Savvy Server Consolidation

Scale Out With Blades and Scale Up With Rack Mounts

Saves Money and Staff Time

Many companies today have a large number of servers to consolidate. The combination of client/server computing, distributed/decentralized computing and relatively inexpensive hardware — inexpensive enough to dedicate one box to a given task or application — has resulted in what's often referred to as "server sprawl."

Now, companies are trying to rein this in — consolidate servers in one or more ways. The idea is to reduce the TCO (total cost of ownership) of their IT server environments, and to make their servers "more flexible" — better able to respond to shifts in load demand or hardware problems, and to provision new servers in minutes instead of hours or days in response to the creation of new services.

And server consolidation is no longer just for enterprises. Today, using blade-server chasses like HP's ProLiant BL Series systems and IBM's eSeries BladeCenter, or higher-powered 2-way and 4-way processors like IBM's eServer xSeries and HP's ProLiant DL servers, even medium-sized businesses can benefit from it.

"More and more people want to do server consolidation, says Jonathan Eunice, principal analyst with IT research company Illuminata. "The processors keep getting faster and more capable, so over the past decade, especially the past few years, server consolidation has become much less a specialty thing for people to do, and now also for the middle-of-the-market."

Why Consolidate? Money, Speed and Flexibility

To some extent, server consolidation is almost necessary, simply to make full use of today's increasingly powerful hardware. CPUs keep getting faster. Two-way and 4-way systems can put more than one CPU on a motherboard. And dual-core architectures will allow these numbers to double, fitting two CPUs in spaces where currently just one will fit.

Almost all new x86 processors are 64-bit, capable of utilizing massively more gigabytes of RAM and terabytes of storage than the previous generation of 32-bit processors. They also incorporate many other architectural and technology improvements. While 64-bit versions of x86 operating systems are relatively new, and 64-bit versions of applications mostly still under development, buying 64-bit hardware positions any size company for years of growth and evolution.

"When you're talking about servers that have been around five to seven years, anything you buy today will be worlds faster," says Ryan Aubin, HP brand manager, CDW. "Customers realize that one new server could very well do the same job as three old ones."

Getting more value out of each new hardware dollar is one obvious reason for server consolidation. Studies by virtualization software vendor VMware estimate that while some servers are fully utilized, many, such as file and mail servers, are running at only 50 percent or even as little as 10 percent of their capacity.

"I'm seeing reports of two-to-one and four-to-one consolidations. And one new server replacing as many as eight, ten, even fifteen lower-stressed existing machines," says Illuminata's Eunice.

The Cost of Server Management

But the cost of hardware represents only a fraction of the total cost of ownership. A study by the META Group tech research firm showed that organizations typically spent $7 on management for every dollar spent on infrastructure.

The biggest reasons that Illuminata's Eunice has been seeing for server consolidation, he says, have been "to save on equipment ▶

cost and management costs and in some cases, space savings. Also, to reduce complexity — it's easier to manage fewer hardware systems."

Steve Fink, director, IT Consolidation Solutions, HP, says, "In a typical data center, about 90 percent of the expense is the staff along with site-related costs — with people being the biggest part of this. Only 10 percent is hardware cost. So you're trying to free up IT staff from routine administration and management to work on projects that drive the business. You can also avoid hiring as many new IT staff as you add new servers and applications that need managing."

Consolidating older, dispersed servers to a smaller number of more powerful — but less bulky — servers can reduce power and cooling requirements, the number of licenses for software and the amount of management software needed. It can also reduce space requirements often enough to avoid or postpone the need to expand your data center to accommodate more server power.

To handle the 35 percent sales growth fueled by the iPod accessory market, Belkin Corporation, according to HP's Fink, "migrated from older servers to an HP-UX server, which required only one-third the floor space and one-seventh the power. This resulted in $140,000 annual savings in management software and delivering a 250 percent increase in performance.

"The focus on consolidation is shifting from boxes to a business discussion and from 'saving money' to 'my business is changing quickly, and IT has to respond,' " says HP's Fink. "Companies are asking if we can consolidate them into a virtualized platform where changing things is done in hours to minutes."

> The idea behind consolidation is to free up IT staff to work on projects that drive the business.

Telltale Consolidation Signs

According to HP's Fink, it's time to consolidate servers when:
- The average age of your server is three or more years
- You are still utilizing direct attached storage
- You have too many management tools
- Your IT staff is minimal and seems always focused on maintenance
- You're not poised to consider open source applications and an open environment where you can move from operating system to operating system
- There's a significant need to simplify and modernize your applications
- You are completing a software refresh
- Your Web servers have multiplied to the point where you have a management problem

Types of Server Consolidation

There are several types of server consolidation. However, not all types of consolidation address the pressing need for decreased TCO and improved IT responsiveness and flexibility.

Logical Consolidation- This process doesn't involve changes to your servers, only to the management tools and procedures, ideally letting each administrator handle more machines.

Physical Consolidation- A process also called centralization, it physically relocates servers, even entire computer rooms or data centers, to a smaller number of locations — assuming that the central locations have the space, power, cooling, weight-bearing capacity and other capabilities to support this larger number of systems, and that your company can afford the server downtime. This helps reduce IT maintenance effort, by minimizing travel. It can also simplify backup.

Rationalized Consolidation- Also called workload or application consolidation, this process is a first step to making better use of your existing server hardware — although it may require more RAM, possibly also third-party virtualization software such as VMware or Microsoft Virtual Server. The idea is to merge existing server applications onto more powerful systems to improve hardware usage, letting you repurpose or decommission the least powerful systems.

Scaling Out and Scaling Up

It may be time for new hardware. (At the same time, you'll probably want to do server virtualization, and go the NAS (network attached storage)/SAN (storage area network) route for your storage.)

Going to new servers usually means "scaling out" or "scaling up" (or some of each). "Scaling out" means more servers, typically with "blade" servers, such as an IBM eServer BladeCenter platform or HP BL ProLiant Series servers.

For example, rather than have 42 1U servers in a rack, "you can have 84 servers in that same rack," says Bob Lenard, director of Solutions and Channel Enablement, IBM xSeries, IBM. The blade servers may be loosely or tightly coupled, he notes, e.g. in a cluster so they can share workloads. "And that rack can also hold your I/O channels and switches, all consolidated into this environment, so your management becomes better."

In terms of traditional "U" real estate, "you may need up to 50 percent less space when you go to blades," says IBM's Lenard. "You may also need 25 percent less power and cooling, and you may have about one-third less weight than a comparable 1U configuration — which could be important, as older data center environments may have a weight limit."

The other direction to go in buying new hardware is scaling up to more powerful processing environments — to 4-, 8- and 16-way servers, such as IBM xSeries or eSeries, or HP ProLiant DL servers. The raw performance improvements in processors lets them handle more workload.

What's Right for Your Company

For an initial server purchase, advises CDW's Aubin, there are several factors that tip the scales in favor of blades. "If over time you're planning on adding a significant number of servers to your data center, or concerned about rack space constraints and the cost of cooling them, you should seriously consider looking at blades."

"It depends on what you're trying to do," says IBM's Lenard.

"Some people like 1U units for their cost economics, and ability to put more memory in them. Blades have more limited physical space in memory slots.

Virtualization — Squeezing In More Action

To get the best use out of today's new 64-bit rack and blade servers, you'll probably want to employ server virtualization — creating virtual machines each running in a secure partition of the hardware, for its administrative and management benefits as well as for maximizing utilization.

Virtualization is gaining rapidly in popularity. An October 2005 report from analyst firm IDC says that survey respondents expect that 45 percent of new servers purchased in 2006 will be virtualized, and predicts that over the next several years, more than three-quarters of all 500-plus employee companies will be using server virtualization.

HP, IBM, Sun and VMware offer their own virtualization management tools for data-center level rapid creation, deployment and control of the virtual machines. It enables administrators to provision and deploy a new instance of a server in minutes instead of days. It also allows moving to a fully-configured system from one physical server to another almost instantaneously, to work around failing or failed hardware, or have access to more capacity.

Another important benefit of virtualization is that your backup site no longer needs to be an exact duplicate of your primary server environment. Instead, it simply needs to be able to run enough of the virtual machines.

"Companies are finding that once they consolidate and virtualize, it's much easier to make the resulting infrastructure resilient for business recovery and continuity solutions," says Richard Lechner, vice president, virtualization, IBM.

The Consolidation Process

As with any IT undertaking, there are a variety of factors to consider. "Make sure you've thought about the IT economics of the consolidation project," stresses Steve Fink, director of IT Consolidation Solutions, HP. "Think of it as a technology and business discussion."

To ease the decision-making process, CDW can be a trusted advisor throughout the consolidation process, says Mike Beltrano, server product manager at CDW. Beltrano describes CDW's role in a four-step process:

1) Plan- Conduct assessments, take an inventory of current servers and applications, and recommend a solution

2) Implement- Configure servers, ship and install new systems and any upgrades to existing systems

3) Manage- Provide any necessary integration and ongoing support services

4) Evolve- Help scale solutions as the business grows and fine-tune the IT environment as needs change

"To help customers understand the benefits of server consolidation, and determine whether it makes sense, CDW offers an online Server Consolidation Assessment tool at (cdw.com/assessment)," notes Beltrano. This easy-to-use tool asks a series of simple questions and generates a customized report that details the benefits your organization may gain from server consolidation.

CDW offers configuration, product support and customized professional services. Call your account manager for details.