Transitioning to Microsoft SharePoint and Virtualization with Microsoft and NetApp

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OPTIMIZING A MICROSOFT SHAREPOINT ENVIRONMENT

The rapid growth and adoption of Microsoft® SharePoint® is straining existing IT infrastructures, including data management and storage systems. This white paper describes how deployment of virtualization and use of virtualized NetApp® data management and storage solutions optimize SharePoint environments, especially for midsize IT organizations.

TABLE OF CONTENTS

LIST OF FIGURES

1 EXECUTIVE SUMMARY

The rapid growth and adoption of Microsoft SharePoint reinforce the role of collaboration in information-rich organizations. Microsoft's fastest-growing business software product of all time, SharePoint is becoming a mission-critical resource [1]. A recent survey showed that 29% of current SharePoint adopters rate it as one of their top three IT initiatives, and 82% of these rate it in the top ten [2]. Without proper planning and governance, the rapid growth and adoption of SharePoint can pose a myriad of IT challenges, including keeping pace with needed storage provisioning, protecting data, scaling deployments, and controlling costs while meeting business needs.

At the same time, fully realizing the benefits of SharePoint can be challenging using traditional IT infrastructures. Enterprises that operate silos of physical infrastructure struggle to manage exponential data growth and the rapid proliferation of servers and storage systems. The solution is to implement a virtualized environment. Virtualization can help enterprises realize significant benefits, including increased resource utilization, enhanced business continuity, and more efficient management.

NetApp storage and data management solutions store, manage, protect, and retain data for collaboration portals and document repositories based on Microsoft SharePoint Server 2007 and 2010. In addition to adopting these solutions, an increasing number of organizations are considering or are already using virtualization to deploy Microsoft business applications such as SharePoint. Microsoft Windows® Server 2008 R2 Hyper-V™, Microsoft Hyper-V Server 2008 R2, and Microsoft System Center provide a robust solution that integrates server virtualization with high-availability clustering, online virtual machine (VM) mobility, and centralized management of the server infrastructure. NetApp provides advanced storage technologies to complement and enhance all the benefits offered by a Microsoft virtualization solution while addressing the storage-related challenges that can result from server virtualization.

This paper describes a NetApp and Microsoft end-to-end solution that delivers on the promise of storage and server virtualization to optimize critical application environments. The combined solution integrates industry-leading technologies at multiple levels, delivering significant benefits in four key areas:

- Improved efficiency
- Application and data protection
- Agility to meet evolving business needs
- Simplified management

The paper concludes by providing suggestions for how to get started with such a solution.

2 THE GROWTH OF SHAREPOINT AND ITS IMPACT

To increase collaboration and productivity across the enterprise, many of today's businesses deploy collaboration and content management systems. Microsoft SharePoint is a leading content management and collaboration platform on the market. As a result, it is quickly becoming the method of choice within organizations for centralized document and information sharing, project management and tracking, portal services, and much more. SharePoint improves team productivity, enables easy management of documents, helps make sure of integrity of content, and fosters efficient collaboration to a degree rarely achieved using earlier tools.

For many organizations, SharePoint is quickly becoming a mission-critical strategic application. A recent study showed that over one-half of respondents felt that their organization would experience significant negative business impacts if SharePoint unplanned downtime was between 30 minutes and four hours [2]. As a result, it must be designed, implemented, and supported in a way that can provide optimal performance and high availability.

This rapid growth and adoption affect IT organizations in several ways. Key IT organization impacts include server and storage sprawl and the accompanying rising costs. But this growth also places provisioning demands on IT departments, consuming space, administrator time, and data center power,

while potentially adversely affecting users. Multiple touchpoints must be managed across the three-layer SharePoint architecture (Web tier, application tier, and database tier). The increasing importance of SharePoint data necessitates thorough, reliable backups and rapid, granular data recovery capabilities. Management requires efficient, cost-effective data protection and availability to reduce costs and boost user productivity across the organization. In large SharePoint deployments, scalability can be a significant issue, especially in SharePoint environments that utilize large data files or binary large objects (BLOBs). IT organizations must also comply with relevant regulatory requirements. The IT infrastructure for a SharePoint environment needs to be designed to address these varied challenges.

3   CHALLENGES WITH TRADITIONAL IT INFRASTRUCTURES

With traditional IT infrastructure designs, realizing the full benefits of SharePoint can be challenging. For example, enterprises that rely on silos of physical infrastructure to support SharePoint struggle to manage rapid data growth and the rapid proliferation of servers and storage systems across their organization. Often in these cases, organizations must deal with a wide range of resource and server challenges to support the SharePoint server environment across the enterprise.

RESOURCE CHALLENGES

In a physical environment, server resources (for example, CPUs, memory, network adapters, internal disks, and so on) support a single operating system and usually a single application. This limitation can create resource contention among applications that can affect performance and availability during peak workloads for one or more applications. A common solution is to configure servers with abundant CPUs, memory, and other components to support multiple applications during peak resource consumption. However, such configurations might result in overprovisioned resources that might be partially underutilized during nonpeak periods. This can impede cost efficiency in midsize and large enterprises.

SERVER CHALLENGES

The growing challenges of dedicated physical resources are becoming more apparent. Servers are now used for file sharing and general-purpose computing, as well as hosting Web applications and business applications such as SharePoint. The tremendous growth in the deployment of these applications and the dedicated servers that support each application instance can contribute to hardware sprawl, underutilized resources, and management complexity.

In addition, application architectures now provide "server roles" that segregate certain functions within the application. Although server roles enable key application functions to be scaled independently from other application components, they can also lead IT departments to deploy more servers. A SharePoint best practice for large, scalable deployments, for example, recommends a dedicated server for each role, of which there are several. In some cases, this can trigger the deployment of multiple servers for each SharePoint farm environment, which can result in hardware proliferation if not carefully managed. This demonstrates that governance is essential.

4   THE CASE FOR SERVER VIRTUALIZATION WITH SHAREPOINT

One approach to address these challenges that is gaining increasing popularity is to implement a virtualized SharePoint environment. Virtualization can help enterprises realize significant benefits when deploying SharePoint and other resource-intensive applications, including increased resource utilization, enhanced business continuity, and more efficient management. For these reasons, an increasing number of organizations are considering or are already using virtualization to deploy Microsoft business applications such as SharePoint.

According to a recent Microsoft survey of SharePoint IT professionals, 64% of respondents indicate that they use virtualization technologies with their SharePoint deployment. Two-thirds of respondents

virtualize their production infrastructure; more specifically, 79% virtualize their Web servers, 80% virtualize their application servers, and 54% virtualize their database servers [3].

In a virtual server environment, physical server resources can be decoupled (abstracted) from the operating system and any application such as SharePoint running on the server. Using virtualization software, these resources can be configured to support multiple operating systems and, hence, multiple applications on a single physical server. Each operating system instance and application can be managed together as a virtual machine (VM) with its own dedicated processor(s), memory, network adapters, and other components, thereby eliminating resource conflicts among multiple applications. Server resources can be dynamically allocated from one VM to another to support SharePoint and other applications during resource-intensive periods such as companywide SharePoint use as a key project milestone approaches. These resources can then be reassigned to the original VM once the peak periods have subsided.

By enabling the consolidation of many applications onto fewer physical servers, virtualization improves resource utilization and manageability and reduces hardware and administrative costs. Resource-intensive applications such as SharePoint can be deployed to efficiently use existing resources. The ability to also dynamically allocate additional server resources to VMs or to move VMs to another physical server enables workload balancing, improves business agility, and facilitates high availability and disaster recovery for critical applications, such as SharePoint.

However, the consolidation of more applications onto fewer physical servers in a virtualized environment greatly increases the impact of any single component, device, or system failure, particularly storage. This potentially affects the performance and availability of multiple applications and associated data. It's also not uncommon for organizations that have implemented a server virtualization solution to experience an unexpected increase in storage requirements, poor storage utilization levels, reduced I/O performance, or complications with backup processes and overall data protection capabilities. These risks and inefficiencies can undermine the cost savings that drive organizations to consider virtualization in the first place. Hence, *storage* virtualization and other advanced storage and data management technologies that complement server virtualization are required to deliver a truly virtualized infrastructure.

5 A DATA MANAGEMENT AND STORAGE SOLUTION DESIGNED FOR SHAREPOINT

Leveraging their strategic alliance, NetApp and Microsoft offer solutions that provide optimal data management and storage for SharePoint users and administrators, as well as solutions to leverage virtualization to maximize SharePoint benefits.

With regard to optimizing data management and storage, NetApp SAN solutions are tightly integrated with Microsoft technologies. NetApp storage and data management solutions store, manage, protect, and retain data for collaboration portals and document repositories based on Microsoft SharePoint Server 2007 and 2010. NetApp storage solutions allow IT staff to monitor and manage SharePoint Server farms across the enterprise from a centralized location. With NetApp, administrators can provision additional storage resources as needed without affecting SharePoint users. NetApp solutions also help administrators automate data protection, including data backup and replication for disaster recovery purposes.

NetApp storage solutions can also help increase the scalability of SharePoint environments by storing and managing large data files on BLOB storage outside of the Microsoft SQL Server® database supporting SharePoint. Using the NetApp unified storage architecture, thin provisioning, and data deduplication technologies, IT staff can design an efficient tiered storage strategy for SharePoint data to help reduce storage costs. These capabilities are further described below.

MANAGING COSTS AND STORAGE EFFICIENCY

Enterprises use a variety of storage architectures for their SharePoint deployments. According to a recent Microsoft survey of SharePoint IT professionals, 65% of respondents indicate use of SANs as their storage architecture [3]. By consolidating SharePoint data onto NetApp storage, organizations can reduce costs by improving storage utilization and simplifying data management. With NetApp storage solutions for SharePoint 2007 and 2010, IT staff can:

- Reduce expenditures by up to 40% through space-efficient storage (using NetApp FlexVol® thin provisioning technology) and deduplication of redundant SharePoint data.
- Streamline data and storage management of SharePoint Server farms across the enterprise.
- Increase IT productivity by automating various data management functions, including data backup and replication.
- Optimize storage resources with a tiered storage strategy supported by NetApp unified storage and Microsoft server architecture that allows both file and application data to reside on a single NetApp and Microsoft solution.
- Using NetApp SnapVault®, automatically place large, unused data files on lower cost SATA storage with policy-based data management tools.

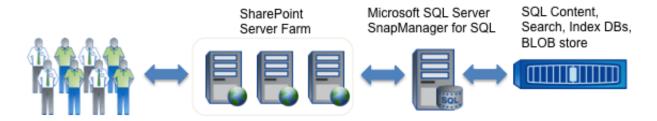## DATA AVAILABILITY, BACKUP, AND RECOVERY

NetApp backup and recovery solutions enable IT staff to perform automated, nearly instantaneous, and consistent backups. With Snapshot™ technology, administrators can increase data protection by making more frequent backups without affecting system performance and with minimal storage space. A flexible scheduler enables different data recovery granularity for different schedules and varying retention policies. The solution also allows IT staff to recover SharePoint data, including an entire SharePoint farm (for example, configuration and search databases and associated indexes), SharePoint site collections, sites, documents, or a specific document version as needed, including its associated metadata. As a result, organizations can improve their data protection and increase the availability of their collaboration and content management system across the enterprise.

SCALABILITY AND DATA MANAGEMENT

NetApp storage solutions allow administrators to manage documents stored outside the SQL Server database used by SharePoint. As a result, IT staff can store and manage large data files more efficiently and improve the scalability of the SharePoint environment. To further simplify data management, files in SMB (CIFS) shares or Microsoft Exchange public folders can be moved into SharePoint using NetApp SnapManager® for SharePoint. End users can then use their familiar SharePoint interface to access data transparently from where it is physically stored.
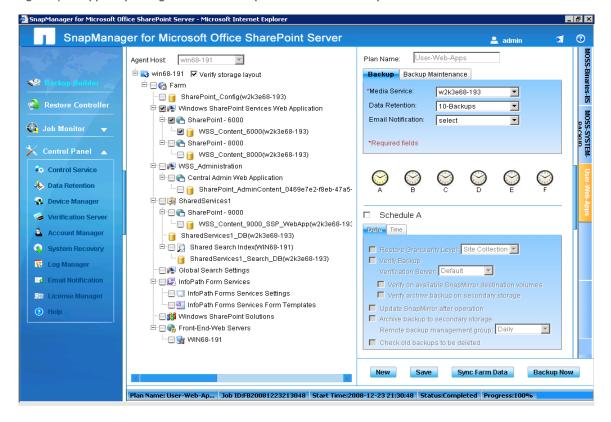
According to a recent Microsoft survey of SharePoint IT professionals, 26% indicate they plan to use remote BLOB storage. Primary reasons cited were performance (65%), scalability (62%), cost reduction (57%), and legal or other compliance (32%) [3]. NetApp provides an extended BLOB store (for Microsoft SharePoint 2007) or remote BLOB storage (RBS) store (for Microsoft SharePoint 2010) so that BLOBs can be stored on other storage besides SQL Server, eliminating some of the strain on SQL Server (see Figure 2). This helps compress the SQL Server database, making it more manageable, improving performance, and making sure that backups function properly. Snapshot copies can then be integrated across the extended BLOB store, remote BLOB store, and the rest of the environment.

Figure 1) Scale by taking advantage of BLOB store.

With the automated discovery feature of NetApp SnapManager for Microsoft SharePoint, administrators can monitor the status and growth of SharePoint Server farms across the enterprise. When needed, IT staff can provision additional storage resources without affecting SharePoint users. This solution also allows administrators to automate SharePoint data protection processes.

Figure 2) NetApp SnapManager for SharePoint provides efficient backup for SharePoint environments.

BUSINESS CONTINUITY

As part of the NetApp integrated data protection solution, NetApp business continuity solutions help safeguard business-critical SharePoint Server data and minimize downtime in the event of a disaster. With NetApp SnapMirror® and MetroCluster™, administrators can cost-effectively protect data from local and regional disasters, replicating data and failover access. NetApp RAID-DP® protects against data loss even in the event of double-disk failure. These disaster recovery solutions enable rapid reestablishment of full system functionality.

ARCHIVE AND COMPLIANCE REQUIREMENTS

NetApp archive and compliance solutions reduce storage costs using low-cost, disk-based long-term storage. NetApp SnapLock® Compliance enables adherence to retention policies and regulations by archiving data on SEC-compliant write once, read many (WORM) volumes. Another option provided by SnapLock Enterprise allows a trusted administrator to delete volumes but not individual records. Achieving compliance also requires encryption to reduce the risk of inadvertent or malicious alteration of SharePoint Server data. NetApp DataFort secures networked storage by locking down stored data with strong encryption and by routing access for secured data through secure hardware. This maximizes security without affecting performance or user workflows.

INTEGRATION WITH MICROSOFT TECHNOLOGY

A recent Enterprise Strategy Group white paper explained that "NetApp hasn't just provided an ability to *connect* storage to SharePoint, it has instead truly *integrated* with SharePoint." [2] And according to a recent IDC white paper, "The bottom line for enterprises is that the combination of NetApp storage solutions … and SharePoint Server environments makes it possible for IT organizations to guarantee that their collaboration environment is enterprise ready." [1]

6   INTEGRATED SERVER AND STORAGE VIRTUALIZATION FOR SHAREPOINT AND BEYOND

An IDC white paper recently explained, "With the growth in SharePoint … firms are moving these workloads to virtual machines running on networked storage infrastructure." [1] Microsoft and NetApp provide an end-to-end, tightly integrated solution that integrates server and storage virtualization. Microsoft Windows Server 2008 R2 Hyper-V, Microsoft Hyper-V Server 2008 R2, and Microsoft System Center provide a robust solution that integrates server virtualization with high-availability clustering, online VM mobility, and centralized management of the server infrastructure. In parallel, NetApp unified storage based on Data ONTAP® provides advanced storage technologies to complement and enhance all the benefits offered by a Microsoft virtualization solution while addressing storage-related challenges that can result from server virtualization.

The combined solution delivers significant benefits for deployments of SharePoint and other vital applications in four key areas:

- Improved efficiency
- Application and data protection
- Agility to meet evolving business needs
- Simplified management

Each of these is covered in more detail below.

IMPROVED EFFICIENCY

Virtualizing servers and storage together provide a pool of processor, memory, and disk resources that can be dynamically allocated across the entire virtual infrastructure. This pool of resources enables fast consolidation of multiple VMs, business applications such as SharePoint, and associated data and significantly boosts server and storage utilization.

Cost savings, particularly in opex and capex, represent a primary motivator for virtualization as IT departments evolve from cost centers to areas of strategic investment. After virtualization, customers often report a 30% to 40% overall reduction in operating costs. By reducing both server and storage system sprawl, many organizations have been able to quickly realize a positive return on their virtualization investments.

Microsoft's ability to provide server and desktop operating systems, virtualization and high-availability software applications such as SharePoint, and a management solution that ties all components together enables it to offer a server virtualization package at a very affordable price.

NetApp efficiency technologies, such as data deduplication, are particularly useful for virtualized environments in which each VM contains the operating system, patches, software applications, and other data. All of those copies can now be reduced to a single instance, reducing storage capacity needs by up to 90%. NetApp deduplication can be used broadly across many applications, including SharePoint primary data, backup data, and archived data. For more information on NetApp efficiency technologies, refer to NetApp TR-3701 [4].

PROTECTION FOR APPLICATIONS AND DATA

Virtualization not only improves infrastructure efficiencies, it actually plays a critical role in centralizing and simplifying high availability and disaster recovery. Using NetApp and Microsoft solutions, critical applications such as SharePoint and associated data can be available to keep businesses running, even under the most extreme conditions.

A virtualization solution from NetApp and Microsoft enables enterprises to maintain application and data access throughout practically any imaginable disruptive event. Strong system reliability and integrated business continuity technologies from both companies provide end-to-end protection of the entire physical and virtualized environment, not just a few applications. Hyper-V, in conjunction with other Windows Server 2008 R2 technologies, provides simplified, reliable high availability at the host and application layer. NetApp offers SnapManager for Hyper-V, which is Live Migration aware and supports Cluster Shared Volumes (CSV) on Windows Failover Clusters.

NetApp has tailored its backup and recovery solutions that are available in physical environments to the needs of virtual environments to make them even more effective. These tools provide fast, cost-effective, policy-based backup and recovery. For example, NetApp SnapManager software leverages Snapshot technology to simplify backup and other data management functions for SharePoint applications running on either physical or virtual machines. SnapManager also integrates with the Microsoft Volume Shadow Copy Service (VSS) framework, making sure of application-consistent backups. NetApp SnapMirror is a data replication product that reliably replicates Hyper-V VM data across unlimited distances over IP, providing disaster protection for global operations.

ABILITY TO MEET EVOLVING BUSINESS NEEDS

The Microsoft and NetApp virtualization solution enables the common pool of dynamic resources to be used to quickly meet rapidly changing business requirements, including expanded SharePoint use. Applications can be deployed, grown, or migrated as dictated by fluid business needs. Organizations can leverage these advanced virtualization capabilities for fast scalability, load balancing, or fast rollouts of production or test environments. For example, NetApp FlexClone® uses technology based on Snapshot to facilitate nearly instant VM provisioning. Microsoft Systems Center Virtual Machine Manager (SCVMM) enables online migration of VMs (Live Migration) and the ability to add an entire Hyper-V host cluster in a single step.

CENTRALIZED MANAGEMENT

Manageability represents another major advantage to implementing an integrated Microsoft and NetApp virtualization solution. The integration of Windows Server 2008 R2 with Microsoft applications such as SharePoint also enables many tasks and processes to be based on familiar Windows commands and interfaces. This common, well-understood approach reduces complexity and enables IT teams to use existing skills and lower administrative costs.

MICROSOFT SYSTEM CENTER

Microsoft System Center is the management suite that ties together all of the above Microsoft components—along with integrated NetApp technologies—to locate and optimize virtualization assets and deliver centralized, integrated server and storage management for the entire Microsoft infrastructure. The products within the Microsoft System Center suite that are most relevant to the integrated management of Microsoft and NetApp virtualization technologies are System Center Operations Manager (SCOM) and System Center Virtual Machine Manager (SCVMM).

SYSTEM CENTER OPERATIONS MANAGER (SCOM)

System Center Operations Manager (SCOM) enables administrators to monitor Microsoft servers, applications such as SharePoint, and clients. It provides a complete view of the health of both physical and virtual environments to enable rapid response to disruptive events. NetApp storage can be monitored with SCOM using ApplianceWatch™ PRO, a free management pack offered by NetApp (see Figure 3). This management pack includes new PRO Tips that provide granular control.
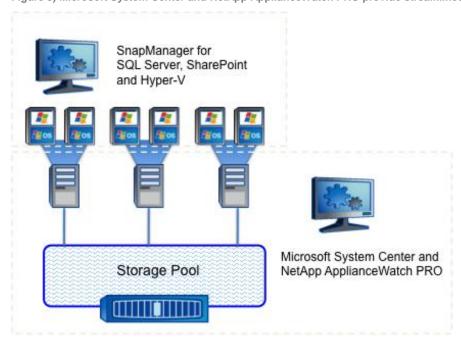
Figure 3) Microsoft System Center and NetApp ApplianceWatch PRO provide streamlined management

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SYSTEM CENTER VIRTUAL MACHINE MANAGER (SCVMM)

System Center Virtual Machine Manager (SCVMM) is a Microsoft Systems Center product that includes technology to consolidate underutilized physical servers and convert them into virtual machines. SCVMM provides complete management of Hyper-V VMs, enabling them to be consolidated, configured, provisioned, resized, or reassigned from a single console. SCVMM Performance and Resource Optimization (PRO) provides an open and extensible framework for the creation of management packs for virtualized applications or associated hardware. NetApp ApplianceWatch PRO includes PRO Tips that enable automatic remediation of common storage issues through SCVMM.

7 CONCLUSION: BENEFITS OF AN INTEGRATED VIRTUALIZATION SOLUTION FOR SHAREPOINT

A server and storage virtualization solution from Microsoft and NetApp integrates advanced industry-leading technologies at numerous levels within the virtual infrastructure. The combined solution provides all the benefits of server virtualization, addresses storage-related challenges that can result from server virtualization, and provides complementary storage technologies that enhance server virtualization. By leveraging end-to-end virtualization, Microsoft and NetApp address today's most critical IT challenges and deliver outstanding results for critical business applications such as SharePoint in the following areas:

- **Efficiency.** By using Microsoft and NetApp virtualization to consolidate physical servers and storage, organizations can dramatically boost resource utilization and reduce hardware sprawl. Cost savings derive from reducing hardware count; simplifying management; and cutting power, cooling, and space requirements.

- **Protection for applications and data.** A virtualization solution from NetApp and Microsoft enables enterprises to maximize SharePoint application and data access throughout practically any imaginable disruptive event.

- **Flexibility and agility**. VMs and storage volumes can be provisioned and resized in minutes or even seconds to support rapidly changing business needs. SharePoint upgrades can be quickly deployed or scaled without downtime or disruption.

- **Centralized management**. Microsoft simplifies the management of virtualized infrastructures using a centralized framework and tight integration with SharePoint. NetApp provides integration with key modules within Microsoft's management framework to enable policy-based virtual machine and storage management.

To realize these benefits and begin planning for a successful virtualized SharePoint deployment, a useful first step is to identify and assess the specific objectives of the project and the corresponding expected benefits of the deployment. Next, characterize the data center environment in which the SharePoint solution will be deployed, including, servers, storage, network components, and applications. At the same time, the assessment team (which might consist of enterprise IT, Microsoft, and NetApp and VAR IT consultants) should identify the specific data sources that will be included in the scope of the project. This might include such distributed locations as file servers, e-mail servers, files on remote laptops, data in back-end applications, and files in other miscellaneous systems. The team should also identify the specific storage and other infrastructure, compliance, archival, and management challenges that need to be addressed in the SharePoint/virtualization adoption process.

The assessment process also should include identifying the primary uses of SharePoint and the types of data that need to be shared and that are likely to grow quickly. This definition of usage models is critical to the process.

The next step after the assessment process is to develop the most efficient server and storage architecture "blueprints" for the particular environment and business needs identified in the assessment phase. This involves developing a customized solution architecture and high-level design that addresses the business requirements. The team specifies particular Microsoft, NetApp, and third-party vendor products and solutions at this phase.

For many enterprises, it is also important to conduct ROI or TCO analyses of the proposed solution and implementation road map. This leads to a full understanding of all anticipated cost components, as well as benefits. Costs might include solution acquisition, licensing, operation, management, downtime, and recovery, as well as infrastructure costs. Quantifying these costs and benefits provides full visibility into the merits of the project. This process also identifies ways to reduce costs through improved storage efficiency; better solution management; lower power, cooling, and space needs; faster recovery from application errors; and others. Once the projected costs and associated benefits are clear, the team can then proceed to actual deployment and ongoing management, the last two steps in the process. NetApp Global Services and NetApp's extensive partner network can provide expert help to assist organizations

in planning and implementing an efficient and reliable virtualized storage and data management solution for SharePoint environments. For more information, see "NetApp Implementation Guide for Microsoft Virtualization" and "NetApp Storage Best Practices for Microsoft Virtualization" in the reference section [5,6].

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