

The Business Case for Virtualization

Building an Adaptive Infrastructure with HP and VMware
virtualization solutions

Brochure



The business case is clear:
Virtualization can help you save money, increase IT agility, and improve business outcomes. Are you capitalizing on these opportunities?



In today's competitive global economy, your business needs to be poised to respond faster to market changes, customer demands, and growth opportunities. To do this, you need an agile IT infrastructure that is built to deliver better business outcomes—what we refer to as an Adaptive Infrastructure.

At the same time, you have to hold the line on rising data center costs. One way to do this is to increase the utilization of information technology (IT) assets, including servers and storage devices. In today's enterprise data centers, for example, it is not uncommon to find servers with utilization rates as low as 5 to 15 percent, and storage with utilization rates of 50 percent.

And then there is the issue of rising energy expenditures. As you fill your data center with higher density servers and storage power and cooling costs can threaten to break your budget.

All the while, your IT organization needs to make hard decisions about compute platform choices for business services. Should you build and manage your own in-house data centers, use a traditional outsourced service provider, or tap into cloud-related services? Or deploy a hybrid of all three?

Virtualization helps you overcome the challenges.

Virtualization enables you to pool and share IT resources to serve the business better and create a business-ready Adaptive Infrastructure. This all contributes to bottom-line business benefits.

From a business perspective, the pooling and sharing of IT resources allows IT supply to keep pace with fluctuating demand. A virtualized environment increases flexibility because a diverse range of resources can be added, changed, and moved as needed, to meet shifts in business demand. Resources can be scaled up or down quickly based on changing workloads. Virtualization techniques also improve resiliency by simplifying backup, failover, and disaster recovery solutions.

From a cost perspective, pooling and sharing helps you increase the utilization of IT assets and pack more computing and storage capacity into the same space. Virtualization helps you reduce the total cost of ownership of IT assets—in terms of both capital expenses and operating expenses—by enabling greater use of your physical resources. For instance, only 50 percent of Storage area network (SAN) storage is utilized in a non-virtualized environment. That increases to 80 percent in a virtualized environment.



HP and VMware offer a complete virtualization solution.

To help you capitalize on your virtualization opportunities, HP offers a complete, integrated virtualization solution spanning the desktop to the data center. The integrated HP virtualization solution puts your organization on a predictable path to the broad benefits of an Adaptive Infrastructure.

And with new, innovative HP technologies, you can get there faster and easier than ever before:

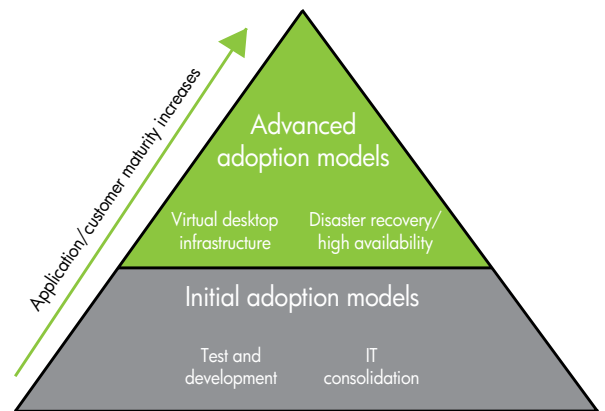
- **Consolidate and virtualize network connections** with HP Virtual Connect Flex-10 technology and ProCurve Networking by HP.
- **Manage your physical and virtual environments** with the advanced infrastructure management capabilities of the HP Insight Control suite and HP Insight Dynamics-VSE.
- **Build a next-generation data center** using HP ProLiant G6 servers and HP BladeSystem Matrix, which integrates compute, network, storage, and management resources into a single platform that is designed for virtualization.
- **Consolidate your storage** using shared storage solutions with HP LeftHand SAN Solutions, HP StorageWorks Enterprise Virtual Arrays (EVAs), and HP XP Disk Array solutions along with Storage Essentials management software.
- **Reduce power usage and costs** by automating power usage with Dynamic Power Capping and capacity planning with the HP Insight software suite.

Your virtualization opportunities span four key areas.

Drawing on the capabilities of HP hardware and software and VMware technology, forward-looking organizations are realizing the benefits of virtualization across four key areas:

- **IT consolidation:** With virtualization, you can consolidate many physical servers and storage units into one virtual server or storage pool. This can result in a 10:1 or greater ratio of virtual servers on a single physical server. This helps you stop physical server and storage sprawl and solve the problem of devices that are under-utilized, consume too much space, and cost too much to power, cool, and maintain.
- **Disaster recovery/high availability:** Virtualization allows your company to create a high availability and disaster recovery plan for your IT infrastructure based on virtual machine environments. By allowing virtual machines to be easily replicated, backed up, and moved from one machine to another, virtualization greatly simplifies recovery in the event of system failure and even reduces planned downtime.

Figure 1: Virtualization adoption model



- **Development and testing:** Virtualization can also improve the efficiency of your test and development environment. With virtualization, you can run multiple operating systems and versions on fewer servers and workstations. This helps you support complex development and testing environments with limited resources.
- **Virtual desktop infrastructure (VDI):** With VDI, a desktop operating system is hosted on a virtual machine running on a centralized server. VDI provides your end users with all the functionality of a stand-alone desktop plus features that increase security, decrease cost and provide high reliability. It is an alternative to the more traditional server-based computing models.

To understand the business case, explore this virtualization scenario.

In Table 1, we compare two scenarios for a 100-server physical environment. The first scenario maintains the status quo of 100 physical servers. The second scenario shows what happens when those 100 servers are virtualized with VMware. Both scenarios assume a three-year replacement cycle. In the non-virtualized scenario, one-third of the infrastructure is replaced every year. The virtualization scenario leverages an HP enterprise configuration in the first year and a 12.5:1 consolidation ratio which leads to 5, 2, and 2 servers being purchased in years 1, 2, and 3 respectively yielding savings of approximately 60 percent over a three-year period, excluding networking and potential real estate savings.

Capital cost savings

Capital cost savings come in the form of reduced expenses for hardware acquisition and potential savings for data center real estate. Examples of the server and storage savings are shown in rows A–D of Table 1. Let's break down the Capital cost savings as illustrated in the virtualization scenario.

- A. **Server hardware:** Moving to a virtual environment helps you cut capital costs by reducing the number of physical servers necessary to support your infrastructure. In our business-case scenario, server utilization averages less than ten percent, yielding a 12.5:1 consolidation ratio. With virtualization, server consolidation ratios are typically in the range of 8:1 to 15:1. This leads to a reduction in expenditures that is significantly greater than 50 percent.

HP virtualization solutions help you achieve these sorts of gains by leveraging VMware software, VMware-certified HP ProLiant G6 servers and advanced management tools, such as the HP Insight Control suite, to allow workloads to be consolidated onto fewer servers. In addition, HP BladeSystem servers help you gain even greater flexibility from your virtualized environment and pack more computing power into the same footprint.

- B. **Storage hardware:** With a virtualized environment, you can reduce your capital expenditures for storage devices by consolidating data storage. As part of a VMware implementation, storage consolidation is a natural progression.

HP StorageWorks SANs deliver pools of shared storage that enable greater server consolidation. Implementing an HP SAN in a non-virtualized environment can increase storage utilization from less than 25 percent to as much as 50 percent.

When you combine HP StorageWorks SANs with HP servers running VMware, you can increase utilization to as high as 80 percent. In our scenario, the cost of implementing new SANs is offset by the cost savings associated with reduced server purchases.

In addition, an ancillary benefit of virtualization is the possible redeployment of some of your existing infrastructure as part of a disaster recovery solution. This is made easier using HP StorageWorks and VMware solutions. Redeployment provides additional capital cost savings that can help fund disaster recovery solutions.

- C. **VMware software:** When you virtualize, there are costs for virtualization software. In this scenario, VMware vSphere Standard licenses and VMware vCenter Management Server are purchased. The costs of the virtualization software are more than offset by the server and storage savings.
- D. **Management software:** To gain better benefit for the consolidation effort, advanced management software such as HP Insight Control Environment (ICE) was purchased. HP ICE in conjunction with VMware vSphere enables significant operational cost savings in the daily management and provisioning of the environment while also helping to reduce costs associated with unplanned downtime.

In addition to the capital cost savings detailed above, virtualization may also help you avoid the high costs of data center expansions. With data center building cost estimates ranging from \$800 per square foot to a projected \$5,000 per square foot in 2009¹, this is an important area for cost savings. This is especially true when you consider that each rack of servers requires approximately 6.5² square feet and needs three times that for adequate cabling and airflow.

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

² HP ProLiant Rack 10000 Series at 23.62" wide by 39.37" deep. <http://h18004.www1.hp.com/products/servers/proliantstorage/racks/10000series.html>



Operational cost savings

In a virtualized environment, operational cost savings are also substantial. These savings stem from reductions in power and cooling costs, management costs and the costs associated with server downtime. Examples of the potential savings for power and cooling and provisioning costs are shown in rows E–F of Table 1.

- E. **Power and cooling:** Virtualization can help you hold the line on rapidly rising power and cooling costs. These savings stem from reductions in the number of physical servers in your environment. The total power and cooling savings from removing just one server from your environment is \$655 per year. In our scenario, the total power and cooling savings over three years is almost \$134,000 or approximately 68 percent.
- F. **Server provisioning costs and time savings:** Virtualization allows you to provision servers in less time—a minimum of 70 percent less time—which, in turn, leads to reduced infrastructure management costs. In the example shown here, adding 100 servers to the environment as part of a physical server refresh requires 1000 hours of provisioning at an average of ten hours per server. In the virtualized scenario, this is reduced to 290 hours, allowing you to spend an additional 710 hours or 17.75 weeks on more strategic IT projects that can help your business grow.
HP Insight Control Environment helps you save time by streamlining server provisioning and management. Based on HP Systems Insight Manager and ProLiant Essentials software, the Insight Control Environment (ICE) gives you a single view of your physical and virtual resources. It delivers comprehensive health and performance monitoring, remote control, vulnerability scanning

and patch management. ICE includes HP ProLiant Essentials Rapid Deployment Pack (RDP), a server deployment solution that facilitates the installation, configuration and deployment of high volumes of servers, and enables the rapid replacement and addition of new servers.

HP also offers migration tools to make it easy to move resources between and within your virtual and physical environments. To further accelerate provisioning, HP Virtual Connect modules virtualize the connections between the HP BladeSystem c-Class servers and your local area networks (LANs) and SANs, enabling quick, transparent server changes.

In addition to the costs detailed in the table, there are significant cost reductions attributable to virtualization's ability to reduce planned and unplanned downtime. Virtualization can help you keep your business up and running during disasters and other disruptive events, and the reduced number of servers resulting from virtualization shortens recovery times and reduces losses associated with downed servers in the event of a disaster. Furthermore, VMware vSphere reduces costs of planned downtime by allowing for host servers to be maintained without disruption to end users via movement of virtual machines with VMware VMotion.

These are just some of the ways virtualization drives cost savings. Server virtualization often leads to total savings across capital and operating costs of 50 percent or more over a three-year period. You also can expect a fast return on your investment. Total payback time for virtualization projects is typically less than one year due to the significant capital and operational savings.

Table 1: Enterprise ROI

	Base (\$)	Virtualized Infrastructure (\$)	Savings (\$)	
Year 1				
Capital Costs				
Servers	136000	40,800	95,200	A
Storage	0	35,000	(35,000)	B
VMware Software	0	33,876	(33,876)	C
Management Software	0	5,980	(5,980)	D
Operating Costs				
Power and Cooling	65,500	36,025	29,475	E
Provisioning Costs	13,600	6,000	7,600	F
Totals	215,100	157,681	57,419	
Year 2				
Capital Costs				
Servers	136,000	19,192	116,808	A
Storage	0	0	0	B
VMware Software	0	13,916	(13,916)	C
Management Software	0	2,990	(2,990)	D
Operating Costs				
Power and Cooling	65,500	20,960	44,540	E
Provisioning Costs	13,600	2,800	10,800	F
Totals	215,100	59,858	155,242	
Year 3				
Capital Costs				
Servers	128,000	19,192	108,808	A
Storage	0	0	0	B
VMware Software	0	13,916	(13,916)	C
Management Software	0	2,990	(2,990)	D
Operating Costs				
Power and Cooling	65,500	5,895	59,605	E
Provisioning Costs	12,800	2,800	10,000	F
Totals	206,300	44,793	161,507	
3-year totals	636,500	262,332	374,168	



Why HP?

Here are some of the key reasons.

Around the world, thousands of IT organizations are working with HP to turn rigid data centers into agile, virtualized environments. Here are some of the reasons why these forward-looking companies are choosing to work with HP to virtualize IT infrastructure.

HP offers a complete solution.

With HP, you gain an end-to-end, tightly integrated virtualization solution that incorporates everything you need—servers, storage, management software, VMware software from HP, and services—including planning, deployment and management. Additionally, HP management software brings business level management capabilities such as application functionality and performance testing, operations support, asset tracking and change and configuration management to virtualized environments. It is an integrated solution all available from HP—no integration worries and no need to manage multiple vendors.

HP addresses critical IT initiatives.

HP delivers the resources you need to put virtualization to work for business-driven IT initiatives. These include initiatives focused on IT consolidation, virtual desktop infrastructure, disaster recovery/high availability, and development and testing.

HP is a leader in server and storage virtualization.

The HP portfolio of virtualization offerings has helped thousands of companies achieve better business outcomes. This portfolio includes leading HP ProLiant and HP BladeSystem for virtualization of your x86 environment. In addition, we offer wide ranging partitioning solutions for HP Integrity servers, so you can find the right virtualization approach for your Integrity environment. HP is also a leader in storage

virtualization—we have sold more than 30,000 virtual storage arrays. We understand storage virtualization, and how you can reduce your total cost of ownership with an HP SAN using our HP LeftHand Arrays, HP StorageWorks Enterprise Virtual Arrays and XP Disk Arrays.

And HP client virtualization solutions, meanwhile, deliver a cost-efficient desktop environment by consolidating many physical desktops onto a single server or blade environment.

HP has the expertise to make it all work.

Most importantly, HP has the services expertise to deliver a comprehensive VMware solution to our customers. HP has earned VMware's Enterprise VMware Authorized Consultant (EVAC) designation, which is the highest level of certification for delivering VMware virtualization services available, and HP is the largest global VMware Authorized Training Center (VATC). HP is the first VATC to train over 17,000 students on authorized VMware training classes. Contact HP Services or HP channel partners to help you evaluate your needs, plan your solution, deploy and operate your virtualized environment.

Let's get started

Whether you have 10 servers, 100 servers or 1,000 servers, we can help you put virtualization solutions in place to achieve savings, simplification and scalability across your environment.

Get started today with our virtualization assessment service. Through this service, we inventory and analyze your current infrastructure and help you develop a detailed business case based on your business needs. To learn more, contact your local HP representative, or visit www.hp.com/go/vmware.

Technology for better business outcomes

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