Microsoft | Virtualization

How Customers Are Cutting Costs and Building Value with Microsoft Virtualization

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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 efficiency gains. For the overview of desktop virtualization technologies and cost savings see http://www.microsoft.com/virtualization/wp-clientvirtstrategy.mspx

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 with 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 is from direct 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 Hyper-V, Dartmouth-Hitchcock Medical Center consolidated 400 servers down to 100 servers. "We expect to consolidate an additional 75 servers using Hyper-V, which will lead to a cost savings of more than U.S. $325,000 annually," says Robert McShinsky Senior Systems Administrator, Dartmouth-Hitchcock Medical Center.

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. MaximumASP reduced its servers from 40 to 5, saving U.S. $7,000 every year. Saxo Bank had an average physical server utilization of just 20 percent and was deploying nearly 200 new servers per year before using server virtualization. Hyper-V allowed the bank to reduce the number of servers needed by 36 percent and realize savings equivalent to U.S. $1 million, due to lower server hardware costs and associated reductions in space, power and cooling costs.

Electrical Power Savings

Many customers have realized similarly dramatic electrical savings, as Saxo Bank, as a result of server consolidation—which is a particularly important benefit in today's climate of volatile power prices. TALX expects to save approximately 50 percent in annual power and cooling costs by consolidating its server environment with Hyper-V. 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. Santa Barbara Web Hosting uses Hyper-V to reduce its power consumption costs by U.S. $5,220 per

month, helping the company provide more cost-effective services to its customers. And Slough Borough Council took advantage of the savings from eliminating 10 initial physical servers to preserve the electrical power needed to turn on a new storage area network.

As Nicholas Merton, IT Support for Microsoft customer Maxol explains, energy costs can be reduced not only by using Hyper-V, but also with 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 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. By improving capacity utilization by consolidating underutilized servers, server virtualization not only lessens cooling requirements and kilowatts of power used, it reduces the environmental footprint for organizations such as Banque de Luxembourg and the Kentucky Department of Education.

According to Jodi Hurley, Infrastructure Operations Manager, Kentucky Department of Education, "By using fewer physical servers, we reduce our environmental impact and lower our energy costs. We're using less electricity and dumping fewer discarded servers into landfills. Virtualization helps us be better environmental citizens."

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.

Xavier Granveaux, Virtualization Project Manager, Banque de Luxembourg, adds, "By running an IT environment that is so much more efficient than before, we will be able to dramatically reduce our carbon footprint as part of the goal to become more environmentally responsible."

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.

Volusia County Schools was running out of rack space and realized it would have to expand its datacenter if it didn't virtualize the environment. "All of our datacenter racks were full. Our cooling system was reaching maximum capacity, and so was our battery backup system—and we had just upgraded it only three years ago," says Ken Richmond, Manager of System Engineering, Volusia County Schools. To accommodate a larger server footprint, the district estimated that it would have to spend U.S. $250,000 to physically build out the datacenter. With Hyper-V, Volusia County was able to consolidate everything in its existing space. "Without Hyper-V, we wouldn't have the room to bring all of these applications and services back to the datacenter," Richmond adds.

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, that 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.

Costco Wholesale Corp. used the MAP toolkit with great success. "It's a good tool to have to help gauge what you can virtualize," says Jason Griffith, Analyst at Costco Wholesale Corporation. Before performing physical-to-virtual (P2V) conversions, Costco IT staff evaluated the existing physical server loads. Using the MAP toolkit, staff members discovered that, in many cases, their servers were running at only five percent utilization, making them good candidates for consolidation. Costco now runs Hyper-V on five servers in its datacenter, and plans to virtualize nearly 50 percent of its servers within the next year. The company reduced spending on new physical servers and expects to cut datacenter energy expenses, which cost the company U.S. $75,000 a month.

After you have determined how many servers you plan to consolidate, you can use the free Microsoft HyperGreen Tool to figure out 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.

Extending Server Virtualization Benefits with Rapid Provisioning

Once your servers are virtualized, they are much easier and less expensive to deploy by using System Center Virtual Machine Manager 2008. Slough Borough Council cut the average time to provision a new server from 16 hours to just 3 minutes, which translates to U.S. $23,700 annual savings in deployment costs. 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 spawn new virtual machines—it takes much less time and labor to provision them. With advanced management tools in Microsoft System Center Virtual Machine Manager 2008, 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: Built-in Hypervisor, Clustering and Energy Efficiency

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

Hypervisor

With Hyper-V a key feature of Windows Server 2008, 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."

Clustering

Because host-to-host clustering is also built into Windows Server 2008, making Virtual Machines highly available is easy to implement and less costly to manage. By implementing clustering with Hyper-V, VMs will automatically failover between cluster nodes in the event of a host downtime. Hyper-V leverages Windows Server 2008 clustering to provide migration capabilities, which enable virtual machine guests to migrate from one cluster node to another with little downtime. According to Acampora of Saint Raphael Healthcare System, "Clustering enables us to deliver 100 percent uptime. We can lose one of our hosts and instantly fail-over its VMs to another system. Instead of experiencing a 24-hour outage, our users see only minutes of outage, if that. It enables us to provide better service to our users."

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 uses approximately 10 percent less energy than Windows Server 2003 running an identical workload.

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. Using the Hyper-V Snapshot feature,

Dartmouth-Hitchcock Medical Center can quickly capture the state of a running virtual machine so that it can rapidly and easily restore that virtual machine to a previous state. "Doing this on physical hardware takes a couple of hours; with virtual machines, it takes minutes," says Robert McShinsky Senior Systems Administrator, Dartmouth-Hitchcock Medical Center. These capabilities are also essential for Bouygues Construction. According to Amaury Pitrou, the company's Projects Architecture, Desktops and Mobility Deputy Director, "The construction industry has changed, and employees are very dependent upon electronic systems. We can no longer tolerate services interruptions. With Hyper-V and System Center Virtual Machine Manager, we are creating a redundant datacenter in Normandy to ensure business continuity."

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.

"…if my central console can manage both my Microsoft virtual machines and my VMware virtual machines with an interface that is familiar and easy for my Microsoft certified staff, that's a big plus," says Brent Register, Client/Server Engineering Manager, The Atlanta Journal-Constitution.

And Erich Nøkling, Business Development Manager, Mamut, adds, "We will be able to support our entire virtual landscape through Microsoft, which already supports the rest of our datacenter, and have solid, seamless coverage under our Microsoft Premier Support Agreement. Hyper-V fits better into our Microsoft infrastructure and simplifies our IT strategy by enabling us to work with as few vendors as possible."

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 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 by the 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. By deploying Windows Server 2008 Datacenter, MLS Property Information Network realized savings of U.S. $200,000 over other editions of the operating system. This licensing was also advantageous to Hostbasket, "We liked the fact that Hyper-V was built into Windows Server 2008," Bart Roels, Operations Manager, Hostbasket says. "Other solutions are built on top of the operating system, which adds more moving parts, performance overhead, and additional software licensing and maintenance. With Hyper-V, we don't need separate drivers for the hypervisor, and we don't pay additional licensing fees." Windows Server 2008 Enterprise Edition gives you the right to run four virtual operating systems per physical server.

System Management Suite Enterprise

System Management Suite Enterprise (SMSE) provides 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.

By purchasing SMSE, Santa Barbara Web Hosting saves approximately U.S. $100,000 per year in licensing costs. MaximumASP took advantage of the SMSE licensing arrangement to obtain all the Microsoft System Center programs in one package. "All the components purchased individually were cost-prohibitive for us. With this new bundle, we can completely manage our

environment with a single family of tools," says Dominic Foster, Chief Technology Officer for MaximumASP.

Approximately One-third the Cost of VMware

Not only do Windows Server 2008 licensing and System Center's SMSE save customers money, together they provide an end-to-end virtualization management solution, at approximately one-third the cost of a comparable VMware-based virtualization solution (VMware's VMware Infrastructure Enterprise with VMware vCenter Server). Plus, 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."

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.

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 Microsoft's built-in platform approach, which incorporates virtualization into our operating system and management offerings, making it part of your everyday IT environment. And, finally, 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.

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.mspx