SearchServerVirtualization.com E-Guide

Server Virtualization: Expert Overview of Costs, Trends and More

Successful virtualization initiatives require IT pros to have a comprehensive understanding of both the software and hardware costs involved, as well as the disaster recovery efforts required. This expert E-Guide, brought to you by SearchServerVirtualization.com and Dell, provides an overview of the expenses associated with virtualization and highlights the virtual server trends expected for 2010. Gain insight into the tangible virtualization costs, and learn how to keep pace with the changing server virtualization market. Explore the pivotal role of virtual hardware platforms in your business.

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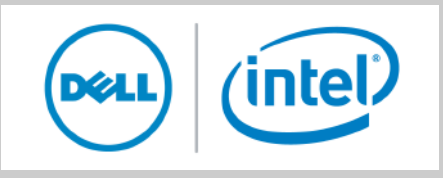

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Virtualization costs include software, hardware and labor

Stephen J. Bigelow, Senior Technology Writer

Understanding virtualization costs -- both tangible and intangible -- is the key to a successful analysis of total cost of ownership (TCO) or return on investment (ROI). Many tangible virtualization costs are readily apparent. Typically, they include the hardware, software and labor needed to make server virtualization work.

Server virtualization hardware costs

New servers are probably the easiest tangible items to identify.

Server virtualization hardware costs should include the initial purchase price for the preferred configuration, i.e., the desired CPU, memory, I/O and network connectivity setup -- as well as complete installation, anticipated power costs, maintenance and service contracts for the system's working life, and reasonably anticipated upgrades for the future, such as additional memory or CPUs.

Be realistic about your anticipated server virtualization hardware costs and savings.

"The capital costs for fewer servers may appear to be an immediate gain," said Allen Zuk, president and CEO of Sierra Management Consulting LLC, an independent technology consulting firm based in Parsippany, N.J. "However, fewer machines may very well cost more because the fewer machines will have to be more powerful to support the additional workload of the box."

In other cases, redundant server purchases may erase most, if not all, savings. Existing servers can certainly still be virtualized, but they'll rarely provide the computing power and redundancy features best suited for a virtual environment. As new servers are introduced to the environment, existing servers are normally relegated to secondary or nonessential tasks, reassigned to remote offices or relocated to backup and disaster recovery (DR) sites.

Server virtualization software costs

Virtual servers also require a virtualization platform, which adds in server virtualization software costs. There are numerous products to choose from, including Citrix XenServer 5.5, VMware vSphere 4 and Microsoft Windows Server 2008 R2 with Hyper-V. In addition to server virtualization software costs, there are also costs associated with tools that can help manage the infrastructure. There are vendor-centric products like Citrix Workflow Studio and VMware vCenter Server, as well as third-party management products like AppSense Management Center and others from vendors such as Kaseya.

You may need other software to enable features like high availability, clustering, failover, virtual server migration or backup. The needs will vary with each organization. Regardless of the actual products selected, server virtualization software costs should include the initial purchase and licensing price along with annual maintenance fees. Careful management is essential to prevent virtual machine (VM) licensing costs from spiraling out of control.

"VM licensing may increase if there is no good management of the environment," Zuk said. "On the other hand, administration costs should decrease."

Cost of obsolescence

Although it's relatively easy to identify new tangible virtualization costs, there are also business costs incurred when removing old or obsolete equipment from service. Examples of such write-offs include old servers that are not being reused or old cooling and power handling/distribution equipment that is no longer needed to support fewer physical servers. Some of this retired equipment may be covered under service contracts, and the unused portion of those contracts may add to this decommissioning cost.

Cost of labor

The last of the tangible virtualization costs to address when you calculate return on investment is labor, which is normally broken down into implementation and management and maintenance. Don't forget testing -- organizations often test the hardware and software together in a lab environment to ensure interoperability before making a purchase commitment.

"Failover software for VM solutions will also need to integrate with existing tools to support DR capability as well," Zuk said.

The labor expense involved in testing is often omitted from an ROI calculation, but its value cannot be ignored for training and process refinement.

Virtual disaster recovery will evolve in 2010

SearchServerVirtualization.com E-publications Staff

The growing adoption of server virtualization technologies in the enterprise has dramatically changed the traditional data center for the better. As the technologies evolve, hypervisors become more sophisticated and the list of available management tools continues to grow. But that's just the beginning of the changes you can expect. This tip highlights a few predictions for various facets of server virtualization technologies throughout 2010.

Server virtualization technologies prediction No. 1: disaster recovery

As server virtualization technologies continue to evolve, so will virtual disaster recovery considerations and planning. Although virtualization provides a backup of sorts, it is not a foolproof method. If one virtual server goes down, it can take hundreds of virtual machines (VMs) with it -- bringing enterprise operations to a screeching halt. Having a solid DR plan in place and examining each aspect will make all the difference.

Concerns about compliance and business continuance are also driving the need for disaster recovery strategies. Fibre Channel on Ethernet (FCoE), network virtualization, growing computing power and attention to security will all influence the future of virtual DR.

Server virtualization technologies prediction No. 2: server consolidation

The future holds promise for server virtualization and consolidation. Server technologies continue to advance, offering more processor cores and memory for the same amount of capital investment. This means that each technology refresh can potentially host more VMs and further reduce the total number of physical servers.

Organizations must adjust their practices to evaluate new VMs in the same way that they evaluate new physical servers. This is critical to prevent uncontrollable virtual machine sprawl --the possibility of organizations moving to 100 physical servers today spiraling to 1,000 virtual servers tomorrow.

Experts consider server consolidation to be one step closer to a fully virtualized data center that abstracts business data from its infrastructure.

"It's not just for power savings, hardware reduction or DR anymore," said Pierre Dorion, a Denver-based data center practice director at Long View Systems, an IT solutions and services company. "We're looking to completely abstract the physical layer at more levels than just the server." Inevitably, that will combine integration with other virtualization efforts throughout network, storage and the desktops/endpoints.

Server virtualization technologies prediction No. 3: test and development

If you've deployed server virtualization in the test and development lab and have worked with VMs, it may be time to take that next step. Try adding more virtual machines to the lab environment. You may also want to investigate using storage area networks (SANs) to centralize all files comprising your VMs in an effort to improve laboratory performance.

SANs cost more than typical tape and disk storage, so don't move to this level until the new virtual labs have proven records of performance and cost reductions. Keep in mind that you must still put proper backup and recovery practices into place.

Server virtualization technologies prediction No. 4: storage

Storage virtualization has been around for some time in one form or another. While its use in storage pooling and consolidation may have peaked, experts like Greg Schulz, founder and senior analyst at The Server and StorageIO Group, insist that this is just the beginning for other aspects of the technology.

"Storage virtualization in terms of agility, transparency, data movement, migration, emulation such as virtual tape … we're seeing the tip of the iceberg," said Schulz. Administrators should expect to see continued product maturity that will lead to more features that create more stability, interoperability and scalability, he added.

Network performance is also shifting, as FCoE and 10 GbE slowly emerge to provide the bandwidth needed for critical storage-intensive applications across Ethernet LANs. Deduplication also plays an indirect role by reducing the size of the overall data set, which can improve backup times and dramatically boost data migration speeds to DR sites.

Server virtualization technologies prediction No. 5: security

Virtualization has its weak points, and security flaws can easily surface in server configuration and OS patching. It's much easier to overlook a configuration setting or OS patch level when there are dozens of VMs on a physical server.

Traditional security techniques generally monitor network traffic and its behavior, which is suitable with distinct physical servers and networking hardware. But when multiple servers are hosted on the same machine -- along with network virtualization technologies like soft switches -- virtual security must emphasize inter-process monitoring of VM interaction.

Virtualization security flaws also surface in server configuration and OS patching. It's much easier to overlook a configuration setting or OS patch level when there are dozens of VMs on a physical server. Keep an eye on your hypervisors, which can also suffer from security flaws and potentially expose the VMs that run under them. Virtualization users should add hypervisor patching/updating to their OS maintenance process.

Server virtualization technologies prediction No. 6: hypervisors

Today's major hypervisors are well-developed, so innovation may have slowed. While the industry is largely settling into the "big three" products -- Citrix XenServer, VMware ESXi and Microsoft Hyper-V -- there is plenty of speculation on where hypervisor technology is heading in 2010.

Improvements in hypervisors will facilitate inspection and enforcement tasks. "We have a lot of clients under pressure to support more multitenant-type architectures where [implementers] start to mix some security zones on

the same physical infrastructure," said Chris Wolf, senior analyst for Burton Group data center strategies, noting the importance of security in public cloud situations.

Vendors will dramatically develop management tools, including that help provide data path visibility and troubleshoot applications in virtual environments as well as planning tools for virtual desktop environments. Tool evolution will incorporate products that manage virtualization throughout the data center infrastructure, including servers, storage and the network. Eventually, virtualization tools that provide integration with the cloud will become available.

Virtual hardware platform explained

Stephen J. Bigelow, Senior Technology Writer

A virtual hardware platform is a collection of computing resources allocated from a physical host server to a virtual machine (VM) during the virtualization process.

Virtualization creates a layer of abstraction between the application and the underlying computer hardware. This abstraction allows software -- the virtualization hypervisor -- to assign, control and monitor the computing resources that form the virtual hardware platform for a workload.

The concept of a virtual hardware platform is crucial to virtualization. It frees a workload from specific physical hardware devices so that the workload can run on any physical host with the proper computing resources available. It also allows key virtualization features, such as live migration, which moves workloads between physical servers with no downtime.

Benefits of a virtual hardware platform

The process of creating a VM assigns a default virtual hardware platform to the VM. Virtual hardware assignments include memory, processor cores, optical drives, network adapters, I/O ports, a disk controller and one or more virtual hard disks (VHDs).

Perhaps the most interesting attribute of a virtual hardware platform is its versatility, because an administrator can adjust the levels of each resource -- adding more memory and additional processor cores, allocating another VHD or assigning more network adapter ports, for example. Increasing resource levels will normally boost that workload's performance or responsiveness -- especially on older physical servers -- or allow the VM to support more users.

Conversely, an administrator can also remove virtual hardware from a VM. For example, an application may not be able to utilize a full 2 GB of memory or two processor cores. Removing excess resources will free those resources for allocation elsewhere, improving the performance of other busy workloads or increasing utilization on the physical server.

Generally speaking, an administrator will need to power down a VM before adding or removing resources.

Other virtual hardware platform uses

It is sometimes possible to allocate more memory to a virtual hardware platform than what is actually available from the physical host. For example, it is possible to configure a VM with 16 GB of memory on a physical server with only 8 GB of RAM. This process, called memory overcommit, allows more VMs to reside on a server, because most VMs don't utilize all of their allocated memory space. When physical memory runs short, the virtualization platform implements a virtual memory swap file on the virtual disk.

The practice of memory overcommit is well accepted, but there is still a serious performance penalty when using a swap file. Therefore, it's best to ensure adequate memory on the server.

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Selecting Server Processors to Reduce Total Cost

Virtualization with the Intel® Xeon® Processor 5500 Series: A Proof of Concept

Executive Q&A: Robin Johnson

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