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**Companies streamline with virtualization**  
*by Mark Anderson - 11.28.07*

Most Americans start their work day by flipping on a computer. So it's no surprise that data centers, which provide reliable, secure access to information technology, have become increasingly vital to the U.S. economy.

Yet a typical data center consumes an estimated 20 to 30 billion kilowatt hours of electricity annually, according to the Alliance to Save Energy. In 2006 alone, data centers were responsible for 1.6 percent of the nation's total electricity consumption, worth \$4.5 billion, according to the U.S. Environmental Protection Agency (EPA). While the EPA predicts the figures will double by 2012, a quantum leap in data-server efficiency offered could change the game entirely. Virtualization, or the consolidation of the work of many data servers onto far fewer machines through the use of software, is transforming a global industry and saving vast amounts of energy in its wake.

"It's either a revolution or a transformation," says Jake Smith, advanced server marketing manager at Intel. "I tend to believe it's a transformation of data-center infrastructures. But it certainly has revolutionary characteristics."

Data centers are commonly filled with many servers, which require a tremendous amount of time, money and energy to maintain. Virtualization software essentially allows data centers to optimize fewer servers to run at higher performance levels. Some experts compare server virtualization to the theory that humans use only a small percentage of our brains.

The average utilization ratio of a server is 15:1 according to John Beaston, co-founder and vice president of customer services at EasyStreet Online Services. Beaston says five more applications could fit on such a server and it would still only be 90 percent utilized. "That's the basic concept. Then, what most will do is get a beefier box and put a lot more virtual servers on it," he says.

Ratios, according to Intel's Smith, have the ability to reach 50:1 and beyond.

"If you're just running file and print servers, you probably have the ability to go 30:1," he says. "If you're running a sales force automation application infrastructure, you may only have the ability to go 3:1. It really depends on the application environment. You modify your ratios to whatever best suits your needs."

The port of Seattle began running a 32:1 consolidation ratio in 2005, and now boots up 220 virtual servers on seven machines. Overall costs are about 20 percent of what 220 physical machines represent, according to Matt Breed, senior manager of enterprise infrastructure.

"A lot of servers are sitting out there burning electricity, but they're not being utilized very heavily," Breed says. He notes investing in virtualization software allowed the port to save on hardware, electricity, thermal output and space.

Virtualization also results in enhanced reliability, according to many experts. Processes can migrate to sister machines at off-site locations, for instance, barely missing a beat.

"You get redundancy that you normally didn't have with physical boxes," Breed says. "Traditionally, you've got a physical box deployed, and you may or may not have documentation on how it was configured or deployed. You lose that physical box for any reason, and you have to rebuild it and get it back online. Most people don't have spares sitting around."

Meanwhile, plugging in far fewer servers and using significantly less air conditioning has attracted the attention of electric utilities.

"When we look out into our integrated resource plan for the next five years, which every utility does, the two major resources are either renewables or energy efficiency," says Thor Hinckley, renewable power program manager for Portland General Electric. "The idea that we're going to be building new generation sources that aren't renewable is just not in the cards."

Virtualization provides instant opportunities for companies to increase renewable energy use.

"We're selling renewables at a premium," Hinckley says. "And the discussion is always a lot easier when you're in a situation where businesses have reduced costs. Then the idea of an increase—a premium cost—is an easier discussion to enter into."

Virtualization software released in 2005 by Palo Alto, Calif.-based VMware, is the recognized industry standard. But untold others, including Microsoft, are working overtime to catch up. "VMware is the clear leader, and they deserve the praise," says Intel's Smith. "But they will not be alone in the virtualization marketplace forever."

The surface has barely been scratched.

"The increase in the number of virtual machines to run on any given CPU platform could go as high as 100:1 or 200:1 if you think far enough out into the future," Smith says. "But what we're really seeing is that virtualization is becoming an infrastructure for innovation."

Nor are home computers immune to the possibilities. A version of VMware for Macs also lets users run Microsoft Windows and Linux side by side, says EasyStreet's Beaston. "You can mix Linux and Windows and Mac, because a virtual machine can be any operating system.

Even so, IDC, a Massachusetts-based provider of global market intelligence, estimates only 17 percent of the worldwide server market will be virtualized by 2010, up from 5 percent in 2005. But the Energy Trust of Oregon is already on board, accelerating plans to offer best-practices training, according to Greg Stiles, the Energy Trust of Oregon's senior business sector manager.

"This is a revolution," Stiles says. "We're jumping in over our head, and we're going to figure it out because it's time to do it. It's been an underserved market, it's been an unaddressed market, and in that sense it's a low-hanging fruit."

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**VMware is the clear leader, and they deserve the praise.**

*Jake Smith, Intel*



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