



SERVER CONSOLIDATION

WHY LESS IS MORE

The task of consolidating your data centers may seem daunting, but what you'll get is infinitely better than what you're giving up

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By Steven J. Schuchart Jr.

Sprawling data centers replete with rogue servers, departmental turf wars and multivendor, multimigraine installations are elevating IT stress levels, leading many of us to ask: "How can we do this better?"

The short answer: Fix it so you manage fewer devices.

Don't get us wrong. We like a few racks' worth of beefy hardware as much as the next geek, but it's time to embrace the "C" word—*consolidation*—specifically, server consolidation. It's a concept whose time has come. A recent survey of 475 Gartner Data Center Conference attendees showed that 92 percent were considering or implementing some type of server consolidation. Whether you choose racks of 1U devices, virtual servers or blades, you'll reap benefits, including easier management and cost savings.

In "Pitching Blades," (see page 45), we zero in on the blade market, which will grow to \$3.5 billion by 2006, according to Imex Research. Sixty-two percent of Gartner conference attendees polled said they had installed or were considering blade servers. The Big 3 server vendors—Dell Computer, Hewlett-Packard and IBM—have all released blade-server products in hopes of capturing a piece of that expanding market. Original plans for backplane integration were to include InfiniBand, but the InfiniBand market has failed to take off. We predict the technology steamroller called Ethernet will prevail against newer technology in the blade-server market, as it has in other areas.

Downsizing Your Domain

Whether in the data center or home sweet home, the idea of "less is more" can improve your quality of life. In fact, taking on a server-con-

FYI

An ROI analysis' value is, like beauty, in the eye of the beholder. There are two kinds of cost savings, **soft money** (qualitative) and **hard money** (quantitative). Hard money is

measurable in generally accepted accounting terms. For example, if a consolidation project lets you retire 15 servers, quantitative savings can be gained from canceling service contracts, reducing facilities costs (power, cooling) and transferring or selling server OS licenses—that's real cash saved, on a daily, monthly or yearly basis. **Hard-money savings are the easiest to sell** and should be the backbone of your ROI analysis whenever possible.

consolidation project is a lot like moving from a sprawling suburban colonial to a minimalist city loft. It's a lifestyle change, and adjustments are required.

Adjustment 1: No pets allowed

In a loft, there's no turf for Fido to frolic in. Likewise, to fully realize the benefits of server consolidation, individual departments must give up their pet server projects. To implement this, you will have to play politics. Get upper management firmly behind you before business-unit administrators catch even a whiff of what you're planning. That may sound harsh, but if too much FUD is inserted into executive ears before you present your case, you're toast.

Take advantage of the resources available to help you build your case. All major server vendors have tools and documentation to assist you, not only in making the overall decision but also when consolidating to a particular platform. In its BluePrints series, for example, Sun offers a useful book called *Consolidation in the Data Center* (see www.sun.com/solutions/blueprints). Dell, HP and IBM all have dedicated server-consolidation services. It may seem extravagant to employ such a service, but IT's biggest hurdle usually is getting upper management to sign off on funding, whether because of the aforementioned political pressure from department administrators or a fear that it's just another "technology for technology's sake" project. In fact, the reality couldn't be further from the truth: It's all about your server farm's TCO (total cost of ownership) and the ROI for the consolidation project. A reduction in TCO is the main cost motivation, and indeed, 68 percent of Gartner conference attendees polled said their organizations

have saved money via their consolidation initiatives.

In terms of ROI, there are many benefits to server consolidation. First, there's administrative time-savings. Each server requires a number of tasks be performed on a yearly, monthly, weekly or daily basis. For example, dreaded annual tasks include physical inventory, such as serial-number verification and machine-configuration recording, and software inventories to keep up those licensing schemes. Monthly (at least) tasks include software updates, utilization monitoring and OS security monitoring. And don't forget weekly utilization tracking and daily verification of nightly backups of each machine. All these tasks take administrative time. (Remember, though, that there are multiple administrative levels, and tasks are often split. Don't count everything at the top pay grade.) Reducing head count has not proved to be a major source of savings—it's cited by only 23 percent of those surveyed by Gartner. But being able to redirect talent can lead to cost avoidance down the road.

Another benefit to consolidating servers is having a highly fluid infrastructure, which not only allows for simpler management but keeps an organization more nimble in terms of allocating capacity on the fly. A company that truly knows its capabilities can more accurately predict the costs and benefits attached to a

Executive Summary

Server Consolidation

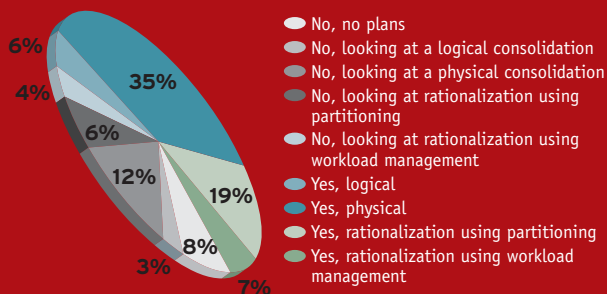
You can call it **server consolidation** or utility data center. It doesn't matter if you plan to use blades, racks of IU servers or virtualization software. The bottom line is that many data centers are weighed down with a bloated TCO, and we're not going to take it anymore.

Still, making the business case for consolidation can be tricky—departmental server politics alone can blow a nascent project out of the water—and there's a raft of practical hurdles that need to be confronted for such an endeavor to succeed. Server-consolidation projects are complex, with whole books devoted to the subject, but this article will familiarize you and your organization with some of the common benefits and hang-ups that come with the territory.

In "Pitching Blades," page 45, contributing editor James E. Drews rounds up a smorgasbord of blade servers from Dell, HP and RLX. These blade offerings run from sub-\$2,000 systems to a \$32,923 device with bells and whistles out the wazoo. But all offer reductions in server space, cables and software licenses, and deliver tantalizing flexibility and ease of management.

SERVER STATS

Do you have a server-consolidation project under way?



Source: Gartner, 475 respondents

new project. Consolidation will give you an accurate picture of your overall available data-center capacity and facilitate planning for future server projects. Server consolidation also can be a jumping-off point toward making business and IT goals more closely aligned from the ground up, perhaps enabling greater access to silos of customer data.

Speaking of cost analyses, remember that some savings, such as less need for technical support and reduced security risk, are highly subjective. We strongly recommend that you determine early in the game what is important to your company in terms of soft dollars. For instance, some organizations may not place much value on administrative time-savings. Make sure that your projected ROI numbers reflect your reality. Do not let consultants determine the relative value of qualitative factors. Outside contractors can help educate upper management, but at the end of the day, if a given metric has limited credibility in your organization, don't make it the cornerstone of your presentation.

Adjustment 2: Enough for everyone

In the 'burbs, it didn't matter that dad hogged the bathroom for two hours every night after dinner. There were two more bathrooms in the house.

Likewise, in the server room, standardized buying practices and other factors have led to uneven utilization rates. A data center before practical consolidation will no doubt have a number of servers running well under their capacity and some that consistently red-line or come close. A server consolidation project will help you identify specific servers that can be consolidated into one unit to better utilize capacity

Convinced?

ONCE YOU DECIDE THAT SERVER CONSOLIDATION IS IN YOUR FUTURE, HERE'S HOW TO GET STARTED:

- » 1. Get your physical inventory up-to-date.
- » 2. Determine how many resources are being used on all servers.
- » 3. Prioritize each software subsystem according to business importance. Go where it makes sense first, balancing the benefits of server consolidation with the risk involved in moving a given application or business-process system.

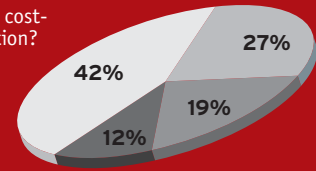
FOR HELP WITH INVENTORY AND RESOURCE MONITORING SEE:

- » "Firm Engineers Better Asset Management," www.internetweek.com/newslead02/lead030402.htm
- » "MRTG Monitors What's Brewing," www.nwc.com/1406/1406ws1.html
- » "The End All of Network Performance Management," www.nwc.com/1325/1325f4.html
- » "Design Tools Come Into Focus," www.nwc.com/1219/1219f3.html

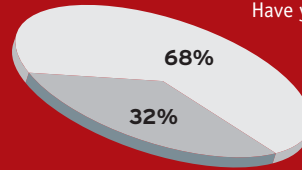
SERVER STATS

What area will offer the most cost-savings in a server consolidation?

- Staffing
- Hardware
- Software
- Facilities



Have you been able to save money via a server consolidation project?



- Yes
- No

Source: Gartner, 475 respondents

across the enterprise. This process can be as simple as moving several multiple-purpose servers into one large unit. Another piece of low-hanging fruit is the ability to consolidate systems with similar end-user functions into one company-standard platform.

Moreover, capacity utilization has more than one facet: Each individual server takes up space in your data center. Each running server consumes expensive data-center power, cooling, cabling infrastructure and UPS capacity. All these physical considerations can be quantified into reduced TCO.

Adjustment 3: Care and maintenance

Move to the city, and forget tending an acre lot. Visualize one tomato plant in a pot on the fire escape. Likewise, fewer servers to care for equals more care for the servers you have. The process may be painful, but the result will be easier to maintain.

Less hardware means less failure. The more time your server administrators have to perform routine maintenance, the more likely that problems will be caught before they cause downtime. The result: Server consolidation leads to greater uptime and reliability, letting you achieve service-level goals without breathing hard.

Adjustment 4: Guarding the castle

Trade in that buggy security system with wires running around 78 windows and doors for one large doorman named Spike.

Security is one of those benefits that is hard to quantify. If your organization has servers scattered across multiple locations, the chances increase that you'll be compromised by an attack on your systems or social engineering. Branch offices that have little contact with IT are often less than vigilant. Even within your main locations, IT may not strictly enforce its security procedures on every department-level server. Having fewer people responsible for knowing and following a security policy can't help but result in stronger enforcement (if you have problems in this area see "Got Discipline?" at www.nwc.com/1410/1410cp1.html).

Even physical security can be problematic in geographically diverse environments. Security in the headquarters may be top-notch, but at a small regional office it may be nothing more than glass and a locked door. All these factors point toward the strong likelihood of increased security benefits via a consolidated server environment.

Adjustment No. 5: Being cost-conscious

In the suburbs, you pay the gas bill, the water bill, the electric bill, the lawn guy, the property taxes and so on. In the city, you pay the rent, period.

Beyond the simple costs of server purchase and maintenance, there are licensing and software support costs. Linux may be free-as-in-beer, but most server OSs cost money. Your management suite probably has a per-server license, as does your antivirus software. Add in the cost of support contracts for the operating systems and service contracts for the servers, and you're spending a good pile of cash on each machine. Fewer machines, fewer costs.

The Utility Data Center

Somewhere, like a distant mirage, there lies an IT utopia called the utility data center. It's a place where new projects can be implemented simply by assigning the needed memory, network bandwidth and hard-disk and processor resources. Imagine a data center dial tone, where all of these assets are measured in percent utilization of an existing pool, and the standalone server is a thing of the past.

Technology is finally making this vision a reality—HP, Sun and IBM all have ongoing utility-computing initiatives. Although the specifics of the utility data center are still vague, it will start with consolidation of servers and storage. For example, HP is selling both storage and servers on a pay-as-you-need basis, which is one of the early business changes that need to occur before the utility data center can come to fruition.

Of course, old-timers will point to their beloved mainframes and claim that this concept isn't new. On the face of it, we agree. The difference is the unprecedented degree of freedom and flexibility the utility data center offers in the form of very granular upgrades, for example.

Data-center consolidation is the foundation of utility computing, and server consolidation is the cornerstone.

Many Choices, Grasshopper

Server consolidation comes in many forms and flavors, but the most popular methods are virtual servers, 1U consolidation and blade servers.

» **Virtual servers:** This method is intriguing, but frightening. Software like VMware and Connectix (recently purchased by Microsoft) let you buy one big server and run many instances of the needed OS—thus the “virtual servers” moniker. Unisys, for example, makes a huge 32-processor Intel machine, called the ES7000 Series. Using VMware or Connectix, you could replace as many as 32 single-processor servers with virtual machines. Personally, this approach gives us the “eggs all in one basket” willies, but many companies are buying in.

» **Consolidation to a rack:** Stacking identical 1U servers is a proven method, but it's a bit old school. On the plus side, it generally gets a company to a single hardware platform, but you may not appreciably reduce the overall number of servers in the rack as you would with blade servers.

» **Blade servers:** The last method, and the one that we think is conceptually closer to the utility data center ideal (see sidebar at left) is the blade server. Blade servers are special chassis made up of multiple processing blades. They have centralized control centers and can be teamed, repurposed and redeployed in a rapid, centralized fashion—well, that's the idea, anyway. To see how well theory matches reality, check out “Pitching Blades,” page 45.

Let's Get Standardized

The “C” word comes in three varieties: hardware, OS and database.

» Hardware-platform consolidation

Is there anywhere you can consolidate processor platforms? Many companies have a number of one-off, special-purpose servers that were purchased years ago. Perhaps it's viable to move the applications they run from, say, RISC to inexpensive x86 hardware. We're not going to debate the merits of individual platforms. We will say, however, that the more diverse systems you support, the more you will spend. Ideally, you should run only one or two server platforms.

First, pick a vendor for each supported processor platform. Many companies have already wisely chosen

WebLinks

Find this story online at www.nwc.com/1411/1411f1.html

Storage & servers white papers, www.nwc.com/go/stor-papers.html

Storage & servers research reports, www.nwc.com/go/stor-res.html

Storage & servers books, www.nwc.com/go/stor-books.html

“Servers: The Next Generation,” www.nwc.com/1319/1319f1.html

“Veritas Software Unveils Utility Computing Model,” www.techweb.com/wire/story/TWB200305050001

to use only one vendor for server hardware, saving them time and money. For instance, you may pick AIX and therefore IBM for RISC, and Dell for x86. One vendor per platform means that your administrators become familiar with technical support practices, warranties, configurations and particular vendor foibles. We are not advocating that you get out the chains and arc-weld yourself to a particular vendor; we are just saying that the vendor-of-the-week game can be detrimental to your data center and your sanity.

» OS consolidation

A server-consolidation project is a good excuse to reduce the number of operating systems in your data center. For example, it may be time to put your old SCO boxes out to pasture and move to Linux. Unfortunately, this

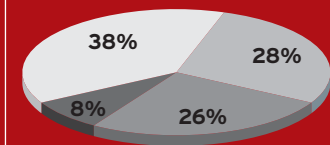
Pick an OS that runs well on your processor platforms.

often calls for an application upgrade and relicensing. The business case here is to get the most out of the server-consolidation benefits we outlined above.

The other main consideration in terms of OS consolidation is to make sure that your chosen OS platform(s) operate well on your preferred processor platforms. Sounds like a no-brainer, but remember: Just because a given OS *runs* on a particular processor platform, that doesn't mean it *runs well* or is widely supported. Solaris on x86 is a prime example, though Sun recently has shown growing warmth toward the x86 platform.

SERVER STATS

Are you using or considering blade servers for server consolidation?



- No, no plans
- Considering them
- Considering them, but need more functionality
- Have a blade server installed now

Source: Gartner, 475 respondents

» Database consolidation

Databases can be the root cause of some of the server sprawl in your data center. Now may be the time to consolidate to one database platform to support all of your applications. This idea may be as politically charged as the server-consolidation project, but it will pay off: The simplification of your environment will reduce the need for custom integration because fewer databases will need to talk to one another (for a look at database area networks, or DANs, see "Savantis Introduces Its DAN," page 52).

Finally, apply common sense. If moving a given software system to a new OS overshadows the cost savings in the long term, don't do it. If there's a remote server that is impractical to move into your centralized data center, then leave it.

Server consolidation is not an end unto itself, nor is it an all-or-nothing game. Even partial consolidation can save money, increase efficiency, improve security and make your IT department better able to react to business changes. A little success goes a long way. Server consolidation will cause short-term pain, but it's the first step to long-term bliss.



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