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Kyle Jones
IS Manager
Lawrence Academy
Groton, Mass.

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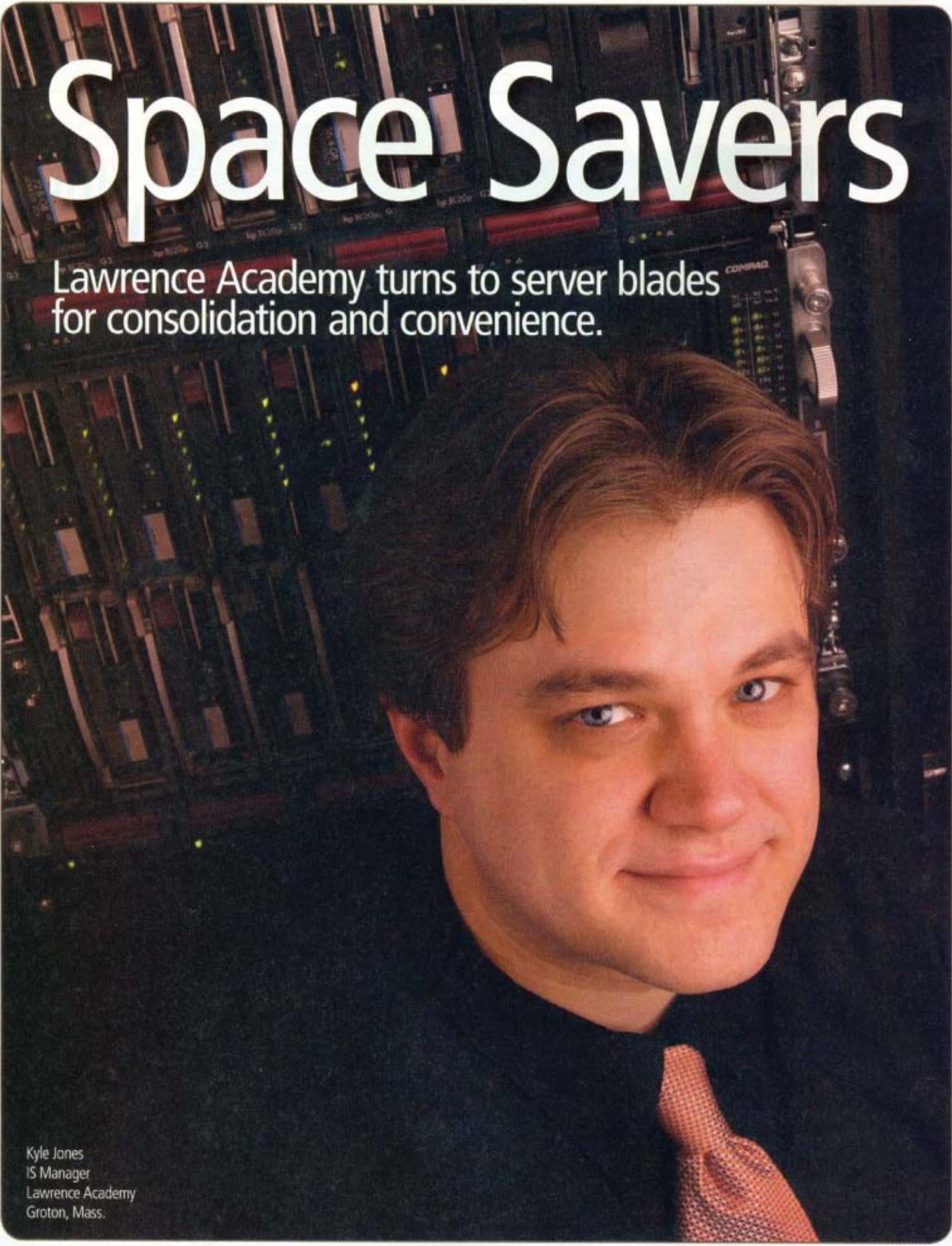**$1245.00¹** CDWG 811599
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Space Savers

Lawrence Academy turns to server blades for consolidation and convenience.

Kyle Jones
IS Manager
Lawrence Academy
Groton, Mass.

Lawrence Academy, a 213-year-old archetype for New England preparatory schools, is long on tradition — but short on space. Like many areas in the Northeast, bucolic Groton, Mass., consists of two types of land: tracts settled centuries ago by Europeans and parcels zoned to prevent further development.

That's why IS Manager Kyle Jones, upon his arrival in the summer of 1998, found that the school's entire systems room had been crammed into a 5-foot-by-20-foot closet that previously served as the school's mailroom. He needed to boost the computing capacity. And by the end of 2005, he had nearly tripled the capacity without adding an inch to the building.

Jones turned to server blades. Server blades are circuit boards dedicated to one application or task, such as serving Web pages. Blades are inserted into an enclosure — those made by Hewlett-Packard, for example, can accommodate eight or 16 blades, depending on the model — where they share the same high-speed bus and power source, thus saving energy and space. The enclosure also contains network switches and other connection devices, thereby vastly reducing the lengths of cable that might otherwise be required.

Blades, as Jones soon discovered, have another great benefit: easy maintenance. That's crucial because Jones is only one of three IT employees, who must maintain 33 servers and 287 desktop computers and terminals, submit budgets and work with educators to thoughtfully integrate technology into the curriculum. "For many schools, blades are great because you have to fit systems in a small room, and you need something that just works," says Jones. "Blade solutions fit the bill."

Although the blades tend to be less expensive over the long haul, there is a downside: The bill includes significant advance capital investment that must be justified to decision-makers. "A reason why a lot of schools aren't using a blade solution is that there is an upfront cost," says Jones (See sidebar on page 11). "You have to buy the servers, the box it's going into and the power. Schools have a problem understanding why this is the way to go — that it's a technology that works very well once you invest the initial money."

Making Life Easier

Some schools consequently purchase a handful of larger, standalone servers. "The problem with that is, if you have multiple users and only four servers and one goes down, it will have a significant impact," says Jones.

It's for that reason that Lawrence Academy, under Jones's direction, continues to aggressively replace its bank of standalone servers, while adding computing power. By mid-February, Jones had replaced 19 of the 33 standalone servers with blades.

He had also replaced 100 of the 287 desktops with thin clients, extending another huge benefit to students, teachers and the IT staff. Because thin-clients' application software and data files are centrally stored — leaving the thin clients with a processor, memory for handling graphics files, ports and an imbedded operating system — maintenance, repairs and upgrades are vastly simplified.

If a thin-client terminal breaks, for example, it's not a problem. Students do not need to wait for a broken terminal to be fixed; spares are kept in a closet and can be swapped in while the other is brought back to the shop for repair. Also, because servers are kept in a centralized location, the data is that much safer.

Certainly, upgrading the hardware is easier with blades. In the past, Jones refreshed one-third of the school's systems each year to ensure that no system was more than three years old. "But we were burning up time shipping back desktops," says Jones. "With thin clients, we can stretch the refresh to every four or five years."

That's because thin clients have no moving parts and simply last longer. Although researchers dispute just how much money can be saved by using thin clients and server blades rather than traditional networked servers, they generally agree that thin-client solutions cost far less to maintain and operate.

"Unlike PC computing — in which indirect administrative costs add up — server-based computing is characterized by higher and more visible capital costs," says Mark A. Margevicius, an analyst at research firm Gartner. "This glaring real-money requirement usually catches the eye of chief information officers, causing them to prematurely rule out the server-based computing model. But from an overall total-cost-of-ownership perspective, server-based computing is often less expensive than the distributed PC model."

Software updates are also a snap. Instead of having to manually install upgrades one hard-disk drive at a time, new software is distributed centrally, using Hewlett-Packard ProLiant Essentials Rapid Deployment Pack, an integration of software management tools developed by HP and by Lindon, Utah-based Altiris. In fact, because Lawrence Academy had worked with Altiris software since 1998, choosing the HP solution came naturally, says Jones.

"I think that the blades and the Altiris software are truly a magical combination," he says. "Once the blades are here, the setup is easy; we slide the blade into the enclosure and let the Rapid Deployment Pack do the rest of the work." It takes only 20 minutes, in fact, for Jones to unwrap a new blade server, configure it and have it ready for use.

Lawrence Academy's servers also rely on Citrix Presentation Server, which Jones has housed on six blades. The Citrix software lets students access their school computer's desktop from home and also enables Jones to centrally manage disparate applications. Other applications for blade servers on campus include file serving, an on-campus intranet, Microsoft SQL Server and accounting applications. ▸

At a Glance

School: Lawrence Academy
Location: Groton, Mass.
Founded: 1793
Enrollment: 395 (grades 9-12)
Average class size: 8-16 students
Web site: www.lacademy.edu

IT Room Setup

Thirteen traditional rack-mount servers remain, all waiting to be replaced by blade servers. Nearby are the server racks that contain three blade enclosures, each of which can contain eight vertical blades. There are 19 HP ProLiant BL20p server blades with space for five more. "Installing a new blade server is as simple as sliding it into an empty bay," says Jones.

In addition to the blades, each rack contains two HP ProLiant DL320 servers, stacked horizontally atop the blade enclosures. Like the blades, they are thin — measuring less than two inches high — and can be used for single functions, such as Web hosting or video streaming. In Lawrence Academy's case, they host Windows Server Active Directory and Microsoft ISA Server firewalls.

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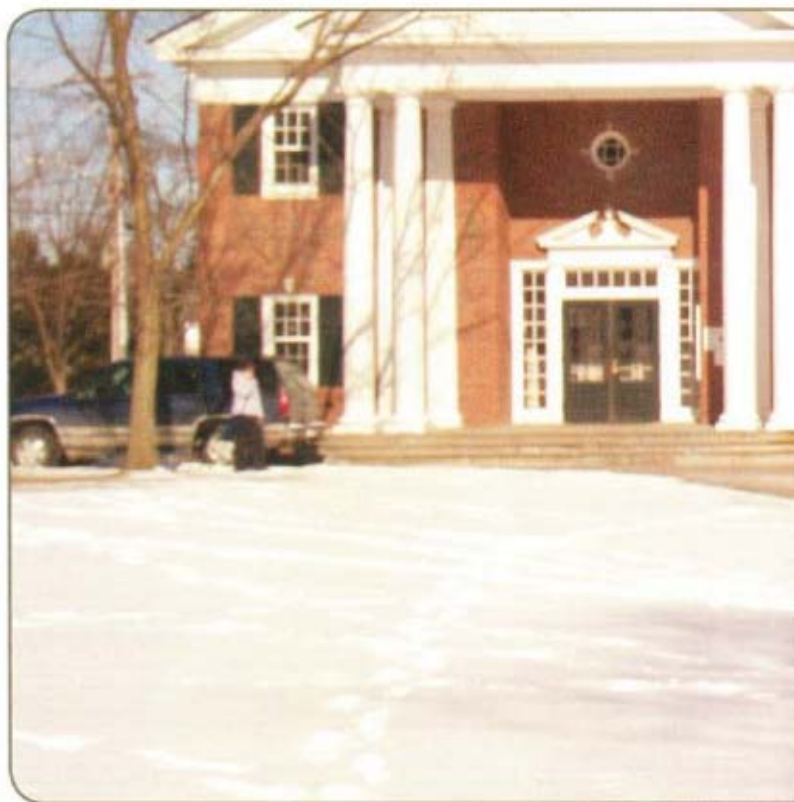>
> — Kyle Jones, IS Manager, Lawrence Academy, Groton, Mass.

Beneath each of these blade enclosures is an HP power enclosure that stands about 1.75 inches high, or 1U (each "U" equals 4.5 centimeters). These newer, low-profile power enclosures replace what were formerly 3U units, further reducing the amount of space that the servers consume. The power supplies located in these power enclosures are redundant, so a single dead power supply will not take down the entire enclosure, explains Jones. "It's interesting to take a look at how little space these units consume in the rack, relative to some of the other components," he says.

Beneath the blade enclosures and the power supplies are APC (American Power Conversion) 2200 XL uninterruptible power supply (UPS) and battery backup units. The power supplies are redundant, so a single dead power supply will not take down the entire enclosure, explains Jones.

At either side of the blade enclosures is a Gigabit Ethernet interconnect switch. Interconnect switches are designed to greatly reduce the number of Ethernet network cables attached to the rear of the blade enclosure. For example, an enclosure with eight blades, which might otherwise need 32 cables, collects those network signals to no more than 12 ports for connection to the network backbone.

For its part, Gigabit Ethernet builds on top of the ubiquitous Ethernet protocol, but increases speed tenfold over Fast Ethernet to 1 gigabit per second (Gbps). Gigabit Ethernet is great for retrieving electronic archives from storage servers and for backing up entire hard drives for security. And because it can accommodate the latest remote diagnostic and troubleshooting software, Gigabit Ethernet makes life easier for IT administrators who are responsible for larger LANs.

But even Gigabit Ethernet switches can only send data as fast as the cable they're connected to will allow. Until recently, those cables were made of copper. And while Category 5e or Category 6 copper cable works for smaller LANs, transmission slows over longer distances. To maintain speed, Gigabit Ethernet needs fiber optic. And that is just what Jones has begun to deploy across Lawrence Academy's network.

What's Next?

As Lawrence Academy continues to replace its aging servers with new blades, it will continue to turn to CDW•G, says Jones. "Our account rep understands what it takes to make a blade shop work. And CDW•G does a wonderful job getting everything we need in time."

In the near future, those product requests likely will include additional blades to replace 1U servers that are running specialized school administration applications that use very little of the server's horsepower. "My thought is to consolidate all these specialized applications onto a single server using server virtualization," says Jones.

Server virtualization is a technique that enables servers to, among other things, share processing power, applications and storage. This allows administrators to be more flexible with the servers they have on hand, allowing them, for example, to temporarily enlist the power of underutilized servers during busier times of the year by creating multiple virtual servers on the same piece of hardware. This requires additional software, which runs between the operating system and the hardware, but can reduce additional hardware purchases.

And that will help Jones and Lawrence Academy save precious space. ⌀
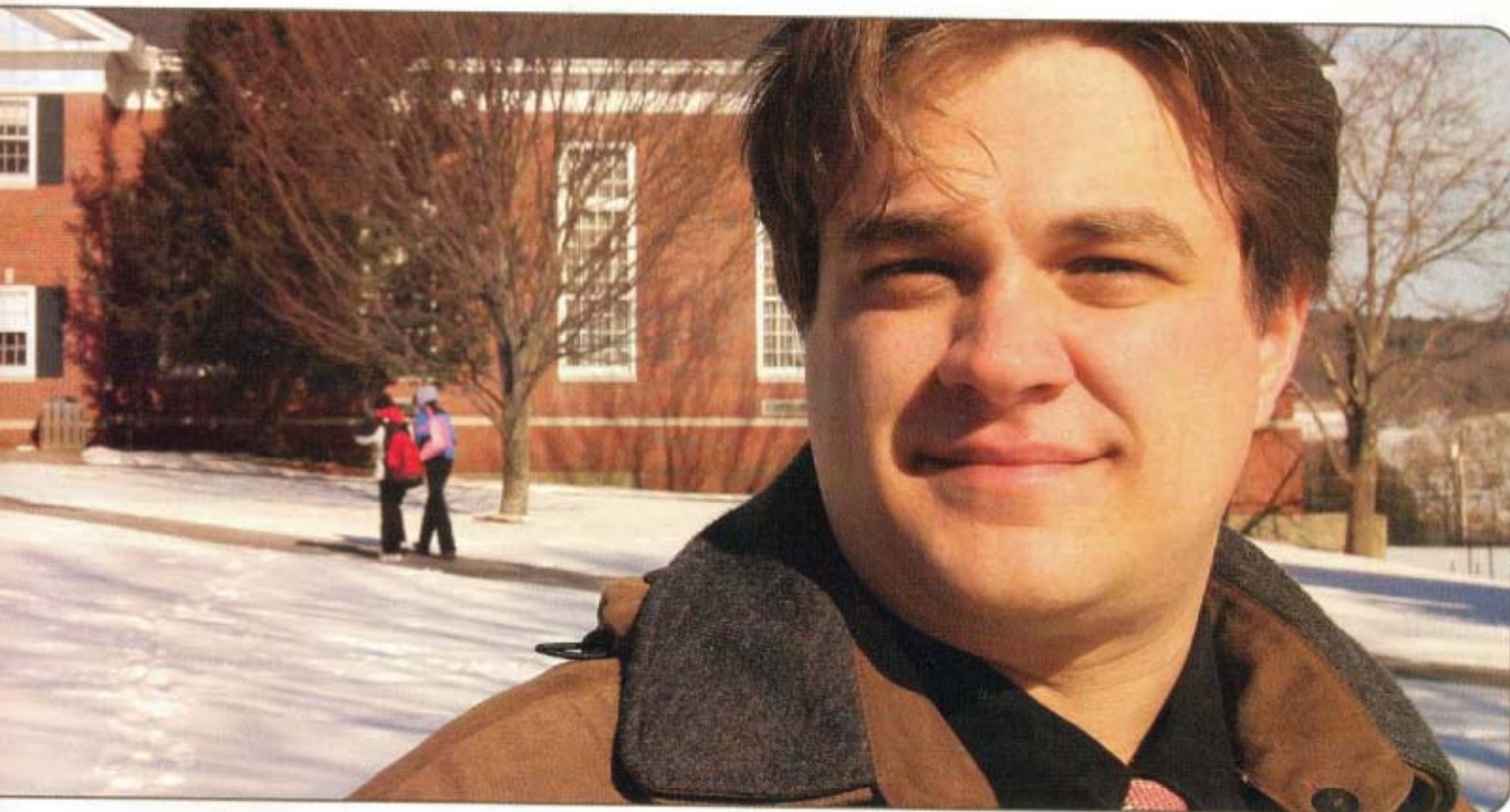
What to Consider When Evaluating a Server-Blade Solution

- **Capital cost:** While you can add blades as you go, you need to invest a fair amount upfront. That includes, for example, $2,000 for each blade; $1,500 to $3,000 for the enclosure; $4,000 to $6,000 for each interconnect switch; $800 for a UPS unit; $700 for the metal rack that holds the enclosures and blades; and $300 to $700 for thin-client terminals. That does not include the cost of software, cables, monitors, keyboards and other accessories; nor does it include the cost of repair, maintenance and air conditioning.

- **Software licenses:** Among the first choices you'll have to make is which software manager to use. Microsoft Terminal Server and Citrix Presentation Server are popular choices, but the terms and conditions vary significantly between the two. (Citrix can be thought of as an "add-on" to Microsoft Terminal Server, extending its functionality.) You'll also have a choice of licensing the software for a certain number of users and time or purchasing it outright. You also will have the option of purchasing technical support.

- **Processing power:** Most blades — for example, HP's ProLiant BL20p G3 or IBM's eServer BladeCenter HS20 — come with one processor and can accommodate two. However, blades are available with as many as eight processors, such as HP's ProLiant 8500 servers. Multiple processors provide more power and the ability to accommodate more users.