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Success Story

Liberty University Protects Mission-Critical Data with NetApp MetroCluster Solution



LIBERTY
UNIVERSITY.

KEY HIGHLIGHTS

Industry
Education

The challenge

Deliver high availability for all systems and applications, eliminate downtime, and lower costs.

The solution

Consolidate on NetApp® unified storage systems with MetroCluster to protect business-critical data and deduplication to increase storage utilization.

Benefits

- Eliminated unplanned downtime; downtime for upgrades now minutes instead of days
- Delivered over \$300,000 in disk cost savings within the first year
- Realized up to 75% reduction in data with deduplication
- Reduced backup window from 12 hours to 2 hours

CUSTOMER PROFILE

Founded in 1971 and located in Lynchburg, Virginia, on a 5,000-acre campus called Liberty Mountain, Liberty University has grown over the past 5 years from a small Christian college with 4,000 students to a formidable university that today educates nearly 12,000 on-campus students and 36,000 online students. In fact, Liberty is ranked as the third largest online education provider in the United States and offers 36 degree programs. The university's goal is to reach a total enrollment of 62,000 students this year.

THE CHALLENGE

In addition to increases in enrollment and expansion of the online curriculum, Liberty's storage system was burdened by the growing number of e-mail accounts it supported. The university provides e-mail services to both matriculated students and alumni and currently supports more than 100,000 active mailboxes.

Maintaining and protecting its business-critical applications—including several SunGard® Banner® enterprise resource planning (ERP) implementations that use Oracle®, and Microsoft® SQL Server® and Microsoft Exchange Server environments—are another important part of the equation.

Like many universities with limited money and IT resources, Liberty is challenged by the need to keep pace with the growth in storage requirements while maintaining high availability for its applications.

The storage solution Liberty implemented in August 2006 was fully utilized in terms of memory and the number of disks it would support. Neither of the options available using the existing platform—a forklift upgrade to a larger, monolithic storage array or additional systems that would ultimately need to be managed separately—was viable for Liberty.

"The management was getting to be too much for us to handle," says Nick Kesler, Information Systems technical lead at Liberty. "We were required to manage each storage system independently without the ease of a GUI management console. Policies had to be created and managed on an individual basis, and there were no unified upgrade or release options. And, at the time, storage wasn't virtualized across the arrays."

In addition, the existing platform only supported the Fibre Channel (FC) transport protocol and not the CIFS, NFS, and iSCSI protocols Kesler and his team wanted for the university's applications. Further, scalability

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Nick Kesler

Information Systems Technical Lead, Liberty University

was limited and thereby impeded Liberty’s ability to roll out new programs to support either its distance learning curriculum or its steadily growing Exchange implementation.

Excessive downtime also put Liberty’s operations at risk. The company backed up its data to tape using Symantec™ NetBackup™ and Oracle Recovery Manager (RMAN). Backups could take up to 12 hours and often caused unnecessary downtime and increased performance overhead.

“We had lots and lots of restores from tape,” says Connie Allison, director of Information Services Operations at Liberty. “We were very close to needing a full-time person just to manage the backups and restores.”

Upgrading the university’s storage solution was troublesome, too. “Upgrades were disastrous,” says Kesler. “We would engage the vendor for upgrades, and it would send engineers on site. Virtually every time we’d have a massive problem involving hours if not days of downtime on our storage system. At one point we had an engineer who didn’t leave our data center for 36 hours except to eat or use the facilities.”

THE SOLUTION

Highly resilient storage architecture

In the spring of 2008, Liberty deployed 2 storage clusters comprised of NetApp FAS3070 and NetApp FAS3040 unified storage systems with as many as 200 physical and 120 to 150 virtual servers attached. The FAS3070 cluster houses the university’s growing VMware® virtual machine environment, the Microsoft Office SharePoint® Server (MOSS) file shares and SQL database, the SunGard Banner ERP programs and associated Oracle Databases, and its Blackboard Learning System.

The Exchange data lives on the FAS3040s that connect by FC to the servers hosted on multiple active-passive x86-based clusters. SQL and streaming media use iSCSI to attach to the network; the Oracle implementation, Blackboard application, and VMware environment use NFS, and user and staff file shares are done over CIFS.

Deduplication drops disk requirements

NetApp deduplication technology is a fundamental component of the core operating architecture, Data ONTAP®, and provides the ability to eliminate duplicate data with nominal impact on data center operations.

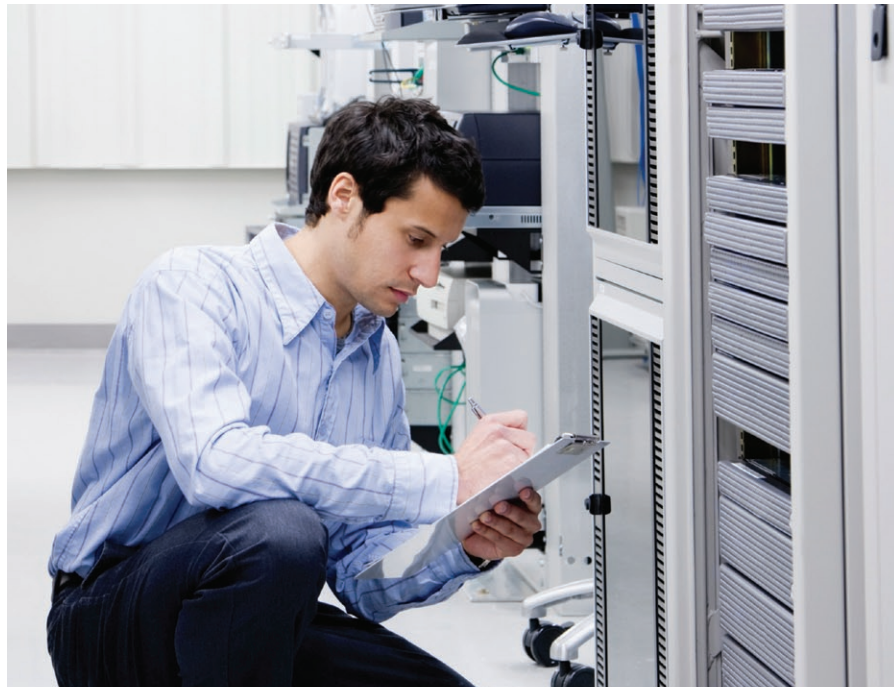
Liberty has applied deduplication to its primary storage data as well as to its VMware environment to reduce the incidence of multiple virtual image clones. The end result is a significant reduction in the need for disk capacity.

Complete data protection

Liberty has adopted a cohesive strategy for data protection that combines NetApp Snapshot™ technology, the NetApp MetroCluster solution, and Oracle Automatic Storage Manager (ASM).

“With almost 12TB of data in file shares, we were getting a lot of restore requests from users,” says Kesler. “People would accidentally delete files, modify them, and then need them back in their original state. We’ve exposed the Snapshot folder to the end users so they can recover files on their own.”

Disk shelves on the FAS3070s and FAS3040s are divided equally between the main campus data center and a location a mile away. The two sites are linked by a fiber network and NetApp MetroCluster. The MetroCluster solution provides continuous data availability by replicating data synchronously, so there is no loss of data at either location. It also provides automatic failover



in the event of a component failure or major site disaster. The combination of failover and data replication allows Liberty to recover in minutes rather than hours or days.

In the past, Kesler and his team had no alternative but to perform backups on the primary system. “Since we’ve moved the backup over and we’ve been able to do it from the less busy node, it’s decreased our backup time from 12 hours to less than 2 hours,” says Kesler. “And, because of the architecture of the ASM in Oracle Real Application Clusters, we’re still able to utilize both sides of MetroCluster for disaster recovery and high availability.”

The team had also been doing host-based backups of the Exchange servers, but now the backups are made directly from the NetApp controllers. Snapshot copies of the data are created nightly, and once a week the changed data is dumped off to tape.

To supplement data protection for its messaging environment, Kesler’s team uses NetApp Single Mailbox Recovery software. “We use Single Mailbox Recovery primarily for high-profile mailboxes—those of C-class executives and VIPs—to get back an individual e-mail or to do that type of granular restore,” says Kesler.

And for enhanced manageability of SQL, MOSS, and Exchange, SnapManager® technology automates backups without affecting performance and offers database restoration in seconds.

BUSINESS BENEFITS

More functionality, lower costs

Liberty has also adopted NetApp FlexClone® technology to create clones of Oracle Databases for test and development. Clones are built from Snapshot copies in less than three minutes. The university is now able to make nonproduction instances of its Banner ERP database and other applications available for testing and training purposes.

In addition, Liberty uses NetApp FlexVol® capability to resize volumes of data for applications that need more or less storage. In the previous environment, “That was virtually impossible to do,” says Kesler. “Making storage available or expanding existing storage to accommodate further need was very, very difficult. NetApp’s ability to grow volumes dynamically has saved many hours of work and headache.”

Liberty is also benefiting from NetApp’s built-in deduplication technology. For deduplication of primary storage data,

the university has seen as much as 50% improvement in data reduction; in VMware environments where similar clones of virtual images can be deduplicated to unique data, the university is realizing a 75% reduction.

“We took our storage and then took the percentage of disk saved times the cost per disk and extrapolated to come up with our deduplication savings,” says Allison. “By reducing our need for disk capacity, NetApp’s deduplication technology saved us over \$300,000 in the first year alone.”

Streamlined upgrades, automated support

Liberty recently completed its first Data ONTAP operating system upgrade. Compared to the university’s previous solution, Kesler says, “It’s so much better. There’s probably not a word to describe how much better it is for upgrading.

“With NetApp MetroCluster software,” continues Kesler, “we’ve completed several controlled failovers for maintenance and upgrade purposes. Those failovers caused only 30 seconds of disruption. We’ve reduced planned downtime from days to minutes with NetApp.”

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Connie Allison

Director of Information Services Operations, Liberty University

Other maintenance issues are also easier to resolve with NetApp. “With our former solution you would have to notice that a disk failed by walking through the data center or by manually checking the management interface,” says Kesler. “With NetApp’s AutoSupport option, we receive e-mail notifications, and the new parts arrive almost immediately.”

SOLUTION COMPONENTS

NetApp products

NetApp FAS3070s

NetApp FAS3040s

Data ONTAP

Snapshot and deduplication technologies

MetroCluster software

FlexClone and FlexVol software

SnapManager for Microsoft Exchange Server

SnapManager for Microsoft Office SharePoint Server

SnapManager for Microsoft SQL Server

Single Mailbox Recovery for Microsoft Exchange

NetApp Global Services

Design and Implementation Services

SupportEdge Premium

Protocols

SAN: FC, iSCSI

NAS: CIFS, NFS

Third-party products

Oracle Database 11g™

Microsoft Exchange Server 2007

Microsoft Office SharePoint Server 2007

Microsoft SQL Server 2005

VMware, VMware ESX Server 3.5

Environment

VMware Enterprise

Applications: Microsoft Exchange Server 2007, Microsoft Office SharePoint Server 2007

Databases: Microsoft SQL Server 2005, Oracle Database 11g

Server platform: Windows®

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