



Liberty University

Liberty University boosts uptime for fast-growing Microsoft Exchange infrastructure with EMC solution

SOLUTION SNAPSHOT

- EMC Software:** EMC NetWorker, EmailXtender, SAN Copy, DiskXtender®, ApplicationXtender®, MirrorView™, SnapView™, VisualSRM™, and PowerPath®
- Primary Applications:** Microsoft Exchange 2003 messaging, Blackboard content management and collaboration, and SunGard Banner administration, finance, and human resources
- Storage Infrastructure:** 30 terabytes of EMC CLARiiON Fibre Channel and ATA storage; 8 terabytes of EMC Centera content-addressed storage
- Processing Environment:** Dell and IBM servers running Microsoft Windows

BUSINESS VALUE HIGHLIGHTS

Profile: Liberty University is a Christian academic community in the tradition of evangelical institutions of higher education. Liberty has more than 23,000 students in its Lynchburg, Virginia-based campus and worldwide distance learning programs.

Challenge: With a hodge-podge Exchange environment, Liberty was suffering from unacceptable levels of downtime and needed a new Exchange infrastructure that could support higher availability and scalability, while reducing administrative overhead.

Business value: With a redundant EMC SAN and EMC software, Liberty has been able to:

- Reduce annual downtime of its Exchange environment from six days to three minutes;
- Restore an entire 40-gigabyte Exchange store in 17 minutes, compared to two-to-three hours in the former environment;
- Decrease Exchange production storage requirements through active archiving, facilitating faster backups and improved application performance; and
- Smoothly and reliably increase the size of the Exchange environment to support a 20 percent annual growth in student population.

The education experience on today's university campus has evolved well beyond the classroom and lecture hall. It has stretched out into the virtual world of the Internet through Web-based distance learning and interactive communications. E-mail, instant messaging, and online community spaces provide social interaction, while also opening the door to exciting new learning opportunities. Liberty University is on the leading edge of this trend and has undertaken an aggressive set of projects to provide its 25,000-plus students and faculty with round-the-clock Microsoft Exchange 2003 services offering nearly unlimited mailbox sizes and new unified messaging capabilities.

“By following the best practices of both EMC and Microsoft, we now have an Exchange solution that has dramatically improved the messaging experience for our students and faculty. For example, we've reduced annual downtime from six days to just minutes. With increased performance, we're able to support nearly unlimited growth in the size and number of Exchange mailboxes, helping to enhance student and faculty productivity.”

Aaron Mathes, Deputy CIO, Liberty University

E-mail usage at Liberty has grown dramatically in recent years. In fact, last year's incoming freshmen class sent three times more e-mail messages than the outgoing class of 2006. With this growth, it has become more challenging to manage mailbox sizes, ensure availability, and integrate new technologies. To overcome these obstacles, Liberty engaged EMC and Microsoft to work together to help the university identify a new Exchange environment that could deliver improved service levels. Today, Liberty has standardized Exchange on a multi-tiered EMC® storage and software infrastructure that incorporates the principles of information lifecycle management (ILM). With an ILM strategy, Liberty is able to satisfy the different availability and performance requirements for e-mails according to their stages in the lifecycle.

Aaron Mathes, Deputy Chief Information Officer at Liberty University, said, “Exchange has become an integral part of the education process, requiring 24x7 availability to support our local campus as well as our global distance learning program. To maximize the education experience for our students, we wanted to design the 'ideal' Exchange environment so we brought in EMC and Microsoft as key advisors to help us achieve our goals.

“By following the best practices of both EMC and Microsoft, we now have an Exchange solution that has dramatically improved the messaging experience for our students and faculty,” Mathes continued. “For example, we've reduced annual downtime from six days to just minutes. With increased performance, we're able to support nearly unlimited growth in the size and number of Exchange mailboxes, helping to enhance student and faculty productivity. Plus, our new EMC and Microsoft solution has simplified management for our Exchange administrator by reducing our storage footprint in the live production environment through active archiving, and enabling very rapid restores with disk backup.”

Elimination of vulnerabilities in Exchange architecture

Prior to implementing its EMC storage area network (SAN), Liberty supported Exchange using server-based and server-attached disk storage. Exchange mailbox stores were growing rapidly to hundreds of gigabytes with very limited disk space to support them. As a result, storage capacity was filling up quickly, which led to serious outages that left all 40,000 account holders (students, faculty, and alumni) stranded without e-mail for days.

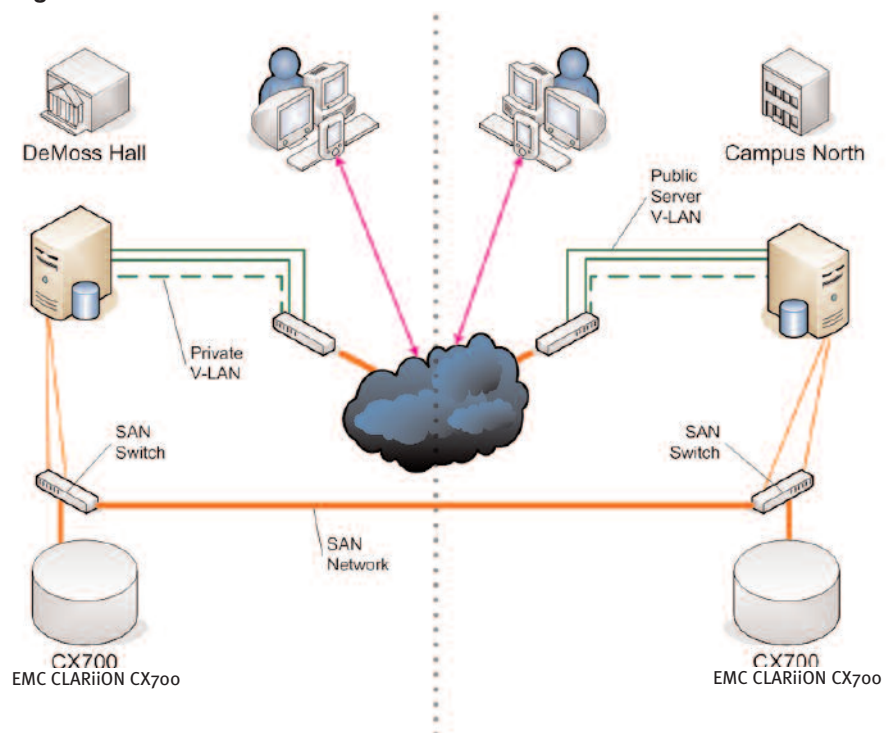
Nick Kesler, Manager of Liberty's Network Operations Center, explained, "Our Exchange stores used to fill up to full capacity on the local disk and we were completely unable to manage the files. There was essentially no place to move anything around and e-mail came to a stop. Once we struggled for three days to free up space and restore the Exchange environment. All that time, e-mail was down, which also dragged down the productivity of our students and faculty.

"On another occasion, we simply had an electrical surge that overheated an entire rack of equipment, taking down Exchange," continued Kesler. "This time, it took us another three days to restore Exchange, again putting a lot of academic projects on hold. After these incidents, we recognized we needed to eliminate such vulnerabilities. So, we've focused on building an architecture for Exchange that provides plenty of capacity, full redundancy, and a business continuity strategy that can get us back up and running quickly if we do run into a problem. Our primary objective is to improve uptime for Exchange—and that's what EMC and Microsoft are helping us do."

Recovering Exchange in three minutes

Technical resources from EMC and Microsoft worked together to help the Liberty IT team incorporate Exchange best practices into every aspect of their architectural design. An internal development group at Liberty performed a detailed user analysis, which EMC and Microsoft used as a basis for recommending how to size SAN storage and distribute mailboxes for optimal response time and disk utilization. The resulting design, which was laid out by SyCom Technologies, includes clustered pairs of Dell Exchange servers connected to redundant EMC CLARiiON® SANs in two separate campus locations (see Figure 1).

Figure 1



By distributing mailboxes and optimizing disk space as Microsoft and EMC advised, Liberty has been able to reduce individual mailbox stores from hundreds of gigabytes to a maximum of 40 gigabytes. Production Exchange data is stored on a high-performance EMC CLARiiON Fibre Channel system. Liberty then uses EMC NetWorker™ software for backing up the production Exchange data to lower-cost CLARiiON ATA disk for rapid recovery. In addition, the university uses EMC SAN Copy™ to copy Exchange data from the primary SAN to the secondary SAN, ensuring that exact copies of all e-mail files are available in the event of a complete site loss. This powerful combination of technologies has enabled Liberty to dramatically improve uptime for Exchange.

Jonathan Minter, Liberty's Director of IT Development and Engineering, said, "We wanted redundancy at every point possible to avoid outages that could take down Exchange. With EMC's SAN Copy software and two separate robust EMC SANs, we're well protected. In fact, when one of the Exchange servers had a problem recently, it failed over automatically to the secondary server while maintaining full continuity with the SAN, and we were back up and running in just three minutes. Looking over the span of a year, our downtime has been reduced from six days to just minutes. In most cases these minutes go unnoticed by end users.

"By using EmailXtender to archive all e-mails older than six months onto EMC Centera, we've reduced the size of our production Exchange store. As a result, we've been able to shrink the time to back up our production store and save money by putting our capital dollars toward less-expensive content-addressed storage."

Seth Sites, Director of Network and System Operations, Liberty University

"We also needed a solution for restoring Exchange files in the event of data corruption or database inconsistencies," continued Minter. "By backing up to disk, we've improved our recovery management capabilities significantly. Using NetWorker, for example, we recently restored a 40-gigabyte Exchange store from disk in just 17 minutes. If we had restored from tape, it would have taken between two and three hours—assuming we had the tapes onsite. This allows us to keep our students and faculty much more productive and cuts our administrative time to just a fraction of what it used to be."

Dramatic reductions in Exchange backup times

Liberty has implemented additional EMC solutions to further improve the efficiency of managing Exchange data, while enabling greater flexibility to support ever-growing e-mail demands across the university. By using EMC EmailXtender® software to archive e-mails older than six months from the CLARiiON Fibre Channel storage to EMC Centera™ content-addressed storage, Liberty is saving users the time and effort of archiving their own e-mails, which can quickly use up capacity on the production storage.

Seth Sites, Director of Network and System Operations at Liberty University, explained, "By using EmailXtender to archive all e-mails older than six months onto EMC Centera, we've reduced the size of our production Exchange store. As a result, we've been able to shrink the time to back up our production store and save money by putting our capital dollars toward less-expensive content-addressed storage."

Sites added, "EmailXtender allows us to retrieve an individual message from the archive, rather than have to go to our tape backup and restore an entire mailbox. So, if a user should accidentally delete or lose a message, we can get it back to him or her in a couple of minutes. That's a great overall productivity benefit."

Liberty is currently implementing additional features of EmailXtender that will provide users with direct access to archived e-mail and further reduce the size of the Exchange store. Using a technique called “shortcutting,” users will be able to keep a pointer to all e-mail messages on their desktops, while the full contents of the e-mail message, including attachments, are stored directly on the EMC Centera. Since users will have direct access to the archived messages, Liberty plans to archive all e-mail older than 30 days, which will dramatically reduce the amount of production storage required for Exchange, allowing larger mailboxes, speeding backups, and improving e-mail performance.

“We will be taking a very aggressive shortcutting strategy to drastically limit the amount of production storage capacity required for Exchange,” said Sites. “To the users, it will still look like all their e-mail messages are on their desktops, but most of the messages will actually be on the EMC Centera. This means we can provide users with virtually unlimited mailboxes. It also means that we will be able to reduce our Exchange footprint and backup cycles dramatically. In tests of the shortcutting, we gained back about 70 percent of our storage space. Based on this, we would expect an equivalent 70 percent reduction in backup times. Ultimately, we’d like to get to where we’re shortcutting 80-95 percent of all e-mails.

“What this also means to the users is faster performance,” Sites continued. “If the physical Exchange mailbox is reduced from 100 megabytes to 20 megabytes through shortcutting, then everything loads faster. The application doesn’t have to sift through all those old files and folders aren’t filled up with thousands of messages. The mailbox stays very lean even as the number of real messages increases, which ultimately allows us to save the expense of buying more production storage.”

Handling long-term growth and new services with ease

Liberty University has taken a long-term view of its Exchange environment to not only meet the current demands of a thriving educational system, but also to anticipate the future needs of students and faculty. For example, in the very near future the university will be deploying unified messaging, allowing voice messages to be sent automatically to a user’s Exchange mailbox.

“We would only feel comfortable implementing a service like unified messaging with the kind of robust infrastructure EMC and Microsoft have helped us create,” stated Mathes. “Voice messages will be large files and we will need to manage our storage capacity very efficiently to accommodate the increased demands. With capabilities like active archiving and shortcutting, our Exchange environment has the performance and reliability to provide a very positive user experience.

“In building our EMC infrastructure, we’ve been very focused on positioning ourselves for the future. For example, while there aren’t any federal regulations in private higher education today, there may be in the future. If so, we have the secure archiving and data protection technologies in place to comply. One thing we do know is that Liberty University is continuing to grow at 20 percent or more per year, which means demand for e-mail and other communication services will only intensify. EMC enables us to have the levels of scalability and performance to keep up with this growth, while simplifying administrative tasks like backup and archiving, so we can deliver the best possible service to our users. At the end of the day, that’s the most important thing for IT—giving our students and faculty the tools they need to maximize their educational experiences.”



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