



Where are you going with virtualization? Next steps in technology

Last Updated: 01/23/08

Executive Summary

As virtualization matures as a technology, there are several trends that organizations will want to watch. They include blade servers, storage area networks, more robust management tools, optimized hardware and input/output virtualization.

As virtualization gains ground in business IT departments, the technology keeps maturing. Here are five trends organizations will want to watch in the next few years as they consider virtualization.

Blade servers

A blade server is a group of high-density circuit boards, called blades, that each contain processors, memory and network connections. In traditional box servers, these components are usually spread out on multiple boards. Blades reside in chassis that hold anywhere from eight units to several dozen units.

As leasing contracts expire on older equipment, companies migrating to virtualization are choosing more and more blades as their storage and server system. And it looks like the popularity trend will continue: Gartner estimates that by 2010, blades will make up 20 percent of server shipments.

“From a hardware perspective, blade servers are the ideal platform for a virtualized, consolidated environment,” says Ed Javier, product manager for CDW.

There are several reasons that blades benefit businesses. First of all, a blade chassis holds twice as many servers as a traditional rack-mount setup and provides power and cooling for the servers. This not only reduces power and cooling costs, it saves space and eliminates cable clutter. Blades also have a single management interface for configuring and maintaining multiple servers. They are flexible, easy to centralize and offer an easy upgrade path — just pop additional blade servers into the chassis as needed. In short, blades reduce overhead costs, simplify management tasks and offer easy clustering and failover capabilities.

Blades have disadvantages, such as proprietary vendor hardware designs, occasionally sketchy input/output (IO) interoperability and the danger of obsolescence due to rapidly evolving technology. But there’s no doubt businesses see the value in blades.

Blade servers can:

- *Reduce floor space in a data center by more than 20 percent*
- *Boost utilization rates to 80 percent or higher*
- *Reduce cabling by 80 percent*
- *Reduce BTUs per server by 50 percent*
- *Reduce power costs per server by 20 percent*

Storage area networks

As virtualization becomes more popular, companies are embracing networked storage over direct-attached storage (DAS), which is a traditional one-machine-to-one-hard-drive scenario. With DAS, if you move a virtual machine around a system, you have to move both the application and the data used by the application — a time-waster for IT. With networked storage, the data already resides on a shared disk array, which speeds the process and allows businesses to take greater advantage of virtual machine technology. There are two flavors of networked storage — basic network-attached storage (NAS), and higher speed storage area networks (SANs).

Storage area networks are gaining in popularity with organizations adopting networked storage. A SAN is a type of network-attached storage, connecting separate disk arrays scattered over a network into one virtual monolithic storage device that can be managed uniformly. What differentiates a SAN from a standard NAS system is high speed. SAN solutions move applications across an enterprise instantaneously and transparently to end users, and are ideal for high-performance applications. They provide flexibility, higher utilization rates and lower costs, especially when combined with a blade system.

SAN technology is becoming more widely used as components drop in cost and complexity. In addition, the proliferation of iSCSI — an IP-based connection standard — in storage devices makes a SAN even more desirable. One disadvantage of SAN has been the complicated Fibre Channel IO fabric necessary to pass data at high speeds between servers and storage devices. iSCSI is slower than Fibre Channel but fast enough for 80 to 90 percent of Windows environment applications. It's a familiar interface for IT workers accustomed to Ethernet and IP. And it allows secure SAN extension over IP networks, making it possible to tie together storage devices in far-flung locations.

Servers optimized for virtualization

Server manufacturers are increasingly manufacturing hardware with an eye toward virtualization. Vendors can pack more processor power and higher capacity into new servers, which is making up for the decline in performance sometimes seen with virtualization on older x86 machines. Buyers are seeing more dual and quad core — or higher — processors in the market. Intel is actually working on an 80-core prototype, which they expect to have in production by 2012. Overkill, perhaps, but a telling sign nonetheless.

Chipmakers are also integrating virtualization support into today's newest generation of processors. Intel Xeon and Itanium 2 processors both incorporate Intel Virtualization Technology, and AMD Opteron processors feature AMD Virtualization (AMD-V). The result of this built-in virtualization support is that IT can pack in more virtual machines per server — an increase from two virtual machines per socket to ten or even twelve. This further enhances consolidation and reduces costs. AMD also builds the memory controller into the processor, enabling Opteron servers to manage virtual machines more efficiently. And Microsoft is making technology investments to leverage new hardware virtualization features in upcoming versions of its server management software.

More virtualization management tools

Avoiding "virtual sprawl" — an overabundance of virtual machines — is just as important as eradicating server sprawl. "There tends to be this assumption that server virtualization by itself simplifies an infrastructure," points out Gordon Haff, principal IT advisor at Illuminata, Inc., a Nashua, New Hampshire-based, research, insight and advisory firm. "Actually, virtualization by itself makes things more complicated because you have another piece of software and more OS images to juggle. To really use virtualization to simplify...takes management and provisioning tools."

Makers of virtualization software are responding to the need for control over virtual machines; they're creating automation and management tools that make it possible for IT departments to manage hundreds and even thousands of virtual environments. Virtual Center from VMware is one example. And server vendors are adding virtualization management capabilities to their hardware and software management. Examples include HP's Systems Insight Manager and IBM Virtualization Manager, an extension to IBM Director.

Input/output virtualization

The last frontier in virtualization technology, input/output virtualization (IOV), has been discovered by hardware and software vendors. Servers and storage devices can both support multiple virtual machines, thanks to virtualization software. But most of today's host-bus adapter cards are still natively designed for a one-to-one system interface and support only a single instance of an operating system. IO virtualization, or the creation of several dedicated virtual connections between servers and storage, will widen the pipeline to bring the connection between servers and storage up to speed with the virtualized hardware itself.

Currently, there are ways to split IO bandwidth through software, with the help of products from VMware and Citrix. But as always, software-level emulation is more efficient when combined with native hardware support. An international standards group, the PCI-SIG (Peripheral Connect Interface — Special Interest Group) is currently working on a standard that would make it possible to segment IO bandwidth into individual virtual pipes. Industry analysts estimate that the first bus devices with built-in virtualization support will start to show up by the end of 2008. There are a few Fibre Channel host-bus adapters that include proprietary support for IO virtualization on the market, but businesses buying these solutions will want to ensure that they can be updated to comply with the new IOV standard when it is ratified.

Go virtual, or wait?

Virtualization is a fast-moving technology that changes rapidly. Does this mean that companies should hold off until technology matures? There is some risk of obsolescence if you invest now, but that almost always holds true for IT upgrades. If a company can benefit from virtualization and has the budget to go forward, now is as good a time as any to invest. It's important to plan carefully and make sure that whatever solution you choose has either a short ROI cycle or room to expand into the future to take advantage of the next big thing.

CDW's server consolidation and virtualization solutions can streamline your data center and cut IT, hardware and software expenses. They can also enable faster, more agile computing for the future, driving more savings and growth.

Ask your CDW account manager for details. If you don't have an account manager, call us at (800) 985-4239.