

MULTI VENDOR ANALYSIS

Taming the Impact of Server Virtualization on Networked Storage With Citrix, Microsoft, and NetApp

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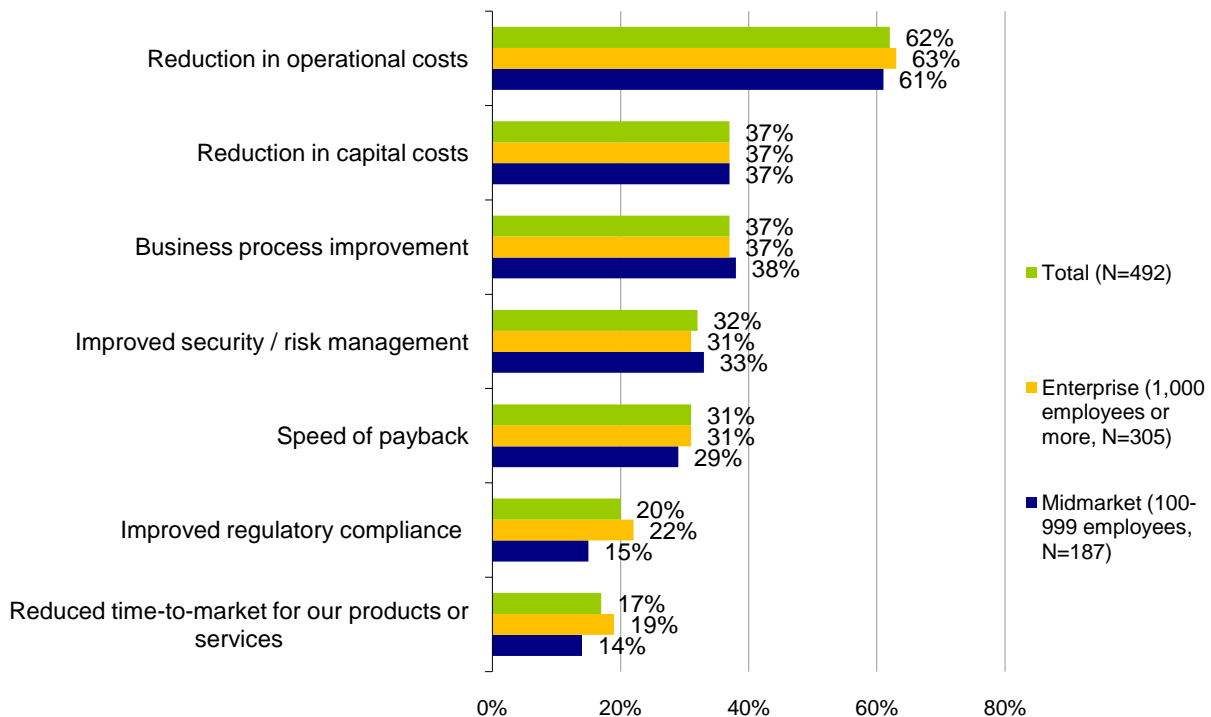
Citrix, Microsoft, and NetApp Trigger IT Operational Efficiency

Relatively speaking, creating a virtual machine is a simple task that takes very little time and is often performed with a few clicks of the mouse. What has taken days, weeks, and even months in the past has been streamlined to take hours and, in some cases, minutes. This improved process is a welcome enhancement for application and business owners, as well as IT. IT has the ability to improve response times and provide a superior level of service while giving application owners quick access to IT resources. In all, virtualization is a game changing event taking place inside businesses as they transform IT from a cost center into a valuable asset.

Operational cost reduction is the key to justifying any IT investment in the current economic climate. No IT project—no matter how critical—will be funded without significant management review and approval. What do IT managers believe the business is looking for as they approve or reject potential IT initiatives? As shown in Figure 1, ESG’s respondents believe that ongoing operational cost reduction is, by a significant margin, the most important justification for IT investment now and over the next 12-24 months. This reinforces the notion that customers will favor products and services that allow them to improve management processes, reduce headcount, consolidate data centers, limit power consumption, or otherwise streamline operations.

FIGURE 1. MOST IMPORTANT CONSIDERATIONS FOR JUSTIFYING IT INVESTMENTS

Which of the following considerations do you believe will be most important in justifying IT investments to your organization’s business management team over the next 12-24 months? (Percent of respondents, multiple responses accepted)



Source: Enterprise Strategy Group, 2009

Server virtualization is rapidly gaining a foothold in the data center. Early adopters of server virtualization quickly target physical servers that are near end of life, migrating the workloads onto virtualized infrastructure. ESG research shows that, on average, early virtualization adopters still have only virtualized less than 25% of their

environments—with plans to quickly double deployment efforts. The quick initial move to a virtualized environment is impressive, but business still struggle to overcome significant hurdles impeding rapid adoption.

Initial planning and purchasing decisions pave the way for future value and accelerated growth while reducing operational costs. A mature virtualization deployment is implemented with consideration for its holistic impact on infrastructure and management. Citrix, Microsoft, and NetApp are working together to help remove virtualization complexities, deliver an improved time to value, and reduce ROI via a simplified and well planned approach to:

- **Managing the virtualized environment** with common tools and processes across all operational roles and responsibilities including server, storage, and application administrators.
- **Networked storage integration** in a virtualized environment as server virtualization provides a catalyst for adoption and a requirement for integrated tools and processes.
- **Business continuity and disaster recovery** solutions that provide improved availability and service level to the business.

Companies interested in reaching their virtualization goals should look into the value that Citrix, Microsoft, and NetApp can deliver—particularly how each individual piece fits together to build a common operating platform. Upcoming sections will explore how Microsoft Hyper-V, The Microsoft System Center portfolio including Virtual Machine Manager, Citrix Essentials for Hyper-V, and NetApp networked storage solutions coexist as well as how the companies have addresses common roadblocks and considered the benefits of virtualization beyond consolidation and improved resource utilization.

Businesses Build Confidence in Virtualization

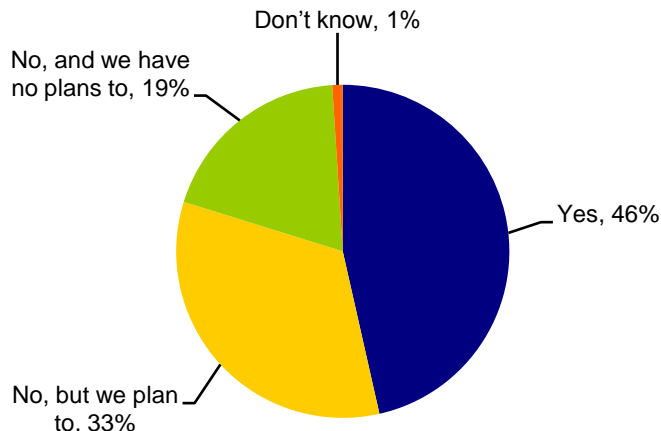
Sparked by high priority business initiatives that are squeezing IT to do “more with less,” virtualization has become a major part of consolidation, cost reduction, and overall business efficiency endeavors. Virtualizing for the sake of virtualization is meaningless—it must be driven by a higher priority business or IT initiative aimed at leveraging the technology’s benefits by applying it to the entire IT infrastructure to satisfy business goals. Before even considering making an investment in virtualization, businesses need to determine both the impact it will have on the IT environment as a whole and the additional capital expenditures required to fully support the initiative.

Early adopters of server virtualization typically take the crawl, walk, run approach, but unlike many other IT technologies that can take years to move through the process and gain proficiency, IT organizations are on the fast track—quickly building confidence and trusting new virtualized infrastructure with their most critical applications. While it is true that some organizations may opt to limit the use of server virtualization to test and development environments in order to learn how to operate the technology without any risk to mission-critical business applications and data, it has already been shown that the vast majority of ESG’s respondent base is using server virtualization in production environments to a significant extent.

Once businesses make the jump to production workloads running on virtualized IT infrastructure, they appear to be increasingly comfortable using virtualization for their most demanding application environments. As shown in Figure 2, almost half (46%) of current server virtualization adopters run “Tier 1” applications on virtual machines and 33% plan to do so in the near future. “Tier 1 applications” refer to any application that would classify as one of their organization’s most important applications, ranging from Microsoft Exchange Server to a custom built Web application used for time and billing.

FIGURE 2. TIER 1 APPLICATION USAGE ON VIRTUAL MACHINES

Would you say that your organization currently runs "Tier 1" applications on virtual machines? (Percent of respondents, N = 365)



Source: Enterprise Strategy Group, 2007

This rapid adoption is driven by broad value: server administrators can provide improved resource utilization, application owners can achieve improved availability, and businesses can streamline IT operational efficiency. While consolidation remains a number one driver of server virtualization, business continuity and disaster recovery is quickly becoming a primary driver by application owners, line of business managers, and executive level managers that recognize the broad impact virtualization can have, regardless of company size.

As companies prepare to implement server virtualization, they need to stand back and consider the immediate impact it will have on existing IT processes and tools, as well as future direction and IT operational efficiency. Server virtualization is not as simple as flipping a switch; it will require investments in infrastructure, management tools, and a virtualization platform. Understanding their synergistic value will help businesses deploy virtualization with minimal impact and maximum confidence.

The Impact of Server Virtualization on Storage

Server virtualization is driving significant changes for many organizations' storage infrastructures, data protection requirements, management processes, and enabling technology investments. Specifically, networked storage is essential in order to unlock the full potential of server virtualization solutions, including the ability to move virtual machines between physical servers for dynamic distribution of workloads, application availability, and data protection purposes. To achieve maximum scalability, efficiency, and peak utilization of resources, organizations need to keep pace with consolidation initiatives by networking their storage infrastructure. Since any type of local disk failure will bring down all virtual machines utilizing that physical server, networked storage options of all types offer significantly better flexibility, data availability, performance, and mobility.

Getting Started

The vast majority of applications being migrated from a physical, one to one infrastructure to a virtualized, one to many infrastructure are Windows and Linux x86 workloads. These are the workloads that have traditionally consumed the majority of physical assets inside the data center and continue to be the top choice for application developers. Microsoft's alignment with back office applications—as well as the number of Windows environments being adopted in virtualized environments—are proving to be a boon for the company. Early adopters of server

virtualization utilized Microsoft Virtual Server 2005 R2, Microsoft's hosted server virtualization solution. Now, with the introduction of Microsoft Hyper-V and System Center Virtual Machine Manager (SCVMM), IT's ability to virtualize both Linux and Windows workloads has greatly improved.

Microsoft Hyper-V is a bare metal hypervisor that is installed directly on the x86 hardware architecture and is included with many server OEM shipments. Hyper-V is included as part of Windows Server 2008 and also available as a free download. Microsoft Virtual Machine Manager (VMM) is part of the System Center suite of management tools and is specifically designed to manage IT infrastructures comprised of both physical and virtual resources as well as VMware ESX hosts. There are plans in place to include Citrix XenServer as well.

Many customers are making Hyper-V deployments part of their Windows Server 2008 upgrade initiatives. Customers are also beginning to standardize on virtualization as the default deployment choice for all new application workloads. This enables IT organizations to provide improved service to the business and streamline IT operational costs while driving the overall utilization of assets across the entire IT ecosystem.

The Critical Role of Network Storage

Deploying server virtualization and migrating physical servers to virtual machines creates the perfect opportunity for users to consolidate storage, centralize management, increase capacity utilization, and enhance data protection. As customers gain more operational experience with server virtualization supported by different types of storage options, they quickly come to understand why it is impractical and risky to support multiple virtual machines with local disks and direct-attached storage (DAS).

In a virtualized environment, companies achieve a higher level of resource utilization, but less bandwidth is available for backups. This creates a real challenge for data protection. Applying agent-based, file-level backup strategies to virtual machine backups has drawbacks—the most significant problem is resource contention. Backups demand significant processing power, and the added resources needed to execute a backup may compromise the performance of that virtual machine as well as other virtual machines running on the system. This creates a burden on the Hyper-V host's CPU, memory, disk, and network components—often making it impossible to back up within available windows.

In order to achieve a truly dynamic data center, the value of virtualization and its benefits must be closely tied to the entire IT infrastructure—including networked storage. Storage integration is key to delivering optimum performance, availability, and overall efficiency to virtualized workloads. As customers build out their virtualized infrastructure with Microsoft Hyper-V and Citrix Essentials for Hyper-V, NetApp storage solutions further extend the benefits with:

- **Efficiency:** NetApp enables end-to-end space savings for Microsoft virtualized environments without compromising performance. This includes data deduplication for primary and secondary storage, thin provisioning, and space efficient snapshots. These technologies complement and extend the benefits of Microsoft virtualization and can enable significant savings in power, cooling, and space.
- **Expertise and Knowledge:** NetApp leverages years of experience and expertise to provide solutions for virtualized infrastructures. Virtualized environments can quickly leverage functionality—such as data deduplication, thin provisioning, space efficient snapshots, replication, and performance characteristics—that NetApp currently delivers in the physical world.
- **Integration and Ease of Use:** Joint Microsoft Hyper-V, Citrix Essentials, and NetApp customers are able to achieve “one-click” access to NetApp data management features via Microsoft Systems Center. This helps administrators quickly provision, protect, and dynamically scale their entire virtualized server and storage environment using a single management tool.
- **Operational Efficiency:** Tight integration between Hyper-V and NetApp storage systems enables IT to gain better virtual machine performance by offloading storage services from physical services and onto the storage system, leading to improved consolidation and lowering the risk of resource contention.

- **Flexibility:** Businesses never want to be “locked in” to a single or proprietary solution. As more mission critical workloads are migrated onto the virtualized platform, storage management, protocol, and application availability choices are essential to operational and capital savings. Customers want the ability to support a mixed physical and virtual environment across multiple sites and enable administrators to grow or shrink storage volumes—without any interruption to service—to meet changing capacity demands
- **Data Protection:** NetApp enables rapid recovery from unplanned outages with double disk protection. Snapshot backups consume additional space only as changes are made to the underlying storage volume. Backup and recovery of Windows files, Exchange mailboxes, SharePoint, and SQL Server data sets are accomplished in minutes via SnapManager tools within the Hyper-V and NetApp environment. NetApp also offers a variety of high availability and remote replication protects.

NetApp FAS Series and V Series storage systems bring enterprise class storage features and functionality to the virtualized environment, adding to the chain of efficiency virtualization is aimed to deliver. This includes integrated cloning with FlexClone, FlexVol for efficient capacity utilization, backup and recovery with snapshot capabilities, and data deduplication to further provide efficient use of capacity.

NetApp is so confident in its overall efficiency and capacity savings that it offers customers a 50% savings guarantee when deploying Microsoft Hyper-V and NetApp storage. This has the potential to save the customer considerable savings in terms of capital expenditures as well as IT operational savings due to the tight integration and teamwork of Microsoft, Citrix, and NetApp.

Moving Beyond the Basics

IT operations and, specifically, server administrators quickly realize the impact Hyper-V is going to have beyond the physical server infrastructure. One of, if not the very first of, the hurdles they typically encounter is integration with networked storage. As previously mentioned, server virtualization relies heavily on networked storage; IT wants to make the process of managing and maintaining it as easy as possible without having to call in a third party consulting arm to provision a single virtual machine. This can be a daunting task to break through, considering some customers are deploying networked storage for the very first time as a result of a server virtualization deployment—the ones that have already server virtualization implemented have to consider the impact to the current environment or look at new investments to support these business-driven initiatives.

Microsoft Hyper-V and SCVMM offer some “out of the box” tools to get customers started with the provisioning process. IT organizations can get familiar with Hyper-V on a single physical server with internal disks for POC (proof of concept) and for test and development. The next step is to either work with existing networked storage tools to provision storage that can be presented to the virtualized environment or purchase new networked storage systems to support the virtualized environment. Either way, **customers must be aware that the integration with networked storage is a potential hurdle that can stall deployments and overall business objectives.** It is important that, early in the process, customers recognize the impact server virtualization will have on networked storage and how they can leverage tools included with Hyper-V as well as the advanced value of management integration with solutions such as Citrix Essentials for Microsoft Hyper-V.

Advanced Storage Management Integration

One of the advantages of Citrix Essentials for Hyper-V is that it enables improved storage management for common day-to-day management tasks as well as critical storage integration in a virtualized environment. For any company considering running their most critical workloads on virtualized infrastructure, Citrix Essentials for Microsoft Hyper-V has the potential to significantly improve the overall experience as well as help IT operations quickly gain confidence in the overall solution.

Citrix has taken its advanced storage management and integration expertise and experience from its XenServer platform and made it available to Microsoft Hyper-V customers. Citrix Essentials for Microsoft Hyper-V extends upon what Microsoft delivers with Hyper-V by simplifying the complexity of interfacing with networked storage systems.

- **StorageLink Gateway** enables automated discovery to native storage services including DAS, NAS, iSCSI, and Fibre Channel
- **StorageLink Resource Manager** enables administrator access to common tasks that are native in storage arrays visible within Microsoft System Center Virtual Machine Manager. This includes partitioning, snapshots, backups, and data deduplication.
- **StorageLink Image Manager** provides a centralized library of virtual machine images. Images can be rapidly cloned and delivered to a number of target hosts.
- **StorageLink Connect** are a set of APIs that link Hyper-V environments with third party backup and enterprise management solutions.

As businesses look to rapidly build a virtualized infrastructure, they need management solutions that go beyond basic virtual machine administration. The tighter the integration of the supporting infrastructure, the easier it will be to hit the ground running and build a stabilized infrastructure that can easily scale with business demands. Citrix and Microsoft have taken it one step further—working with leading networked storage solutions from NetApp to extend management integration, overall operational efficiency, and ease of provisioning.

Achieving a Virtualized and Highly Optimized Infrastructure

The benefits of virtualization have to be carried throughout the entire IT infrastructure if businesses are to enjoy the full advantage of the technology and see a reduction in overall IT operation expenses. Storage management and integration are significant hurdles that customers consistently encounter. They may not come into play for the first few virtual machines, but the importance of networked storage quickly rises to the top of the priority list for companies that want to scale deployments while maintaining availability, performance, and reliability. Microsoft Hyper-V is proving to be a stable platform that offers tremendous value and, with the addition of Citrix Essentials and NetApp storage, it is proving to deliver a highly optimized virtualized infrastructure that lays the building blocks for today's virtualization initiatives while accommodating future growth potential.

From day one, Citrix, Microsoft, and NetApp have worked together to improve the user experience from a management perspective and efficiency from an IT infrastructure perspective. Common tasks such as provisioning are easily handled within Microsoft SCVMM so that an administrator can perform both server and storage provisioning using a single console. As virtualization initiatives quickly mature, Citrix, Microsoft, and NetApp are also ready to handle data protection and disaster recovery of virtual machines. Many customers are driven to Microsoft Hyper-V for its ability to consolidate multiple workloads on a single physical server, but quickly recognize that due to the encapsulation and portability of virtual machines, there is an opportunity to greatly improve service levels for application owners.

Administrators will use SCVMM to control the distribution of workloads across a physical server resource pool. As they begin to achieve this highly optimized environment, customers will also begin to fully utilize the built in features that NetApp delivers on the storage system. IT business process and tools that worked in the physical world do not always work in the virtual world. An example of this is data protection.

Having the right tools and IT infrastructure in place means IT organizations will be ready when they need to transition from the most familiar to the most efficient means of data protection. The integration of Citrix, Microsoft, and NetApp enables this all to take place in a seamless manner.

ESG's View

Companies considering server virtualization have to step back and take a broad look at its impact on the IT infrastructure, mission critical workloads, availability, and the ability to scale both existing and new applications. Installing Microsoft Hyper-V and creating a couple virtual machines is a great way to get started and see the immediate benefit virtualization has to offer, but companies planning to deploy Hyper-V at scale have to consider the impact to the overall management of the IT infrastructure as well as the impact it will have on storage.

Citrix, Microsoft, and NetApp are all delivering solutions to increase IT operational efficiency and simplify administration and management in a highly virtualized environment. It is one thing to approach senior level management with the benefits of Hyper-V alone, but there is exponential value in delivering the message of virtualization as it applies to the entire chain of efficiency and cost savings. Citrix Essentials for Hyper-V and NetApp complement the value of virtualization with integration into Microsoft System Center, allowing IT to avoid future roadblocks and capitalize on new investments. Companies are willing to spend money to save money; so long as today's frugal investment continues to deliver value well into the future.



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