



LIBERTY UNIVERSITY

LIBERTY UNIVERSITY CUTS MAINTENANCE TIME BY 65%

FAST FACTS

Industry:	Academic
Challenge:	Increasing manageability of Web servers and storage
Solution:	Red Hat Enterprise Linux 4, Red Hat Global File System
Benefits:	Reduced complexity and increased consistency across the web server cluster. Consolidated storage configuration.

The Liberty University IT Development and Engineering Department is responsible for serving the technology needs of Liberty's constantly growing community by providing services to its faculty and staff, as well as both residential and distance learning students.

"We are a project-based organisation with project managers, application developers, systems developers, network engineers and testers. We fulfill every information system need of the University, including the Web site, the academic system, the administrative system and the core network infrastructure," said Jonathan Minter, director of IT Development and Engineering, Liberty University.

THE CHALLENGE: INCREASING MANAGEABILITY OF THE WEB ENVIRONMENT

The Web server cluster is a critical system hosting the University's online marketing as well as services for students, such as online admissions applications, online student bill payment, community announcements, and a single sign-on portal to all Web applications. The Web server cluster also hosts several Web sites for organisations affiliated with the University, including two campus radio stations.

To improve operational efficiency, Liberty University was looking to create a scalable Storage Area Network (SAN) environment while increasing the manageability of their Web server environment.

"The Web server cluster was becoming increasingly more difficult to manage," said Seth Sites, director of Liberty University's Network Operations Center. "Troubleshooting replication problems took many man-hours, especially when they involved configuration or file permissions." Replication also created a flood of network activity, which slowed down servers and further exacerbated the problem by increasing time needed for replication. Additionally, some settings could not be replicated reliably, as they were stored in the registry. As a result, many configuration changes had to be made manually across all the servers, adding exponentially to overall management time.



"We were spending 15 hours a week managing the environment. The complexity and risk for error was a constant issue. The lack of disk space on the Web servers prohibited us from deploying new applications," Sites said.

Liberty University also faced the need for multiple hosts reading and writing from the same Logical Unit Number (LUN) on the SAN.

"Several applications allow users to upload files, so we needed to have multiple Web servers share the same files and configuration," Minter explained.

THE SOLUTION

The IT leaders at the University knew for some time that they wanted to make the switch to Linux. Ultimately, the need for a cluster file system for the SAN led the IT team to select Red Hat Global File System (GFS) and Red Hat Enterprise Linux.

The University's new environment consists of four Dell PowerEdge servers running Red Hat Enterprise Linux, Apache, ColdFusion MX 7 and EMC CX700.

Minter explained, "The SAN is mounted using Red Hat GFS from each of the servers for concurrent access. The benefits generally come from three sources: using Red Hat GFS to simplify replication management; migrating to Red Hat Enterprise Linux; and upgrading to the latest version of ColdFusion."

With the exception of Anderson Silva, the system tester for the project, Linux and open source was a new concept to the team. "I've been using open source software since 1997. Over time it has become my main tool for scripting because it's flexible and fast. I let the results speak for themselves," said Silva.

Despite their lack of experience with Linux at the beginning of the project, the team found it easy to develop their open source skills. "I learned some basics from Liberty University's 'Introduction to Unix' course and I noticed that, the more I used and understood Linux, the more I liked it and the easier it was, stated systems engineer Bret Unbehagen. "I took Red Hat training courses and just recently became a Red Hat Certified Technician (RHCT). In particular, I learned many things in the RH133 course that I had not previously encountered and it helped me to use Linux more efficiently," added Unbehagen.

The IT team committed itself to rigorous testing and planning for the new deployment. Critical steps in the migration included movement of authentication from Microsoft's Active Directory to Cold Fusion's LDAP connectivity, and the creation of a conversion script for file names and permissions.

"The conversion script was broken down into 40 independent steps -some of which were redundant, but we were determined to make sure it was thorough. Once we had the environment configured, we used the Jakarta Jmeter to perform performance testing on the nodes," Silva explained.

"The Red Hat Professional Services consultant was extremely knowledgeable and his explanations were excellent. His experience was invaluable to us in transferring general best practices and helping us get over some hurdles we were facing," stated Minter. "Justin made a big impact on the project. He showed me better methods of creating the kick-start script. He also showed me how to create a GFS cluster, and then allowed me to recreate the same cluster. Because of his support and teaching attitude, he was able to complete his tasks ahead of schedule," added Unbehagen.



For security, the team used the Linux and Apache security benchmarks and a scoring tool from the Center for Internet Security (www.cisecurity.org) to harden the servers.

The IT group designed the production environment and used Red Hat Professional Services to validate the design and assist with determining the correct configuration. As a result, the University had a working file system in their test lab up within one day.

BENEFITS

Red Hat Global File System has allowed Liberty University to increase the manageability of its SAN environment, reducing complexity and ensuring consistency across the Web cluster. For Minter and Sites, the biggest benefit was the time they've saved maintaining the environment. "We've been able to trim management time significantly, reducing it to a few hours a week," stated Sites. Along with increased manageability, Red Hat Global File System has also increased cost savings. "We've been able to eliminate and consolidate storage, saving the University money and providing more scalability for the storage in one centralised location," added Sites.

"We have also developed an automated deployment system to move releases from one environment to another," added Minter. "The servers all act exactly the same way now, with no inconsistency of files or configurations. Theoretically, we have the same scalability as before but now, we can get a new Web server up and running, literally within one hour."



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