EARNING AN "A" FOR AVAILABILITY

LAKE FOREST ACADEMY THWARTS DOWNTIME WITH A TOTAL AVAILABILITY SOLUTION.

Since its establishment in 1857, Illinois' Lake Forest Academy (LFA) has stayed ahead of the curve in its commitment to preparing students for high levels of achievement in college. In order to maintain its elevated academic goals, the institution must ensure that its technology and infrastructure are fully operational and accessible at all times. ▷

Dave Aykroid
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"If our end users are thinking about the availability of servers, we have missed the mark," emphasizes Dave Aykroid, LFA's director of information technology. "We want them to be thinking about learning and innovating."

With that in mind, LFA implemented a total availability solution in 2008 that was designed to meet the continuous uptime needs of the school's 100-plus faculty and staff members and nearly 400 students, about half of whom reside on campus.

Keeping Systems Available

"At LFA, total availability means maintaining a server infrastructure our users can rely on," explains Aykroid. "As a result, our efforts are focused on implementing and refining technology in the classroom, rather than spending our time remediating problems with the infrastructure."

LFA is now able to do just that, thanks to the deployment of an IBM BladeCenter, VMware Infrastructure Enterprise, Tripp Lite uninterruptible power supply (UPS) systems and two LeftHand Networks storage area network (SAN) nodes. The comprehensive solution is earning high marks for facilitating continuous uptime, easing management and maintenance of the academy's critical systems, preserving valuable floor space and increasing efficiency.

"Faculty and students alike expect access to the system at all times, and our volume of activity continues to increase," notes Matthew Less, dean of faculty and a math instructor at the academy. "This system has handled the increased workload and provided far less downtime."

"Network availability is now a constant," Aykroid says. "It just works."

Staying Ahead of Demand

Unfortunately, that was not always the case. Describing LFA's previous data center environment as "a patchwork of aging tower and rack-mount servers," Aykroid reports that as the school's needs grew, additional tower servers were added.

"Then we found ourselves left with a combination of 14 physical servers of all shapes, sizes and vendors," he explains. "Heating and cooling requirements grew, and the noise level was high. We were rapidly running out of floor space."

At the same time, the academy was struggling to accommodate its expanding IT staff. "We required additional desk space," says Aykroid, "but our data center dominated the largest room in our office."

LFA was also seeking a more robust UPS system to better protect its critical equipment. "We reside in a historical building dated at more than 100 years old," he acknowledges. "Given this environment, utility power can be volatile at times."

With its previous solution, the academy was also limited to scheduling any equipment maintenance or upgrades during off-hours. "If we needed to do any physical maintenance on the servers, we had to bring them down one at a time," Aykroid explains.

Storage was another area where LFA's needs were quickly surpassing its capacity.

"Our teachers and students are doing great things in the classroom," he emphasizes, highlighting the academy's digital music, web design and 3D design classes. "But the large multimedia files created by these classes presented a challenge as our local storage space dwindled."

In addition to providing network storage to every staff member and student, LFA operates numerous databases including student

information systems, a library catalog solution and an online grade book. "Our storage requirements were increasing exponentially," Aykroid reveals.

As the school began researching different approaches to achieve total availability, IT administrators outlined some key prerequisites for their new system.

"The main thing was having a robust, scalable solution that would be able to keep up with our demands," says Aykroid. "We want to encourage innovation and productivity among our students; not stifle it because we're concerned about our technology being able to keep up."

With the installation of the IBM BladeCenter and the move to a virtualized server environment, LFA has significantly improved efficiency and heightened availability. Consolidating from 14 physical servers to just six, the solution has reduced IT costs, improved flexibility and increased energy efficiency by running fewer servers.

Management Made Easy

Aykroid has seen a reduction in the cooling costs. "There has been a substantial difference," he reveals. "The virtualized solution has also made it easier for us to manage."

For example, the academy can quickly move virtual machines to other servers in order to perform hardware maintenance — without ever bringing down any infrastructure. IT staff members are able to easily patch and reboot servers, as well as rapidly provision new servers and deploy technology.

"VMware's VMotion product allows us to migrate virtual servers to a surviving machine in seconds, permitting us to bring servers down for maintenance, even during the height of the school day," Aykroid explains. "The level of downtime has been reduced significantly, while making our infrastructure more manageable. We can manage the system remotely, and we can restart these servers without having to physically push a button."

Furthermore, new servers can be provisioned on the fly for staff trainings or to demo new technology solutions without incurring any hardware costs. "We are able to do more with less," he says. "And we can do it quickly. Virtual servers can be created from templates in minutes, allowing the technology staff to deploy these solutions the same day."

The addition of two Tripp Lite Smart Online rack-mount UPS systems (which provide redundancy for protection) was another significant step in LFA's attainment of total availability. Each of the 8kVA units occupies just 8U of valuable rack space, a boon for the academy's data center space constraints.

"We wanted something that was robust and fault-tolerant," Aykroid explains, adding that the school also sought a solution that would preserve floor space and lower cooling costs.

To ease maintenance, the UPS systems feature a detachable power distribution unit (PDU) with a manual bypass switch, enabling hot-swap UPS replacement without powering down connected loads. Aykroid also appreciates the ability to monitor power, temperature and humidity within the data center using an SNMP/web card.

"The SNMP card sends alerts via e-mail to my smartphone, so I am aware of the environment 24x7," he says.

To address its storage woes, the academy found relief in LeftHand Networks' NSM 2120, which delivers scalable capacity, performance and availability. The high-density, energy-efficient storage nodes help LFA avoid painful configuration changes such as controller upgrades, expensive software add-ons and paying upfront for future growth, thanks to the ability to scale performance, capacity and availability by simply adding additional nodes.

In addition to the device's flexibility and capacity to accommodate growth, Aykroid praises the solution's efficient use of storage. "The SAN allows us to carve out storage volumes the way we want, so we can allocate storage to the area we need it and grow as necessary," he explains.

Previously, all of the school's servers were attached to local storage, which made it impossible to designate space in any other area. "Our mail server may have had dozens of megabytes free, while our student file server — where we needed storage — was running out of space," Aykroid explains.

Furthermore, because LFA purchased a redundant SAN, one module resides in the data center and the other in a separate building, further improving the school's availability by providing for continuity of operations and disaster recovery.

"If the data center was destroyed by a natural disaster or a fire, we have that redundant module in the other building," he notes.

Maintaining Power: A Key Consideration

LFA is among a growing number of organizations that are taking note of the importance of achieving high availability, according to Farah Saeed, senior consultant for the Energy and Power Systems team at Frost & Sullivan. Over the past decade, headline-grabbing events such as the Northeast blackout of 2003 (which brought a large section of the North American economy to a standstill) have pushed power quality issues to the forefront.

"These types of events have led to an awareness of what it means to have reliable power, and what a lack of reliable power can do," Saeed explains. "It can not only affect your day-to-day operations, but can also lead to significant monetary consequences."

Indeed, for the average organization, downtime can cost about $78,191 per hour, according to recent findings from *Computerworld* magazine.

"There is a trend toward deploying power applications that are highly reliable and highly available," Saeed reveals. "Money is being invested in these systems because they provide long-term benefits."

Although a UPS was once considered little more than a "battery in a box," more and more organizations are deploying premium power protection solutions, largely as a result of an increased dependence on computerized equipment and the need for continuous e-mail and Internet access.

"The availability of these applications is highly critical, but unfortunately the grid is not entirely able to support the type of usage we have and the demand," Saeed explains. "There is obviously a heightened concern regarding, 'How available is my equipment?'"

Planning for the Future

For LFA, the new solution has not only proven its value in delivering continuous uptime, but has generated an impressive return on investment (ROI) as well.

"I know that for us, the biggest indicator is the equipment cost," Aykroid acknowledges. "We've saved thousands of dollars on hardware costs alone. And I don't know where we would have put our additional staff members. It's hard to put a price on that."

An added benefit is that the solution allowed LFA to transition its data center from the largest room in the building to the smallest, opening up more office space for new staff members.

"We were able to physically downsize the footprint of our equipment, while increasing our capabilities and providing a simple way to add capacity as we need it in the future," Aykroid sums up. "It's a very good, scalable solution. It's almost future-proof."

John Strudwick, LFA's headmaster, agrees. "LFA's strategic plan calls for the school to implement a technology plan that ensures the creation and improvement of an infrastructure that meets the technological needs of the school's mission," he says.

"Through forward thinking, careful planning, partnering, technical support and clear execution, we have been able

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>
> — Dave Aykroid, LFA's director of information technology

to achieve this goal, as well as establish IT solutions and structures that will enable LFA to continue to meet its technological needs and be a school that faces its future with confidence and success."

When it comes to implementing this type of initiative, Aykroid offers organizations some valuable tips: "Begin with the end in mind and look to the future. Involve your staff and work closely with the CFO. Instill a passion about the benefits of the project."

The IT director recommends a five-year plan. "Make sure you're purchasing something that can be useful for that time horizon," he says. "We can't afford to rebuild our data center and tear everything down in two years. We needed core infrastructure that would last."

Smart Partnering

Choosing a qualified partner is another important consideration, Aykroid emphasizes.

"It's difficult for many schools to do everything themselves, so partnering with a great vendor like CDW•G can really help," he says. "CDW•G provided the right amount of guidance for us to implement the project ourselves, teaming up with qualified sales specialists and vendor representatives where appropriate."

Noting that the school has been an exclusive CDW•G customer since 2005, Aykroid praises the expertise and dedication of Account Manager David Friedman, who coordinated onsite visits with a variety of equipment manufacturers.

"David is someone who really focuses on the long-term relationship," notes Aykroid. "He recommends a product that's best for us because he's interested in keeping us around as a customer. He's always gone above and beyond."

The ability to investigate different solutions was another advantage to working with CDW•G, according to the IT director.

"CDW•G was able to provide us with the in-house expertise," he explains. "They had multiple solutions to offer, instead of just one. We were able to bring in their specialists, as well as reps from multiple vendors. We were able to choose the specific products that were right for us."

Ultimately, the total availability solution has enabled LFA to remain right where it wants to be: at the top of the class.

"When our users access the network, they want it to be reliable and something they can depend on," says Aykroid. "I have the peace of mind that we have the infrastructure in place to make this a daily reality." ◊

TOWARD TOTAL AVAILABILITY

The different categories of technologies listed below can all contribute to the goal of providing 100 percent availability and ensuring that recovery from any disaster is quick and complete. To choose specific manufacturers and products, it's best to rely on research, information from colleagues and field trials whenever you can get them.

Total availability should include the following:

- **UPS**

- **Backup hardware**

- **Backup software**

- **Storage area networks**

- **Replication and clustering technologies**

- **Virtualization**

- **Continuity of operations management software**