

Virtualization—it's not just for enterprises anymore

Learn why so many midsize businesses are applying this dynamic technology to ensure business continuity and run leaner, more efficient operations.



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Abstract: Why have the majority of large enterprises embraced virtualization technology and why are midsize businesses the fastest growing market segment for new virtualization initiatives?

If you're not already aboard the virtualization train, then read this paper and get on it quickly. More and more midsize companies are deploying virtualization to transform their IT infrastructure into a highly efficient and flexible enabler to gain cost and time-to-market advantages with their business operations. By not deploying virtualization, you may soon find yourself at a competitive disadvantage.

So what do virtualized business know that other businesses don't? How are they benefiting from virtualization technology? And how are midsize companies able to afford these solutions that were once thought to be only for large enterprises?

This white paper will explore these important questions, examine common virtualization deployment scenarios, and explain how virtualization solutions from HP and VMware can help midsize businesses achieve a wide variety of business continuity, performance, and efficiency goals.

Introduction

Virtualization is a revolutionary technology that is dramatically changing the computing landscape. Although enterprises were generally the first to jump on the virtualization bandwagon, virtualization is an amazingly versatile, surprisingly affordable technology that has the capacity to right a whole lot of wrongs for IT organizations of all sizes. And the benefits are tremendous.

Frustrated by low server utilization levels? Lack the space to expand your infrastructure, the budget to buy new hardware, or the resources to deploy new hardware? Lack backup/restore capabilities? Grappling with out-of-control power and cooling expenses? Virtualization has the answers to all of these very common, yet frustrating, IT challenges.

Virtualization can help companies of all sizes vastly increase server utilization levels, delay or avoid hardware purchases, and expand infrastructure capacity without increasing physical space requirements. Plus it makes hardware deployment easier, helps bring power and cooling expenses under control, and provides backup and restore capabilities to ensure business continuity.

How does it work?

Traditionally, IT organizations have dedicated servers for each application, with each server configured to handle the peak load of the application it hosts. In these environments, most server capacity goes unused most of the time—and average utilization rates of less than 25% are common.

By virtualizing your server resources, you reduce the need to configure servers with excess capacity. By allowing several applications to run, in isolation, on one server without interfering with each other, you can decrease the number of servers you use.

Capital and operational savings

By reducing the number of servers you use, you can dramatically reduce your hardware acquisition and server management costs. Plus, since you'll also be using less power, less cooling, and less space, those costs are likely to drop as well.

The savings that result from virtualizing your infrastructure generally fall into two categories: capital cost savings and operational cost savings.

Capital savings come in the form of reduced hardware acquisition and data center real estate costs.

- Moving to a virtual environment reduces the number of physical servers necessary to support your infrastructure.
- An ancillary benefit is the possible redeployment of some existing infrastructure as part of a disaster recovery solution. This is made easier using VMware solutions and provides additional cost savings.
- Virtualization helps you avoid the cost of data center expansions. With building costs ranging from \$800 per square foot to a projected \$5,000 per square foot in 2009¹, this is a very important area for cost savings, especially when one considers that each rack of servers or storage requires approximately seven square feet.

¹Anthes, Gary, "Data Centers Get a Makeover," *Computerworld* news article, published November 1, 2005: www.computerworld.com/databasetopics/data/datacenter/story/0,10801,97021,00.html?SKC=home97021

Operational savings are substantial as well, with reductions in power and cooling costs, management costs, and costs associated with application downtime.

- Every server removed from the data center results in power and cooling savings of approximately \$800 per year².
- Virtualizing allows you to achieve up to a tenfold reduction in server provisioning time, which in turn leads to reduced infrastructure management costs.
- By enabling faster recovery from unplanned downtime and allowing for better management of planned downtime, virtualization further reduces indirect costs.

Total payback time for virtualization projects is typically less than one year due to the significant capital and operational savings.

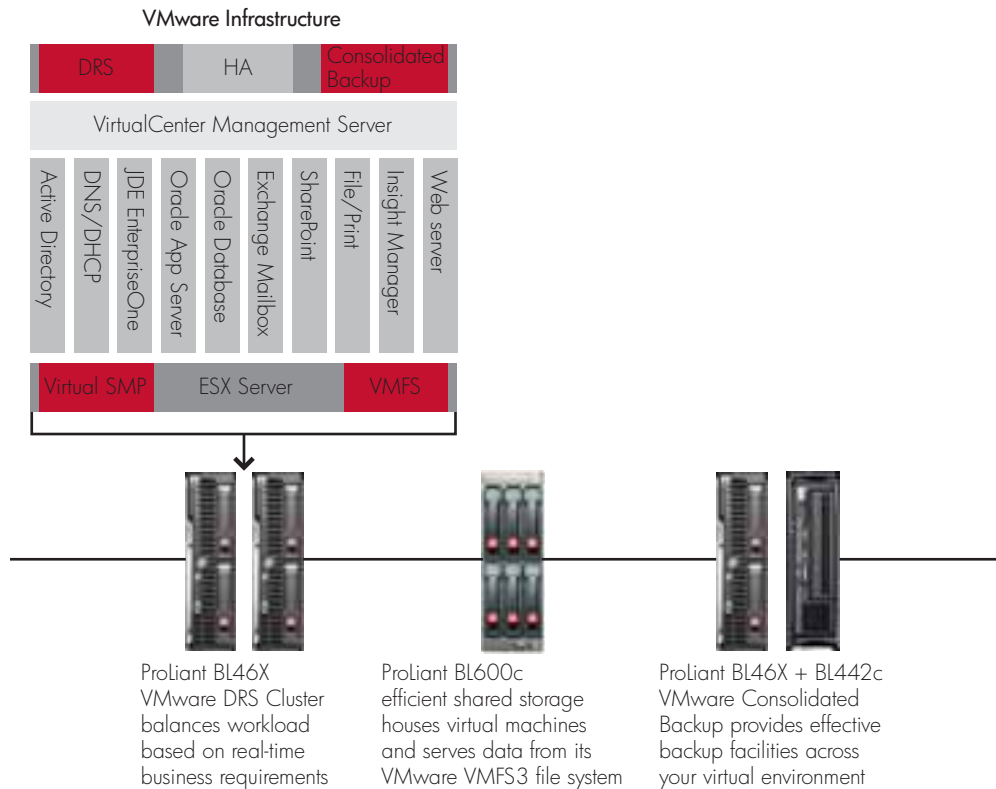
Usage scenarios

How can you benefit from virtualization technology? Take a look at the following five usage scenarios. They list the most popular uses for virtualization solutions and explain the unique business benefits each type of implementation can bring to midsize businesses like yours.

- **IT optimization:** Virtualization enables your organization to optimize its server resources for improved utilization and reduced IT complexity. When you virtualize resources with HP ProLiant servers and VMware virtual infrastructure solutions, you can easily migrate from an underutilized, over-provisioned physical environment to a virtual environment with fewer, more reliable systems. By doing this, you'll use less hardware, which means you'll reduce your real estate requirements (and expenses) as well as your power and cooling requirements and your management costs. Need more capacity? No problem. Virtualization allows you to add virtual servers to host new applications without the requirement of immediately adding hardware. And when it is time to add and provision new physical servers, HP and VMware make the process easy. Just combine HP BladeSystem, HP Virtual Connect, and HP StorageWorks storage area networks (SANs) to grow without requiring re-cabling or changes to the network infrastructure. This greatly increases your organization's flexibility and agility, so it can respond to changing business requirements quickly and efficiently.

²Power cost savings = $.67 \times (.5\text{kW}) \times (24\text{h}/1\text{day}) \times (365\text{ days}/1\text{year}) = \238.58 ; Cooling cost savings = $.8 \times .67 \times (1.25) \times (1.25) \times (.5\text{kW}) \times (.0813/\text{kWh}) \times (24\text{h}/1\text{day}) \times (365\text{ days}/1\text{year}) = \596.46 .

Figure 1. IT optimization usage scenario



Note: in this usage scenario diagram, ProLiant DL38X or DL58X Servers could also be used, along with the HP StorageWorks Ultrium 448 Tape Drive.

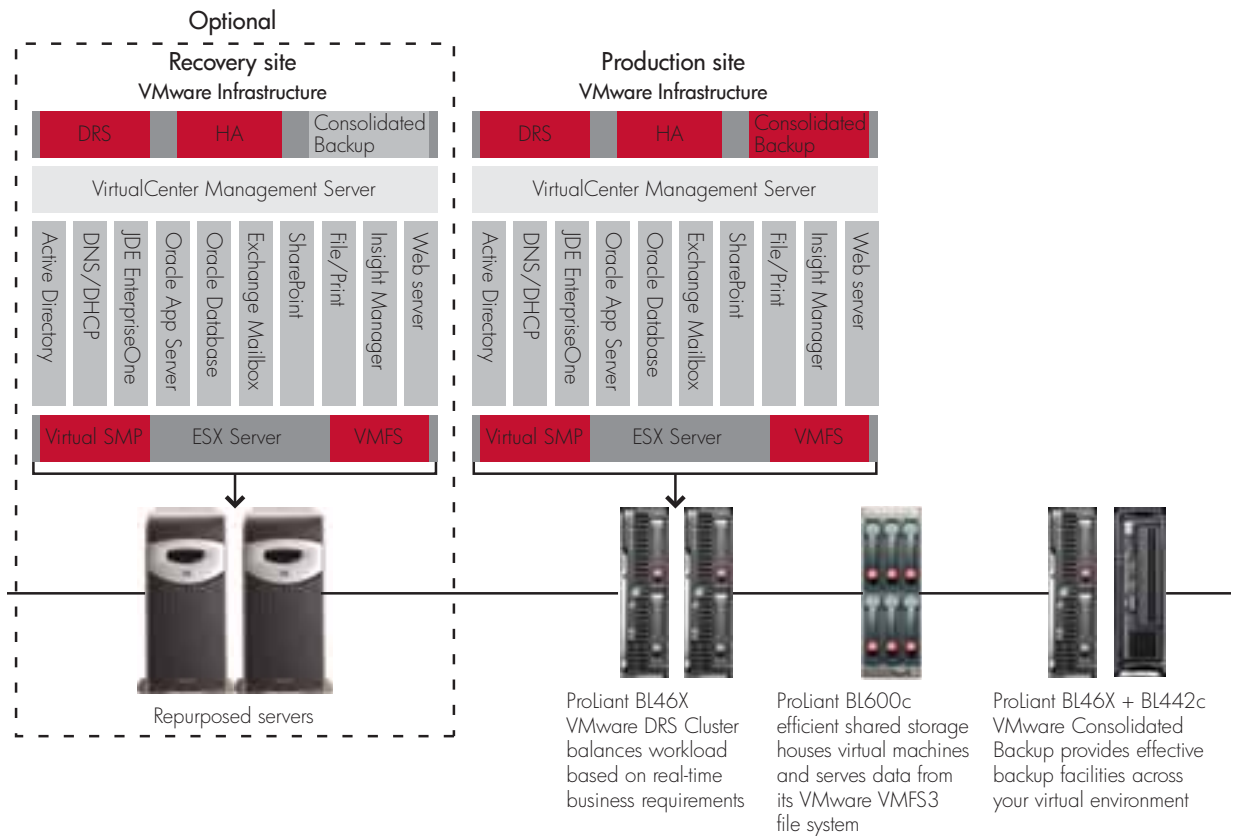
Figure 1 above shows a VMware virtualization infrastructure running on HP BladeSystem servers (see “Note” in figure). The BladeSystem servers provide a flexible, scalable foundation upon which to build the virtual infrastructure. In this example, there are ten virtual servers running on the HP BL46X servers. A variety of applications—including Oracle® JDE EnterpriseOne, Microsoft® Exchange Server, and other Microsoft software—are running, one per virtual machine. Running these applications on virtual machines allows you to maximize use of your hardware resources. VMware DRS further extends the efficiency by dynamically balancing the workload across the ProLiant BL server blades to ensure maximum performance for your applications.

- **Business continuity/Disaster recovery:** You need to protect your data from a multitude of threats, ranging from software glitches and hardware failures to human errors and natural disasters. Figuring out which disaster recovery approach is best for your firm—from a technical, operational, and financial standpoint—is a daunting challenge, one that leaves many companies completely overwhelmed. Virtualization can help answer these questions.

VMware Infrastructure and HP server and storage hardware offer new cost-effective options to traditional business continuity solutions. These options range from affordable low-cost backup or virtual machine replication to advanced highly available multi-site solutions that enable ongoing operations in the event of a disaster. With virtualization, you can treat your physical infrastructure as a pool of virtual machine and storage resources that can quickly be allocated, de-allocated, and most importantly, replicated across sites as required.

Virtualization enables greater efficiency, faster application recovery, and lower cost. Because VMware software continuously monitors the status of all the virtual machines in the pool of resources, it can quickly detect virtual machine failures and automatically restart the workload on another available resource in the pool. Alternatively, HP StorageWorks products can move an entire image, including operating system and application, over to another virtual machine resource at a remote location. This can help you maintain the availability of critical applications, reduce the risk of business interruption, and recover more quickly from disruptive events.

Figure 2. Business continuity/ Disaster recovery usage scenario



Note: in this usage scenario diagram, ProLiant DL38X or DL58X Servers could also be used, along with the HP StorageWorks Ultrium 448 Tape Drive.

In Figure 2 above, the virtual infrastructure running at the production site on HP BladeSystem servers (see “Note” in figure) is augmented by VMware High Availability (HA) and VMware Consolidated Backup. VMware HA provides high availability for virtual servers running on the BL46X server blades. In the event that a physical server fails, virtual machines (VMs) running on the physical server will fail-over to another physical server.

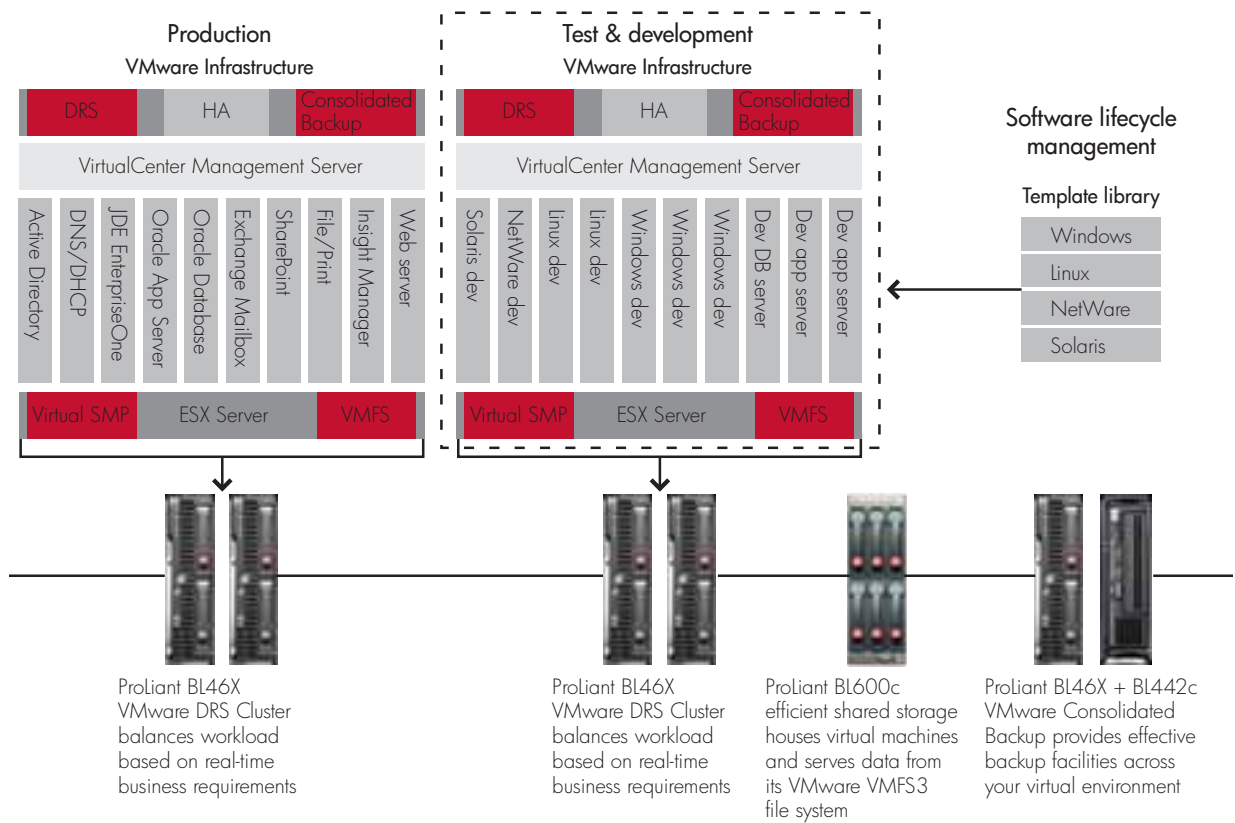
VMware Consolidated Backup provides file-by-file backup without the need for an agent, and supports full and incremental file protection. In this example, VMware Consolidated Backup is using a BL46X blade server and backing up to a BL448c tape drive.

At the optional recovery site, the virtual infrastructure is running on repurposed servers. This solution uses HP StorageWorks Storage Mirroring on the production servers as well as the recovery servers to replicate data between the two sites. This provides real-time failover and high availability for a business, while minimizing costs due to the repurposing of existing equipment. Should a disaster occur, Storage Mirroring facilitates a rapid recovery by redirecting virtual machine execution to the recovery site.

• **Test & development:** Virtualization can be an invaluable tool for test and development processes. A single physical server can host dozens of virtualized development environments, where you can safely run and test several applications at once without impacting your mission-critical production environment. This greatly speeds the development process and cuts costs by reducing the number of physical servers needed for test and development. What’s more, in a virtualized environment, you can save the virtual machines that you create and re-use them as templates for future tests. This easy-to-use library of virtual resources further streamlines project schedules and reduces resource costs.

In Figure 3, there are two HP BladeSystem (see “Note” in figure) and VMware infrastructure environments. One is for production and the second is for test & development. The value of a virtualized infrastructure for test & development is the ability to support multiple testing environments—including Microsoft Windows®, Linux, NetWare, and even Solaris—on a small number of servers, as well as the ability to support multiple application types. With virtual machines it is easy to add and replicate test & development environments quickly.

Figure 3. Test & development usage scenario



Note: in this usage scenario diagram, Proliant DL38X or DL58X Servers could also be used, along with the HP StorageWorks Ultrium 448 Tape Drive.

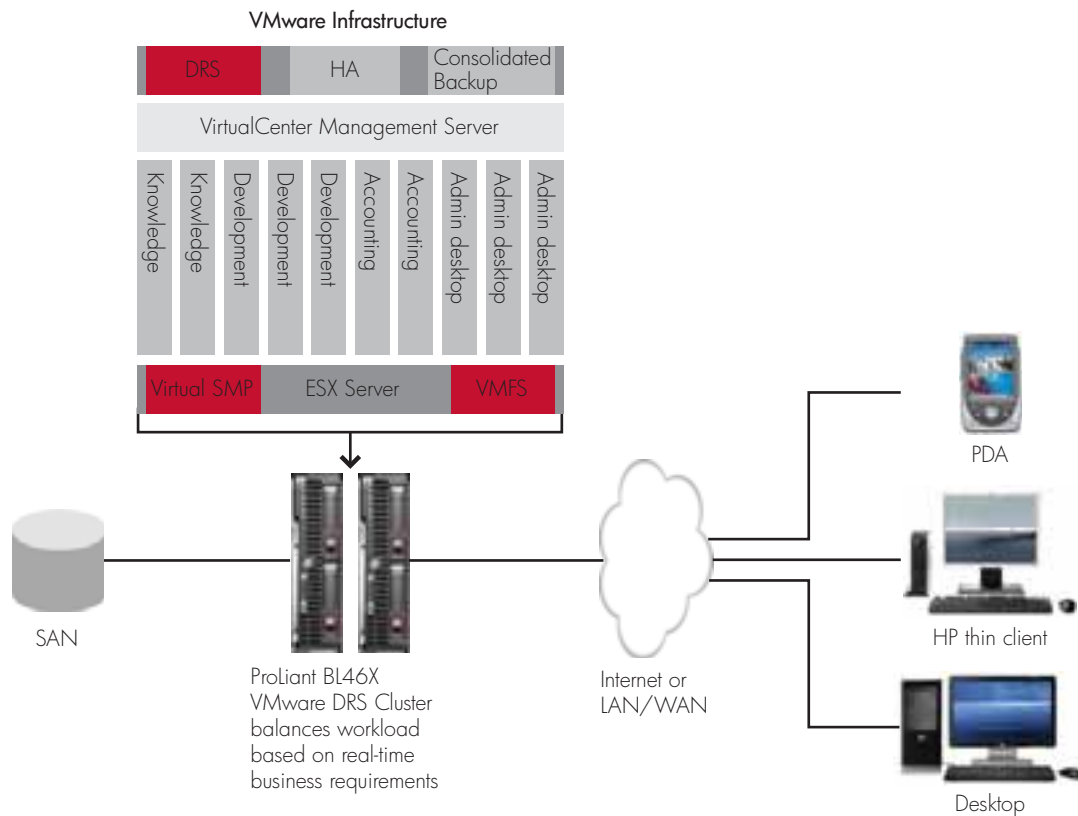
In smaller environments, it is possible to have both production and test & development virtual machines running on the same physical servers.

- Virtual desktop infrastructure:** As you are probably aware, the traditional one-PC-per-user desktop environment creates formidable management challenges. Heterogeneous desktop hardware requires multiple PC images. Labor-intensive technical support keeps support costs high. And instead of focusing on new or strategic projects, valuable IT personnel spend too much time on repetitive tasks, such as resetting passwords or maintaining hardware. In addition to these inherent challenges, recent press headlines about stolen laptops with sensitive data files have highlighted a persistent security issue associated with the traditional desktop environment: It's hard to protect these devices and the sensitive information they contain. Maintaining security is made more complicated by the need for constant upgrades and patches. Backing up desktops is also a challenge—if it gets done at all. And all the while, many organizations are paying steep power and cooling costs for hundreds of underutilized PCs.

The HP Virtual Desktop Infrastructure (VDI) with VMware software is designed to help you respond to these challenges. HP VDI provides a new and innovative approach to managing and controlling today's desktop environment by enabling your organization to host desktops inside virtual machines running on centralized servers in a data center.

HP VDI consolidates each physical desktop onto a VMware virtual machine that is running on a secure HP ProLiant or BladeSystem server in the data center. This allows IT to centrally host and manage the desktop environment from within the data center. Users access their virtual desktops remotely from a thin client, repurposed computer, or even a handheld device. Security is enhanced because VDI enables organizations to move sensitive data usually stored on desktop or notebook drives into the corporate data center. Support is streamlined because configuration, patch management, and image management can be performed through centralized resources. And compatibility issues are reduced by running desktop applications on top of desktop operating systems.

Figure 4. Virtual desktop infrastructure usage scenario



Note: in this usage scenario diagram, ProLiant DL38X or DL58X Servers could also be used, along with the HP StorageWorks Ultrium 448 Tape Drive.

Figure 4 provides an overview of an HP Virtual Desktop Infrastructure with VMware software. Here multiple client access devices connect to a VMware infrastructure running on ProLiant BL46X server blades (see “Note” in figure) using HP SAN technology for storage. In this environment, users log in to virtual machines running in the virtual infrastructure, each of which represents a client environment. Using templates, a variety of role-based desktop environments can be created and quickly deployed—for instance knowledge worker desktops, developer desktops, administrator desktops, and accounting desktops.

The advantages of an HP VDI solution include greater security since data resides on a storage area network attached to the servers, greater data protection due to improved SAN-based backup, and lower cost and hardware requirements associated with maintaining desktop infrastructure.

• **Legacy application and operating system support:**

The HP and VMware virtualization solutions allow your company to upgrade to a new hardware platform while continuing to run legacy applications inside a virtual machine. This can greatly extend the life—and the ROI—of applications that otherwise may have become obsolete.

Throughout these usage scenarios, we’ve mentioned elements that both HP and VMware would typically contribute to different virtualization solutions. Now let’s examine more closely the specific virtualization offerings from HP and VMware and discuss how we are working together to deliver proven, cost-effective solutions.

Table 1. VMware software components

The HP virtualization solution with VMware software leverages multiple software products from VMware, including those described here.

VMware ESX Server	Provides virtual infrastructure software for partitioning, consolidating, and managing servers Provides hardware-independent virtual machines, encapsulated in easy-to-manage files, to increase administration flexibility
ESX Server 3i	Is a next-generation thin hypervisor that can be integrated into ProLiant server hardware Server ships ready to boot up into a VMware hypervisor
VMware Virtual SMP	Allows a single virtual machine to span multiple physical processors Enables multiple processors to work in parallel within a single virtual machine
VMware VirtualCenter	Provides a central point of control for your data center's virtual computing resources Allows you to manage hundreds of virtual servers from a single console
VMware VMotion	Lets you move live, running virtual machines from one host to another while maintaining continuous service availability Enables intelligent workload management by allowing you to make dynamic changes without impacting users
VMware DRS	Dynamically allocates and balances computing capacity across collections of hardware resources aggregated into unified resource pools
VMware High Availability	Provides easy-to-use, cost-effective high-availability capabilities for all applications and operating systems running in virtual machines
VMware Consolidated Backup	Provides a centralized facility for LAN-free backup of virtual machines Simplifies backup administration and reduces the load for ESX Servers
VMware Capacity Planner	Provides a Web-enabled tool that delivers accelerated, more accurate, and benchmarked capacity planning and server consolidation assessments
VMware Lab Manager	Streamlines development and test lab infrastructure and operations by pooling servers, networking, storage, and other resources that can be shared across development and test teams

Core solution components

VMware Infrastructure virtualization software suite

VMware is the global leader in virtual infrastructure software for industry-standard servers. Many of the world's largest companies use VMware solutions to simplify their IT infrastructures while fully leveraging their existing computing investments.

HP virtualization solutions with VMware software build on the capabilities of VMware ESX Server and complementary software products from both HP and VMware to provide an easily managed virtual machine environment.

HP servers certified for VMware software

HP is an industry leader when it comes to x86 servers, storage, management software, services, and support. Building on this core strength, HP ProLiant servers and the HP BladeSystem provide ideal platforms for virtualization on industry-standard hardware.

With HP, you have the added assurance that comes with hardware and software that has been certified for VMware products. HP tests and qualifies many of its products with VMware software. This includes drivers, management agents, installation software, and more. Certification allows you to run your business-critical applications with confidence, knowing HP has tested

key components within the virtualized stack. Today, HP has more certified platforms for VMware software than any other vendor—more than 30 HP ProLiant server models have been certified for use with VMware ESX Server.

By using HP BladeSystem, you can leverage the performance, density, and low power consumption of server blades. A smaller solution footprint helps you make the most of the valuable space in your data center and attachment to a SAN is economical.

HP StorageWorks products

Information is critical for the ongoing success of any business. You can increase the availability of your information by combining server virtualization with replication and data protection software and technology from HP StorageWorks to significantly reduce the time required to recover from a disaster.

Network storage is an essential component of a virtualization solution and allows you to take advantage of many of the features of VMware software, including the ability to quickly move virtual machines to different physical servers, while shielding the business from virtual machine hardware failures and protecting end users from service interruptions.

Table 2. Management software from HP

HP Systems Insight Manager	Discovers and identifies physical and virtual systems Provides a consolidated management console for physical and virtual resources
HP Storage Essentials	Discovers, manages, and monitors heterogeneous network storage performance; automates tasks; simplifies procedures, and helps lower costs
HP VMware Operations Pack	Helps you virtualize IT operations and service management functions
HP VMware Change and Configuration Pack	Enables IT change and configuration management functions and features
HP VMware Performance Pack	Helps with planning the infrastructure for optimal performance by providing tools to load test your virtualized environment prior to deployment
HP Insight Power Manager	Power monitoring and management that provides centralized control of server power consumption and thermal output
iLO Power Management Pack	iLO2 Advanced is for ProLiant ML/DL, and iLO2 Select is for BladeSystem and Linux servers
Insight Control Portfolio	
HP ProLiant Essentials Virtual Machine Management Pack	Provides central management and control of VMware software and other virtual machines Enables physical host to virtual machine association Is part of HP ProLiant Essentials Virtualization Management Software
HP ProLiant Essentials Server Migration Pack	Automates the manual task of migrating servers between physical or virtual platforms Enables conversions between virtualization layers for easy migration from one virtual machine type to another Is part of HP ProLiant Essentials Virtualization Management Software
HP ProLiant Essentials Performance Management Pack	Detects and analyzes hardware bottlenecks on HP ProLiant servers; selected HP Integrity servers; and MSA, All-in-One Storage System, EVA, and XP shared storage devices Uses historic performance and utilization data to identify under-utilized servers that can be virtualized
HP ProLiant Essentials Rapid Deployment Pack	Automates the deployment of physical systems, the VMware ESX virtualization layer, and virtual machine guests in the ESX environment
HP ProLiant Essentials Vulnerability and Patch Management Pack	Helps protect your virtual machines from the security vulnerabilities experienced by physical systems

HP StorageWorks storage arrays, iSCSI SANs, and network-attached storage (NAS) provide an ideal storage platform for virtualization. A combined HP BladeSystem and Enterprise Virtual Array (EVA) infrastructure is an excellent platform for virtualization, offering an integrated, certified, easy-to-manage infrastructure. The ability to pool and centrally manage server and hardware resources results in a lower overall cost of IT, reduced power and cooling requirements, and enhanced business continuity and availability. Like HP ProLiant and BladeSystem servers, the HP StorageWorks storage arrays portfolio is certified to perform in VMware environments.

HP integrated virtualization management

Gain a single view of physical and virtual resources

While many companies can provide hardware that works with VMware products, no other company offers HP's tightly integrated virtualization management capabilities. HP arms you with the tools you need to unify the management of physical and virtual assets within the same environment.

Consolidated management is enabled by the combination of HP Systems Insight Manager and HP ProLiant Essentials software, part of the HP Insight Control management software portfolio, which works in concert with VMware products. HP Systems Insight Manager discovers and identifies physical and virtual systems. Add in the capabilities of HP ProLiant Essentials software and you gain the ability to monitor both the health and the performance of physical and virtual resources.

HP ProLiant Essentials Virtualization Management Software, included with selected VMware products from HP, provides critical management and migration tools for a VMware virtualization solution. This software complements both HP Systems Insight Manager and VMware VirtualCenter.

Vitus Bering Denmark

HP and VMware help Danish educator find new route to success

Vitus Bering Denmark is a unique and vibrant educational institution that was facing a not-so-unique problem back in 2006. The school had been growing very quickly through mergers and partnerships with other educational organizations and, as a result, had a bad case of server sprawl. The infrastructure included more than 55 underutilized legacy servers from a wide variety of vendors. Most were six to ten years old, and becoming less reliable with age. They all depended on inefficient direct-attached storage (DAS). And full backups of the system, using Veritas Backup Exec, took an entire week to complete.

When the opportunity to optimize the IT infrastructure finally came along, the Vitus Bering IT team jumped at the chance. After reviewing proposals from a wide variety of vendors, they ultimately decided to consolidate their servers using VMware virtualization software and industry-standard servers and storage modules from HP.

“HP made it easy for us to decide by offering a complete, turnkey package at a very attractive price, including a tape library with an HP Data Protector software license,” noted Vitus Bering’s Head of Systems Administration, Kim Andersen.

HP partner Opin Kerfi Group hf. designed and installed the new infrastructure, including HP ProLiant DL585 G2 servers, an HP StorageWorks 8000 Enterprise Virtual Array (EVA8000), a StorageWorks Enterprise Modular Library (EML) E series tape library, HP Data Protector software, Command View EVA software, and VMware Infrastructure 3 architecture.

With the new solution in place, Vitus Bering was able to eliminate 50 of its original servers and move from four server rooms to one. According to a TCO analysis conducted by HP using the VMware TCO Calculator*, this will save Vitus Bering nearly 90 percent in energy and cooling costs over the next three years, amounting to savings of approximately US\$80,000.

And the benefits of Vitus Bering’s new virtualized and consolidated IT infrastructure go well beyond reductions in TCO. New server provisioning now takes just five minutes, and the staff can add virtual servers at any time without the delay or expense of a hardware acquisition.

“We have virtualized about 95 percent of our original physical servers and consolidated all of our critical storage onto the HP SAN,” Andersen explains. “Our IT operations are better in every way imaginable. We have eliminated single points of failure, we have business continuity where none existed before, and everything we do is so much easier now.”

Catholic Charities

Serving more efficiently than ever with the help of HP and VMware

Catholic Charities of Boston is one of the largest providers of social services in Eastern Massachusetts, serving nearly 200,000 people each year through a network of 40 locations that offer more than 140 supportive programs and services.

Like many charitable organizations, Catholic Charities relies on donations and is exceptionally careful with expenditures. This meant an IT infrastructure that consisted of hand-me-down tower and rack servers that were difficult to manage, had almost no power redundancy, and were totally power inefficient, according to Eric Johnson, Catholic Charities IT project manager. It also meant no cooling infrastructure whatsoever, spotty networking capabilities, and the inability of many of its 850 employees to access files stored at the hub site.

These inefficiencies hindered employee productivity and system reliability, ultimately driving the IT staff and organizational leaders to seek a solution that would allow them to centralize IT operations and improve the quality of service their infrastructure delivered.

The solution they chose consisted of HP BladeSystem servers and VMware virtualization software. Specifically, they invested in twenty-five Dual-Core Intel® processor-based HP blades and two 16-unit blade racks. The servers run Microsoft Windows and Linux, and they use Integrated Lights Out 2 (iLO 2) management software, which comes standard in HP blades, to remotely manage the servers.

Catholic Charities also used VMware virtualization software to deploy 50 virtual machines on five of the physical servers to save on power and space. Installation of the entire system took all of two days.

Today, Catholic Charities has drastically increased the amount of technology services it can provide to its 850 employees. The servers run roughly 30 different business applications, including accounting and fundraising databases, e-mail, and Web services.

*Derived from VMware TCO Calculator, available online at:

www.vmware.com/products/vi/calculator.html

HP Services

End-to-end expertise—for a one-stop solution

HP and its channel partners offer a wide range of services for VMware deployments, including everything from analysis and optimization to migration and ongoing support. Our team of virtualization experts utilizes a powerful combination of expertise and innovative tools such as the VMware Capacity

Planner to help identify your needs and develop a clear virtualization strategy.

Once your strategy is established, HP Services can also provide implementation assistance and ongoing support of your virtualization solution. We take an environmental approach to supporting virtualized environments, which emphasizes proactive management, problem prevention, and mitigating the

risk of downtime. And in the event a problem occurs, we offer a very robust portfolio of technical support services. In all of these efforts, HP support personnel work closely with the VMware support organization to ensure seamless, technically effective services.

Why HP with VMware?

Only HP and VMware can provide you with an end-to-end virtualization solution to save, simplify, and scale across your data center environment. This integrated virtualization solution stems from HP's well-established partnership with VMware. That relationship, which spans more than five years, yields significant enhancements to our virtualization solution offerings.

HP and VMware engineers, for example, work together to jointly develop technology early in the development cycle of future products to make HP and VMware products work better together. And HP has developed a certification process that has enabled it to have the largest number of servers, storage devices, and options of any VMware partner. Once the certification for each product is complete, it is audited by VMware and posted to the company's hardware compatibility list.

Building on our close cooperation at the engineering level, HP has developed a holistic solution for IT optimization projects—including services that span the IT lifecycle (from strategy and design through ongoing management), VMware software, HP ProLiant and HP BladeSystem servers, and HP StorageWorks products. HP-branded services take the extra step of providing support not only for the HP server, storage, and VMware software but also for supported operating systems, including Microsoft Windows and Linux, within VMware virtual machines—along with proactive support of the virtualized environment.

HP does not stop there. Leveraging the most extensive portfolio of servers certified for VMware software, HP provides the right virtualization solution for customers with HP ProLiant and BladeSystem servers coupled with HP storage. In fact, implementing VMware virtualized infrastructure solutions with the HP BladeSystem, HP StorageWorks SANs, and HP Virtual Connect for networking extends the virtual experience beyond a standard VMware solution as servers, storage, and network connections are virtualized.

With HP and VMware technologies, you gain a tightly integrated end-to-end solution that puts virtualization to work for your critical business initiatives, including server optimization, virtualized desktops, disaster recovery/high availability, and workload optimization.

The sooner we start, the better the business outcome.

At HP we're ready to put our vast resources and expertise to work to help you achieve better business outcomes. Let's start with a discussion of your business strategies, tactics, and goals. Contact your Authorized HP Reseller today. Or learn more about HP virtualization offerings at: www.hp.com/go/VMware

Virtualization licensing requirements: Virtualization requires that you have the appropriate number of software licenses for the applicable number of virtualized environments. It is your responsibility to verify that you work with your software provider and obtain the appropriate number of licenses to all third-party software to be used in virtualized environments.

To learn more, visit www.hp.com

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