the University.
- Blackboard – an online classroom management system, used to support traditional classroom teaching and learning, as well as some distance education initiatives. There are currently nearly 17,000 students enrolled in approximately 1,800 course sections within the Blackboard system. This is roughly half of the University's student population and number of courses. The new SAN infrastructure replaces server-based direct-attached storage that previously supported Blackboard.
- Internet Message Access Protocol (IMAP) – currently being upgraded, the IMAP system serves as the University's central email and message management environment.

The new storage solution was brought online in September 2004 to meet the demands of the annual fall influx of students into the University.

BENEFITS

The University's students, as well as teaching, research, administrative and IT staffs, all benefit from the new storage area networks. The SANs make it possible to centralize and streamline storage operations, reduce down time and enable 24x7 access to student, administrative and course information, while satisfying stringent security and privacy requirements. Historically, the University has purchased dedicated direct-attached storage devices along with server hardware as each project was implemented. But, in approaching the initial phase of an ILM strategy,

CSSD decided to take a different approach – implementation of dual SANs. This allowed the project team to provision more than 15 terabytes of disk space on an extremely aggressive two-month timetable, providing a stable and scalable storage environment with substantial savings over traditional storage solutions.

The cost savings are substantial because, although disk space itself has become relatively inexpensive, the cost of managing discrete disk storage for several hundred file servers is high in terms of both effort expended and hardware over time. Since storage in the new infrastructure resides on a few SAN arrays, separate from the application server infrastructure, SAN-based storage devices require less overall administration when compared with local storage. In fact, CSSD reduced storage administrative time by 30 percent, making IT staff hours available for other tasks – such as network operations center (NOC) work activity, development of new systems, etc.

The SAN approach also enables the Network Operation Center's server and application engineers to allocate storage based on changing demands of applications, yielding higher disk utilization rates, and avoiding the purchase of additional storage for individual servers. For example, 100GB of storage may be dedicated to a given server, but the application that runs on that server may only utilize 60GB. The remaining 40GB of storage is wasted because it cannot be allocated to another application. In a second example, an application that doubles its storage needs every year forces the University to keep adding storage, even though there is unused disk space on another server, which is dedicated to a different application.

A SAN solves both of these problems because unused disk space can be reallocated automatically from one application that does not need as much to another that does. And, allocation can be done dynamically, "on the fly," without shutting down servers or needing to physically move storage devices from server to server.

At the University of Pittsburgh, SAN technology and storage management and business continuity software provided the following benefits:

- More efficient storage utilization,
- Ability to dynamically add needed capacity to designated applications,
- Web-based storage administration,
- Redundant storage infrastructure enabling data high availability,
- Eliminated the need for cumbersome and expensive triple mirroring,
- Reduced the time required to test and deploy new software modules by providing the ability to quickly and easily replicate databases from production to test, training, development, and demo environments, and
- Simplified database refreshes.

The SANs are a fundamental first step toward the University's planned disaster recovery needs, as well as a broad ILM strategy, to be implemented over the coming years.

IMPORTANCE

Two state-of-the-art EMC CLARiON® SANs are at the heart of the University's ability to provide a 24x7 online environment. One SAN supports the SIS application alone, eliminating the need to set-up and maintain multiple direct-attached data stores for the PeopleSoft system. The University segregated student administrative information in a clustered database environment on its own SAN in part to meet the various regulatory requirements, and also because it made good business sense to do so given the high volume of student records that must be maintained for round-the-clock access.

The second SAN supports Blackboard, IMAP, Port Authentication and other general-purpose applications. The EMC storage arrays include both fiber channel and ATA disks. Both SANs use EMC Navisphere Manager software for storage management, and EMC SnapView software for creating business continuity volumes for system backup and recovery. This backup capability will be extended in the next phase of the implementation to convert the remote computer facility into a formal disaster recovery site.

The University's success with EMC SAN technology has led to the decision to continue to deploy these technologies as other existing systems are upgraded and replaced and as

new systems and services are developed. The result, over the next few years, will be the implementation of a leading-edge information lifecycle management strategy across the University.

ORIGINALITY

By deploying a leading-edge storage infrastructure to support its NOC and data center, the University of Pittsburgh can now deliver IT capabilities at some of the highest levels found in today's educational environments. In fact, the dual SANs are more like the kind of solution typically found on Wall Street or at an Internet service provider than on a university campus. And use of the SANs and accompanying storage management applications as the basis of a University-wide ILM capability reveals an encompassing vision of where the University sees education – and the role of IT in education – evolving in the future.

SUCCESS

The University of Pittsburgh's new storage infrastructure allows CSSD to achieve the goal of anytime, anywhere, always available access to systems and services. This is a crucial accomplishment, especially in light of distance learning, online coursework and the growing importance of email and other electronic messaging. It's no exaggeration to say that the University's teaching and research happen every day, 12 months a year, and these activities run around the clock. The integration of SAN technology into CSSD's overall strategy for its network operations center ensures the delivery of high service levels and functionality that enable the University to fully apply the benefits of IT for teaching, learning, research and business.

Unlike a corporate environment, in which ROI studies can be commissioned to map revenues to IT enhancements, in an academic setting, it is the delivery of stable, reliable, and high performance IT services that is the true measure of success. The old adage that, Nobody notices if it's not broken, applies here – students, administrators, instructors and researchers all expect immediate access to systems and information, with high performance and minimal down time. Thanks to the new infrastructure, that's exactly what CSSD can deliver.

DIFFICULTY

Two major difficulties faced CSSD in integrating the SAN solution: a highly compressed timeframe and a steep learning curve.

The SANs needed to be implemented on a very aggressive two-month timeframe in order to have the development and testing environments available in time to meet the project schedule. Most of the University's projects run on an August implementation timeframe – regardless of when the projects begin – in order to be fully operational for the fall influx of students. In the case of the student administrative information system, CSSD and its vendors pushed to meet specific target dates for implementation of the various modules of the PeopleSoft system. The admissions and the course catalog modules went live in August 2004, the financial aid module went live in January 2005, and additional components are being rolled out each month until August 2005 when the entire system is due to be live.

The learning curve was also very challenging for a CSSD team used to dealing with direct-attached storage. CSSD's partnership with EMC proved to be invaluable in ensuring that the systems were set up and configured correctly and on time, and also in ensuring that high levels of knowledge transfer and training were delivered quickly, to help CSSD realize the greatest benefits of implementing SAN technology. As a result, even though the University's NOC began operations only a few months before the SAN systems were installed, the integration of the new storage technology with the NOC was seamless and entirely transparent to the University community.