



White Paper

## Consolidate and Virtualize Your Windows Environment with NetApp and VMware

Sachin Chheda, NetApp and Gaetan Castelein, VMware  
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## 1 EXECUTIVE SUMMARY

Are you faced with an increasingly complex and expensive Microsoft® applications environment? You are not alone. The dramatic increase in the number and importance of Microsoft Windows® applications, as well as the sheer amount of Windows data, has created significant challenges through a sprawling, difficult-to-manage infrastructure. Ensuring application availability in such an environment is next to impossible, and making changes to meet evolving business needs is a slow, laborious, and expensive process.

NetApp and VMware have teamed together to create a joint solution to help you consolidate and virtualize your existing Microsoft applications environment, thereby helping reduce your infrastructure costs by up to 50% and protecting all your applications with best-in-class availability. Because NetApp® and VMware® technologies are already jointly used in thousands of customer sites, the solution is simple and risk free.

By boosting server and storage utilization to 60–80% (versus the 5–25% rates common in traditional environments), you can slash your hardware costs. Advanced management tools let you manage your entire infrastructure as a single dynamic pool of resources. New applications and storage can be provisioned in hours rather than days or weeks, and can be scaled and load-balanced on the fly.

Most Windows workloads, including applications and data storage, provide essential business services and must be protected with high-availability solutions. Unfortunately, less than 20% of these applications benefit from high availability today because of the cost and complexity of traditional solutions. NetApp and VMware offer a range of simple and cost-effective capabilities to meet your needs. Our data protection and availability solutions automatically deliver the right level of protection for each workload.

Technology is only the first chapter of the story; we combine proven technology in well-defined solution architectures that take the guesswork and risk out of deployment. A dedicated team of joint partners understands all solution elements and can help you plan, implement, and deploy a complete solution that uses your existing hardware to create a more efficient, cost-effective infrastructure for your Windows applications. This prepares your company to better meet its needs now and in the future—no matter what the future holds.

## 2 WHY WINDOWS CONSOLIDATION MAKES SENSE

In today's highly automated, technology-driven economy, business success has become inextricably linked to IT capabilities. Applications such as Microsoft Exchange, Microsoft SQL Server®, and Microsoft SharePoint® serve a wide range of critical business functions, including communication, knowledge management, collaboration, and day-to-day operational activities. However, the inefficient server and storage infrastructure that has grown up over time in most Windows environments is not compatible with today's flat or declining IT budgets.

Many midsize enterprises are making targeted investments in consolidation and virtualization to tackle issues such as:

- Application and infrastructure sprawl
- Unsustainable IT costs
- Complex management
- Poor availability
- Inability to grow and adapt with business demands

It is critical for midsize enterprises to consolidate their Windows environments and Microsoft applications to increase server and storage utilization, reduce infrastructure and software costs, and contain spending on space, power, and cooling. In the typical one-workload-per-physical-server architecture, servers and software licenses are underutilized, infrastructure administration is inefficient, and IT can be slow to meet changing business needs.

While consolidating servers and applications is an important step, it is not a complete solution. Because Windows data has become increasingly critical for day-to-day operations, highly available and secure data storage is becoming a top priority. However, in most Windows environments, data is scattered across a variety of devices such as direct-attached storage (DAS) connected to file and applications servers, network

attached storage (NAS), and iSCSI and/or Fibre Channel storage area networks (SANs). Such a segregated storage environment further complicates management and contributes to application downtime.

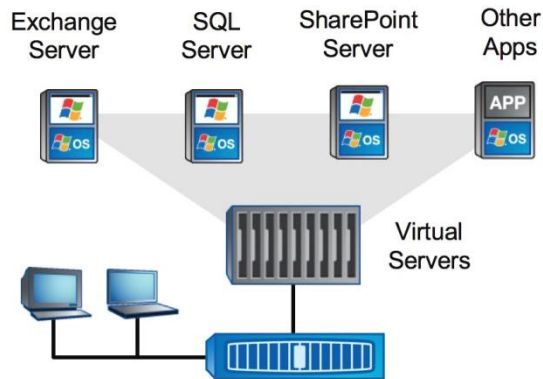


Figure 1) NetApp and VMware have teamed to offer a simple, consolidated, virtualized Windows infrastructure.

Only by consolidating and virtualizing applications, servers, and storage can you create a Windows IT environment that will meet your needs now and in the future. This white paper examines a unique solution that combines the benefits of server virtualization technology from VMware and storage virtualization from NetApp. This solution:

- Lowers your costs through higher utilization, greater efficiency, and reduced overhead
- Delivers best-in-class availability with a more stable infrastructure, enhanced data protection, and continuity capabilities that scale with your business
- Is simple and risk-free—infrastructure complexity is significantly decreased and easy-to-use tools enhance manageability, and, because this solution is already in use at thousands of customer locations, risk is greatly reduced

The following sections explore in greater detail the challenges associated with traditional Windows infrastructure, explain how a joint NetApp-VMware solution addresses these challenges, and provide advice to help you get started with improvements to your Windows infrastructure.

#### HOW QUICKLY WILL CONSOLIDATION AND VIRTUALIZATION PAY FOR ITSELF?

Before undertaking any significant changes to your Windows infrastructure, you'll want to consider what cost reductions you can expect and how quickly the initial investments you make will be paid back in cost savings.

As you replace physical servers with virtual machines, consolidate storage, and eliminate sprawl, your server count goes down (a single virtual server typically replaces 5 to 10 standalone physical servers) and hardware utilization goes up. Because the total amount of hardware you have to manage and maintain decreases, so do your associated costs for maintenance contracts, power, cooling, and so on. The savings from only consolidating storage can pay for that consolidation in as little as 12 months.

But these are only the most obvious savings. Consolidation can also yield a significant reduction in software licensing costs. For example, Microsoft SQL Server® is often licensed per processor. On physical servers, processor underutilization leads directly to underutilization of software licenses. Consolidation and virtualization allow you to boost license utilization from the conventional 5–10% to upwards of 60%.

Finally, there's the cost of downtime. If a critical Windows application is down, you're losing money. Virtualizing servers and consolidating storage actually improve the resiliency of your infrastructure, provide greater data protection and faster recovery, and make it easier and less expensive to implement business continuity.

Read on to find out how virtualization pays for itself quickly and delivers a high return on investment over the life of your Windows infrastructure.

### 3 MICROSOFT WINDOWS CHALLENGES

The dramatic increase in the number of Microsoft Windows applications and the amount of Windows data create significant challenges. If yours is like most midsized enterprises, IT goals such as simplifying management, increasing data availability, enhancing flexibility and scalability, and improving efficiency are not being adequately met.

#### SPRAWL AND COSTS

The aggregate cost of operating a traditional, siloed Windows infrastructure—in which each workload essentially has its own standalone Windows environment—can be crippling. Sprawling, underutilized, and difficult-to-manage hardware, software, and storage infrastructure, along with poor availability and a lack of flexibility and scalability, all contribute to an unsustainable cost model for Windows infrastructure. Only by consolidating and virtualizing can you get your operating costs in line with your budget.

The traditional deployment requires at least one—and often many—physical servers, plus associated storage for every workload. Because each of these applications is provisioned for its peak load and multiyear growth requirements, average utilization of hardware and storage is typically very low, in the 5% to 25% range. In many cases, this dedicated infrastructure is also very rigid and complex to manage.

Underutilization of application licenses also leads to high software costs, which typically exceed hardware costs. Many Microsoft applications are licensed on a per-processor basis, and underutilization of processors in turn leads to underutilization of licenses.

Storage in these application environments—both primary storage and the secondary storage needed for backups—suffers from the same low utilization. Up to 40% of the data in most companies is stored on file servers, and the proliferation of many small Windows file servers to meet file storage needs contributes significantly to the problem of sprawl. Storage consolidation reduces the total amount of storage you need, while making the storage you have more readily accessible where it's needed.

#### MANAGEABILITY

Most midsized businesses employ a limited number of IT professionals, and cannot afford to have the majority of IT time spent on day-to-day management activities. However, numerous underutilized physical servers, scattered storage, and a lack of effective management tools complicate management. Without ways to efficiently automate management and maintenance tasks using a small set of cost-effective tools, IT departments have few or no resources available to focus on the enhancements that would benefit the business.

#### AVAILABILITY

A Windows IT infrastructure has become critical for businesses of all sizes. If your Microsoft applications are down or your Windows data is inaccessible, critical elements of your operation, such as planning for daily production, coordinating shipments, and so on, are also down.

The complex and scattered nature of Windows environments makes it difficult to ensure the availability of your applications, infrastructure, and data. More than 80% of Microsoft applications are not protected with high-availability solutions, and many businesses struggle to accomplish routine data management and protection tasks.

To get continuity, minimize downtime, and reduce business risk, you need efficient ways to achieve high availability and perform backup and restore. You may also need high availability and disaster recovery capabilities for a handful of critical applications, but deploying such solutions with traditional methods is often complicated and expensive.

## FLEXIBILITY AND SCALABILITY

The lengthy process of acquiring, integrating, and managing a new physical server every time your business needs a new application is not sustainable. Many businesses require weeks or even months of lead time to deploy a new workload (such as a new SQL Server database) or to scale an existing application. This is simply too long to efficiently meet your rapidly changing business requirements. By the time you buy the necessary servers, storage, and software licenses, you may have missed your window of opportunity, but simply adjusting compute and storage capacity to meet the needs of growing applications is also difficult.

## 4 THE NETAPP-VMWARE SOLUTION

With the pressure of flat or declining IT budgets and demands for a more scalable Windows environment, midsized businesses must implement a unified consolidation and virtualization effort that incorporates servers, storage, and networks for success. Achieving goals of reducing sprawl, increasing efficiency, simplifying management, and cutting cost is what the NetApp-VMware solution is all about. To address the needs of your Windows environment—applications, data, and infrastructure—as a whole, we have teamed to provide deep integration and perform extensive testing. NetApp and VMware understand that servers and storage must work together for a successful consolidation and virtualization effort.

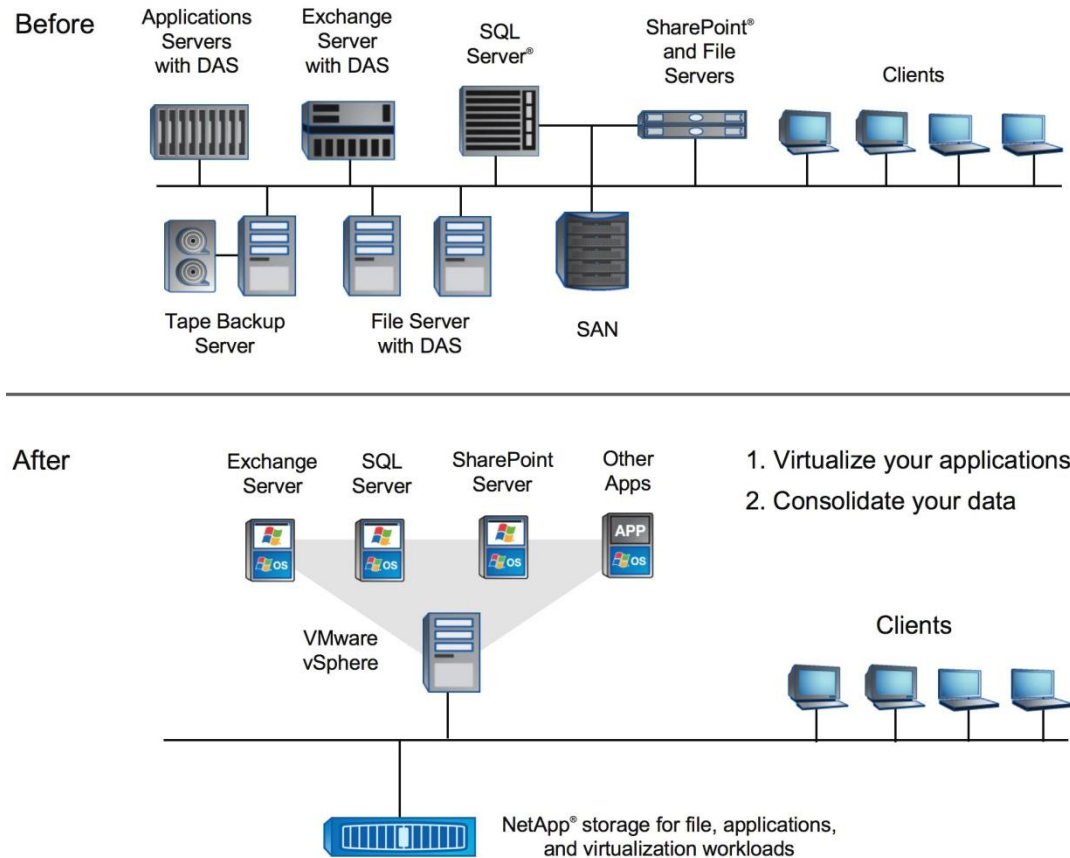


Figure 2) A typical Windows environment before and after consolidation and virtualization with a NetApp-VMware solution.

With VMware vSphere™, applications are encapsulated in virtual machines and abstracted from the underlying infrastructure. The infrastructure is managed as a single dynamic pool of processing, storage, and networking resources that can be allocated on the fly to various virtual machines and applications. By effectively sharing and load-balancing resources across many applications, servers can be consolidated by

a ratio of 5 to 10 times. VMware vSphere also reduces virtualization (hypervisor) overhead and delivers close to native performance for tier-1 applications. Users not only see resources as if they were dedicated to them, they also get the performance they expect from standalone deployments.

VMware vSphere provides a set of application services that enables applications to run more efficiently. The need for planned downtime is virtually eliminated and the availability of your most critical applications can be assured at any level necessary using VMotion™ and VMware HA. New applications can be deployed in a matter of minutes from VM templates and can be scaled dynamically by simply resizing the underlying virtual machine.

The unique, unified storage architecture of NetApp storage systems complements the capabilities of VMware vSphere by providing essential storage services. NetApp unified storage supports all SAN and NAS protocol on an efficient, scalable storage platform. You can satisfy all your Windows storage needs—including storage for virtual environments, application data, and Windows files—from a single storage pool. A single management interface lets you see and control both SAN and NAS volumes with no unnecessary boundaries between the two.

Industry-leading storage efficiency technologies—including deduplication for primary and secondary storage, thin provisioning, and efficient replication—cut the storage you need for your virtual environment by 50% versus the storage needed for traditional storage solutions. Advanced data protection and continuity solutions simplify backup and accelerate recovery, allowing you to avoid both planned and unplanned downtime without the complicated and expensive hardware and software configurations of other solutions.

The combination of VMware and NetApp technologies creates a unified management solution that simplifies your entire Windows environment. Using VMware's vCenter™ suite and NetApp System Manager you can manage all your virtual machines and underlying server and storage infrastructure. NetApp Virtual Storage Console functions as a vCenter plug-in to enable administrators to easily manage and monitor NetApp storage from the vSphere environment.

Technology is only one aspect of the solution. Joint NetApp-VMware solutions have already been proven in deployments at thousands of customer sites, so your risk is greatly reduced. As partners, we are working closely to create reference architectures that encompass all your critical Windows applications and data. Using these architectures you can reduce the uncertainty that comes with any new technology deployment and get up and running more quickly, with fewer hassles. NetApp and VMware have trained, joint partners who are well versed in the technologies of both companies and can deliver combined solutions that adhere to best practices and further reduce your costs.

## 5 SOLUTION BENEFITS

Consolidation of servers and storage reduces the cost of your Windows environment by improving operating efficiency and eliminating system downtime, while virtualization maximizes the value of your IT assets through increased automation, scalability, and the ability for multiple applications to share the same server and storage infrastructure. A complete solution from NetApp and VMware delivers the following benefits to boost IT efficiency and increase your return on investment.

### **REDUCED SPRAWL AND COSTS BY UP TO 50%**

Reducing the physical sprawl of your Windows environment reduces the resources—hardware, software, manpower, electricity, floor space, and so on—that you need to run your operation. One VMware server typically takes the place of 5 to 10 standalone physical servers. A single NetApp storage system with its unified storage architecture can take the place of multiple pools of direct-attached storage on application and file servers, providing both network-attached storage (NAS) and storage area network (SAN) functions as needed. A single NetApp storage system can meet all your Windows storage needs.

Consolidation and virtualization of servers and storage enable midsize businesses to increase utilization rates up to 60–80%. This enables more efficient utilization of software licenses for applications that are licensed by processor. For example, suppose you have 10 SQL Server instances running on 10 physical servers, each with 2 physical processors. You would need licenses to cover 20 processors. However, utilization of those CPUs is often as low as 5–10%. By consolidating onto an SQL cluster of 2 servers with 2 sockets each, you can run the same 10 software instances with licenses for only 4 processors.



Figure 3) Consolidate multiple physical instances of Microsoft SQL Server onto a single VMware server and reduce both hardware and license costs.

The savings that result from a consolidated, virtualized infrastructure, plus the application savings that come along with it, can be substantial. VMware has demonstrated that SQL Server consolidation can reduce your hardware and software costs by greater than 50%, and consolidation rates for Exchange environments can be 5 times or better. The NetApp Virtualization Guarantee Program<sup>1</sup> guarantees that you will use 50% less storage with NetApp in your VMware environment than with traditional storage. Across your entire Windows environment, consolidation and virtualization with NetApp and VMware can reduce your Windows costs by as much as 50%.

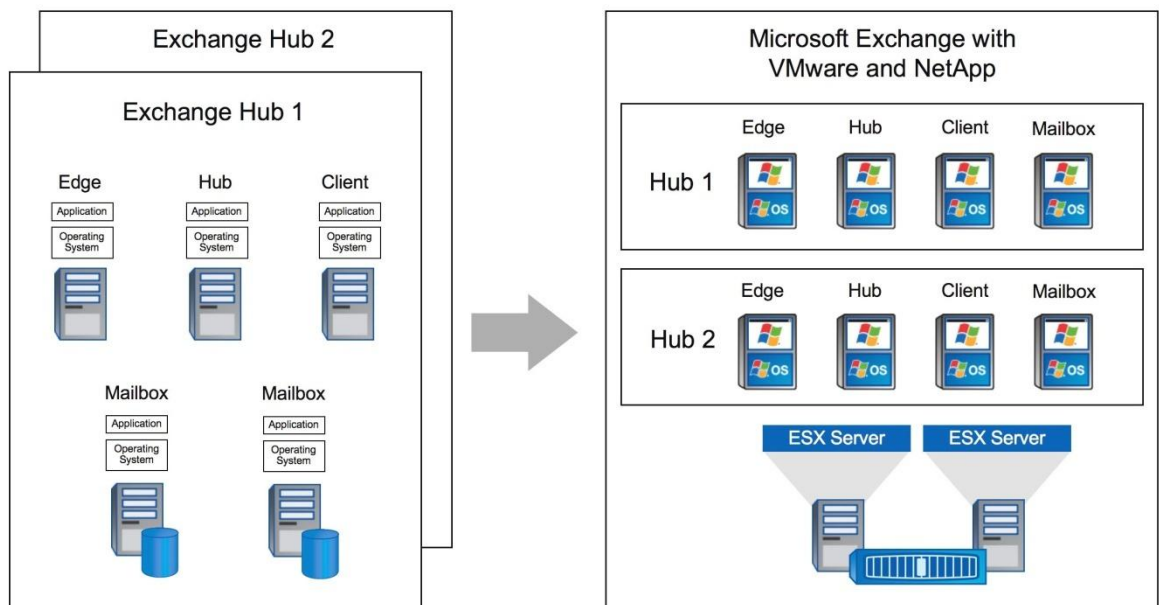


Figure 4) Typical five-times consolidation for Exchange 2007 when going from a physical environment to a virtualized infrastructure with VMware and NetApp.

## SIMPLIFIED MANAGEMENT

Through virtualization and consolidation, what was once a sprawling, resource-intensive IT infrastructure is transformed into a single pool of processing and storage resources that can adapt rapidly to changing needs. With VMware and NetApp, new servers and storage can be provisioned in minutes rather than days or weeks, and administrators are able to efficiently manage and optimize resources to better serve business needs.

VMware vCenter Management Suite and NetApp System Manager and the Application Pack also simplify and automate common tasks such as backup and recovery. Administrators no longer need to supervise

<sup>1</sup> Restrictions apply. For more information, visit [www.netapp.com/guarantee](http://www.netapp.com/guarantee)



individual backups or constantly worry about optimizing resources, freeing precious time to focus on more productive projects.

## INCREASED AVAILABILITY

Full server virtualization and Windows storage consolidation make it much simpler to keep your Windows applications running and your data protected and available. VMware and NetApp help you minimize or eliminate both planned and unplanned application disruptions without excessive cost or complicated procedures.

VMware VMotion and NetApp Data Motion™ allow you to move running applications and their underlying data so that hardware maintenance can be performed without disruption. VMware HA and NetApp MetroCluster allow you to protect the availability of 100% of your Windows applications with no application or operating system changes.

When it comes to recovery capabilities, you can quickly restore a single file or recover an entire server and all associated applications in a matter of minutes. A range of data protection options allows you to achieve very aggressive recovery time objectives and near-zero recovery point objectives for your most critical workloads.

## ENHANCED FLEXIBILITY AND SCALING

A fully virtualized Windows environment gives you the flexibility to do things you simply could not do before. If a critical application is maxing out its CPU or memory resources, VMware lets you increase those resources on the fly. If a storage volume is full, the NetApp Data ONTAP® operating environment makes it simple to expand the volume without disruption. Storage space can be quickly reclaimed and returned to your free storage pool when it is no longer needed. Virtual machines can also be cloned using the deep integration between VMware and NetApp, allowing you to replicate existing configurations for testing or scaling.

Quick provisioning of either a new application encapsulated in a virtual machine or new storage for any Windows workload—virtual or physical—is easy with the NetApp-VMware solution. Instead of the multiple weeks it takes in a traditional Windows environment, you can deploy new applications in minutes.

## 6 PREPARING TO CONSOLIDATE YOUR WINDOWS ENVIRONMENT

The following steps will help you begin the process of leveraging your existing infrastructure in a consolidated, virtual environment:

- **Assess your environment.** Identify all the servers that make up your current Windows environment and the data sets associated with each application on each server. Be sure to include any existing virtualized environments in your assessment.
- **Monitor usage.** Observe and measure the performance of all facets of your Windows environment to accurately gauge the challenges you face. Be sure to monitor during periods of peak usage, such as month end, to identify trends and patterns across different storage workloads. Tools such as Microsoft System Center Operations Manager can help capture the information you need.
- **Create a business case.** Summarize your current operational problems with cost impact if known, establish goals for the project, and lay out the cost benefits of virtualization in your environment as specifically as possible.
- **Plan.** Based on your goals, plan the specific infrastructure changes you will make and the equipment necessary to make them. Identify the different phases of implementation, such as installation and setup, service configuration, data migration, and so on.
- **Implement.** Put your plan into action, working with trusted partners as necessary. Be sure to document any changes to the plan to facilitate more effective problem solving if needed.

- **Document and review.** Documenting your new Windows environment will allow you to evaluate the results of the project against your goals. Track your new environment's success and alert partners if any problems persist or goals are not being met. Careful documentation will capture your best practices and provide you with a useful baseline for future projects.

NetApp and VMware have developed a team of qualified partners who can help you evaluate your Windows environment to identify goals specific to your business. These partners will work with you to create comprehensive consolidation and virtualization plans to meet your objectives, lower your costs, boost availability, and take the risk out of solution deployment.

To learn more about consolidating and virtualizing your Windows environment, contact your local NetApp-VMware value-added reseller or visit us at [www.netapp.com](http://www.netapp.com) or [www.vmware.com](http://www.vmware.com).

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