Case Study Forum

University of Phoenix Increases Storage for Online Classes, Lays Groundwork for Growth, and Improves Disaster Tolerance with Hewlett-Packard StorageWorks EVA

IN BRIEF

- **Goal:** For University of Phoenix to keep up with storage capacity requirements of its fast-growing online courses, while providing excellent input/output, and managing growth of its IT staff.
- **Solution:** Easily managed virtualized storage capacity and scalability, with dramatically enhanced performance utilizing the Hewlett-Packard StorageWorks Enterprise Virtual Array (EVA5000)
- **Results:** The university can continue growing and adding new online classes without performance degradation. It has an improved ability to recover from disasters, and to handle drastically increasing storage requirements without adding to staff.

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University of Phoenix is one of the fastest-growing universities in the country, experiencing increasing growth in online classes each year. With growth comes the need to quickly add and maintain the storage necessary to run new courses. To address this situation, the university chose a solution based on the HP StorageWorks Enterprise Virtual Array 5000 (EVA5000) because it offered flexible, scalable storage that allows for instant upgrades and quick disaster recovery, will grow as quickly as the university requires, and can be managed without adding to IT staff.

Note: This case study was authored by the Case Study Forum. The Case Study Forum is dedicated to writing and publishing case studies for the IT community.

Benefits

Objective	Benefits Achieved
To keep up with the storage capacity and performance required by the growth of University of Phoenix's online classes	University of Phoenix has been able to easily keep up with storage capacity needs, despite increasing growth in storage requirements.
Provide scalable storage with no downtime	University of Phoenix can add terabytes of storage on the fly, while still using its databases and running online classes, with no downtime, and no performance degradation.
Improve disaster tolerance	The HP StorageWorks EVA5000 has built-in redundancies which allows for instances in which University of Phoenix can lose multiple subsystems without losing data or disrupting online classes. It also will allow the university to recover much more quickly in the event of a disaster.
Offer dependable storage	The EVA5000s have not gone down a single time since University of Phoenix purchased them.
Manage increasing amounts of storage without adding to IT staff	The manageability of the Hewlett-Packard EVA5000 allows University of Phoenix to continue to add and maintain large amounts of storage, without adding IT staff.

About the University of Phoenix

University of Phoenix, which has served working adults for more than a quarter of a century, has made its mission to remove barriers to education for busy adults by providing accessible scheduling and rigorous degree programs centered on professional goals. The university is the largest private accredited university in North America. As of February 28, 2005, 283,844 students attend Apollo Group, Inc. institutions, and of those, 143,846 attend through Apollo's Online Campuses. (The Apollo Group owns the University of Phoenix.) The university's focus on small interactive classes, highly personalized teaching and comprehensive academic accountability systems has won praise and recognition by noteworthy academic and business leaders. The university is accredited by The Higher Learning Commission and is a member of the North Central Association.

The Challenge: Meet Drastically Increasing Storage Requirements without Adding IT Staff

University of Phoenix is the nation's largest regionally accredited university, due in large part to the astonishing growth of its high-quality delivery of online learning. The number of students taking classes online is continuing to grow.

Class enrollment is growing at a pace so that the university has had to add, on average, two new servers every other week to be able to continue to meet the demand for online learning.

The growth in storage has been similarly dramatic. The university was using Direct Attached Storage (DAS), which was inadequate for its needs. DAS has several limitations that made it unsuitable for the mass storage that the university needed, and for the growth it was experiencing.

University of Phoenix was looking for a solution that did not have limitations on the size of storage and databases, that could be easily managed, that would perform at high speeds so that students would not experience classroom slowdowns, and that would include reliable disaster recovery (DR). It also wanted a solution that would allow the university to continue on its growth path, without adding staff for managing the additional storage.

Additionally, the university wanted a more stable and recoverable environment in the eventuality of a disaster. And it was looking for a more available, agile environment that could adapt more quickly to the changing requirements of the faculty, staff, students, and business as a whole.

What University of Phoenix Wanted in a Storage Solution

University of Phoenix was looking for a storage solution that would have the following capabilities:

- **High performance.** It wanted a storage solution that would be able to keep up with the demands of delivering large amounts of data simultaneously to multiple users at very high speeds.
- **Scalability.** The storage solution had to be able to be easily scalable. It also had to be able to handle large amounts of data, and be able to add storage without any limitations, on an as-needed basis.
- **Manageability.** The storage had to be easily managed.
- **Disaster tolerance.** If one or more subsystems went down, the university wanted to still be able to hold its online classes, without any noticeable or adverse effect on performance. It also wanted to be able to recover quickly if a disaster did occur.
- **Dependability.** The success of the university depends on its ability to deliver a high-value online educational experience, at whatever time students want to learn. The university was looking for a storage solution that would be extremely reliable.

"We were looking for a storage solution that would allow us to grow as quickly as needed, deliver the best educational experience for our students, and allow us to manage it without adding to our IT staff."
MARK HILBURN
SENIOR STORAGE ENGINEER
APOLLO GROUP
UNIVERSITY OF PHOENIX

Additionally, the university was looking for a solution that would allow it to continue to add to its storage for its online classes, but not require additional staff to install or maintain the storage.

University of Phoenix Chooses the HP StorageWorks EVA5000

University of Phoenix tested storage solutions from several vendors against one another. The Hewlett-Packard StorageWorks EVA5000 outperformed the competition in several key areas, including input/output speed, and the ability to perform real-time, off-site DR. Additionally, the university found the solution far easier to manage than the competition.

Implementation went smoothly, and was assisted by Hewlett-Packard engineers who helped configure and deploy the solution. Including initial testing time, it took approximately 90 days for the EVA-based solution to be installed, tested, optimized, and deployed. The university had planned to load 18 servers on each EVA5000. But it found that because of the EVAs' high performance, it was able to

load 30 servers onto an EVA, cutting down on the number of disk subsystems it requires to power its online classes.

"Hewlett-Packard brought in multiple engineers to help with deployment, and they did everything we asked for and more. They helped us optimize the system and solved issues as we came across them. They were an invaluable help in the deployment."
MARK HILBURN
SENIOR STORAGE ENGINEER
APOLLO GROUP
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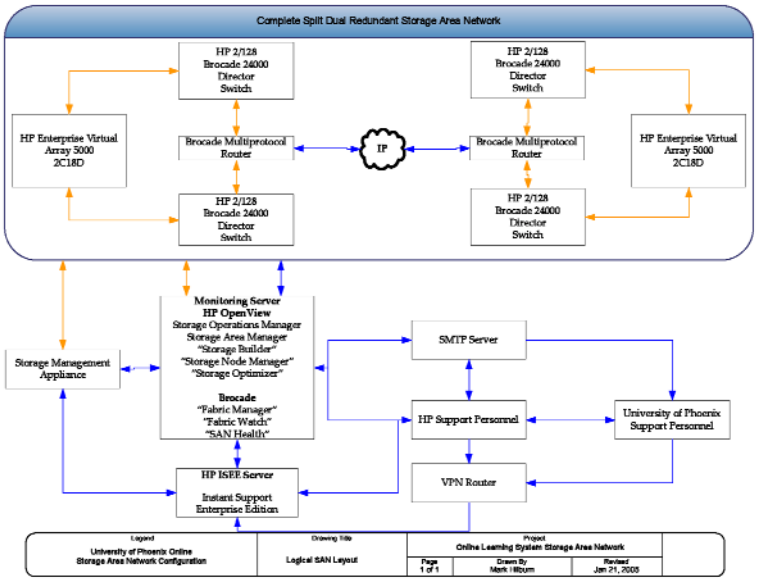
The University of Phoenix chose a Hewlett-Packard EVA5000-based solution because it outperformed the competition in several key areas, including input/output speed, and the ability to perform real-time, off-site DR. Additionally, the university found the solution is far easier to manage than the competition.

The university purchased one EVA5000. But it has quickly added more storage to keep up with the soaring demand for its classes, and now has five EVA5000 storage systems, each of which has more than 16 terabytes of usable storage.

An Inside Look at the Hewlett-Packard Solution



The Hewlett-Packard StorageWorks Enterprise Virtual Array (EVA5000) solution, as deployed at the University of Phoenix.

The Bottom Line for the University of Phoenix

"The EVA5000 offers what we need: affordable, easily scalable storage; excellent manageability; dependability; disaster tolerance; and high performance."
MARK HILBURN
SENIOR STORAGE ENGINEER
APOLLO GROUP
UNIVERSITY OF PHOENIX

A detailed analysis of the implementation shows that University of Phoenix will gain substantial benefits from the project, including the ability to handle growth without adding to IT staff, and improved disaster recovery.

Before the HP solution, it would have taken a substantial amount of time for the university to rebuild its DAS-style storage in the event of a disaster. With the EVAs, recover can be accomplished in two days.

The benefits are far reaching, including IT staff savings. The university will be able to add and manage increasing amounts of storage without adding to its IT staff.

Because the EVAs can provide higher I/O with redundancy, the university has been able to purchase fewer servers. Due to the ease and efficiency of DR with the EVA5000-based storage solution, DR effectiveness has been increased. And because the EVA5000 allows for greater availability, internal user productivity has increased.

Since the EVA5000 systems have been installed, they have not yet gone down. They are so simple to manage and maintain that no staff has been added to handle the increased amounts of storage. Storage can be added on the fly, without having to take databases offline, or disrupt online classes.

"We've found Hewlett-Packard EVAs to be a very dependable and manageable storage system that provides excellent IO. It offers University of Phoenix manageable growth."

MARK HILBURN
SENIOR STORAGE ENGINEER
APOLLO GROUP
UNIVERSITY OF PHOENIX

University of Phoenix Looks to the Future

The Hewlett-Packard StorageWorks EVA5000-based solution allows University of Phoenix to scale its storage to meet the demands of any number of students who want to enroll in online classes. It will be able to continue to grow without having to add to IT staff to manage its storage.