BACKUP DATA CENTER OFFERS UPFRONT BENEFITS

Drexel University uses new facility as springboard to upgraded infrastructure.

Squeezed into the sub-basement of a residence hall, Drexel University's old secondary data center was only accessible down a long set of outside stairs. On a blistering day during one of the heat waves that rolled over the Philadelphia-based campus last summer, faltering air conditioners allowed the temperature in the data center to climb above 96 degrees.

"And that was just the ambient air temperature — who knows how hot the insides of the servers were," says Kenneth Blackney, the university's associate vice president for Core Technology Infrastructure. "All in all, the old facility isn't really an ideal environment for computing."

That is changing this fall as the backup data center moves into space in Drexel's new URBN Center for Arts and Design, a building donated to the university and then extensively renovated, including retrofitting and improvements to meet green building standards.

"There wasn't much high-level strategy involved in deciding that we needed to move the data center, but there has been lots of thinking and planning about how we can make the most of the new space now and in the future," says Blackney.

Drexel's computing needs are growing along with the university, which, with over 26,000 students, has more than doubled its enrollment since 1995, says Blackney. During the same time, the university also acquired a College of Medicine — the largest private medical school in the country — and established a law school.

At about 600 square feet, the new backup data center is about twice the

size of the old facility, though a direct comparison is difficult because of the irregular, approximately triangular shape of the old space, says Paul Keenan, Drexel's executive director for systems and security. In addition to increased space and energy efficiency, the new data center has access to more than double the power (up to 100kVA) than was available in the old location. The old facility could accommodate six server racks, but the room had insufficient power and cooling capacity to allow them to be fully populated, Keenan says.

"This is a much more modern data center, with significantly more capacity than we've had in the past," says Keenan. "We have 11 racks available and much more capacity per rack, which means we can accommodate Drexel's continued growth. We can make many more things redundant. It gives us more location independence in terms of keeping things up and running."

Reducing Time and Risk on Moving Day

In order to take advantage of the new center, the IT staff had to get a roomful of equipment transported and installed with as little downtime as possible because the servers and storage units are always in the process of performing critical functions, says Keenan.

"The reality is that there's a decreased level of redundancy while equipment is in motion," he says. "We wanted to minimize that time — that's really the primary goal. The aim is to make sure the move is just a matter of putting the equipment in place, connecting it and testing it to see that it works correctly."

And beyond the immediate task of moving the data center equipment and getting it up and running quickly, the IT staff wanted the migration to

Kenneth Blackney, Associate Vice President for Core Technology Infrastructure (left) with Paul Keenan, Executive Director for Systems and Security, Drexel University, Philadelphia, Pa.

be a "fresh start" that cleared away the cable clutter that creeps into any technology environment, says Keenan. "We wanted to make this new room as clean and efficient as possible from the start," he says.

In order to squeeze minutes out of the moving time, Drexel's IT staff spent much of the summer cabling and configuring the new space to meet current and projected needs, installing generators and putting a new APC power and cooling system in place.

Keeping Cool

As Drexel planned the data center relocation, IT administrators had engaged with multiple companies for products, services and advice. CDW•G "came through" by helping the university develop the crucial power and cooling piece of the project, says Keenan.

"CDW•G worked closely with us. They took a look at our new space and helped us figure out what we needed," he says. "We ended up with a holistic solution that is as efficient and redundant as it can possibly be."

The state-of-the-art APC system includes a 100kVA uninterruptible power supply (UPS) that provides plentiful and consistent power, along with protection from outages. Seven in-row coolers with N+1 redundancy provide safeguards against overheated equipment, even if one of the units fails. A hot aisle containment system further maximizes cooling efficiency by channeling heat toward air-conditioning units. The whole system can be monitored and managed through a virtual appliance.

"In the old data center, any problem with the air conditioning was a crisis," Keenan says. "We'll have redundancy in our cooling units now, so we could lose a whole cooling unit, or even more than one, in the new data center and it wouldn't impact production."

The goal was to make sure Drexel had a cooling system that could grow and change with the university's needs, says Aaron Stephens, CDW•G field solution architect. "We don't want them to have to 'rip and redo' as they do more things with the data center," he says. "The technology keeps operational costs down and will continue to work with their roadmap for the future."

No More Lift and Shift

With the new data center space ready, the IT team turned to the issues involved in moving individual pieces of hardware, some of which would need to be hoisted out of the basement on a crane. Even without the special complications caused by the location of Drexel's old facility, data center relocations require much more preparation than the relatively casual "lift-and-shift" model that was the norm as recently as a decade ago, says David Cappuccio, research vice president at the information technology research firm Gartner, Inc.

"Today's environment is much more complex, especially in highly virtualized environments, and organizations need to understand going in how complicated the process of moving can be," Cappuccio says. >

Even in migrating a secondary data center used primarily for backup and failover, the IT staff needs to have mapped how all the various pieces of hardware and applications are connected to each other and larger systems and what impact they have on the organization. That detailed assessment should determine the sequence and methodology of the move to minimize risk and downtime, says Cappuccio.

"You have to understand where you would have the most cascading effects if there are problems in the migration and take extra steps to mitigate those risks," he says. "It's not a simple process."

Drexel's backup data center contains 45 physical servers, primarily from IBM. Their purposes vary, but many are part of an active, load-balanced server environment that provides full services if there were an outage in the main data center, says Keenan. These include Exchange 2010 servers; mail gateway servers performing anti-spam, anti-virus and delivery functions; Lightweight Directory Access Protocol (LDAP) authentication servers; central authentication servers; voicemail services; wireless radius services; SQL Server Cluster nodes; Domain Name System (DNS) and Dynamic Host Configuration Protocol (DHCP services; and web application servers.

In addition, the secondary data center houses test and standby Oracle database servers and utility servers for monitoring and other functions. Four physical servers in the old data center are dedicated to hosting approximately 100 virtual machines, including VMware Site Recovery Manager servers for failover. The number of VMs will double as the move to the new center is completed and rise from there, says Keenan.

An HP 3PAR F400 Storage System with 350TB capacity, is used to mirror production data and may be the heart of the data center. Lifting the storage array out of the basement space and reinstalling it in its new home was the single biggest concern in the migration, says Keenan. Drexel solved the problem by contracting with HP to handle transport of the storage unit, as well as some other aspects of the move.

"We believed that the array would need to be disassembled to get it out of the current room and up the steps, and we were looking to HP to do the reassembly and be responsible for it," Keenan says.

With racks and cabling in place, moving the servers becomes fairly straightforward, though reconfiguring the blade chassis in the URBN Center space demanded extra attention from Drexel's networking specialists, he says.

Room for Improvement

Including a backup generator and other new equipment, as well as improvements to the building directly related to the data center, the relocation project cost approximately $650,000, says Blackney. But that investment was a critical step toward upgrading the Drexel computing infrastructure, which is increasingly integral to the work of the university.

"Now we have real redundancy — 70 percent of the technology in the room is dedicated to mirroring or failover," he says. "But we can also use the space for more capabilities and to give us more flexibility as we make other improvements."

Drexel will add additional storage technology to the new backup data center, including a new tape library. The IT staff also plans to move more applications and services into the secondary center permanently, says Blackney. In the immediate future, they will also begin

to modernize Drexel's primary data center, including the power and cooling system — a project that will require temporarily shifting equipment and functionality to the backup center.

"We wanted enough space in the backup center to create enough contiguous empty space in the primary center, so that we can start to make the transformation in terms of power and cooling," says Blackney. "Eventually, we think we'll be able to give square footage back to the university for other uses because we'll be able to operate safely at much higher densities."

The backup data center relocation provided a rare opportunity to lay the foundations for other improvements, says Keenan.

"You don't get a crack at a project that makes this kind of difference very often," he adds. "You can't just think about current needs. You've got to work through the details, such as providing power and cooling up front for what you want to do in the future. When you do that and the project works, it translates into tremendous potential for growth." ■

INCREDIBLE SHRINKING DATA CENTERS

The new backup facility at the URBN Center is likely the last data center Drexel University will ever build, says Kenneth Blackney, associate vice president for Core Technology Infrastructure.

"At Drexel, we are both a producer and consumer of cloud services, and we know that all kinds of systems and applications are leaving the data center," he says. "Trends like cloud computing and virtualization suggest that data centers are getting smaller. We may rearrange and update space we have, but we probably won't need more space."

As IT organizations make decisions about space and power and cooling systems, they have to balance their growing needs with the potential of the technologies in those shrinking data centers, says David Cappuccio, research vice president at information technology research firm Gartner, Inc. Cloud computing is certainly part of the equation, as the number of what were traditionally onsite data center functions, that are being delivered as hosted services, increases, he says.

"A lot of people are offloading noncritical systems, and some are offloading ones they wouldn't have considered loosening control of a few years ago," he says.

Growing virtualization in the data center and new hardware designs that decrease footprints and increase potential density should also figure into any organization's plan, but are too often ignored, says Cappuccio.

"The standard practice of predicting the 10-year window ahead is often an exercise in futility," he says. "Organizations with a 1,000 square feet of space do a linear calculation and decide they'll need 3,000 square feet and power and cooling to match it. They don't take into account emerging technologies that increase density and efficiency. They overbuy and overbuild because it's easy and less risky."

Since no technology strategy can take into account all the "what ifs," the key to effective planning is flexibility, adopting technologies and designing spaces that are modular and can grow or shrink as computing needs change, Cappuccio adds.