



WHITE PAPER

Deploying Microsoft Exchange Server 2007 with NetApp Networked Storage

By Mark Bowker

October, 2008

Table of Contents

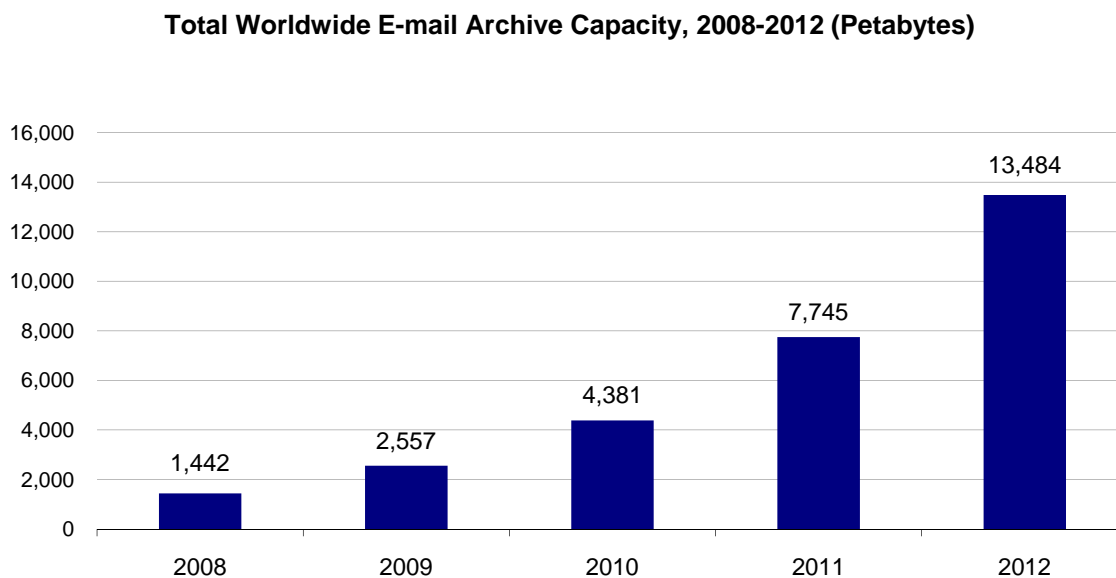
Table of Contents	i
Microsoft Exchange: Storage Demand Explodes	1
Planning Storage Infrastructure for Microsoft Exchange Implementations	2
Limitations of DAS in Exchange Deployments	3
Inefficient Capacity Utilization	4
Scalability Limitations	4
Instability	4
Management Shortcomings	5
Server Virtualization Benefits Exceed DAS limitations	5
NetApp Overcomes DAS Limitations	5
High Availability and Data Protection	7
Scalability	7
Disaster Recovery	8
Manageability	8
Exchange and Server Virtualization	8
Implementation Considerations	10
Conclusion	11

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of the Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at (508) 482-0188. This ESG White Paper was developed with the assistance and funding of NetApp.

Microsoft Exchange: Storage Demand Explodes

Regardless of industry or geographic location, business information is exploding on a massive scale—affecting primary, secondary, and archival storage systems. The sheer quantity of data being amassed is outpacing organizations' ability to keep tabs on it, maintain corporate compliance, meet strict government regulation, and even simply house it in a useful format that can provide invaluable history and knowledge. As a direct result of increased primary e-mail capacity, the e-mail archiving market is on an upward growth curve. Based on the trends apparent in data collected for research, ESG projects the total worldwide e-mail archive capacity will increase from 1,442 petabytes (PB) in 2008 to 13,484 PB in 2012—a 73% compound annual growth rate (CAGR) (see Figure 1).

FIGURE 1. E-MAIL ARCHIVE CAPACITY



Source: Enterprise Strategy Group, 2008

These massive, and growing, volumes of data are also being kept for longer periods of time and customer requirements are becoming more complex—requiring a storage infrastructure that can keep pace. While compliance and record retention mandates are frequently cited as a major capacity driver, other business needs—including the ability to improve e-mail performance, optimize storage resource utilization, and enhance employee productivity—all contribute to the decision to invest in storage capacity, management tools, and replication software to improve the stability, reliability, and availability of e-mail.

E-mail systems clearly stand out as a mission critical application where businesses will continue to make investments. Even with ebbs and flows in the economy and weak capital spending, e-mail will still need to remain online. Not only has it become the primary means of business communication, it is also the superhighway for driving business workflows, collaboration, and even filling sales pipelines with a rich set of leads. Application architects consider e-mail to be the critical link between business processes and backend systems as they design and deploy applications centered on the e-mail system's capability to transport information. It is common to hear, "our business runs on e-mail. Without it, we are dead in the water."

Statements like that confirm e-mail's status as

a mission critical application that is closely associated with the productivity of the business. When e-mail goes down, employees typically start heading for the door—unless the company can quickly recover and regain the committed quality of service without the end-user even being aware that an interruption has occurred.

Among e-mail applications, Microsoft Exchange dominates the marketplace. Microsoft is continuing to build toward a unified communication application platform that aggregates all forms of business communication. Microsoft Exchange 2007 includes the ability to incorporate e-mail, fax, and voicemail into a single system. However, including fax and voice communication into Exchange 2007 exponentially increases its impact on capacity, availability, performance, and manageability. Exchange 2007 adopters are using the migration and upgrade process as the perfect opportunity to refresh hardware, reevaluate process, and holistically look at the entire IT infrastructure to ready themselves for the next generation messaging architecture.

Planning Storage Infrastructure for Microsoft Exchange Implementations

Architecting and planning a Microsoft Exchange 2007 environment is not a simple undertaking. Involvement from all the teams inside the IT organization, as well key line of business owners, is essential for successful implementations. Microsoft Exchange 2007 deployments involve more than just flipping a switch and migrating mailboxes between the old and new information stores. The proper IT infrastructure has to be in place to deliver predictable performance, uncompromised availability, and committed service level agreements. When designing Exchange Server 2007, it is clear that Microsoft understood that to deliver new capabilities with the application, it would need to improve the scalability and performance of the underlying application architecture. It was also of critical importance to have an understanding of how the business can benefit from the new architecture and what IT resources are required to run the new environment.

There is no such thing as a turnkey or one-size-fits-all Microsoft Exchange 2007 deployment. Businesses need to evaluate the entire infrastructure, including the impact to existing investments, archiving strategies, and compliance mandates. Exchange is a complex application that requires unique attention, but still needs to leverage existing IT process and control. Customers are faced with important decisions regarding servers, networking, storage, and Microsoft Exchange's impact on larger data center initiatives. Capacity planning and management are important, but equally if not more important are considerations of availability, data protection, security, automation, and diagnostic tools.

The following sections specifically explore the storage considerations and challenges of a Microsoft Exchange 2007 environment, as well as the holistic impact it will have on the entire IT infrastructure and business processes. Direct attached storage (DAS) and networked storage are both viable options when implementing Microsoft Exchange 2007 and it is important that customers understand the advantages and disadvantages of each solution. Companies like NetApp recognize this challenge and are offering storage solutions that align with customer requirements and consider the impact and advantage networked storage brings across the entire data center.

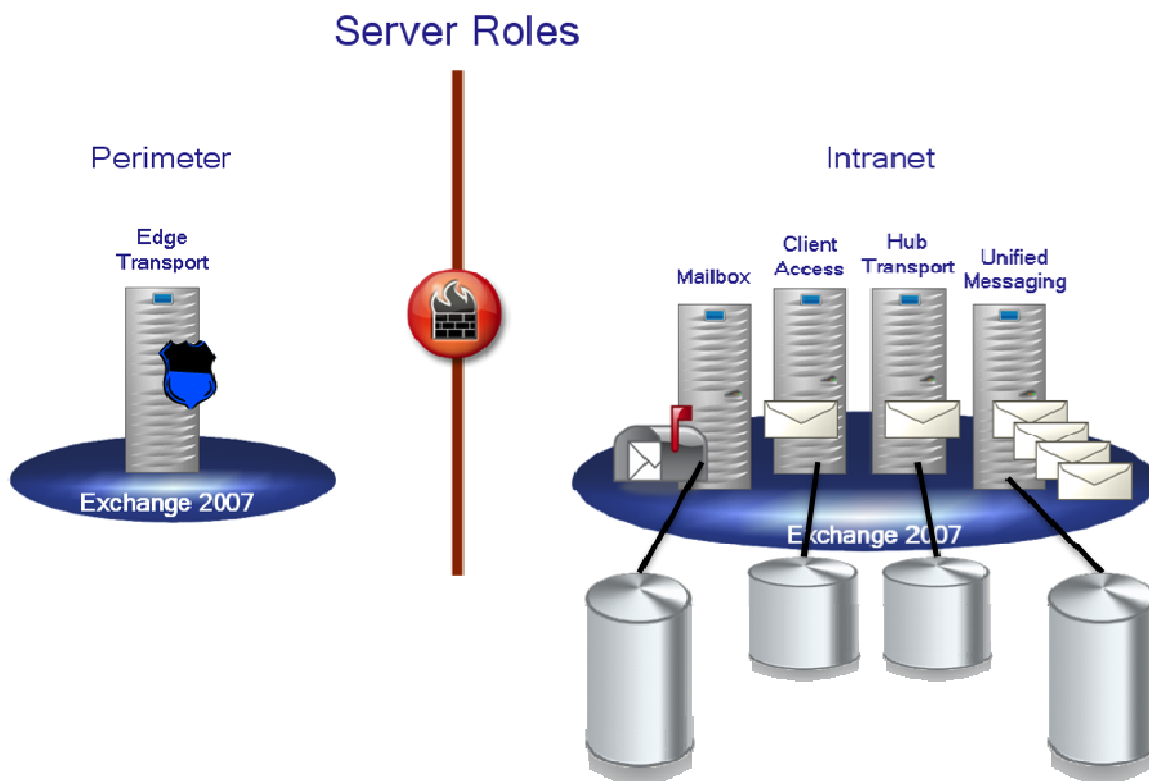
Mailbox Quota Limitations

In an attempt to limit the amount of data stored on primary e-mail servers, companies have implemented mailbox quotas to help limit exceeding capacity limitations and running backup jobs that are exceeding an allotted time window. The creation of quotas, however, creates an entirely new set of problems. When employees reach their quota, they start saving e-mail to local archives and sending business e-mails to personal accounts—actions fraught with risk that often lead to more management headaches, data loss, and compliance nightmares. The root cause of the problem is often traced back to a **storage strategy that couldn't scale** to meet user demand, inadequate archiving strategies, and rigid storage systems that lack the flexibility to keep pace with the business.

Limitations of DAS in Exchange Deployments

When exploring the deployment options with Microsoft Exchange 2007, the first sketch that typically makes its way on the whiteboard is an architecture that shows internal and direct-attached storage (DAS) connected to the different mailbox roles as shown in Figure 2. The diagram shows each mailbox role on a physical server accessing segregated storage capacity. Each role specializes in unique tasks that are organized to control mail flow, protect data, and distribute workloads. Multiple roles can reside on the same physical server, but it is common practice to see organizations break out the different roles on individual servers. For example, the Hub Transport role would run on a separate physical server independent of the Mailbox server, requiring dedicated IT resources including network, server, and storage. The bottom line is that splitting out the roles disaggregates the overall management strategy and requires additional hardware, support, management overhead, and additional costs, thereby increasing complexity and creating significant operational and managerial inefficiencies.

FIGURE 2. MICROSOFT EXCHANGE 2007 SERVER ROLES



Source: Enterprise Strategy Group, 2008

DAS, in terms of pure cost, can be an attractive offering, but it has limitations that are not easily overcome and often require the use of additional IT resources. DAS solutions go against the grain of achieving a true dynamic data center with the ability to apply business policies in an automated and self-healing fashion to the entire IT infrastructure. The shortcomings of DAS can leave IT tripping over its own feet trying to keep pace and flex with the rapid change businesses are experiencing.

- **Capacity** is purchased to be consumed—not to lay dormant, making poor use of IT resources and investments, consuming power, and adding yet another unnecessary variable to the risk equation. IT wants to maintain peak capacity utilization metrics with the ability to easily expand capacity on an as-needed basis without effecting application performance.

- **Scalability** is what enables IT to easily grow beyond current deployments without having to make major infrastructure changes, dip too deeply into already-constrained budgets, or perform forklift upgrades. Scalability is what enables IT to keep pace with the business and deliver a valuable service.
- **Reliability and stability** ensure that IT is delivering upon its commitments and is spending more time on new projects and being applications-focused rather than spending resources supporting IT infrastructure and users.
- **Management** plays an important role in any IT environment and the processes are exponentially simplified when managing a single unit as opposed to multiple server/DAS islands dispersed throughout a data center.
- **Server virtualization** adopters are widely utilizing networked storage to support business continuance, high availability, and disaster recovery initiatives by taking advantage of the mobility of virtual machines from one physical server to another and recognizing that the storage associated with these servers needs the same level of fluidity.

Inefficient Capacity Utilization

A capacity planning exercise attempts to “right-size” storage capacity requirements to business needs. At first glance, it is relatively simple to look at existing capacity consumption, but this method does not always take the bigger picture into consideration. For example, a company may have implemented quotas that limit mailbox size and, if not carefully accounted for, capacity recommendations will fall short of requirements. Capacity planning exercises also greatly rely on the direction of the business and all new applications and workflow engines have to be considered. Since there are so many variables, capacity is often over-purchased and the entire Exchange system will run at inefficient capacity utilization rates.

Furthermore, Exchange 2007 upgrades are often part of larger data center initiatives that include technologies aimed at reducing space, power, and cooling requirements. Some may argue that disk capacity is inexpensive, but in the case of DAS deployed with Exchange 2007, the dormant capacity still has to be powered on and cooled—leading to a chain of inefficiency and additional costs in the data center. Maintaining peak capacity utilization and efficient use of available capacity requires a storage strategy that includes an intelligent reporting and monitoring capability to closely monitor and make necessary changes transparent to the application. This includes being able to expand and shrink volumes while the application remains online, reducing the amount of duplicate data stored, and utilizing technologies like thin provisioning to virtually allocate capacity without dipping into the physical capacity pool. The combination of all these technologies will allow for efficient capacity utilization that ultimately turns into dollars saved. The savings may at first seem minimal, but quickly compound as they are applied across the entire data center and then multiplied over 3 or 5 year time periods or even longer.

Scalability Limitations

The capacity planning process always brings up scalability questions and “what-if” scenarios. What if voicemail is not routed to the Microsoft Exchange 2007 system initially and 18 months down the road, the company decides to take a strategic turn and move voicemail and fax to the new environment? Can the existing storage architecture meet the unified messaging demands? As more and more systems rely on e-mail as a critical transport and collaboration tool, the only certainty is change. It’s critical that the underlying storage system has the ability to adapt and keep pace with these changes.

Instability

RAID protection levels are relatively straightforward and Microsoft offers recommendations as to where to place data and what RAID level can provide the best protection and performance. However, since disks *will* eventually fail, further consideration has to be sought to consider the impact a RAID rebuild will have on the entire system—and what impact this will have on application response time. Poor performance will impact productivity and places the business at risk. There are business systems that can absorb some disruption in service or

performance degradation, but Exchange does not fit into this category. Uptime, performance, and availability are critical to the entire business.

Availability discussions also have to address single points of failure and, in a DAS environment, design discussions must consider SCSI hardware failure as a reality. DAS environments often have a single point of failure that will impact the entire environment and while there are methods that address this issue, they also introduce additional cost and complexity.

Cluster Continuous Replication (CCR) was added to Exchange Server 2007 in an effort to help solve availability concerns, particularly when running Exchange on DAS. CCR maintains a second copy of data with little performance impact and can be used if the primary application server becomes unavailable or if the underlying disk subsystem fails. The second copy enables a consistent 'failover' to occur with minimal downtime and data loss. However, this new data protection feature increases the responsibilities of Exchange and system administrators and requires redundant IT infrastructure. Multiple server purchases, additional storage capacity, and consumption of networking resources all lead to additional points of failure, increased capital costs, and elevated management overhead.

Management Shortcomings

As IT strives to do more with less, it's imperative that overall management of the infrastructure is included in the bigger picture. Managing multiple islands of storage can be challenging if a company chooses DAS for Microsoft Exchange 2007, file sharing, databases, web servers, etc. as each environment will have to be managed separately. Any cohesion among application environments will be lost. Running backup jobs across the entire environment also leads to a slew of problems that require individual backup strategies, retention of excessive duplicate data, and extremely lengthy and error-prone restoration processes. When compared to current networked storage implementations, the DAS legacy topology simply demands more dedicated IT resources to manage the same capacity.

Server Virtualization Benefits Exceed DAS limitations

DAS and server virtualization are like oil and water. There is a consistent trend, as discussed in a later section of this paper, to implement Microsoft Exchange 2007 in virtualized environments as the built-in mobility, high availability, efficient resource utilization, and disaster recover assistance—all managed as a single pool of resources inherent in a virtualized environment—are quite attractive. However, to take advantage of the aforementioned benefits, the virtualized implementation has to be deployed with networked storage. In a recent ESG survey of current and planned virtualization adopters, 86% of current users deployed networked storage to support their virtualization initiatives. Server virtualization can be implemented with DAS to achieve initial consolidation and utilization efforts, but networked storage is required for mobility, high availability, and DR across the entire virtualized infrastructure.

Server virtualization solutions offer functionality that fundamentally relies on underlying networked storage. For example, storing virtual machine images on networked storage enables the mobility of virtual machines between physical servers for load balancing, high availability, and maximum utilization of resources. With networked storage, multiple copies of virtual machines can also be created, stored, and accessed for replication and disaster recovery purposes, and can be used to more efficiently perform bare-metal restores. As such, a networked storage infrastructure is a key building block in deploying server virtualization solutions.

NetApp Overcomes DAS Limitations

Microsoft Exchange 2007 has many deployment options and it's important that customers consider the entire IT infrastructure before hastily choosing the path of least resistance—as they will most likely end up regretting the decision down the road. Changing the underlying infrastructure is a cumbersome task that requires planned downtime, impacts productivity, and always comes with associated costs—expected and unexpected. Networked

storage options deserve special attention and consideration when designing, testing, deploying, and managing a Microsoft Exchange 2007 environment.

NetApp's networked storage solutions address the shortcomings of DAS and enable IT organizations to recognize a leap in efficiency, productivity, and manageability—ultimately achieving greater ROI and lower TCO. As shown in Figure 3, there are many ways NetApp networked storage can be beneficial to the entire business, inclusive of the Microsoft Exchange 2007 environment. At a high level, efficient IT organizations will leverage networked storage throughout the entire data center to achieve increased capacity utilization, improved performance, high availability, reduced floor space, and global protection of critical data. The list goes on to include a more efficient IT staff that can manage and maintain storage dependencies across the entire data center.

Exchange 64-bit Architecture

Exchange Server 2007 is built upon a 64-bit architecture to deliver superior performance over the 32-bit operating environment. A larger supported memory size within Exchange Server 2007 enables the application to build a much larger database cache than previous versions. This improves read performance and helps **reduce I/Os** to the disk subsystem that stores all the message and calendaring files. Read requests are cached and transferred straight from memory instead of directly from the disk. This equates to nanosecond response times from memory rather than millisecond response times from disk. The smaller cache sizes in previous versions of Exchange required many reads to go to disk, causing the storage system to be the limiting factor of system designs for Exchange

FIGURE 3. NETWORKED STORAGE ADVANTAGES WITH MICROSOFT EXCHANGE

	Networked Storage	Direct Attached Storage
Capacity Utilization	Thin provisioning, data deduplication and RAID-DP	Poor allocation, low utilization and over purchased capacity
Scalability	Provision from a central pool of capacity, grow based on demand without affecting applications	Requires planned downtime and capacity limitations
Management	Centralized, common tool set and single pane of glass	Many management points and more committed IT resources
High Availability	Multipathing, redundant controllers and built in data protection	Single points of failure and third party replication tools required for DR
Disaster Recovery	Instant snapshots, save on WAN bandwidth by only sending unique data	Difficult to replicate data dispersed across data center
Backup and Recovery	Instant copies of data, easily clone data for test/dev and save multiple space efficient copies	Lengthy backup and recovery times
Server Virtualization	Built in mobility, high availability and maximum resource utilization	Requires application downtime

Source: Enterprise Strategy Group, 2008

High Availability and Data Protection

“Microsoft Exchange” and “high availability” are synonymous from a business perspective. Microsoft Exchange 2007 CCR minimizes the adverse effects of failovers, but the goal should be to avoid failing over in the first place. When using Microsoft Exchange CCR and a disk failure occurs, the business is vulnerable to an entire site failure until both systems are brought back online. Once a server has failed over, it takes significant effort to get it back up and running again. NetApp storage systems are fully redundant, supporting multipathing with redundant controllers that feature redundant power supplies, fans, network ports, and disk access paths. NetApp RAID-DP, NetApp’s double parity RAID implementation, provides better resiliency than RAID 10 using almost half fewer disk spindles. The resulting robust NetApp storage systems makes Single Copy Cluster (SCC) configurations of Exchange highly-available; even more so when integrated with continuous replication.

NetApp RAID-DP helps protect against information loss if two drives fail in the same RAID group. Customers have a choice when considering RAID protection levels. Mirroring, or RAID 1, offers a high level of availability, but is expensive because customers need to buy more capacity; essentially double the quantity of data to be stored. Another benefit of using NetApp RAID-DP is the flexibility it offers customers when they are choosing what types of disk drives to utilize. SATA disk drives are less expensive than Fibre Channel, but SATA is less reliable. In order to avoid the cost of Fibre Channel drives for e-mail, customers often opt to buy SATA solutions that utilize costly RAID 1 (mirrored configurations) to improve availability. By using RAID-DP, customers can enjoy 2x cost savings by deploying SATA drives with a more efficient level of RAID protection, consuming less capacity than RAID 1 while simultaneously experiencing greater reliability than other non-RAID 1 levels can offer.

Backing up an Exchange database to tape is no longer going to make the cut and meet the stringent SLAs that many companies have adopted. Companies that continue to use DAS and tape risk lengthy restore times, corruption of data, and poor use of IT staff. Networked storage solutions from NetApp ultimately eliminate the need for tape backups altogether through the use of efficient snapshot, cloning, and replication technologies. Tape can still be used for compliance purposes, but it does not have to be used as the primary restoration vehicle. The added benefit is that these technologies can be applied across all the data stored on the network storage system and IT can manage and control all the information from a common set of tools and management solutions aimed at empowering the entire IT staff, including application and database administrators.

Scalability

The limited scalability of a legacy DAS topology can be overcome by deploying networked storage solutions. When specifically looking at Exchange environments, IT views them as dynamic and changing on an hourly basis. Scalability and flexibility are complementary features that allow IT organizations to quickly respond to change. DAS solutions have rigid limits that, when reached, require abrupt disruption and committed IT resources. For example, if additional capacity is required and CCR has been implemented, the additional capacity has to be added in both locations. Avoiding these limits from being reached is one of the reasons DAS solutions are often over-purchased, as noted previously. The DAS capacity also cannot be utilized by multiple applications. For example, a SQL database with DAS could have 500 GB of capacity available, but the Exchange server is not able to leverage the available capacity in a DAS environment.

NetApp networked storage solutions break down these walls and enable companies to scale capacity on demand, efficiently store data on thin provisioned volumes, share capacity amongst the entire IT infrastructure, and transparently move data between different tiers of storage to further optimize and match application and storage system performance. For example, IT can set up shares for user .PST files and also leverage a lower, more cost effective tier of storage for e-mail archiving and still maintain a simple to manage centralized pool of storage capacity. The business can then pair application requirements with data storage requirements and have the option to adjust to changes when they occur. Now, when an Exchange server requires additional capacity, it can quickly draw from a pool of centralized capacity without purchasing additional drives and planning for application downtime.

Disaster Recovery

Disaster recovery (DR) considerations are crucial when deploying Microsoft Exchange 2007. Not only is it important to have a plan in the event of a local outage, but careful consideration should also be given to the chance of an entire site failure. In the event of a disaster, the first system that needs to be brought online is communications. E-mail is the ideal method of communication, but users need access and the environment has to be able to withstand a major service interruption. In a DAS environment, this is difficult for the administrator to achieve as it requires redundant hardware and specialized technical skills.

Microsoft recommends Standby Continuous Replication (SCR) as a DR solution for Microsoft Exchange. Even though this technology allows DAS to be used in a DR solution, it has some shortcomings. For example, **failing over to the DR site is a manual process** and SCR does not include a mechanism to fail back to the primary site. Getting the primary site back online is a labor- and network-intensive process and may require complete reseeding of the primary Exchange database. SCR also does not utilize compression, which results in additional network bandwidth consumption.

NetApp's goal is to simplify the DR process while reducing the administrative costs associated with DR for Microsoft Exchange. Customers are able to gain more efficient file recovery and granular mailbox recovery. Most importantly, they are able to meet and improve upon SLAs. Microsoft Exchange environments are in the business spotlight and anything that can be done to improve availability and enhance data protection will yield a favorable ROI and a productive workforce.

Manageability

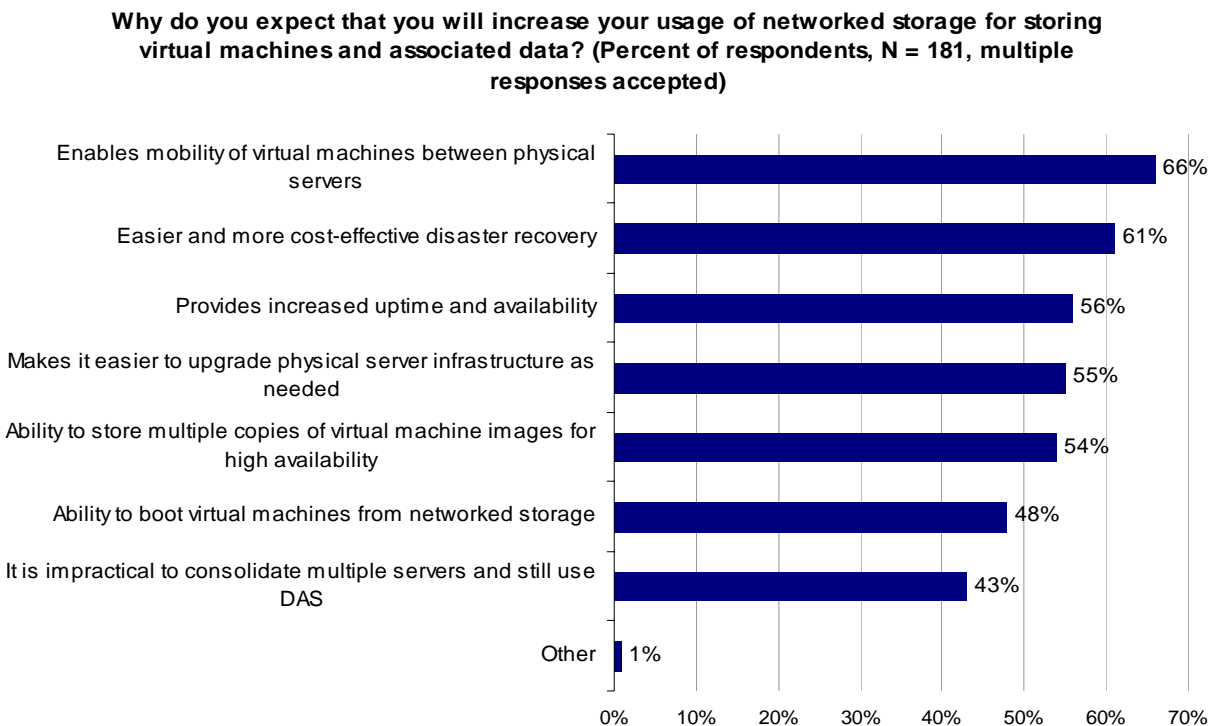
The management of the entire IT infrastructure is an important consideration as data centers look to automate processes and simplify mundane daily tasks. The rule of "less is best" applies when it comes to management capabilities within IT. It is difficult and nearly impossible in many cases to manage across disaggregated IT resources such as DAS, which forces IT to constantly struggle to adapt to change. NetApp understands this challenge and, with features like SnapManager for Exchange, is able to hand off storage system tasks to the Exchange administrators who ultimately know better than anyone else the types of protection, performance, and DR solution required for their specific needs.

Once a management strategy is defined, it's important that it be applied across all mission critical, business critical, and core IT services infrastructure. Segregating workloads and specific applications introduce proprietary skill sets, additional infrastructure, increased costs, and potential risk to the business. Data centers are currently going through massive consolidation and optimization efforts to simplify management and build an infrastructure that embraces automation.

Exchange and Server Virtualization

Customers are increasing their usage of networked storage for storing virtual machines and associated data. As shown in Figure 4, 66% of current server virtualization adopters surveyed are primarily utilizing networked storage in virtualized environments for the mobility of virtual machines between physical servers, but nearly as important (61%) is that it enables more cost-effective DR.

FIGURE 4. REASONS FOR INCREASING USE OF NETWORKED STORAGE FOR VIRTUAL MACHINES



Source: Enterprise Strategy Group, 2008

Ultimately, deploying server virtualization and migrating physical servers to virtual machines creates the perfect opportunity for users to consolidate storage, centralize management, increase capacity utilization, improve availability, enhance data protection, and reduce backup windows. As customers gain more operational experience with virtual servers supported by different types of storage options, they will quickly come to understand that networked storage will enable all of these potential benefits to be fully realized and why it is impractical and risky to support multiple virtual machines with DAS.

As an example of NetApp's commitment to virtualization, the company has teamed up with VMware and its Site Recovery Manager product. This feature helps IT administrators automate the failover and recovery processes in a virtualized environment. The NetApp mirroring and replication processes are managed inside VMware's vCenter alongside policies that control and maintain the entire virtualized infrastructure. This integration is an example of how NetApp and VMware are working together to simplify the DR process and enable companies to look at DR from an application perspective—as opposed to trying to manage and control individual pieces of infrastructure. NetApp shares the vision of enabling the application owner to determine availability, DR, and performance requirements and then, through an automated set of policies, drive the supporting infrastructure.

NetApp is also working with leading technology vendors to offer DR solutions on other virtualization infrastructures. The goal is to allow the customer to choose the appropriate virtualization solution—such as Microsoft Hyper-V, Citrix XenServer, etc.—and NetApp will help them enable DR in their chosen virtualized environment. Since virtual machines are really just files, they are highly mobile and NetApp can provide local protection and ship them to a remote site for DR purposes.

Virtualization is a major enabler of data center automation, but virtualization alone cannot deliver on its promises without a comprehensive underlying networked storage infrastructure. Now that Microsoft has developed support policies¹ for running Exchange in virtual environments, placing Microsoft Exchange 2007 into such an infrastructure enables the business to continue applying policies, trusting the infrastructure to react predictably to

¹ <http://technet.microsoft.com/en-us/library/cc794548.aspx>

change. NetApp, along with a number of virtualization providers, is working closely to simplify the storage provisioning and management process so that business policies can be applied. NetApp is well-equipped to simplify this process with or without virtualization vendors, but the virtualization layer is a point of service that NetApp will continue to leverage and use as an integration point to enforce policy and react to business change.

Implementation Considerations

When considering Microsoft Exchange 2007 implementations and wading through the mud of DAS versus networked storage, it is imperative to keep the greater business requirements in mind. Look beyond the Exchange environment and consider the impact it will have on every application in the data center. Tactically solving IT problems is relatively easy. Strategically considering and implementing infrastructure that addresses business needs is a challenging task that requires careful attention be paid to the entire lineup of business applications, databases, web servers, and the Exchange environment responsible for processing the various workflows and collaboration tools that enable all the applications to interact with one another.

Best practices from all vendors are important to consider as a guideline, but recognize that each environment is unique. Microsoft Exchange 2007 will work with either DAS or networked storage, but what happens when disks fail, network access is broken, bandwidth is consumed, a disaster strikes, or security is breached? Looking out on the horizon—across all the platforms and workloads—will help lend a hand in the decision-making process. DAS certainly has its attractions, but once all the IT resources, operational costs, and additional complexity are factored in, it becomes readily apparent that networked storage has many advantages, including:

- **Centralized management and control.** Managing the entire networked storage infrastructure from a centralized management console greatly simplifies provisioning, security, and troubleshooting. NetApp is also focusing its efforts on the interaction between applications and storage administrators to simplify all administrative tasks.
- **Increased utilization.** The combination of data deduplication and thin provisioning significantly reduce the storage capacity requirements and increase capacity utilization rates across the entire infrastructure, including the Exchange environment. NetApp networked storage systems will scale on demand to match business growth, data explosion, and archiving requirements.
- **Improved disaster recovery.** NetApp snapshots, cloning, and mirroring solutions all play a strategic part in protecting applications and maintaining business productivity. NetApp networked storage solutions help protect the entire IT infrastructure in the event of an entire site failure.
- **Successful virtualization implementations.** Server virtualization relies on networked storage for mobility, high availability, and maximum resource utilization. Deploying Exchange in a virtualized environment further improves SLAs, recovery times, and application availability.

Major data center initiatives, such as upgrading to Microsoft Exchange Server 2007, present the perfect opportunity to consider new technologies. Add virtualization into the mix and a perfect storm is brewing: the data center refresh. As a result, there has been an increasing demand for technologies, such as the iSCSI protocol, as a viable option in physical and virtualized Exchange environments. The perceived complexity of Fibre Channel can be quickly addressed with NetApp iSCSI solutions that leverage existing skill sets and networking investments and offer the same value added features as delivered in a fibre channel solution.

Customers and vendors are also anticipating FCoE becoming a fully ratified standard. With that in mind, NetApp has certified an end-to-end FCoE environment leveraging NetApp storage systems. Though FCoE is pending standards body approval, NetApp is already helping to validate the technology and build customer confidence. Data centers currently looking to deploy FCoE in test and development environments can turn to NetApp and leverage its expertise to deploy FCoE solutions with the assurance that they have NetApp expertise and proven qualification as a foundation to their deployments.

Conclusion

Deploying Microsoft Exchange 2007 is not an easy undertaking. It involves careful consideration and planning at all levels of the business. E-mail, specifically Microsoft Exchange, is a mission critical application that deserves the utmost attention and respect. End-users, business applications, and customers all use e-mail as a primary means of communication and collaboration. The infrastructure decisions made to support the environment must consider the impact on the entire business and also consider other major data center initiatives, such as virtualization.

NetApp has built solutions and incorporated features into those solutions that meet the demands of Exchange while still considering the rest of the application deployments. Deploying Exchange on DAS is feasible, but there are roadblocks and pitfalls. Networked storage solutions from NetApp help avoid these and allow IT to focus on working with business owners to create policies that can be applied to the infrastructure. Business owners will also welcome improved SLAs and confidence will shine through as IT runs down its checklist on how Exchange and NetApp deliver secure, highly available, and scalable disaster-proof solutions that will help the business continue to soar to new heights.



20 Asylum Street

Milford, MA 01757

Tel: 508-482-0188

Fax: 508-482-0218

www.enterprisestrategygroup.com