



Microsoft | Virtualization

How Customers Are Cutting Costs and Building Value with Microsoft Virtualization

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Microsoft

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Introduction

Businesses have never been under more pressure to reduce costs and operate more efficiently. Virtualization is one of the most effective means for making this happen. It provides powerful, tangible ways to streamline many traditionally time-consuming processes and minimize the resources needed to deploy and manage IT resources.

This white paper examines how Microsoft customers are using virtualization technology to simplify their IT infrastructure, IT processes, and save money. It begins by discussing the core savings inherent in using virtualization to consolidate servers and, as a result, how this helps organizations gain significant time, space and power savings, as well as environmental benefits. We then look at additional savings customers are achieving due to the unique way that Microsoft built virtualization technologies into our server and management platforms. Finally, we show how Microsoft enables even further savings through innovative pricing and licensing, which lower both acquisition and ongoing ownership costs.

Note that this paper is primarily focused on how customers today save money with server and management virtualization solutions. There is a whole set of the client solutions that also provides customers with savings and increased flexibility. For an overview of the Optimized Desktop see <http://www.microsoft.com/windows/enterprise/solutions/virtualization/default.aspx>.

Inherent Savings from Server Virtualization: Consolidation, Power, Green IT, Space

The most frequently discussed virtualization benefits relate to servers. By virtualizing servers, you can address the problems of underutilized and difficult-to-manage hardware, excessive power consumption, and the expensive space required to house servers in datacenters and branch offices. This leads to tremendous savings in several areas. The first and most visible saving is from server consolidation.

Server Consolidation Savings

By running multiple virtual machines on fewer physical servers, Microsoft customers are drastically cutting hardware requirements and easing server management. For instance, using Windows Server 2008 R2 Hyper-V, East Lothian Council, one of 32 unitary council areas in Scotland, United Kingdom (U.K.), "...will migrate most applications to four new servers, which will each run approximately 12 virtual machines. The virtualised capacity is 90 percent less expensive to acquire than the physical machines that they replace," according to Rod Adam, IT Team Leader, Server Management Team, [East Lothian Council](#). This consolidation allowed the Council to avoid a £150,000 computer room upgrade saving the Council £80,000 after the virtualization infrastructure purchase.

This degree of savings is typical. Indiana University Auxiliary IT Department went from 152 to just 32 servers, which it expects will save U.S. \$85,000 annually. [Podravka](#) reduced its servers from 102 to 24, which combined with the other benefits of Microsoft virtualization will be seeing savings of U.S. \$2,000,000 over 5 years. [Wacom Europe GmbH](#) will see a reduction in hardware support costs through consolidation. By purchasing and operating less physical servers, Wacom Europe GmbH expects to save 60% on hardware support costs. "Rather than purchasing extended service contracts for 20 physical servers, we'll need to purchase those contracts for only 4 physical servers," says Markus Kost, Senior IT Engineer for Wacom Europe. "At an average cost of about €500 [U.S.\$737] per server computer per year, that will save us about €8,000 [\$11,795] a year and we can have as many virtual servers as the hardware will support."

Electrical Power Savings

Through server consolidation, many customers have realized dramatic electrical savings which is a particularly important benefit in today's climate of volatile power prices. [EmpireCLS Worldwide Chauffeured Services](#) expects to save an additional

33 percent in annual power and cooling costs with the improved consolidation capabilities of Windows Server 2008 R2 Hyper-V, than what it was previously seeing. “With Windows Server 2008 R2, we have reduced LUN management by 80 percent,” says Alan Bourassa, Chief Information Officer at EmpireCLS. “We can also run 8 virtual machines to each CSV and 24 virtual machines per server. Previously, we could run only 8 to 12 virtual machines per server. By increasing our server utilization with Windows Server 2008 R2 and taking advantage of the increased capacity of our new HP ProLiant G6 servers, we will reduce both our server farm infrastructure and our power costs by 33 percent.” [HotSchedules](#), which notes that its “number one cost in the datacenter is power,” currently spends about U.S. \$11,000 a month on datacenter power costs, but with Hyper-V, it anticipates that this monthly figure will go down to \$2,500. Danny Burlage, Chief Technology Officer at [Wortell](#), reports, “By virtualizing servers and taking advantage of the intelligent power management features in Windows Server 2008 R2, we have cut our energy consumption in the data center by 85 percent. This solution frees up a lot of resources.”

As Nicholas Merton, IT Support for Microsoft customer [Maxol](#) explains, energy costs can be reduced not only by using Hyper-V, but by also using Microsoft System Center Virtual Machine Manager 2008. “We estimate that we’ll save about U.S. \$47,000 in electrical costs over three years. We also plan to shut down servers at night when the processing load is far less and move their applications to a smaller number of servers. In a physical environment, you can’t just turn off Exchange Server or other critical applications. But in a virtual environment, you can use System Center Virtual Machine Manager 2008 R2 to automatically move selected applications to specified servers and move them back to their ‘home’ servers in the morning.” More efficient electrical power usage also improves Maxol’s standing as a “green” company.

Environmental Impact and Savings

As Maxol noted, server virtualization can have a tremendous impact on green initiatives. Consolidating underutilized servers improves capacity utilization, lessens cooling requirements and kilowatts of power used, and reduces the environmental footprint for organizations such as Lancashire Constabulary and Chester Zoo.

“We’re two-time winners of the Queen’s Award for Enterprise (Sustainable Development) so we’re interested in anything we can do to reduce our carbon footprint,” says Phillip Morris, IT Manager at [Chester Zoo](#). “We’ve already decreased it substantially by not buying 30 more pieces of hardware, and we expect to see significant savings in electricity used to power and cool the servers.”

[Lancashire Constabulary](#) created a Virtual Desktop Infrastructure using Microsoft virtualization to host the virtual desktops. Colin Fitzsimons, Senior Systems Engineer, Lancashire Constabulary, says: “With our pilot programme completed, our success criteria for Windows Server 2008 R2 includes having a virtual desktop infrastructure across 104 Hyper-V hosts scaled to support 48 virtual desktops each. Hopefully, we can do better than that in terms of cost reduction. With Hyper-V, we can now re-evaluate our use of VMware and cut the cost of virtualisation.” When fully implemented, the VDI will result in lower electricity costs and contribute to the force’s green initiatives and carbon reduction targets.

To meet governmental regulations concerning the reduction of carbon dioxide usage, many organizations are turning to virtualization. Rod Adam, IT Team Leader, Server Management Team, East Lothian Council was concerned about the team’s ability to support the council’s carbon dioxide emission targets. The U.K. government has pledged to reduce carbon dioxide from its own buildings and transport by 12.5 per cent by 2012 compared with 1999 levels. He says: “When we originally spoke to our energy supplier about our projected requirements, it confirmed that this could potentially double electricity consumption at council headquarters.” Now, with server virtualization from Microsoft, Adam says, “Hyper-V helps us to meet budgetary targets and reduce our carbon footprint, which means that we can continue to deliver outstanding value to our internal customers as well as the citizens of East Lothian. It also provides us with a strategic platform for future server and application deployments.”

The [Perth and Kinross Council](#) also projects a significant positive environmental impact: “The electricity consumption savings in the first year of virtualization will deliver a reduction of 350,000 kilowatt hours of electricity equivalent to 151 tonnes in reduced carbon dioxide emissions. We are making a contribution to the councilors’ sustainability targets in three ways: by cutting the number of physical servers, lowering use of electricity, and reducing the need for air conditioning, ” said Ken Wilson, Application Services Manager, Perth and Kinross Council.

Microsoft’s measurements with Hyper-V show a near one-to-one energy savings for each server consolidated. In other words, the power consumption of the host OS does not substantially increase as guests are added. To put these savings into perspective, consider these actual measurements, which highlight the power consumption of 10 IIS Web servers compared to that of 10 IIS Virtual Servers running on Hyper-V.

Server Setup	Ave. Watts	kWh/year	Cost	KG of CO2
Standalone IIS x 10	5,001	43,839	\$4,007	34,084

One Hyper-V server with 10 IIS7 VMs	512	4,490	\$410	3,491
Savings	4,489	39,349	\$3,597	30,593

Space Savings

Burgeoning server farms can also be expensive to house. But consolidating servers through virtualization can save valuable space in your datacenter and branch offices, and further reduce operational costs. [Indiana University Auxiliary IT Department](#) used to spend U.S. \$17,500 annually on rent for five racks in its datacenter. Using Microsoft virtualization technology, it slashed its rack count down to two, saving \$10,500 annually on datacenter rack fees.

[Lionbridge Technologies](#) wanted to more efficiently handle their dispersed servers. By centralizing their servers Lionbridge Technologies would be able to increase productivity due to enhanced collaboration. Unfortunately, to bring all of their geographically dispersed servers into their centralized datacenter was impossible without expensive changes to with their hosting provider. “For example, if we had five new servers coming online, we would have to spend a lot of valuable management time just deciding where to put them,” says Oyvind Kaldestad, Vice President of Corporate IT at Lionbridge Technologies. “And then we might have to buy more space, or negotiate with the hosting company for more power. By using Hyper-V instead of physical servers, we’ve tripled the number of servers we run without increasing floor space or using more power. As a result, we have probably saved \$30,000 or more per month in additional rack space and electricity.”

Getting Started with Server Virtualization: MAP and HyperGreen Toolkits

Getting started on realizing these savings is now easier than ever with Microsoft assessment tools for server consolidation and environmental savings. Microsoft has a free downloadable tool, called [Microsoft Assessment and Planning \(MAP\) Solution Accelerator](#), which helps identify your best candidates for consolidation. With its agent-less inventory, performance data gathering, and auto-generated proposal and report generation capabilities, MAP lets you conduct network-wide readiness assessments so you can quickly and efficiently determine the right servers to target for Hyper-V.

[Cheshire Fire and Rescue Service](#) used the MAP toolkit with great success. By working with their partner Nvtron, Cheshire Fire and Rescue Service was able to determine which of the existing servers in their main datacenter were suitable for virtualization. Using the MAP Toolkit they were able to determine if more servers

were capable of running Microsoft virtualization. Kieron Connolly, Business Development Manager at Nviron, says: “The last thing you want to do is retire servers that are perfectly capable of running in a virtualised environment. MAP helps us to identify underutilised resources and the hardware specifications needed to successfully consolidate the servers using Hyper-V technology.”

After you have determined how many servers you plan to consolidate, you can use the free [Microsoft HyperGreen Tool](#) to calculate how much energy you’ll save and the environmental impact of those savings. You simply plug in the number of servers you are going to consolidate, and HyperGreen generates a report detailing your reductions in kilowatts, money and CO2 emissions.

Calculate Your Savings from Microsoft Virtualization Solutions

With so many customers realizing such substantial savings, you may be wondering what kind of benefits virtualization can provide to your organization. It’s easy to find out. Use the [Microsoft Integrated Virtualization ROI Tool](#) to estimate your return on investment in Microsoft virtualization solutions, including server, desktop and management. As our customers have shown, the results can be transformational.

Extending Server Virtualization Benefits with Rapid Provisioning

After your servers are virtualized, they are much easier and less expensive to deploy by using System Center Virtual Machine Manager 2008 R2. [PoundHost](#) uses System Center Virtual Machine Manager 2008 R2 to create custom or prepackaged virtual machines to order for their customers in 20-60 minutes. This automation has allowed Poundhost to provide more customizable solutions they weren’t able to offer before and now the installs are done automatically instead of the manual configuration they had to do before. In the lab, Fpweb.net is using Hyper-V and System Center Virtual Machine Manager 2008 R2 to quickly provision test environments when developing customized solutions for customers. Developers can also use the Microsoft virtualization software in the lab to efficiently evaluate new solutions and bring them to market before other hosting providers. Indiana University Auxiliary IT Department now requires just one hour, instead of 10 hours, to provision a server, which it estimates saves U.S. \$9,000 in setup costs alone based on a \$50-per-hour IT professional wage. Even more dramatic, [WorleyParsons](#) slashed its time to deploy a new server from 3 weeks to just one day, saving AU \$1,055,000 (U.S. \$999,985) every year.

“In the past this would require deploying a new physical server, which could take three weeks because of the time involved in purchasing and setting up the server. With Hyper-V and System Center Virtual Machine Manager, we now have the templates and ability to provision in a much shorter timeframe,” says Vito Forte, Chief

Information Officer, WorleyParsons. “Virtualization with Hyper-V is providing the ability to deliver applications quickly, and this is what we need to do to differentiate ourselves from competition.”

How do these customers, and many others, achieve these kinds of savings? Because they no longer have to physically build machines—they simply create new virtual machines, which require much less time and labor to provision. With advanced management tools in Microsoft System Center Virtual Machine Manager 2008 R2, you can automate P2V conversions, intelligently place virtual machines on the most appropriate servers based on usage and capacity, and manage both Microsoft and VMware hosts—all with the same solution.

Amplifying Savings and Value with Microsoft's Platform Approach to Virtualization

Because of virtualization's proven ability to save our customers money and lay the foundation for a more dynamic IT environment, Microsoft built it into its core platform offerings. By making machine virtualization ubiquitous on the server and application virtualization ubiquitous on the desktop, and by deeply integrating virtualization into our end-to-end management solution, Microsoft uniquely makes virtualization part of the everyday IT environment.

As Bert Van Pottelberghe, Sales Director at [Hostbasket](#), says, "Having one vendor for the hypervisor, operating system, and much of our application software was very appealing to us from a support and cost perspective."

Windows Server 2008 R2: Built-in Hypervisor, Live Migration, High Availability and Energy Efficiency

Windows Server 2008 R2 is replete with tools and capabilities that streamline processes and enable customers to maximize the value gained from virtualization technologies.

Hypervisor

Hyper-V is a key feature of Windows Server 2008 R2, so customers don't have to purchase or manage hypervisors separately from the operating system. As a result, Hyper-V licensing "was 50 percent less than competitive solutions," according to Paul Acampora, Manager of Customer Service for [Saint Raphael Healthcare System](#). [Jackson Energy Authority](#) was able to save U.S. \$15,000 by using Hyper-V in Windows Server 2008 Enterprise—including \$5,000 on VMware licenses and \$10,000 on a remote access solution. And, by choosing Hyper-V over VMware ESX, [Santa Barbara Web Hosting](#) saved money and got an easy to use solution:

"The ESX solution would have cost U.S. \$30,000 for four servers. With Microsoft, we have a service provider agreement that allows for monthly payments with no capital costs—costing us less than \$1,000 over the life of the contract," says David Straede, President and Chief Operating Officer for Santa Barbara Web Hosting. "Hyper-V has the core features businesses need. It's the Windows people know, is installed just like other Windows-based applications, and works in a management console that IT staff are already using. The ESX feature set simply doesn't justify its additional expense."

Hyper-V R2 has expanded processor support for servers with up to 64 logical processors. Hyper-V R2 has also increased physical host memory support to 1TB of RAM. This is a significant increase from 32GB. The increased processor and memory support in Hyper-V R2 makes it possible to run even more demanding workloads on a single physical computer, or consolidate more workloads on a single physical computer. “With the new Hyper-V capabilities, we’ll be able to keep up with business expansion and offer more services without deploying as much hardware as we would for a nonvirtualized environment,” Geoff Mears, IT Manager at [Southern Spars](#), says. So far, Southern Spars has extended its virtualization capacity by 20 percent to 24 virtual machines, using the same number of host computers as before. “With the additional virtualization capacity provided by Hyper-V in Windows Server 2008 R2, we will be able to consolidate servers and push out major hardware upgrades for 18 months, which will save us approximately NZ\$80,000 [U.S.\$56,000],” says Mears.

Hyper-V R2 includes numerous enhancements that reduce the performance overhead inherent in virtualization. The Jumbo Frames, TCP Chimney, and Virtual Machine Queue features increase Virtual Machine network performance and lower virtualization overhead. As a result, [PetroChina Limited](#) now uses Windows Server 2008 R2 to support larger workloads on individual computers and achieve “wire speed” storage performance. Applications running in Hyper-V R2 Virtual Machines perform better than before.

Hyper-V R2 supports hot plug-in and hot removal of storage. By supporting the addition or removal of storage while a VM is running, Hyper-V R2 makes it possible to reconfigure VMs quickly to meet changing workload requirements.

Live Migration

Windows Server 2008 R2 with Hyper-V includes live migration capabilities, which enable virtual machine guests to migrate from one cluster node to another with no perceived downtime. Charles Chow, Enterprise Engineer at [Continental Airlines](#), says, “The ability to easily move VMs from host to host with Live Migration while making updates—with no interruption in service to the user—will be invaluable to us.” In addition, the Cluster Shared Volumes and Processor Compatibility Mode features simplify physical host configuration so that Hyper-V live migration is easy to implement. Also, for Continental Airlines, the reduction in the number of LUNs that the SAN team had to set up due to Cluster Shared Volumes—from 80 to 8—also saved time. “Deployment was faster, not only because we didn’t have to wait for 80 LUNs to be created, but also because we didn’t have as many LUNs to configure within the cluster,” says Jim Dekan, Technology Manager for Enterprise Systems Engineering at Continental Airlines. These features are included at no additional cost with the Hyper-V role in Windows Server 2008 R2, and they are also included with [the free Hyper-V Server download](#).

High Availability

IT administrators want to use virtualization to increase the Availability of their applications and services. By implementing failover clustering within Windows Server 2008 R2 Hyper-V, VMs will automatically failover between cluster nodes in the event of a host failure. “We now offer a 100 percent uptime service-level agreement with our high-availability VDS, which we have never done with physical servers,” Todd Benjamin, Director of Enterprise Hosting at [Hostway](#), says. “Customers are paying a premium for HA offerings. Now we can give them the exceptional uptime levels that they desire.”

Energy Efficiency

The U.S. Department of Energy has said that the datacenter is the fastest-growing energy consumer in the United States today. While power consumption is often viewed as a hardware issue, Microsoft has made significant engineering investments to ensure that Windows Server 2008 uses energy efficiently, helping reduce power costs for our customers. As a result, Windows Server 2008 R2 uses approximately 10 percent less energy than Windows Server 2003 running an identical workload.

The Core Parking feature of Windows Server 2008 R2 Hyper-V enables power savings by scheduling VM execution on only some of a server’s CPU cores and placing the rest in a sleep state. This significantly reduces power consumption when server load is low. Even with unpredictable server loads, Core Parking automatically maximizes power savings when server load drops.

VDI

VDI leverages machine virtualization technologies to allow a single Windows Server 2008 R2 Hyper-V server to run many desktop virtual machines. With VDI, organizations can run multiple desktops, each in a virtual machine, on the same server in a datacenter and use remote desktop protocols to allow a user to access their personal desktop from any authorized device, thereby improving desktop flexibility. “People like the fact that, with Remote Desktop Services, their virtual desktops look the same as their physical desktops”, says Jim Dekan at Continental Airlines. IT departments can take advantage of all the benefits of centralization, including centralized management of desktop workloads and improved business continuity, while extending the lifecycle of the endpoint devices. Colin Fitzsimons, Senior Systems Engineer for [Lancashire Constabulary](#), says: “By putting in VDI centrally, we no longer have to replace 1,200 desktops that had reached the end of their life cycles—it would have been a time-consuming and expensive project.”

Integrated Solution for Managing Entire Environment

If making it easy for customers to implement virtualization is important, making it easy to manage the environment is just as critical for saving time and money. With Microsoft System Center, customers have a single solution for managing the entire IT lifecycle, from deployment and provisioning, to monitoring and back-up. Equally important, you can manage both server and desktop resources, both virtual and physical assets, and both Microsoft and third-party hypervisors, all with the same platform.

These capabilities helped [Banverket ICT](#) choose Microsoft for its virtualization strategy: “We had been watching with interest the evolution of the Microsoft strategy to build interoperability between infrastructure management and virtualization technologies from the datacenter to the desktop. We knew we wanted to build an integrated virtualization platform that would encompass server consolidation, Terminal Services, and application virtualization that we could manage with a single set of tools. We looked at VMware but decided against it because we wanted to benefit from the end-to-end integration that Microsoft virtualization and management technologies will provide us,” explains Pontus Blomkvist, Service Design Manager, Banverket ICT.

Even disaster recovery capabilities are built into the Microsoft solution, helping you improve productivity during unplanned downtime and minimize the financial impact of IT outages. [Warid Telecom](#) reports near-continuous uptime with its new solution. The company attributes the improvement to its high-availability failover cluster and to better desktop management. “We have had no downtime since deploying Windows Server 2008 R2,” says Saad Moten, Manager IT—e-Services (Infrastructure) at Warid Telecom. “We have 99.9 percent uptime and optimal application performance as well.” The Microsoft solution also provides a major advantage for disaster recovery. “If a fire or some other disaster occurs in our building, we could quickly get our whole environment back up and running with System Center Virtual Machine Manager 2008 R2,” says Markus Kost, Senior IT Engineer for [Wacom Europe](#). “We can use it to check our virtual backup and determine how much space we need on the new server. Then it sets up the new environment.”

Another example where virtualization is integrated into the management platform is with System Center Configuration Manager 2007 R2, which allows you to deploy both physical and virtual applications from the same console. [Tuv Nord](#) agrees that an integrated virtualization and management solution provides tremendous benefits: “We were eager to get Microsoft Application Virtualization and System Center Configuration Manager working together so that we could have a single, uniform infrastructure for distribution. And with just eight people in our group, the more we

can simplify our processes, the better. Now we can deploy both virtualized and installed applications using the same procedure,” notes Arne Bertgen, IT administrator for Tuv Nord.

Customers Save on Training and Support

With virtualization built into the Microsoft platform, virtualization becomes a skill rather than a specialty. Now that you no longer need separate processes or IT teams to manage and support virtualization solutions, you can save time—and money—across the board. Customers agree that this is a crucial advantage.

“Hyper-V is easy to use because it’s running on an operating system that we already know very well,” says Oyvind Kaldestad, Vice President of Corporate IT at [Lionbridge Technologies](#). “So from an IT manager’s perspective, we have cut deployment time and complexity. With Windows Server 2008 R2 and Hyper-V, everything is simpler.” Kaldestad points out that Lionbridge now manages a much larger server infrastructure with the same employees. “We tripled our server infrastructure without adding support staff because most of our servers run on Hyper-V.”

And Tom Brauch, President [Fpweb.net](#), adds “Thanks to System Center Virtual Machine Manager 2008, our IT staff is 30 percent more productive in managing the data center, and 60 percent faster in setting up a new customer. In hosting, the biggest obstacle to customer service is time: customers want us to stand up their solutions and perform migrations, upgrades, and other services right away. Using Hyper-V and System Center Virtual Machine Manager 2008 to automate server management, we gain time in the data center to hit the ground running and wow customers from the outset. Then we can follow up with more responsive support than our competitors. Getting more time for our engineers to do what they do best and optimize our customers’ solutions is an immeasurable benefit.”

Lowering Cost of Acquisition and Ownership with Innovative Microsoft Licensing

As you can see, Microsoft's approach of architecting virtualization into our core solutions helps customers save tremendous amounts of time and money. To help you keep costs as low as possible—both at acquisition time and throughout the lifecycle—we offer attractive licensing for a range of virtualization products.

Windows Server 2008 R2 with Hyper-V Enterprise and Datacenter Editions

The Enterprise and Datacenter Editions makes licensing Windows Server for virtual machines easy. With Datacenter Edition you license Windows according to the number of processors on the physical server and get unlimited product use rights for the virtual guests. There's no need to count, track, or license the virtual machines. This makes it a compelling option for many customers. The [University of Macerata](#) gains cost-effective licensing and free upgrades through Microsoft Software Assurance for Volume Licensing. "We can purchase one license for one physical server that includes unlimited virtual instances," says Marco Principi, IT System Architect at the University of Macerata. "In terms of cost and performance, Hyper-V is a better virtualization solution for us than VMware and is better supported than Xen, both of which we've used in the past." Steve Binnie, Network Administrator, [Cheshire Fire and Rescue Service](#), is extremely pleased with the licensing arrangements for virtualised machines running Windows Server 2008 R2. Put simply, one licence covers one physical machine running Windows Server 2008 R2, but a systems administrator can run as many virtual machines as required on that server. "We get all the virtualisation functionality that we need with our Microsoft server licences. There's no need to pay for additional software on top of that," he says.

Datacenter Management Bundles

Windows Server 2008 R2 Hyper-V provides a tremendous platform for running Virtual Machines. However, to turn this collection of servers into a dynamic pool of resources that can drive down more cost out of the infrastructure, an IT Organization will need to implement good management practices. There are two ways to bundle the Management Tools that are catered to Datacenter Virtualization. Enrollment for Core Infrastructure (ECI) offers a compelling way to license the Windows Server operating system, System Center Server Management, and Forefront Client Security together in a simple per-processor license and offers customers value through:

- **Cost Savings** of 13% to 29% when compared to purchasing the product licenses individually. The entire ECI suite starts just 5% above the Windows Server standalone price.
- **Flexibility** with three ECI suites which empower customers' to license exactly what they need by mixing Standard, Enterprise or Datacenter edition of the products in any combination. Customers can also purchase additional licenses over time with no requirement to cover their entire footprint, and step-up to higher editions at their own pace and without penalties.
- **Simplification** with a "per processor" licensing model. Customers no longer have to count servers, operating systems, virtual machines and devices just to license their datacenter. ECI suites encompass all functionality in a single "per processor" license.

Another option is to either System Center Server Management Suite Enterprise (SMSE) and System Center Server Management Suite Datacenter (SMSD) provide a great way to keep purchase prices low and reduce total cost of ownership. You can manage an unlimited number of operating system environments on a physical host server and receive licensing for the four System Center products that simplify end-to-end lifecycle management: System Center Data Protection Manager 2007, System Center Operations Manager 2007, System Center Configuration Manager 2007, and System Center Virtual Machine Manager 2008.

As the company's virtualization environment grew, IT staff at Fpweb.net decided to take advantage of Microsoft System Center technologies to better manage both the virtual and physical servers in its data center. Fpweb.net plans to take advantage of the most cost-effective way to acquire these technologies and will be purchasing the Microsoft System Center Server Management Suite Datacenter license. Furthermore, Hostway used the Microsoft System Center Management Suite in the Service Provider License Agreement to acquire Microsoft System Center data center solutions that simplify virtual-machine creation, management, monitoring, and backup. "Using the Suite license to purchase our System Center solutions cut our licensing costs in half over what they would have been licensing the programs individually," Todd Benjamin, Director of Enterprise Hosting at Hostway, says.

Approximately One-Sixth the Cost of VMware*

Not only do Windows Server 2008 R2 licensing and System Center's SMSD save customers money, together they provide an end-to-end virtualization management solution, at approximately one-fifth the cost of a comparable VMware-based virtualization solution (VMware's vSphere Enterprise with VMware vCenter Server). In addition, the Microsoft solution enables you to manage physical assets, applications and third-party hypervisors—capabilities that are not possible with the VMware solution—providing even greater value. As Nicholas Merton, IT Support for [Maxol](#), says, "We saw that Hyper-V did everything we needed and was far more cost-effective than VMware, which costs about U.S. \$6,300 per server more than Hyper-V."

PoundHost is a fast-growing hosting service provider in Maidenhead, United Kingdom, that embraced server virtualization as a way to curb hardware costs and lower hosting prices. However, the high cost of VMware and lack of management tools hurt competitiveness. [PoundHost](#) replaced VMware with Windows Server 2008 R2 Datacenter and Hyper-V technology to reduce licensing costs by 80 percent and add new services. Between a dramatic increase in virtual-machine sales and reduced licensing costs, PoundHost has increased profitability by 55 percent. Automated server provisioning has reduced IT costs by more than U.S. \$50,000 annually, and proactive server monitoring increases server availability.

Conclusion: Three Ways to Save Money

You can save a tremendous amount of time, energy and money using virtualization. First, leverage the inherent savings that server and desktop virtualization provide through consolidation, reductions in power, space, and CO2 emissions, and by accelerating provisioning processes. Then, increase these savings through the operational efficiencies of Microsoft's built-in platform approach, which incorporates virtualization into our operating system and management offerings, making it part of your everyday IT environment. Take advantage of our innovative pricing and licensing programs, which help you minimize acquisition and ownership costs, making virtualization an even more compelling option for your business.

*Based on a server virtualization comparison of Microsoft® System Center Server Management Suite Datacenter with VMware's vSphere Enterprise Plus with VMware vCenter Server. Cost comparisons assumes a five host configuration, 2 processors on each host, 2 years support costs for both products, and no operating system costs included. The Microsoft solution can use either the free Microsoft Hyper-V Server 2008 R2 hypervisor or an existing Windows Server 2008 R2 hypervisor. Based on Microsoft estimated retail prices and published VMware prices available at <https://www.vmware.com/vmwarestore> as of 08/04/2009 for purchases in the United States. Actual reseller prices may vary.

To learn how you can save money with Microsoft virtualization solutions:

- Download the [Microsoft Assessment and Planning Solution Accelerator](#) to identify your best candidates for server consolidation.
- Use the [Microsoft Integrated Virtualization ROI Calculator](#) to estimate your return on investment in Microsoft virtualization tools.
- Determine the reductions you can achieve in kilowatts, money and CO2 emissions with the [Microsoft HyperGreen Tool](#).

To read the case studies highlighted in this white paper, and for additional Microsoft virtualization case studies, go to <http://www.microsoft.com/virtualization/case-studies.aspx>

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