# Microsoft® Virtual Server 2005 R2 Enterprise Edition

# HP BladeSystem

## Maximize Virtualization Benefits with Microsoft Virtual Server and the HP BladeSystem

White Paper

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# Introduction

Businesses rely on technology to help achieve their goals. Technology can help businesses connect with customers, capture and organize knowledge, and automate tasks. As technology has evolved, many businesses find that the complexity of IT continues to increase. This has led IT organizations to look for ways to simplify IT and get more from their employees and resources.

An increasingly popular approach to improving IT efficiency is the use of virtualization technology. It is easy for businesses and individuals to see and acknowledge the added value of server virtualization. A virtualized infrastructure can help you save money by increasing hardware utilization, reducing power and cooling costs, and dramatically simplifying and accelerating deployment. Virtualization also gives IT organizations the flexibility to adjust quickly to changing business needs.

There are many scenarios in which virtualization can be implemented to yield these benefits, including:

- **Development and testing** – Software teams need less hardware to develop and test distributed applications, and they can quickly deploy and reset the environment.

- **Server consolidation** – Many core infrastructure and application servers can be virtualized to reduce the number of required servers. A server consolidation approach that relies upon virtualization can be used to support legacy servers or a new server deployment strategy.

- **Workload optimization** – Virtualized workloads allow you to have greater flexibility and to respond faster to changing business needs. When properly implemented, virtualization can give you more control to help manage utilization and balance workloads to meet rigorous requirements of service level agreements and to respond to business demands.

- **Disaster recovery** – Virtual machines can be used to facilitate cost-effective disaster recovery, offering fast recovery time and economical maintenance and operation.

- **Virtual desktop infrastructure** – Information worker desktops can be virtualized to provide enhanced security and manageability.

Regardless of which scenarios you might be considering, the objective of virtualization is the same: to add value to business. Since server administration costs are far greater than the initial cost of hardware and software, businesses must look for tools that can help minimize administration time to reduce the total cost of ownership (TCO) of technology solutions. Virtualization is a broad approach that can help accomplish this.

**The Challenge with Virtualization**

However, many businesses are reluctant to commit to virtualization. Despite the potential benefits, there still can be a significant amount of risk to organizations that undertake a virtualization initiative. The risk is especially high with large-scale initiatives like server consolidation and disaster recovery. Some of these risks include:

- Experience and training of IT staff

- Limited number of management tools

- Complexity of configuration options

- Need for transition and fallback plans to ensure that services are not interrupted

- Investigation of software licensing policies

- Datacenter capacity limitations

- Up-front capital requirements

These risks not withstanding, a well planned, well executed strategy can lead to a successful IT paradigm shift to a virtual infrastructure. Key to this success is finding the right solution and tool set.

## Microsoft and HP: Comprehensive Virtualization with Lower TCO

Microsoft and HP offer a virtualized infrastructure solution that can reduce IT complexity and transform IT to respond to and align with business needs more effectively with a successful deployment of a virtualized infrastructure. Growing out of the powerful 20-year partnership, the HP/Microsoft Frontline Partnership is engaging in a new joint initiative called HP & Microsoft Solutions for the People-Ready Business. HP & Microsoft Solutions for the People-Ready Business draw on the complementary strengths and experience of this collaborative relationship focused on helping enterprises leverage next-generation technologies to manage and transform IT environments. Together, HP and Microsoft offer a solution built on a comprehensive portfolio of products and servers including HP ProLiant servers, HP BladeSystem servers, HP StorageWorks products, HP desktop PCs, notebooks, and tablets and Microsoft software, guidance, and tools to help you implement a virtual infrastructure.

The new HP BladeSystem servers are an efficient, cost-effective solution built to support a wide variety of applications and environments. An alternative to a conventional racked server infrastructure, the BladeSystem is designed for consolidation. It provides the essential elements of a modern data center—power, cooling, management, connectivity, redundancy, and security—in a modular, self-tuning unit in a single enclosure.

The HP BladeSystem is fully integrated with HP management tools including HP Insight Control. HP Insight Control represents the total value of the HP ProLiant and BladeSystem management portfolio and enables customers to transform server hardware into best-run server infrastructure. HP Insight Control brings together HP Systems Insight Manager V5.1 and HP ProLiant Essentials management software and delivers them in simple, integrated packages for deploying, monitoring, and controlling server infrastructure from anywhere. With HP Insight Control, you can deliver on the promise of Unified Infrastructure Management by closely integrating server and storage management, discovering the power of IT working as one, and transforming today's assets into a next-generation adaptive infrastructure.

HP Systems Insight Manager (SIM) is a centralized management console and serves as a central access point for HP ProLiant Essentials. ProLiant Essentials is a comprehensive infrastructure management solution designed to make the most of ProLiant servers by meeting your specific IT needs. ProLiant Essentials provides remote management, provisioning, security, virtualization, and performance management through tools and management packs including the Server Migration Pack (SMP) and Virtual Machine Management Pack (VMM). With SMP and VMM you can take control of physical and virtual resources through simplified, automated migrations: physical to virtual machine migration (P2V), virtual to virtual migration (V2V), and virtual to physical migration (V2P).

Microsoft provides the foundational and application-level software to deliver management-integrated virtualization backed by Microsoft best-in class support. Microsoft® Virtual Server 2005 R2 is the virtualization software designed specifically for the Microsoft® Windows Server family of products. As a free download, Virtual Server has the essential features you need to improve server utilization and increase administrative productivity and responsiveness. Uniquely positioned to provide end-to-end support for virtualized software environments, Microsoft has the platform and the vision to help you deliver a virtualized infrastructure into the future.

Together, HP technologies and tools along with Microsoft software and support comprise an efficient, integrated virtualization solution that delivers lower TCO. That, in turn reduces the risk for organizations that want to undertake large-scale virtualization initiatives. Additionally,

a virtualized infrastructure based on the combined HP and Microsoft solution helps to increase server utilization, improve administrator productivity and responsiveness, and simplify support.

# Benefits of Using HP ProLiant Server Blades

Keeping servers running requires extraordinary administrative time and effort. To address this, HP aims to cut administrative overhead in half by delivering tools and solutions to simplify IT management. The HP ProLiant line of server blades is a step toward achievingthat objective.

The HP BladeSystem provides a consolidated server solution that eliminates the conventional "racked and stacked" data center model of the past several decades. The unique architecture of the HP BladeSystem, along with HP ProLiant BL series servers and intelligent management tools, is designed with a unique architecture that provides the scalability needed to support a rapidly growing virtual infrastructure. In short, the HP BladeSystem can help reduce costs, improve efficiency, scale more quickly, and meet service-level agreements for availability and performance.

The HP BladeSystem helps lower TCO by providing the tools to help you manage tasks across many devices at once. This toolset includes HP Thermal Logic, HP Insight Control, and HP Virtual Connect. These tools work together to provide control over the HP BladeSystem and to integrate with HP SIM to help you manage the rest of your HP infrastructure.

## Increased Efficiency

With a traditional infrastructure, adding capacity requires significant manual effort to procure and install rails, cables, trays, and wiring. In contrast, the BladeSystem offers true plug-and-play scalability. A BladeSystem rack infrastructure is completely prewired for 160 redundant Gigabit Ethernet network connections, 80 redundant Fibre Channel connections, and full power redundancy. The entire physical infrastructure required to run blade servers is already in place, including keyboard/video/monitor switching (KVM) and integrated remote management software. The efficiencies of this system extend to capacity planning, which can be laid out and implemented before a server is ordered.

**Power and cooling** are fully architected into the HP BladeSystem via the HP Thermal Logic thermal instrumentation and controls. HP Thermal Logic automatically adjusts and shifts power load and thermal control based on changes in workload demand and environment. Compared to the fans of traditional servers, HP Thermal Logic technology requires 50 percent less airflow and 70 percent less power to cool the same number of server blades. This lets you increase system performance as needed without exceeding the power and cooling capacity of your data center.

**HP Thermal Logic** also gives you the unique ability to monitor, pool, share, and match power use to demand. You can balance performance, power, and cooling according to the tasks at hand and set limits for power and cooling levels to maximize efficiency. With an intelligent power infrastructure and HP Power Regulator technology, you can decrease power usage at the server level during low utilization periods to save money, cut waste, and maximize your investment.

The HP BladeSystem network subsystem is built around the **HP Virtual Connect Architecture**, an innovative new interconnection strategy that gives server administrators the flexibility to connect and manage servers however they want. Using Virtual Connect modules for HP BladeSystem, your local-area network (LAN) and storage-area network (SAN) connections are available to a pool of up to 64 physical servers and any number of virtual servers. You simply define the I/O connection for a server, deploy it at the click of a button, and migrate it to another server bay instantly—all without making any configuration changes to the SAN or LAN. This saves provisioning and maintenance time, improves productivity, and enables you to pool server resources more easily.

HP Virtual Connect Architecture also reduces the number of cables in your HP BladeSystem environment and eliminates the need to add managed switches to the data center. This saves on cabling costs and improves reliability without complicating LAN or SAN management.

One of the greatest advantages of a blade server solution is scalability. The HP BladeSystem takes this to a new level and adds additional benefits such as convenience and ease-of-use.

The HP BladeSystem integrated chassis provides the capacity to scale out. Using the latest multi-core processors from AMD and Intel, HP ProLiant server blades deliver the power of a four-processor server in less than 2U of space providing significant ability to scale within a single blade. One HP BladeSystem enclosure provides the capacity for up to 16 dual-processor blade servers. Within one fully leveraged HP BladeSystem enclosure—occupying less than one-fourth of a 42U server rack—you can provision the power of up to 32 processors. A full rack of HP ProLiant server blades can deliver the power of up to 128 processors.

## Simplified Management

For a long time, servers have been managed as single devices. With the HP BladeSystem, all components are related hierarchically to each of the other components within the infrastructure enabled by Insight Control Data Center Edition. Insight Control Data Center Edition is an integrated management suite that delivers core management functionality for HP BladeSystem lifecycle, including hardware-resource deployment, health and performance monitoring, vulnerability scanning and patch management. BladeSystem components are all managed via intelligent, interconnected tools and technologies that significantly reduce the amount of time required for system management, delivering total control, maximum flexibility, and tangible savings

Insight Control Data Center Edition delivers the following capabilities for HP BladeSystem environments:

- Unified server health and performance monitoring

- Rapid, unattended server and OS deployment

- Proactive performance monitoring and bottleneck analysis

- Vulnerability and patch management

- OS independent remote control (built into BladeSystem servers and enclosures)

The ProLiant Essentials VMM Pack and other SMP plug-ins extend HP SIM capabilities to manage virtual machines. The VMM Pack provides central management and control of Microsoft Virtual Server 2005 R2 SP1 virtual machines, giving administrators the ability to:

- associate physical hosts to virtual machines

- easily identify guest or host servers reaching high CPU, memory, or disk utilization levels

- enable restoration of guests on any available host through backup, template, and alternate host capabilities.

The SMP plug-in automates the manual processes required for migrating servers between physical or virtual platforms: P2V, V2P, and V2V. Thus you can easily move servers to appropriate physical or virtual platforms that meet performance and capacity requirements.

## Reduced Total Cost of Ownership

The increased efficiency and simplified management provided by the HP BladeSystem and integrated tools save on direct and indirect expenses. For example, the HP BladeSystem pools and shares common resources such as connectivity, power, and cooling and decreases the need for others. This reduces up-front infrastructure costs. The HP BladeSystem uses and controls power intelligently, thereby reducing operational costs. Because the HP BladeSystem hardware architecture is scalable, you can buy only the computing resources that address your immediate needs and add blades and other components as-needed basis to accommodate growth.

For customers in the United States, HP reduces BladeSystem TCO even further by offering a trade-in program for HP e3000, Sun UNIX, Intel-based, or AMD-based HP/Compaq or competitor servers with processor speeds ranging from 486 to Pentium 300MHz and above. This can help reduce or remove barriers to upgrading your infrastructure. Taking advantage of the HP Trade-In Program can help with both cost and data center space issues, and it can give you an easy way to recycle your server hardware. To learn more, visit the HP Trade-In Program Web site at http://www.hp.com/united-states/tradein/home_flash.html.

# Benefits of Virtual Server 2005 R2 SP1

Virtual Server 2005 R2 SP1 delivers all of the core benefits of virtualization in a free software package. Microsoft® Virtual Server 2005 R2 with Service Pack 1 (SP1) is a highly cost-effective server virtualization technology that is engineered specifically for the Microsoft® Windows Server® 2003 operating system.

When deployed in conjunction with Windows Server 2003, Virtual Server 2005 R2 SP1 provides a virtualization platform that runs a broad range of x86 operating systems in a guest environment. Virtual Server 2005 R2 SP1 is fully tested and supported by Microsoft to host Windows Server operating systems and Windows Server applications. In addition, Microsoft provides 24x7 support for specific distributions of Linux running on Virtual Server 2005 R2 SP1.

Virtual Server 2005 R2 SP1 provides high availability for both planned and unplanned downtime and enhanced support for backup and disaster recovery. Virtual Server takes advantage of Windows Server platform services such as the Windows Cluster Service to provide high availability through load balancing, stateful migration, and failover. New in SP1, the Volume Shadow Copy Service can take a point-in-time snapshot of operating virtual machines to accelerate backup, protect data, and facilitate flexible disaster recovery.

Additionally, Virtual Server 2005 R2 SP1 integrates with a broad range of existing Microsoft and HP management tools. Therefore, administrators can use their existing server management tools to seamlessly manage a Virtual Server 2005 environment running on HP hardware.

## Simplified Migration

To facilitate a smooth migration path to Windows Server virtualization, Microsoft provides the VHD format, which is broadly applicable. This format will be used for the next-generation hypervisor-based virtualization technology that will be included with Microsoft® Windows Server® code named "Longhorn." Additional tools, such as Microsoft® System Center Virtual Machine Manager, are also being developed to provide improved manageability for virtualized environments and unique tools to help manage virtual infrastructures.

## Licensing Advantages

Microsoft has also announced new highly advantageous licensing for virtualization on the Windows Server 2003 platform. Under the new use rights, a Microsoft® Windows Server® 2003 R2 Enterprise Edition license allows you to run up to four virtual instances of Microsoft® Windows Server® 2003 R2 Standard Edition or Windows Server 2003 R2 Enterprise Edition operating systems on the same server. Microsoft® Windows Server® 2003 R2 Datacenter Edition takes this licensing model a step further, offering unlimited virtualization of Windows Server 2003 R2 operating systems on properly licensed servers.

## Lower Total Cost of Ownership

The value proposition of Virtual Server 2005 R2 SP1 is significant. Not only is Virtual Server 2005 R2 SP1 free of charge, but Microsoft now also offers low-cost licensing options for virtual machines through its most scalable server operating system products: Windows Server 2003 R2 Enterprise Edition and Windows Server 2003 R2 Datacenter Edition. Virtual Server takes advantage of tools built into the Windows Server 2003 operating system to deliver high availability, eliminating the cost of additional software or complicated solutions. Microsoft provides comprehensive support of many Windows and non-Windows guest operating

systems including some Linux distributions such as SuSE Linux and Red Hat Linux. Plus, your investment in virtualization with Virtual Server is protected for the future through Microsoft's commitment to continue use of the flexible, standardized VHD file format. Microsoft is committed to virtualization and is investing on many fronts to deliver maximum value to customers for the long term, contributing even further to reduced TCO you receive from Virtual Server.

# Achieve Lower TCO with HP and Microsoft

HP and Microsoft have maintained an ongoing partnership for more than 20 years. It is therefore no surprise that the complementary products from HP and Microsoft have been integrated to form an ideal server virtualization solution. Using HP BladeSystem servers with Microsoft Virtual Server 2005 R2 delivers reliable, cost-effective virtualized infrastructure solutions that can help you overcome the barriers to deploying virtualization broadly in your organization.

## Combined Toolset

HP and Microsoft provide a complete, combined toolset that reduces the risk associated with virtualization solutions. The HP and Microsoft solution provides full coverage for a variety of key scenarios,delivers great value, and reduces TCO. In addition to the management tools that accompany the HP BladeSystem, HP provides planning tools to further reduce risk and help organizations plan for a virtual infrastructure. The HP tools are specifically designed to assist with virtualization and, more generally, with server sizing.

One example of these planning tools is the HP ProLiant server sizer for Microsoft Virtual Server 2005 R2, available as a free download from the HP **ActiveAnswers** Web site located at http://www.hp.com/solutions/activeanswers/microsoft/virtualserver. The HP ProLiant server sizer for Microsoft Virtual Server is a tool that helps you select the HP ProLiant or BladeSystem server environment necessary to support your Virtual Server deployments. The tool provides a quick and consistent methodology for determining a "best-fit" server for your individual needs. The sizing information and algorithms have been developed based on testing and performance data for HP ProLiant servers running Microsoft Virtual Server 2005 R2. This is just one example of the tools available to help you plan and prepare properly for your virtualization initiatives. The results provided by this tool will give you insight into the size and cost of an appropriate solution and give you data around which you can plot strategies for successful new programs. This information helps fill in the gaps and eliminate guessing, and thus helps mitigate risk.

Undertaking a simpler virtualization solution is another way to help control risk before executing a more sophisticated initiative. HP **Virtual Desktop Infrastructure (VDI)** is an example of a simpler end-to-end virtualization solution provided by HP and Microsoft. A replacement for the traditional desktop configuration model, HP VDI is an integrated solution that includes hardware, software, and management tools. HP VDI builds on Microsoft Virtual Server technology to help provide a complete virtualization solution at a significantly lower cost than alternative hardware/software configurations.

If you have been planning or even considering IT initiatives that take advantage of virtualization technologies, you can mitigate the risk to your organization and proceed with confidence using Microsoft Virtual Server 2005 R2 and HP ProLiant server blades and tools. HP and Microsoft provide organizations with the solutions they need to move ahead today and protect investments into the future. HP and Microsoft continue to invest in tools and solutions for virtualized infrastructures. And the depth of the HP and Microsoft partnership means that collaboration around low cost virtualization solutions will continue.

## Best Value

The cost of a Microsoft and HP virtualization solution is managed on many fronts. Because the Microsoft Virtual Server 2005 R2 software is free, you start with a low-cost solution. You can download the software today from the Virtual Server Web site, located at http://www.microsoft.com/virtualserver/. Virtual Server also helps control cost at its greatest

source: management time. Virtual Server enables you to configure and deploy virtual machines in minutes. And with the efficient HP BladeSystem hardware infrastructure, the process is simplified further by connected infrastructure and simple management tools that make resource management easy.

Virtual Server 2005 R2 also gives you the ability to increase hardware utilization substantially through consolidation, thereby slimming support requirements for racks of low-utilization servers. Additionally, Virtual Server includes management tools that enable you to balance workloads effectively across hardware resources, and the HP BladeSystem exposes those resources in a way that allows Virtual Server to take maximum advantage. As resource demand increases and you need to scale the infrastructure, you only need to add another blade. You can eliminate the time otherwise spent collaborating with multiple IT teams on procurement, deployment, and management.

Both Microsoft and HP also provide direct cost-saving incentives. Microsoft helps simplify and control licensing costs through highly advantageous licensing for virtual machines that run on Windows Server 2003 R2 Enterprise Edition and Windows Server 2003 R2 Datacenter Edition. HP offers a server trade-in program through which you can earn rebates toward the purchase of new server hardware.

## Simplified Solution

Another compelling advantage to using the Microsoft and HP solution for virtualization is its simplicity. Not only do the technology components fit together elegantly, but using Microsoft and HP for your virtualization solution minimizes the number of support vendors with whom your IT staff must interact. This reduces the potential for finger-pointing and time spent opening and escalating issues. This support scenario delivers added value, particularly to IT organizations that often devote excessive resources to vendor management and sub-standard support.

Because HP ProLiant and BladeSystem servers are thoroughly tested for compatibility with the Windows Server operating system, fundamental compatibility of hardware and software is ensured. Microsoft offers full support for the host operating system, virtualization layer, guest operating systems (even for some third-party operating systems), and Microsoft applications running in virtual machines. Similarly, HP provides comprehensive support for its hardware and management tools.

The Microsoft and HP relationship continues to evolve and strengthen. In December of 2006, HP and Microsoft announced a new level of collaboration with the HP & Microsoft Solutions for the People-Ready Business. This comprehensive portfolio of enterprise solutions is the result of the 20-year partnership between Microsoft and HP, and it reflects the long-term shared commitment to helping businesses drive new growth, realize greater value from their existing IT investments, and utilize new technologies to achieve new levels of success.

The objectives of the collaboration are to help customers accomplish the following:

- Realize greater value from current IT investments by simplifying, transforming, and connecting their technology assets more effectively.

- Capitalize on next-generation technologies to reduce and avoid costs while simplifying their IT environment.

- Achieve the agility of an adaptive enterprise through the ability to transform and improve IT to respond to changing business conditions, and to align with business needs more effectively.

This collaborative offering of combined technology and services will undoubtedly include the use of virtualization-based solutions that leverage the HP portfolio of products, services, and tools and Microsoft software and support.

# Conclusion

The HP BladeSystem with fully integrated HP management suites such as HP Insight Control featuring Systems Insight Manager ProLiant Essentials management software deployed with Microsoft Windows Server 2003 R2 and Microsoft Virtual Server 2005 R2 provides an integrated server, storage, network, and management solution that makes your Windows environment both more manageable and more responsive. The modularity and virtualization capabilities of the HP BladeSystem simplify the deployment and provisioning of Microsoft Virtual Server-based virtual machines. This combined infrastructure is designed to deliver the performance and scalability your business needs to accommodate growth while controlling hardware-related costs such as power and cooling.

The HP BladeSystem is comprised of both the physical hardware and a management software subsystem; all aspects of the system are connected via HP SIM. When used in conjunction with ProLiant Essentials server management software, HP SIM delivers a variety of value-added management plug-ins that facilitates virtualization scenarios such as server consolidation, disaster recovery, and HP VDI.

Microsoft Virtual Server 2005 R2, a highly cost-effective virtualization solution created specifically for Windows Server 2003 R2, provides the technology that fuels virtualization. Using portable virtual machines encapsulated in the VHD file format, Virtual Server provides new levels of flexibility that help to dramatically accelerate new server deployment, increase server utilization, and improve IT responsiveness. Microsoft continues to invest in core virtualization technologies and integrated management tools. The Microsoft road map for virtualization protects IT investments by retaining the VHD format into the next generation of hypervisor-based virtualization technology in Windows Server "Longhorn".
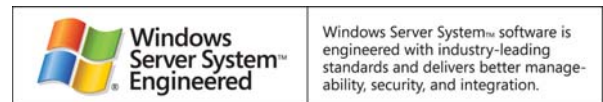
Together, Microsoft Virtual Server and HP BladeSystem servers deliver virtualization with lower total cost of ownership. Moreover, the Microsoft and HP virtualization solutions reduce risk to organizations by providing a comprehensive solution that enhances and strengthens virtualized scenarios by providing the value-added tools needed to be successful. Through Virtual Server and Windows Server, Microsoft delivers a scalable, reliable, and flexible software suite with licensing advantages that further reduce TCO. HP's new approach to infrastructure via the integrated HP BladeSystem enables a new model of IT efficiency and productivity with the hardware and connected tools to quickly deploy and easily manage a flexible, scalable IT infrastructure.

Microsoft and HP have shared a long-lasting partnership that is deepened by a commitment to deliver enterprise solutions, as demonstrated by the HP & Microsoft Solutions for the People-Ready Business. Microsoft and HP have a long-term shared commitment to helping businesses drive new growth, realize greater value from their existing IT investments, and utilize new technologies to achieve new levels of success.

# Related Links

For more information about HP & Microsoft Solutions for the People-Ready Business visit http://www.microsoft.com/business/peopleready/hp. For information on the products and services discussed in this paper, please see the following:

- The Microsoft Virtual Server home page, located at http://www.microsoft.com/virtualserver/

- The Microsoft Windows Server 2003 R2 Enterprise Edition Web site, located at http://www.microsoft.com/windowsserver2003/enterprise/

- The Microsoft Virtualization Web site, located at http://www.microsoft.com/virtualization

- The Microsoft System Center home page, located at http://www.microsoft.com/systemcenter

- The HP BladeSystem Web site, located at http://www.hp.com/go/bladesystem

- HP Insight Control Data Center Edition, located at http://www.hp.com/go/icdce

- The HP ProLiant Servers home page, located at http://www.hp.com/products/servers/platforms/

- The HP ActiveAnswers Web site, located at http://www.hp.com/ActiveAnswers/microsoft/virtualserver/

- The HP ProLiant Trade-In Program Web site, located at http://www.hp.com/united-states/tradein/