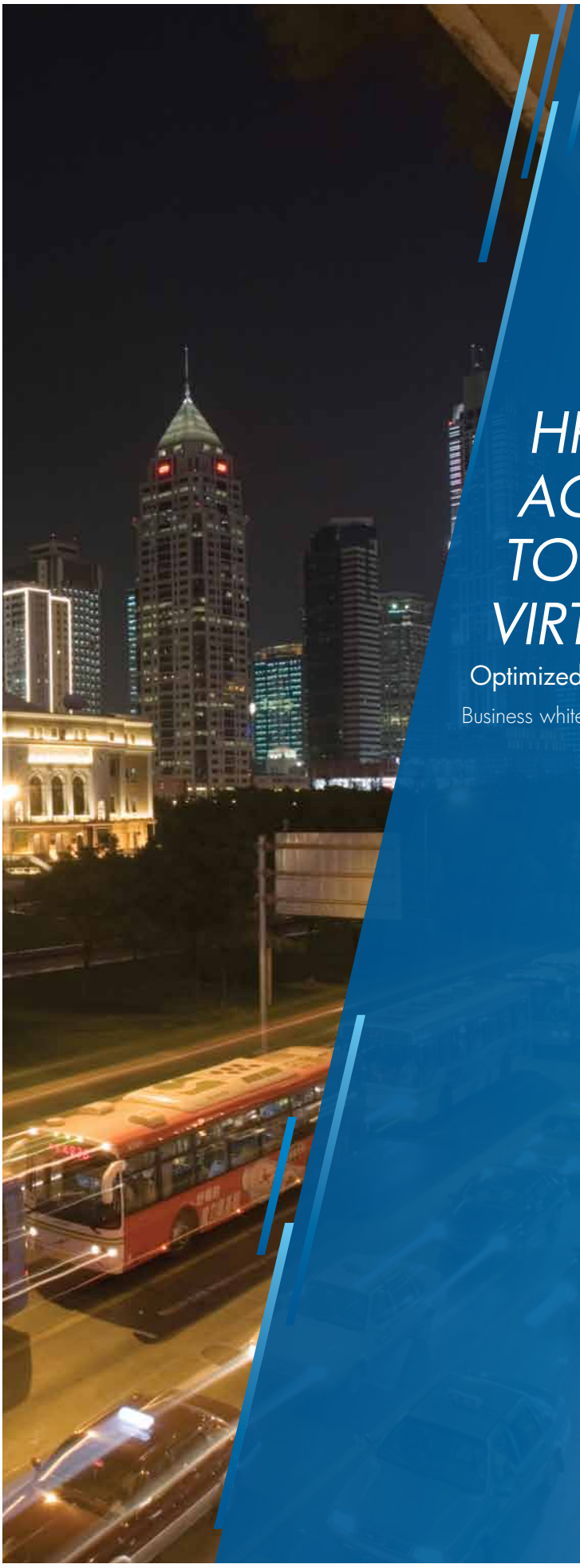


HP VIRTUALSYSTEM ACCELERATES TIME TO VALUE FOR VIRTUALIZATION.

Optimized solutions speed the path to cloud.

Business white paper

Executive summary

Virtualization has already delivered significant benefits for IT organizations around the world. But many are stymied by its complexity, which keeps them from getting the most from the technology. This paper provides new insights into the benefits of building a fully converged infrastructure to manage the complexity of virtualization and outlines key attributes of a leading solution.

Introduction

Virtualization has helped organizations reduce the number of physical servers in their data centers, and decrease both energy consumption and operating costs. In fact, today there are more virtual machines (VMs) deployed in data centers than physical machines, and IDC predicts that 69 percent of all workloads will be virtualized by 2013.[1] Moreover, virtualization is a key enabler for moving applications to private cloud computing environments, with their promise of achieving even greater business value by increasing IT agility to gain competitive advantage.

In fact, Gartner states that virtualization is the number one top trend for 2012.[2] However, research conducted by the Enterprise Strategy Group cautions that "nagging issues and challenges exist: Scalability, performance, and availability are key concerns that must be addressed before organizations can move from a strategy of lowering costs via consolidation of IT utility and productivity applications to improving quality of service."[3]

[1] IDC, *Market Analysis Perspective: Worldwide Datacenter Trends and Strategies,* March 2011.

[2] Gartner, *Gartner Top 10 IT Trends for 2012,* Dave Cappuccio at Symposium NA, October 2011.

[3] Enterprise Strategy Group, *Hyper-V R2 SP1 Application Workload Performance,* March 2011.

Virtualization complexity is increasing.

As virtualization becomes widely adopted, its complexities increasingly present multiple challenges to IT management, of which the following stand out:

Multiple tier network architectures
Today's network fabrics fail to deliver the simplicity, performance, and capacity required by the new highly virtualized IT world with its heavy server-to-server traffic.

Inflexible legacy storage
While focusing on the virtualization of their server infrastructure, organizations often neglect to implement modern storage architectures designed for virtualization. Users are facing, among other problems, significant storage capacity, performance, provisioning, and management issues, which, taken together, drive up the cost and risk of virtual server deployments considerably. Legacy monolithic and unified storage arrays designed for more predictable workloads and physical host to storage associations often struggle with unpredictable and mixed workloads and are more complex and inefficient as the environment scales.

Difficult to determine expected performance
Service levels in a virtual environment can be difficult to establish and maintain due to unpredictable demand by workloads for compute, network, and storage resources.

Too many management tools
Complexity increases with virtual and physical management requirements and incompatible management tools increase operational costs.

Unaddressed security issues
Using new and different tools in the virtual world compounds the same old misadministration and mistakes experienced in the physical world.

Complicated to scale or extend to cloud
Virtualization is a foundational technology for cloud computing, but it can be complicated to evolve from a virtualized environment to a cloud environment, which delivers greater elasticity, automation, orchestration, and self-service.

In order to deliver a successful virtualized environment, organizations need to address the specific challenges above with a comprehensive solution that eliminates the complexities inherent in virtualization.

Reducing complexity with converged infrastructure

Fortunately, converged infrastructure solutions go a long way in solving the complexity of virtualization by integrating servers, storage, networking, security, power, cooling, and facilities into shared pools of interoperable resources.

New research from IDC, *Measuring the Business Value of Converged Infrastructure in the Data Center*, makes clear that savings in hardware consolidation aren't sufficient to justify a shift to a converged data center. "Without advanced, unified, cross tier management capabilities, organizations have a bunch of hardwired hardware that can't do much—definitely not dynamically," the report said.[4]

VirtualSystem can help organizations reduce IT labor costs by 86 percent

Complexity can be further reduced—and more business value generated—by integrating management software and providing a platform for the preferred hypervisor, network fabric manager, storage virtualization, and IT automation software applications. A fully converged IT infrastructure eliminates integration headaches and optimizes performance and scalability in highly virtualized data centers.

The business value of converged infrastructure

Full integration across a virtualized data center provides three overarching benefits by:

- Reducing the complexity of integrating hardware and virtualization software, and delivering a finished solution to the data center
- Simplifying lifecycle management and security
- Protecting and expanding upon virtualization investments toward hybrid cloud environments when the business is ready

After surveying, interviewing, and consulting with organizations around the globe to understand current IT priorities, IDC analysts categorized them in five levels of infrastructure convergence maturity.[4] (See Figure 1.) These can be grouped as follows:

Traditional and compartmentalized (level 1)—The organization has only begun to initiate convergence.

Standardized and optimized (levels 2 and 3)—Many best practices in convergence have been implemented but the organization is just beginning to realize benefits such as lower infrastructure costs and IT productivity improvements.

Automated and adaptively sourced (levels 4 and 5)—The organization has optimized its IT infrastructure as far as possible given currently available technology. It is now technically capable of offering private cloud services.[4]

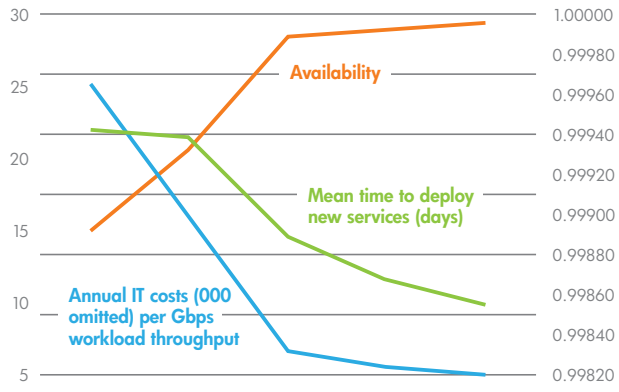
The IDC research team requested not only information about each company's throughput and level of convergence, but also information about its data center total cost, IT labor cost, speed of deployment, and uptime characteristics. The results indicated a marked correlation between higher levels of convergence and reduced IT costs per unit of workload, faster deployment, and reduced downtime.[4] Figure 1 shows how all of these factors play out for organizations in each of the convergence levels.

It's clear from the research that moving to level 5 of the maturity model described above will bring about the greatest ultimate benefit to an organization. As it reaches level 5, it can expect to see its annual IT labor costs slashed to as little as $110 per Gbps workload throughput, which is a 99.5 percent reduction from the IT labor costs it would be subject to at level 1 of the maturity model. In the same way, the mean time for the organization to deliver new applications would be reduced by 70 percent, and annual downtime would be reduced by 97 percent.[4]

But what is particularly interestingly is that the greatest incremental gains can be made in the earlier stages of the maturity model. For example, just by moving to an "optimized" virtual environment across servers, storage, and networking, represented by level 3 in the model, an organization can see its IT costs reduced by 86 percent, its mean time to deployment of new applications reduced by 40 percent, and its annual downtime reduced by 84 percent.[4]

Therefore, by investing in solutions that more effectively deliver an optimized virtual environment in level 3, organizations can achieve immediate financial and operational benefits, in addition to becoming more "cloud ready."

Figure 1.
Effect of increased convergence levels on IT costs, uptime, and speed of deployment



Convergence level

	1. Traditional	2. Standardized	3. Optimized	4. Automated	5. Adaptively sourced
Annual IT costs (000 omitted) per Gbps workload throughput	$24.36	$13.39	$2.09	$0.67	$0.11
Mean time to deploy new services (days)	20	20	12	8	6
Availability	0.99892	0.99933	0.99969	0.99993	0.99996

[4] IDC, *Measuring The Business Value of Converged Infrastructure in the Data Center*, Richard L. Villars, Randy Perry, Report No. 229416, September 2011.

HP Converged Storage can help reduce storage acquisition costs by up to 50 percent.

HP VirtualSystem

HP VirtualSystem is classified within level 3 of the Converged Infrastructure Maturity Model, delivering the benefits noted above, and is referenced within the IDC report as follows:

HP VirtualSystem is built on proven reference architectures optimized for Citrix, HP-UX, Microsoft®, and VMware best practices, and is designed to support multiple workloads from mid-market to large enterprise and service providers. It can be expanded with modular components to add performance and capacity, and is built on a common, modular architecture to enable an upgrade to a hybrid cloud computing environment with HP CloudSystem.

Best-in-class Converged Infrastructure

HP VirtualSystem is part of the HP Converged Systems portfolio, preintegrated, tested, and supported solutions optimized for cloud, virtualization, and next-generation applications. Based on HP Converged Infrastructure, which integrates servers, storage, networking, security, power, cooling, and facilities into shared pools of interoperable resources—all managed through a common management platform, HP Converged Systems reduce the time and resources required for planning, procurement, and deployment to accelerate time to application value.

HP VirtualSystem simplifies and extends converged infrastructure into optimized, turnkey solutions for server and desktop virtualization. It delivers a complete, high-performance virtualized environment with pre-tuned server, storage, networking, management, and hypervisor resources.

The HP VirtualSystem portfolio delivers best-in-class technologies, simplified end-to-end management, and integrated services that maximize virtual server and client performance. The solutions are backed by integrated services that align organizations' virtualization investments to their business goals. HP offers a full lifecycle of virtualization and cloud roadmap, planning, design, and implementation services helping with integration of HP VirtualSystem into existing data centers.

HP FlexFabric provides simple, reliable VM mobility for HP VirtualSystem with a one- or two-tier network to avoid the problems of multiple-tier network architectures. This architecture, optimized for server-to-server and server-to-storage traffic, delivers secure, high-performance VM migration across the data center with unified orchestration. Unlike traditional, hierarchical networks, the HP FlexNetwork is designed to meet the security, agility, and performance needs of virtualized and cloud environments where up to 80 percent of the network traffic is server to server. HP FlexFabric provides wire-once, change-ready, direct connections to thousands of VMs, eliminating unnecessary network hops, reducing latency, and optimizing network utilization and performance.

By simplifying networks, reducing tiers, and virtualizing connections between virtual machines and networks, HP VirtualSystem helps organizations to accelerate VM performance and recovery with faster mobility and failover. Costs and complexity are reduced by eliminating 95 percent of NICs, cables, and switches for reduced acquisition costs and simplified management.

HP Converged Storage—provides modern, scale-out storage that delivers simplicity, efficiency, and agility to virtual and cloud environments. It is built on modular, standardized platforms and scale-out software with integrated management and automation. The HP Converged Storage strategy and portfolio remove the boundaries between server, storage, and networking to enable businesses to transform themselves from within.

HP VirtualSystem has been designed with 3PAR and LeftHand storage systems depending on the solution configuration.

The HP 3PAR Utility Storage platform provides a reduction in initial capacity acquisition cost by up to 50 percent and an increase in storage management efficiency by 10X.[5] It enables simplified provisioning, management, massive scale out, and consolidation of multiple workloads with no loss of performance or security.

[5] The numbers are from an HP survey of 3PAR storage customers and are representative of their average results based on production deployment. Individual client results can vary depending on existing environment and new storage configuration.

The HP LeftHand Storage platform was the industry's first shared scale-out storage architecture and has 40 percent lower power and cooling costs than external SAN infrastructure.[6] It is built on HP Converged Infrastructure and is easily managed with common modules for both VMware vSphere and Microsoft System Center.

HP Insight Control—delivers advanced management capabilities to deploy, monitor, and control hardware, OS, and applications in a coordinated fashion, through tight integration with VMware vCenter and Microsoft System Center.

This addresses the proliferation of management tools by enabling unified virtual and physical security and management. It provides an integrated view from a VM to the core of the network that provides deep insight across the complete network topology and simplified troubleshooting and tuning. It offers new granular visibility through HP Insight Control enhancements to the leadership end-to-end HP networking diagram, enabling visual tracing and monitoring of the Virtual Connect network end to end from the host, all the way to individual network modules connected within the domain delivering comprehensive management of the network. This makes it easier for organizations to review and change any HP-specific information including security of all VM network traffic.

HP Insight Control management software for VirtualSystem can help reduce downtime by 83 percent.

HP Insight Control functionality for rapid VM provisioning provides faster deployment or upgrades of servers with a simple, easy-to-use solution that turns manual, resource-intensive discovery, imaging, and provisioning into unattended, repeatable, and highly automated activities. It also provides the ability to more pro-actively monitor health and performance of VMs and the underlying host systems that support them, including the Virtual Connect network and HP storage. This reduces downtime by 83 percent, according to the IDC study.[4]

HP ProLiant, HP Integrity, and HP BladeSystem servers—HP ProLiant servers provide faster VM performance due to balanced server architecture, which delivers 27 times more performance per watt and 20 to 1 consolidation rates over previous generations, leading benchmark performance for VMware and up to three times better VM server density than competing solutions.[7]

HP Integrity Superdome 2 servers deliver always-on resiliency, to keep mission-critical applications up and running for customers with zero tolerance for downtime.

HP BladeSystem helps to eliminate sprawl and is engineered to maximize operational efficiency, saving as much as 56 percent in total cost of ownership over traditional infrastructures.[8]

Best-in-class solutions and services

To speed the return on investment with HP VirtualSystem and increase business value, accredited virtualization and cloud experts within HP Technology Services and HP AllianceONE partners provide lifecycle services ranging from strategic consulting and planning to pre-integration, deployment, and ongoing management. These services provide end-to-end support for the hardware and software solution with single source accountability.

HP Start Services for HP VirtualSystem—accelerate time to business value. This short duration service includes integration to the data center, orientation, and handover to the organization's IT staff with software configuration, integration, and operational readiness review and is included with the HP VirtualSystem solution.

HP Transformation Experience Workshop—provides an optional one-day workshop geared toward IT and business leaders to create awareness and insights into the concept of virtualization and private cloud, shared services, and converged infrastructure.

HP Cloud and Virtualization Consulting Services—another option includes the full lifecycle of cloud and virtualization roadmap, planning, design, and implementation services to help integrate HP VirtualSystem into the existing data center.

HP Factory Express

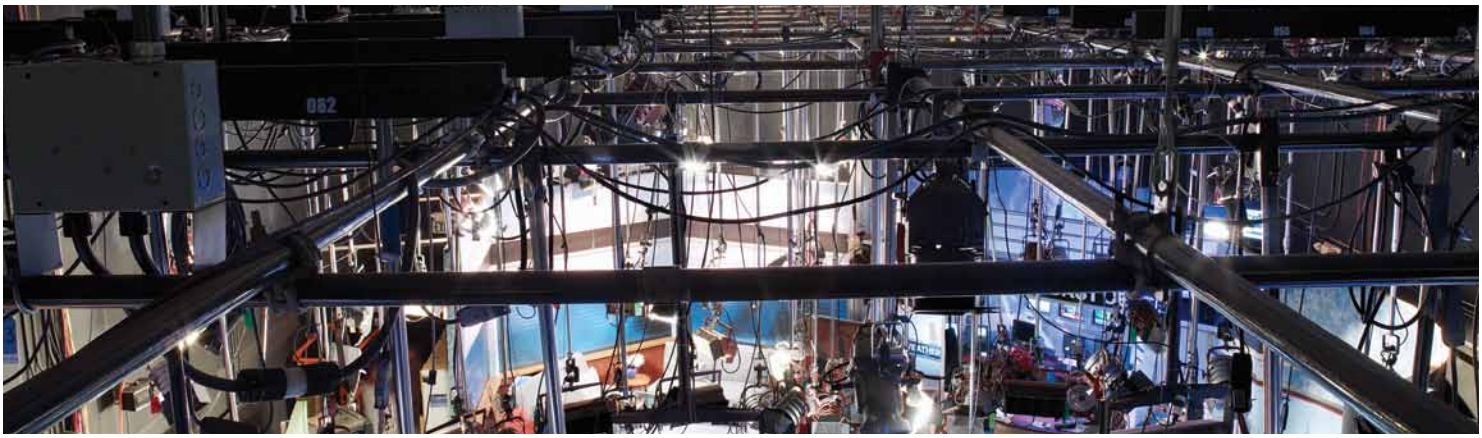
This service is included with the VirtualSystem solution and saves up to 50 percent on a typical deployment time. It helps organizations avoid expensive project management and technical consulting work, and platform-level testing at the factory lowers the overall project risk.

[4] IDC, *Measuring The Business Value of Converged Infrastructure in the Data Center,* Richard L. Villars, Randy Perry, Report No. 229416, September 2011.

[6] HP internal estimate comparing P4800 SAN with Virtual Connect vs. rack servers/external SAN.

[7] HP internal estimate comparing Intel® Xeon® Series 5600-based ProLiant G6 servers to G4 and www.vmmark.org.

[8] HP white paper, "The business case for HP BladeSystem Matrix," December 2011.



HP CloudSystem

While many customers are focused on virtualization today and not quite ready for the cloud, those who are further along the maturity model have HP CloudSystem at their disposal. HP CloudSystem is a complete, secure, scalable cloud solution offering a ready-to-go platform that increases agility for enterprises and drives revenue growth for service providers. The core platform is fully extensible from HP VirtualSystem, enabling customers to seamlessly deploy private, public, and hybrid cloud environments, and includes HP BladeSystem, HP ProLiant servers, HP Converged Storage, core-to-edge HP Networking products, and HP Cloud Service automation software.

Both VirtualSystem and CloudSystem are built on HP Converged Infrastructure. Both include or integrate with VMware and Microsoft hypervisors and key management software such as vCenter Server and System Center VMM. And both include HP Insight Control for deep infrastructure management and control. However, for customers ready for the cloud today, CloudSystem includes additional functionality like the Matrix Operating Environment, which enables automated self-service provisioning of physical and virtual infrastructure services, as well as tools to help optimize and protect their continuity. CSA for Matrix software enables basic application provisioning, monitoring, and lifecycle management so that customers can put cloud services into production quickly and easily.

CloudSystem Enterprise includes the full Cloud Service Automation 2.x suite from HP Software for customers seeking a more robust private or hybrid cloud environment. It includes advanced composite application automation and lifecycle management, as well as a unified portal and service catalog for a single view of all services across private and public cloud environments. In the end, customers who begin with VirtualSystem can eventually roll in CloudSystem to manage their VirtualSystem or upgrade entirely into CloudSystem with services from HP.

Expanding virtualization to SMBs

The dramatic growth of virtualization and the benefits it provides are not confined to large enterprises. HP is extending its virtualization portfolio with a series of pre-defined, channel-ready solutions targeted at specific SMB workloads. Pre-bundled and sized for 25 to 250 virtual machines, organizations can cost-effectively consolidate, improve utilization, and streamline management with a predictable solution that enables quality of service performance.

For more information

HP has a vision of an Instant-On Enterprise that delivers business advantage based on converged infrastructure. We can help organizations reduce complexity, modernize their architecture, and align their virtualization investment to business goals.

HP VirtualSystem is an important development in implementing that vision. For more information, please visit the HP VirtualSystem page at www.hp.com/go/virtualsystem.

4AA3-7670ENW, Created December 2011