



White Paper

# NetApp Storage for Windows Environments: Challenges and Solutions

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## **STORE ALL YOUR WINDOWS DATA ON NETAPP UNIFIED STORAGE**

Consolidating your Microsoft® SQL Server®, Exchange, and SharePoint® Server data along with your Windows® files using NetApp® storage for Windows environments reduces the cost of physical storage as well as ongoing management costs in Windows environments. Storage utilization improves dramatically, storage management becomes simpler, and headaches associated with backup and restore are reduced or eliminated. NetApp storage solutions scale to accommodate growth, while letting you easily reclaim storage space as needed. A range of technologies, including NetApp RAID-DP®, clustered storage, and replication capabilities, help protect the availability of your critical data. With NetApp, companies have been able to slash the cost of Windows storage by as much as 50%.

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# 1 INTRODUCTION

Windows environments in today's businesses can be complex. There are a variety of users to accommodate, ranging from product-collateral hungry salespeople, to engineering power users, to the compliance and cost-conscious executive. These users depend on the many critical applications running on different Windows servers: applications such as Microsoft Exchange Server for messaging, Microsoft SQL Server supporting tasks such as order management, and Microsoft SharePoint Server for collaboration and workflow. Additionally, also found in these environments are file servers to provide Windows file storage used to store critical documents, spreadsheets, presentations, and engineering data.

Each of these Windows servers relies on significant disk capacity for storage, which is typically provided by directly attached storage (DAS) or by one or more storage-area networks (SANs) or via network-attached storage (NAS). Often, the result is separate servers and storage for each type of data. (See Figure 1).

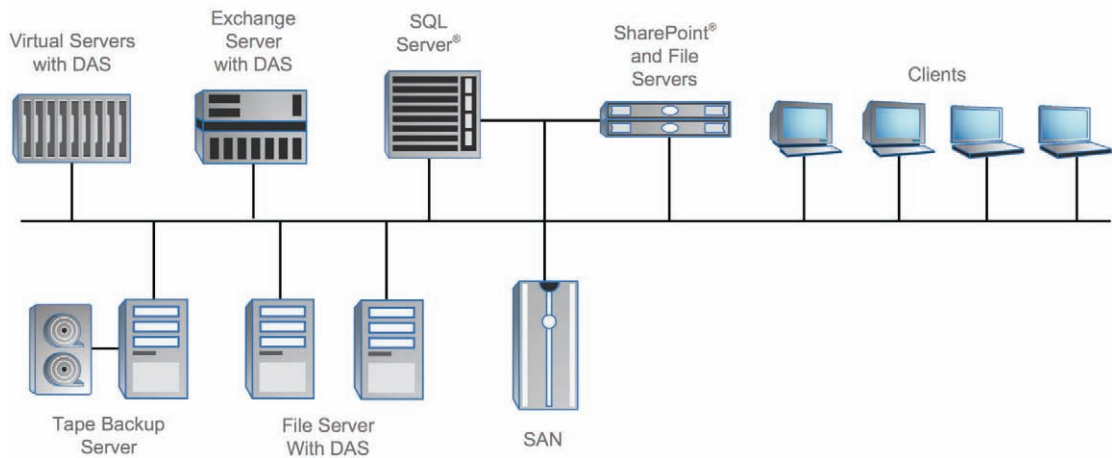


Figure 1) Typical Windows environment with separate servers and storage for each workload.

Your business is not static, and neither is your Windows environment. Departments grow and shrink as work increases and decreases. Windows servers and storage are added, retired, moved, and reconfigured. The natural tendency is to buy Windows servers and storage that appears to offer new advantages and to overprovision—buy too much CPU power and storage—while budget dollars are available. The result is earlier mentioned separate pools of DAS, SAN, and NAS, each associated with one Windows workload. These separate storage pools are underutilized, and difficult, and expensive to administer. The NetApp unified storage architecture helps you join these separate Windows storage environments together by providing all your storage resources from a single, centralized storage system. The results: major storage savings and major reductions in how much time you spend on routine administration. With support for all popular server and desktop virtualization products on the market, NetApp storage for Windows environments is also the ideal platform to support any virtualization efforts you are planning. (See Figure 2).

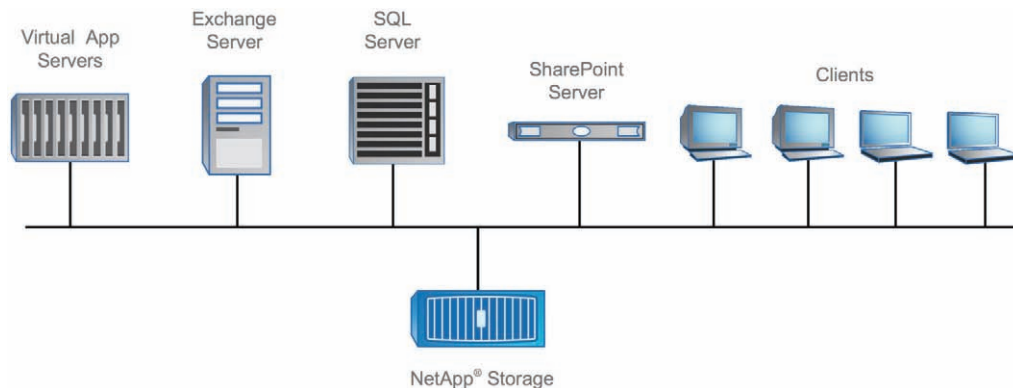


Figure 2) Windows environment with NetApp storage for all workloads.

This paper explores the challenges found in diverse Windows server environments, where “islands of storage” contain various forms of structured Windows application data as well as unstructured Windows files and folders. It lays out the tremendous savings opportunities presented by the path-breaking ability of NetApp storage for Windows environments to efficiently store, effectively manage, carefully protect, and easily scale all types of Windows data, providing quick payback on your investment. Even greater overall savings can be achieved with NetApp’s support for server and desktop virtualization, should you choose to implement those technologies now or in the future.

This paper will be particularly helpful to administrators working in medium- to large-sized Windows environments; however, the concepts, technologies, and benefits discussed are applicable to smaller environments as well.

## **2 KEY WINDOWS STORAGE CHALLENGES**

Opportunities for improved efficiency and storage cost savings can be particularly compelling with economic and competitive pressures limiting resources and reducing the budget you have available for servers, storage, and software. NetApp storage for Windows provides major cost savings and outstanding returns on the investments you make, whether you decide to eliminate islands of storage, simplify management, rationalize backup and restore, improve scalability, or put a business continuance solution in place.

### **ISLANDS OF WINDOWS STORAGE**

Your business relies on Windows file servers and applications such as Microsoft SQL Server, SharePoint Server, and Exchange Server running on a variety of servers and storage; every need for new capabilities seems to require another server and yet more storage.

The result is different and completely separate Windows storage systems—often one system per application—scattered all over. Much of this storage is underutilized—typically, isolated disks are less than 30% full—wasting money and time. Meanwhile, some servers seem to be chronically low on storage, even though you’ve got plenty of space elsewhere on your network.

### **POINTS AND QUESTIONS TO CONSIDER**

- Adding a new server with DAS every time a new instance of Exchange, SharePoint, SQL Server, or a new file server is needed is a short-term solution. How do you break this cycle?
- Can you quantify the growth of your Microsoft application and file servers, storage, and data?
- As you consider consolidating storage, can you be sure that all your Windows workloads gracefully share the same pool of consolidated storage? How?
- Do you know how much of your disk space is occupied by redundant files or other data?

### **INEFFICIENT AND EXPENSIVE ADMINISTRATION**

The cost of data management begins to rise the moment you unpack and install your second Windows server with DAS. Having multiple servers and multiple individual storage systems means that all the routine administrative tasks—patching; maintaining antivirus software; managing backups; and finding and restoring lost files, messages, or data sets—must be performed in duplicate, triplicate, or worse.

If your storage comes from multiple vendors, the chances of making an administrative mistake and having to spend vital time recovering from that mistake go up exponentially. Administration inefficiencies increase, and the cost and complexity of managing your Windows data rise dramatically.

As disks get cheaper and data proliferates, your storage footprint also expands. Backup windows lengthen, and backups occur less frequently and sometimes fail altogether. The results of managing multiple servers and individual storage systems in a complex environment are high infrastructure and operational cost, reduced availability, and ongoing management problems.

#### POINTS AND QUESTIONS TO CONSIDER

- How would you benefit from automation of day-to-day tasks such as backup?
- How much would your productivity improve if you could leverage existing Windows tools to manage storage?
- Can you manage your storage today without disrupting users?

#### LIMITED RESOURCES AND FLAT TO DECLINING BUDGETS

Businesses increasingly have to do more with less. You may need to cut IT costs, including shrinking spending on software, storage, and “overhead” functions such as administration, while accommodating data growth. In today’s business climate, the IT projects that are easiest to justify are those that reduce costs, enhance agility, and improve operational efficiencies. NetApp solutions can decrease your total cost of ownership and simplify storage administration while increasing availability and scalability.

#### POINTS AND QUESTIONS TO CONSIDER

- Your storage needs continue to grow rapidly while your budget stays flat or shrinks. Can you accommodate this growth while reducing spending on storage and data management?
- How do you prioritize the IT projects currently being discussed in your organization?

### 3 NETAPP SOLUTION ELEMENTS

This section describes NetApp’s unified approach to addressing the challenges described above. The benefits of NetApp storage for Windows environments include:

- Consolidation
- Simplified management
- Improved backup and simplified recovery
- Assured availability
- Improved scalability

#### CONSOLIDATION

Pooling all your Windows application data and Windows files on NetApp unified storage reduces complexity, eliminates silos of storage, dramatically increases storage utilization, shrinks your physical storage footprint, and reduces the number of management interfaces you have to deal with. Easy-to-use, intuitive NetApp administration tools enhance your effectiveness.

Instead of running every instance of Microsoft SQL Server, Exchange, and SharePoint on a standalone server, each with its own isolated storage, you can consolidate your Microsoft application data and store it along with all your Windows file data using NetApp storage. The NetApp unified storage architecture not only meets all your requirements for Windows applications storage, but also eliminates the need for separate Windows file servers. Eliminating standalone Windows file servers reduces the complexity of your Windows environment by reducing your total server count—servers that would otherwise require constant maintenance. (See Figure 3).

You can take the consolidation process a step further by virtualizing your application servers and implementing a virtual desktop infrastructure to consolidate all your Windows servers and desktops on just a few servers. NetApp provides support for popular server and desktop virtualization technologies from leading suppliers, allowing you to reduce the amount of hardware you have while enhancing the manageability of your Windows environment.

Customers using NetApp storage as part of their virtualization efforts have significantly reduced the amount of storage they need. In fact, NetApp’s 50% Virtualization Guarantee program<sup>1</sup> guarantees that you will use 50% less storage with NetApp than with traditional storage and is applicable to Citrix, Microsoft, and VMware® environments.

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<sup>1</sup> For applicable terms and conditions, please see NetApp 50% Virtualization Guarantee—<http://www.netapp.com/us/solutions/infrastructure/virtualization/guarantee.html>

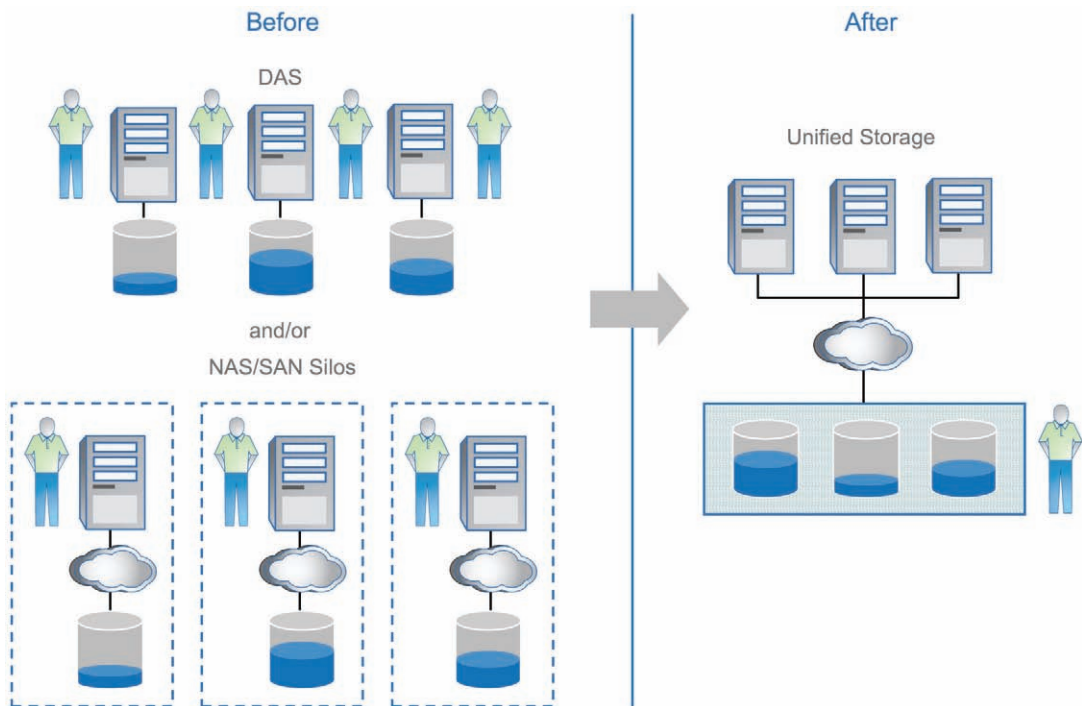


Figure 3) Consolidating with NetApp storage for Windows environments allows you to place all Windows storage (file, applications data) on a single storage system where it's much simpler to manage and protect.

### SIMPLIFIED MANAGEMENT

Because managing individual storage is time consuming and making changes in such an environment can be complex, consolidating onto the NetApp unified storage architecture helps simplify management and reclaim time and resources spent on daily management tasks. NetApp management solutions integrate with and leverage existing management tools, such as Microsoft System Center, and automate administrative tasks—enhancing your productivity. NetApp management software includes a variety of tools that can help you manage physical storage, application and file data, and storage services such as backup and recovery processes. (See Figure 4).

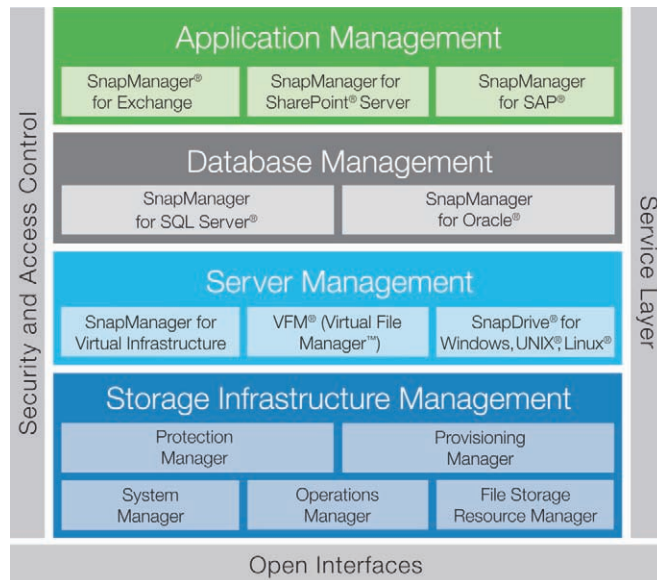


Figure 4) NetApp management software provides options for managing popular Windows applications as well as Windows files and your overall storage environment.

NetApp System Manager and other storage infrastructure management software make initial installation and storage configuration a breeze. You can also create policies to automate tasks such as provisioning and backups. NetApp provides a variety of tools to manage application and other data in your Microsoft environment, including SnapManager for Exchange, SnapManager for SharePoint Server, SnapManager for SQL Server, and SnapManager for Virtual Infrastructure.<sup>2</sup> All SnapManager solutions allow you to set up automated backup policies that protect your application or virtual infrastructure data according to a schedule that you define, with dramatically simplified recovery so you can make sure your critical applications and data are always available.

For unstructured data, NetApp VFM (Virtual File Manager) simplifies your file storage management by allowing you to create a single, unified view of file storage. Using this single view and the VFM reporting and management engine, you can automate reporting and management tasks, making it much simpler to perform operations such as migrating and tiering files in your Windows environment.

A recent Forrester Research report using Forrester's Total Economic Impact methodology found that customers using NetApp manageability tools saw a payback on their NetApp investments in less than one year.<sup>3</sup>

## IMPROVED BACKUP AND SIMPLIFIED RECOVERY

Creating backups can take a long time, and as a result, you probably back up less frequently than you'd like. Windows backups can also be network and resource intensive because they repeatedly transfer redundant data and require constant monitoring. With NetApp storage for Windows environments, you can effortlessly back up and recover all your Windows files, virtual machines, Exchange mailboxes, SQL Server databases, SharePoint data sets, and other Windows application data in minutes. With NetApp, you can back up more frequently with less impact. Our Snapshot™ technology allows frequent, near-immediate backup with no disruption.

You can also store multiple backup copies to create an online archive of backups on inexpensive disks, minimizing tape in your environment. Rather than relying on tape backups, you may now only need tape for weekly or occasional backups to archive your data offsite. With this approach, all backup activity occurs on your storage system, and there is no application disruption due to the backup process.

Backing up Microsoft applications is also greatly simplified. NetApp SnapManager tools automatically discover and monitor all data associated with Microsoft applications (Exchange, SharePoint Server, and SQL Server), flagging any new or unprotected data. Each application is placed in hot backup mode prior to creating a NetApp Snapshot copy to make sure that the resulting backup is always consistent. Automatic backup policies protect data according to a schedule that you define. SnapManager tools can be installed and used with either physical or virtual servers.

To back up virtual environments you can use SnapManager for Virtual Infrastructure (VMware) or the Citrix Storage Delivery Services Adapter for NetApp. For other virtual environments, SnapDrive® can be used to create automated Snapshot copies of your storage volumes. A single Snapshot copy can back up multiple virtual machines at once. (See Figure 5).

Restoring files, messages, and data sets is a problem in most Windows environments. Restoration is complicated by multiple servers, storage systems, and tapes and hampered by an inability to restore the right data quickly and reliably.

NetApp enables users to restore their own files through access to previous Snapshot copies, reducing the number of frantic calls to the help desk. NetApp SnapManager tools make it simple to recover all or part of your Microsoft Exchange, SQL Server, or SharePoint Server environment, including single mailboxes from previous backups, dramatically reducing the time spent to successfully restore from backups.

As an example, Irwin Mitchell, a UK-based law firm, implemented NetApp storage for its Exchange needs.<sup>4</sup> As a result, it reduced the time needed to recover from a failure by 89% while also reducing storage costs by 50% and the time needed to add storage capacity by 92%.

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<sup>2</sup>SnapManager for Virtual Infrastructure supports VMware ESX environments. Integration with Citrix XenServer is provided by the Citrix Storage Delivery Services Adapter for NetApp Data ONTAP®.

<sup>3</sup>The Total Economic Impact of NetApp's Manageability Suite, Multi-Company Analysis, January 2009

<sup>4</sup><http://media.netapp.com/documents/irwin-mitchell.pdf>

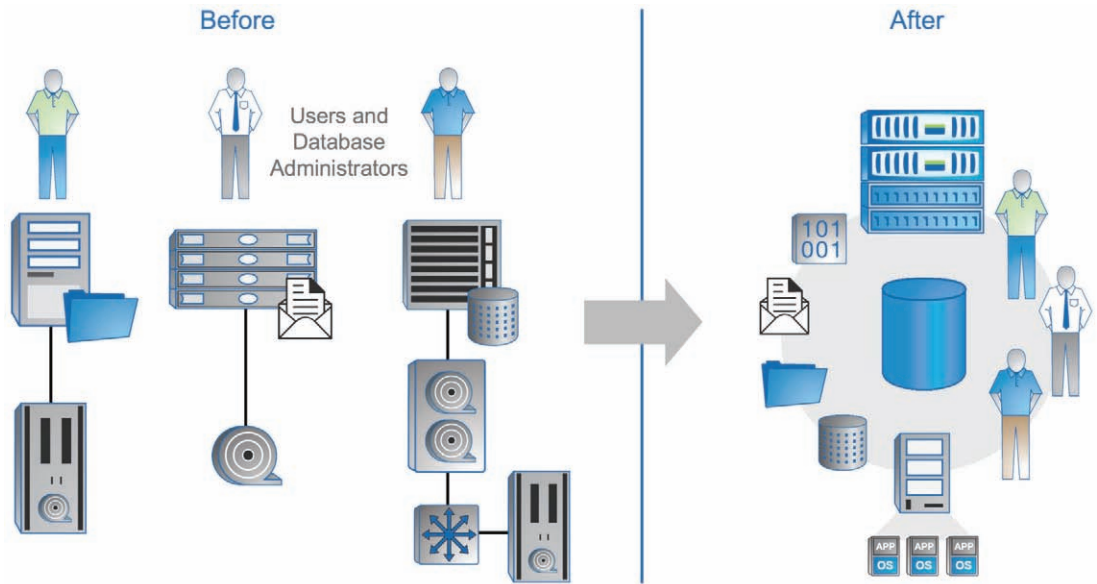


Figure 5) Consolidating storage on NetApp and using NetApp policy-based tools take the complexity out of backup.

**ASSURED AVAILABILITY**

Your business depends on the reliability of your Windows environment. NetApp helps you safeguard all your Windows messages, files, and data sets—locally or remotely—to achieve higher availability and reduce risk. We protect both your Windows files and Windows application data for reliable data access, whether that means quickly restoring a mailbox or recovering from a natural disaster, and you can choose the solution that is right for your needs and budget.

NetApp storage for Windows environments starts by safeguarding your data using the double-parity protection of RAID-DP, which protects you in the event that two disks fail at once. NetApp active-active storage systems eliminate single points of failure in your storage environment without leaving valuable resources sitting idle. A recent IDC study showed the measured availability of NetApp storage at 99.999%.<sup>5</sup>

These capabilities can be further extended through a selection of additional data protection technologies, including mirroring data and failing over to a remote site when your environment requires it. This is especially useful if 24X7 operation of your Windows environment is critical to your business.

Setting up and maintaining continuity are easy and cost effective. Our management tools allow you to create policies that automatically provide the right level of protection for all your Windows application and file data.

**IMPROVED SCALABILITY AND HIGHER STORAGE EFFICIENCY**

NetApp has developed a number of technologies to store, scale, and manage data efficiently, so that you get the maximum utilization from your NetApp storage. Utilization on traditional storage systems averages only 20% to 30%, while NetApp customers are typically able to exceed 65% utilization, storing more data in less space and getting more from their investments. The RAID-DP technology mentioned above saves 46% versus the data mirroring that is common with other solutions.

The NetApp Snapshot capability allows you to perform instant backups with no performance impact. Space-efficient Snapshot copies form the basis of all NetApp data protection technologies. Snapshot copies are point-in-time copies of your data volumes that can be created in less than a second regardless of the size of the volume. Snapshot copies only consume additional space as changes are made, so they are highly space efficient versus competing methods, and a NetApp volume can store up to 255 Snapshot copies with no performance impact.

<sup>5</sup> IDC report “FAS Storage Systems: Laying the Foundation for Application Availability” (February 2008)

NetApp deduplication technology—which works on both primary and secondary storage—regularly examines a disk volume for blocks containing the same data. When duplication is found, the duplicate block is replaced with a pointer to the identical block, and the space is reclaimed.

Deduplication can be particularly useful in virtual environments, which have numerous copies of nearly identical operating system and application code. Space savings achieved with deduplication typically range from 25% to 55% for most data sets, up to 95% for full backups stored on disk, up to 95% for virtual desktop environments, and up to 70% for virtual server environments. (See Figure 6).

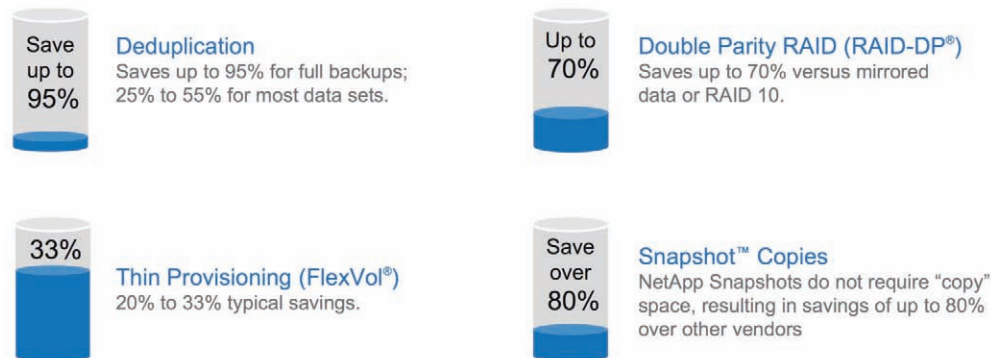


Figure 6) Impact of various NetApp storage efficiency technologies<sup>6</sup>.

Traditionally, when you provision a disk volume you pre-allocate storage—based on your best guess how much storage an application will need—only to have it sit idle for months or years. With NetApp thin provisioning you no longer have to allocate storage up front. Storage is treated as a shared resource, and capacity is consumed only as each application requires it. Space can be freed when it is no longer required. Using thin provisioning to grow and shrink individual volumes as needed typically saves 20% to 30% of storage capacity versus traditional provisioning.

These technologies are built into the NetApp unified storage architecture to make your Windows environment more efficient, so you can easily scale to meet storage needs as Windows files and application data grow. NetApp uses the same unified operating environment on all storage system models. Should you outgrow a storage system, you can be sure that any upgrade or second storage system you purchase will support the same familiar interfaces and tools. For example, Burt’s Bees was able to use NetApp storage to tackle its 100% annual data growth problems and stay true to its “greater good” company model.<sup>7</sup>

## 4 IMPACT TO THE BOTTOM LINE

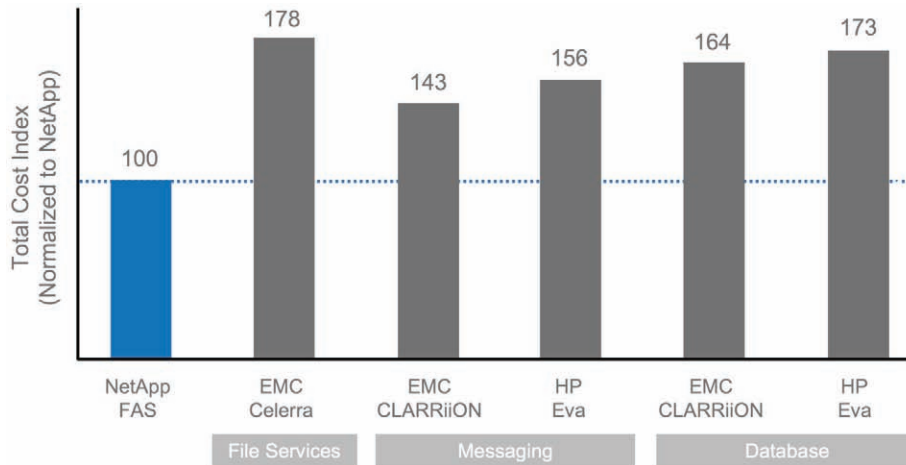
As you’ve seen, NetApp storage for Windows environments lets you consolidate underutilized Windows file servers, Windows application storage, and storage for your virtual desktop and server environments to improve storage efficiency while eliminating the overhead associated with managing traditional silos of Windows DAS, NAS, or SAN.

At this point, the question you’re probably asking is “How much money can this consolidation actually save?” In these economic times, it’s much easier to justify IT investments that pay for themselves quickly and continue to save you money in the long run.

Recent studies of NetApp, EMC, and HP customers compare spending on storage infrastructure for file serving, messaging, and database application storage. These studies show that customers using NetApp spend 30% to 40% less than those using EMC Celerra to meet their file service needs. Similarly, NetApp customers report saving 30% to 40% versus EMC CLARiiON and HP EVA for messaging and database. These studies include both upfront costs and ongoing management, but they do not take into account the potential benefits of deduplication, thin provisioning, or other NetApp storage efficiency technologies. (See Figure 7).

<sup>6</sup> NetApp Whitepaper: The NetApp Storage Efficiency Guide (WP-7022-1208)

<sup>7</sup> <http://media.netapp.com/documents/BurtsBees.pdf>



Source: Oliver Wyman, Total Cost Comparison Interviews, 2007 and 2008

Figure 7) Comparison of NetApp total cost for file services, messaging, and database versus standard Windows file servers and competing storage systems.

A recent study by Forrester Research showed that customers that consolidated just their Windows file storage on NetApp repaid those investments in 19 months or less, with much of the gains coming from reduced administrative costs.<sup>8</sup>

The savings from consolidating all the storage associated with Windows file service, Windows applications, and virtual environments—a capability that no other storage vendor can deliver—are arguably even greater than those described above.

NetApp customer First Health consolidated files and healthcare applications on NetApp to better accommodate 100% annual data growth.<sup>9</sup> The NetApp solution gives First Health fast, reliable data access with tremendous data protection, security, and recoverability. Overall, the IT staff estimates the NetApp solution has reduced total storage costs by at least 30% and paid for itself in less than 12 months.

## 5 CONCLUSION

Consolidating your Windows files, Microsoft Exchange, SQL Server, and SharePoint Server data as well as server and desktop virtualization environments on NetApp unified storage dramatically reduces the cost of purchasing and managing storage in Windows environments. Storage utilization increases, managing and maintaining storage become simpler, and headaches associated with backup and restore are eliminated. Unique NetApp technologies—including our unified storage architecture, reliable RAID-DP, near-instantaneous backups, advanced replication, and policy-based automation—let you consolidate with confidence.

Contact your NetApp representative for help assessing your current Windows operations and to find out how much you can save by consolidating Windows storage with NetApp storage for Windows environments.

<sup>8</sup> <http://www.netapp.com/us/library/analyst-reports/forrester-tei-case-study.html>

<sup>9</sup> <http://media.netapp.com/documents/firthealth.pdf>