NETWORKWORLD® 2007

Buyers' Insights

STORAGE

Buyers' Insights into Purchase Trends and Challenges

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Conducted for: Network World Inc.
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EXECUTIVE SUMMARY

The purpose of this research is twofold. First, we investigate how organizations are managing storage – areas to which they are devoting the most attention, the challenges they are facing and the storage technologies they are deploying. Second, this research explores how storage products are purchased – those considered and factors that influence vendor selection, as well as how storage vendors could improve the purchasing process. An online survey was sent to members of Network World's research panel, and results are based on 266 respondents involved with the purchase of storage for their organization.

Top Issues Related to Storage

- Study respondents are most worried about the following storage issues: 1) the growing amount of data that needs to be stored; 2) handling the expanding amount of files and unstructured data on the network; and 3) safeguarding corporate data from outside hackers.
- Organizations' storage priorities center on data protection and backup. Specifically, in the next 12 months, they will be looking to 1) improve back-up times; 2) build or improve existing business continuity plans; and 3) shorten time to recover lost data.

Storage Technologies

Storage is growing in importance, and IT departments must increasingly look to new technologies to help them meet their evolving data storage and management requirements. This research investigated the deployment of seven storage technologies. Respondents who have deployed a technology were asked if it met their expectations on the benefits it was supposed to deliver. Those who have not deployed a technology were asked what factors were inhibiting the use of it at their organization. The findings are summarized below:

TECHNOLOGY	STATUS OF DEPLOYMENT	TOP BENEFITS DELIVERED	INHIBITORS TO DEPLOYMENT
NAS	• 59% already or within 12 months • 22% considering	• Ease of management	• No need
SAN	• 58% already or within 12 months • 23% considering	• Better utilization of storage resources • Reliability • Ease of management	• Lack of financial resources
iSCSI	• 29% already or within 12 months • 31% considering	• Ease of installation • Performance • Use of LAN to carry block and file data • No specialized experience required	• No need • Lack of financial resources
Storage virtualization	• 25% already or within 12 months • 39% considering	• Better utilization of storage resources • Easier replication of data • Reduction in number of storage appliances	• Lack of financial resources
VTL	• 23% already or within 12 months • 25% considering	• Availability • Faster back-up times	• No need
Data de-duplication	• 20% already or within 12 months • 26% considering	• Reduction in amount of data that needs to be stored	• No need
FAN	• 8% already or within 12 months • 22% considering	(Not enough deployment to measure)	• No need

Key technology take-aways:

NAS	While at least 8 out of 10 of the larger companies surveyed have deployed or are considering NAS, smaller organizations are taking a more cautious approach on implementation. However, almost one-third of smaller companies are considering deployment.
SAN	While many larger companies have already deployed SANs, almost one-third of SMBs are considering the technology. The latter are most likely very price sensitive because they cite lack of financial resources as the top inhibitor to deployment.
iSCSI	iSCSI does not require specialized storage resources and is relatively inexpensive, but lack of financial resources is one of the top barriers to deployment. Potential buyers need to be better educated on the technology's benefits. Larger companies are leading deployment, but the technology's benefits should appeal to organizations of all sizes.
VTL	This technology is not really on the SMB radar screen. Many organizations are looking to improve back-up times, which is a benefit of this technology, but lack of a perceived need is the barrier to deployment. Thus, potential buyers need to be better informed about VTL's ability to address storage issues.
Storage virtualization	Across all technologies investigated, virtualization has the highest percentage considering implementation, however cost issues are holding back a portion from deploying.
Data de-duplication	Given that nearly 8 out of 10 respondents are worried about the growing amount of data requiring storage, deployment and interest in this technology should be greater. The top reason for not deploying it is lack of a perceived need, so many truly do not understand the technology and its ability to reduce the amount of data that needs to be stored.
FAN	This is an emerging technology, and it has the lowest deployment and greatest percentage who have never heard of it across all technologies investigated. FANs have the potential to play an important role in organizations because so many are worried about dealing with the growing amount of unstructured data on the network.

Storage Purchase Process

Products planned to purchase:

- Almost all organizations surveyed (97%) will purchase a storage-related product in the next 12 months. Disk/storage/RAID arrays are most likely to be purchased. More than one-third (39%) will increase spending on storage-related endeavors, and another 38% will spend the same amount.

Selecting a storage vendor:

- As managing storage becomes more complex, it is likely that new criteria will emerge for choosing a vendor. This research investigated the importance of three factors in the storage vendor-selection process: 1) security solutions, 2) integrated storage management solutions, and 3) management across heterogeneous storage environments. Eight out of 10 respondents said storage security solutions are important when they select a storage vendor. Vendors should take note that buyers want solutions to secure and protect data as well as store it. In addition, just over 8 out of 10 respondents (81%) indicated that storage management solutions are important, indicating organizations view storage vendors as more than just commodity providers of terabytes - they want vendors that can help them manage complex storage. Finally, the ability to manage heterogeneous storage environments is important to 78% of respondents when selecting a vendor.

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PURPOSE AND METHODOLOGY

Purpose

The objective of this research is to investigate the key issues surrounding storage management, the implementation of different storage technologies and the purchase of storage products. Specifically, the following insights are provided:

Storage management

- Level of concern with different storage-related issues.
- Storage-related activities that organizations will be focusing on in next 12 months.

Storage technologies

- Status of storage technologies
  - Network Attached Storage
  - Storage Area Networks
  - iSCSI
  - Virtualization
  - Virtual Tape Libraries
  - Data De-duplication
  - File Area Networks
- Benefits organizations have realized as a result of implementing storage technologies.
- Reasons for not deploying technologies.

Storage product purchase

- Specific products planned for purchase.
- Importance of different factors when making a storage purchase.
- How the purchase process could be improved.

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Methodology

An e-mail blast was sent to members of Network World's research panel in March 2007 asking for their participation in a survey related to storage. There were 266 qualified respondents involved in the purchase of storage. All results of this survey are based on 266 respondents unless otherwise indicated. Some percentages may not add up to exactly 100% due to rounding.

The specific ways in which respondents are involved with purchasing storage-related products are outlined below:

RESPONDENTS' ROLE IN PURCHASING STORAGE PRODUCTS	% RESPONDING
Determine the technology solution	87%
Research vendors and storage technology solutions	84%
Determine the business need	81%
Create short list of vendors	75%
Select final vendor	64%
Oversee storage purchase process	61%
Manage/responsible for storage budget	45%
Approve budget	22%

Multiple Responses Permitted

The majority of respondents have a network/IT job function (73%). Ten percent are Independent Consultants, and 9% are Corporate Management (the remaining 8% are classified as "Other"). Respondents represent a diversity of industries; those mentioned by at least 3% include Manufacturing – not computer related (11%); Travel/Entertainment (8%); Web Hosting/ISP (8%); ASP/SSP/MSP (8%); Business Services (6%); Process Industries (6%); Utilities (6%); Aerospace (5%); Insurance/Real Estate/Legal (5%); Retail/Wholesale Trade (5%); Health Care Services (4%); Transportation (4%); Carriers/Voice/Data/ISP (4%); Government (4%); Financial Services (3%) and Education (3%).

Respondents work in SMBs and large organizations. Results are reported across these categories when differences existed.

	DEFINITION	% RESPONDING
Large companies	1,000+ employees	46%
Medium-sized companies	100 to 999 employees	35%
Small companies	Less than 100 employees	19%

MANAGING STORAGE

Storage Concerns

Large-scale catastrophes, federal regulations governing data retention, and press surrounding stolen or lost data have made managing storage more challenging than ever. Which issues are keeping IT professionals up at night? Respondents rated their level of concern relating to 5 storage issues (1 = Not at all concerned to 5 = Very concerned). As seen in Figure 1, nearly 8 out of 10 respondents are concerned with the growing amount of data that needs to be stored and managed. Other top concerns are dealing with the expanding amount of files (74%) and safeguarding corporate data from outside hackers (72%). It should also be noted that approximately two-thirds (65%) are worried about safeguarding data from unauthorized internal access. A greater percentage of respondents from larger companies are concerned with all of these issues compared to respondents from smaller companies (see Figure 1a).

Figure 1: Storage Concerns
(% "Very concerned" or "Concerned")

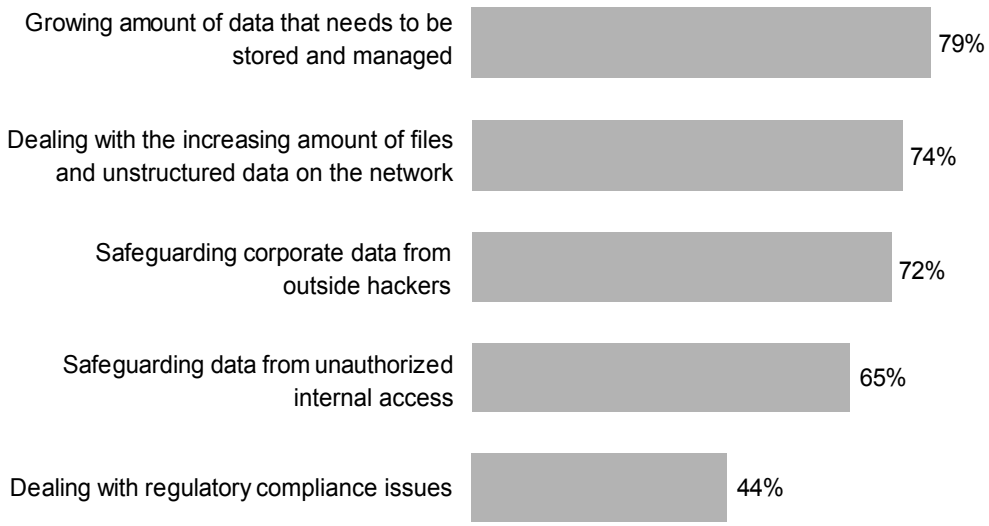

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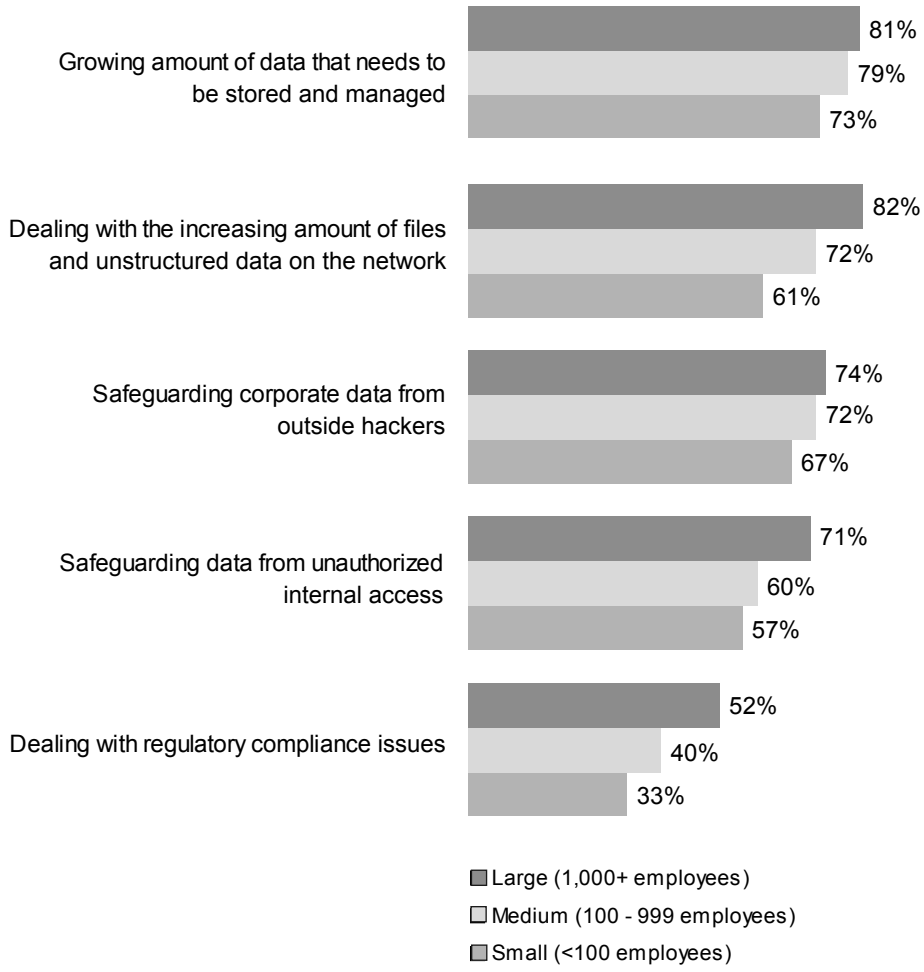
Figure 1a: **Storage Concerns by Company Size**
(% "Very concerned" or "Concerned")



Storage Priorities

Respondents were asked which storage activities their organization will be involved with in the next 12 months (see Figure 2). The two mentioned most are improving data back-up times (mentioned by 74% of respondents), and building or improving business continuity/data protection plans (69%). More than half of respondents indicated they want to shorten time to recover lost data (62%), and 53% will be looking to reduce overall storage administration complexity.

In a few cases, the priorities varied by company size (see Figure 2a). Specifically, improving back-up times and shortening data recovery are of greater importance to large and medium-sized companies than they are to small organizations. A greater percentage of medium-sized organizations want to build or improve data protection plans than their small and large counterparts. Finally, there is more interest in storage consolidation among SMBs than larger companies.

Figure 2: **Involvement with Storage-Related Activities in Next 12 Months**

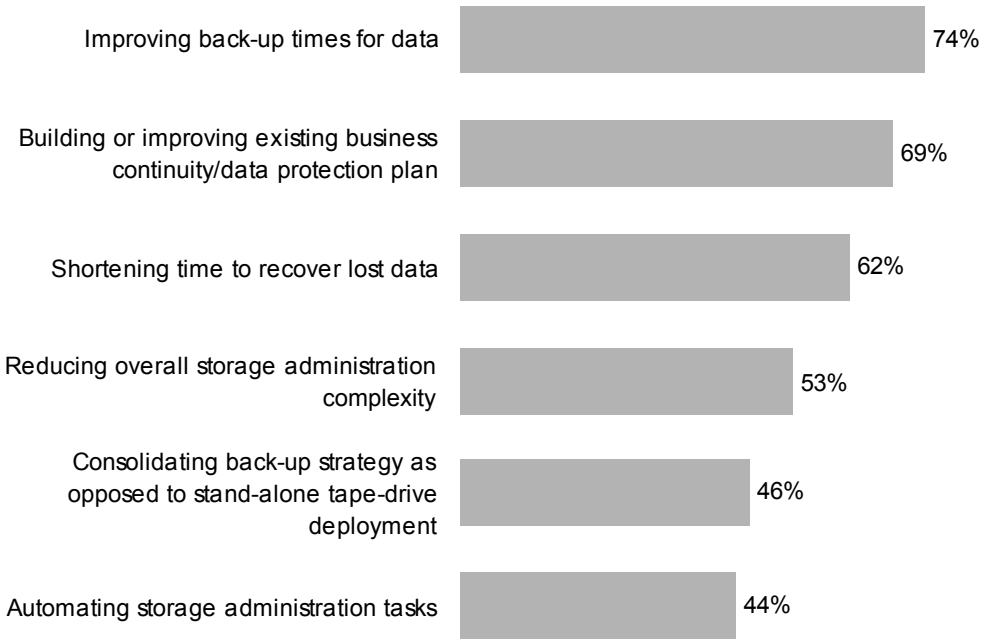


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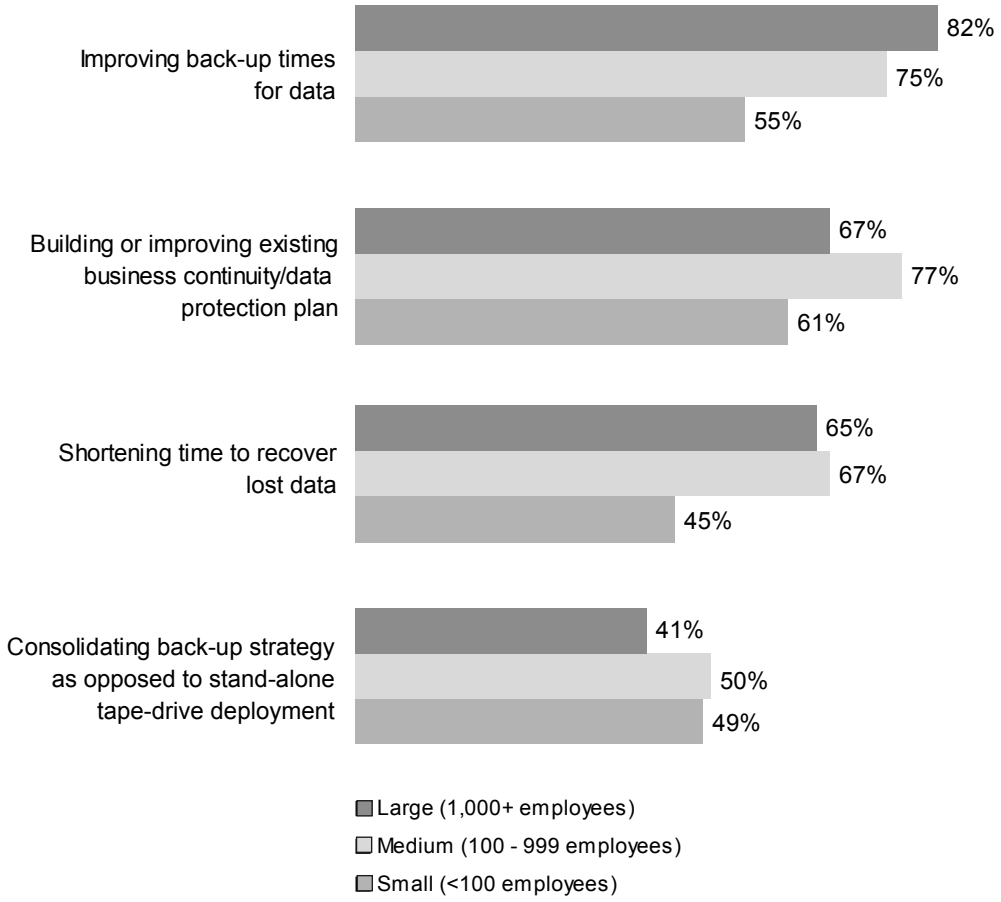
Figure 2a: **Involvement with Storage-Related Activities by Company Size**



STORAGE TECHNOLOGIES

Network Attached Storage

Network Attached Storage (NAS) is data storage technology that can be connected directly to a network to provide centralized data access and storage to heterogeneous network clients. NAS systems usually contain one or more hard disks, arranged into redundant storage containers or RAIDs (Redundant Arrays of Independent Disks). As seen in Figure 3 below, 48% of respondents indicated NAS has been deployed at their organization, and another 11% will implement within 12 months. NAS is not on the radar screen of few organizations (19%). NAS deployment does vary by company size (see Figure 3a). While 55% of large companies have implemented NAS, only 31% of small companies are using the technology.

Figure 3: **Network Attached Storage Status**

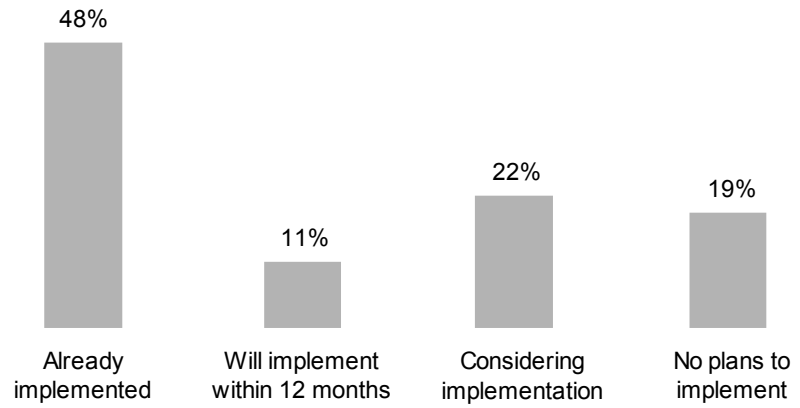
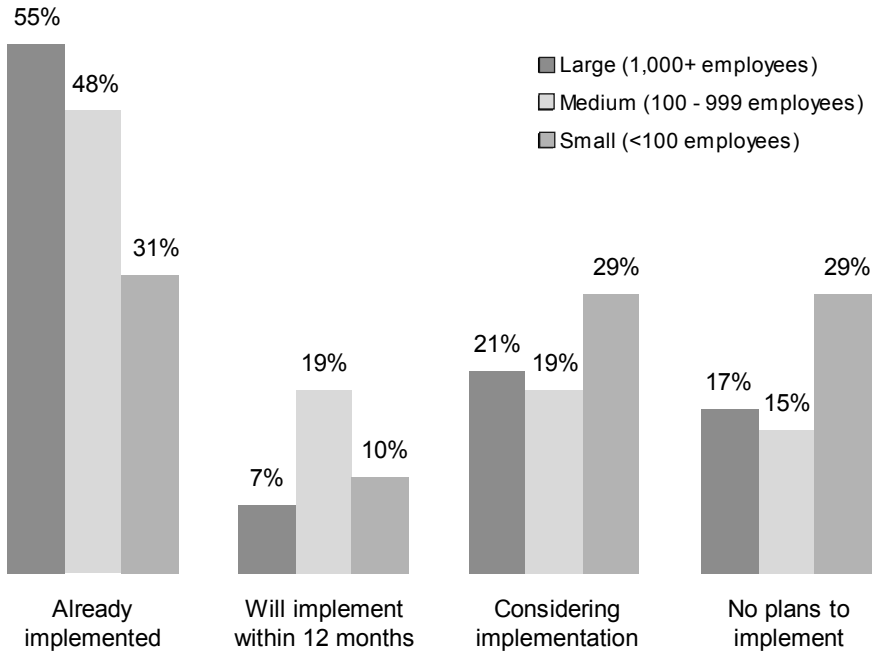


Figure 3a: **Network Attached Storage Status by Company Size**



NAS delivers several advantages, and respondents who have already deployed the storage technology were asked to what extent it delivered on four specific benefits (see Table 1).

Vendors have touted NAS as one of the easiest ways to add storage to a network. Results here indicate this is true as 9 out of 10 respondents said NAS either exceeded (19%) or met (72%) their ease-of-management expectations.

Vendors claim that NAS can increase performance because file serving is handled by the technology and not by a server also responsible for other processing. The technology met or exceeded expectations for reliability for 85% of the respondents. They also say NAS effectively moves storage out from behind the server and puts it directly on the transport network - the end result being better utilization of storage resources. In this study, 83% of respondents indicated NAS either exceeded (14%) or met (69%) expectations in this area. In addition, NAS delivered faster backup to 77% of respondents who deployed it.

***Table 1:* Ability of NAS to Deliver Benefits**

	NET EXCEEDED OR MET	EXCEEDED OUR EXPECTATIONS	MET OUR EXPECTATIONS	DID NOT MEET OUR EXPECTATIONS	TOO SOON TO TELL
Ease of management	**91%**	19%	72%	6%	4%
Reliability	**85%**	20%	65%	7%	9%
Better utilization of storage resources	**83%**	14%	69%	12%	6%
Faster backup	**77%**	12%	65%	16%	7%

Base = 128 (Among respondents who have already implemented NAS)

Respondents either considering NAS implementation or with no plans were asked which factors were holding them back from deploying the technology. The top two reasons were "No need" (38%) and "Lack of financial/internal resources" (32%).

***Table 2:* Factors Holding Back NAS Adoption**

	% RESPONDING
No need	38%
Lack of financial/internal resources	32%
Concern with the technology	22%
Too new/unproven	3%
Other	13%

Base = 108 (Among respondents without definite implementation plans)
Multiple Responses Allowed

Storage Area Networks

A Storage Area Network (SAN) is a specialized network designed to attach storage devices such as disk arrays, tape libraries and CD arrays to servers. SANs are highly reliable, easy to provision and extensible across long distances. In this study, 46% of respondents have already implemented a SAN, and another 12% will do so within 12 months, bringing deployment to 58% of respondents. Just under one-quarter (23%) are considering implementation.

SAN implementation does vary considerably by company size (see Figure 4a). While two-thirds of large organizations (67%) have deployed SANs, this figure drops to 33% for medium-sized companies and 22% for small companies. However, 32% of medium-sized companies and 28% of small companies are considering deploying SANs. Some industry observers expect smaller companies to jump on the SAN bandwagon as their storage needs grow.

Figure 4: **Storage Area Networks Status**

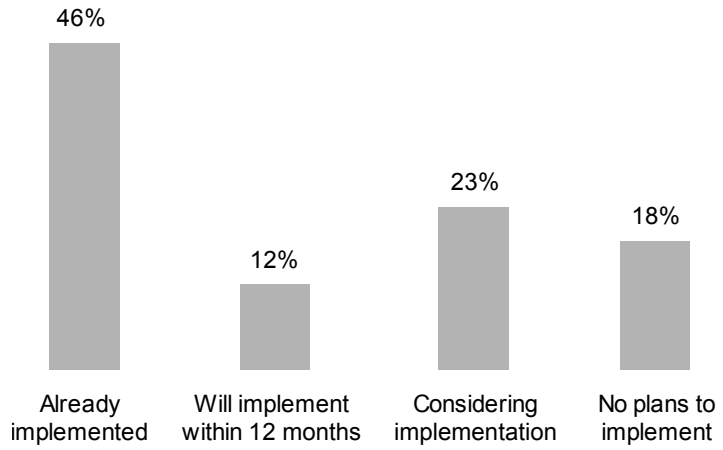
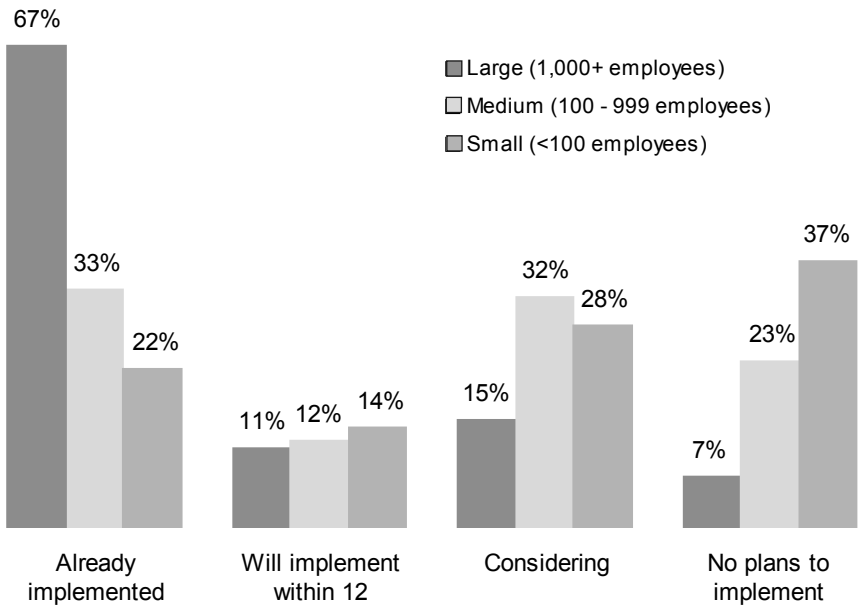


Figure 4a: **SAN Status by Company Size**



SAN advocates claim the technology offers faster data transfers, higher throughput, less downtime, better utilization of existing hardware resources and more effective IT management than other storage technologies. The ability to better utilize storage resources is critical today as the amount of data collected and stored by organizations is increasing dramatically. In this study, 89% of respondents running SANs indicated that the technology either exceeds (26%) or meets (63%) their expectations when it comes to better utilization of storage resources.

Using SANs to share storage usually simplifies storage administration and adds flexibility because cables and storage devices do not have to be physically moved to transfer storage from one server to another. A total of 87% of respondents said SANs either exceeded or met their expecations for reliability and ease of management; 82% indicted they delivered faster backup.

***Table 3:* Ability of SANs to Deliver Benefits**

	NET EXCEEDED OR MET	EXCEEDED OUR EXPECTATIONS	MET OUR EXPECTATIONS	DID NOT MEET OUR EXPECTATIONS	TOO SOON TO TELL
Better utilization of storage resources	**89%**	26%	63%	7%	5%
Reliability	**87%**	37%	50%	8%	6%
Ease of management	**87%**	24%	63%	7%	6%
Faster backup	**82%**	15%	67%	14%	5%

Base = 123 (Among respondents who have already implemented SANs)

Although prices have been dropping, SANs are still considered a more expensive option than Directly Attached Storage or NAS. The results of this research show that "Lack of financial/internal resources" is the top reason for not deploying a SAN.

***Table 4:* Factors Holding Back SAN Adoption**

	% RESPONDING
Lack of financial/internal resources	51%
No need	29%
Concern with the technology	9%
Too new/unproven	5%
Other	13%

Base = 111 (Among respondents without definite implementation plans)
Multiple Responses Permitted

iSCSI

iSCSI (Internet Small Computer Systems Interface) is an IP-based standard for linking data storage devices over a network and transferring data by carrying SCSI commands over IP networks. It was developed by the IETF and became an official standard in February 2003. Because of the prevalence of IP networks, iSCSI can be used to transmit data over LANs and WANs.

Some industry observers expect iSCSI to over take Fibre Channel, the other main approach to storage data transmission on IP networks. iSCSI enables organizations to reap the benefits of storage consolidation more affordably than Fibre Channel. In addition, most IT professionals already understand IP, so iSCSI provides an easy-to-implement network storage architecture based on existing staff skill and resources.

In this study, 21% have already implemented iSCSI, and another 8% will do so within 12 months. These are early adopters. Another 31% are considering implementation, and 35% have no plans for iSCSI at this point. Figure 5a illustrates that large companies are more likely to have deployed iSCSI (33%) than medium-sized (13%) or small (10%) companies.

Figure 5: **iSCSI Status**

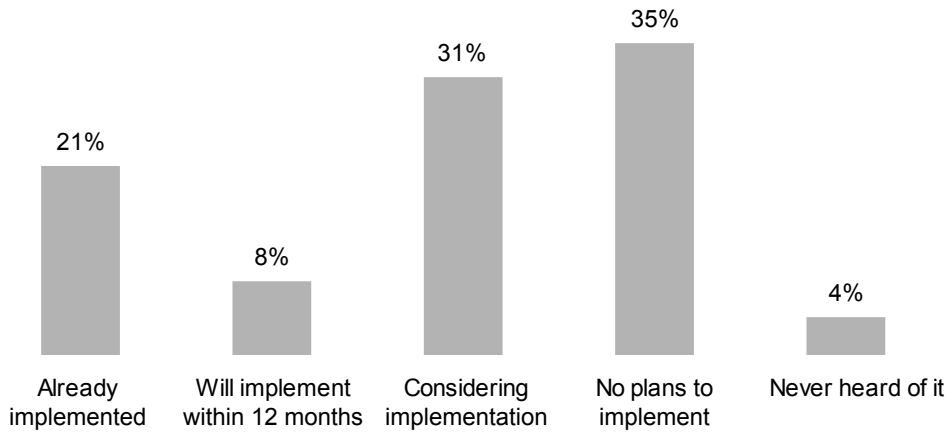
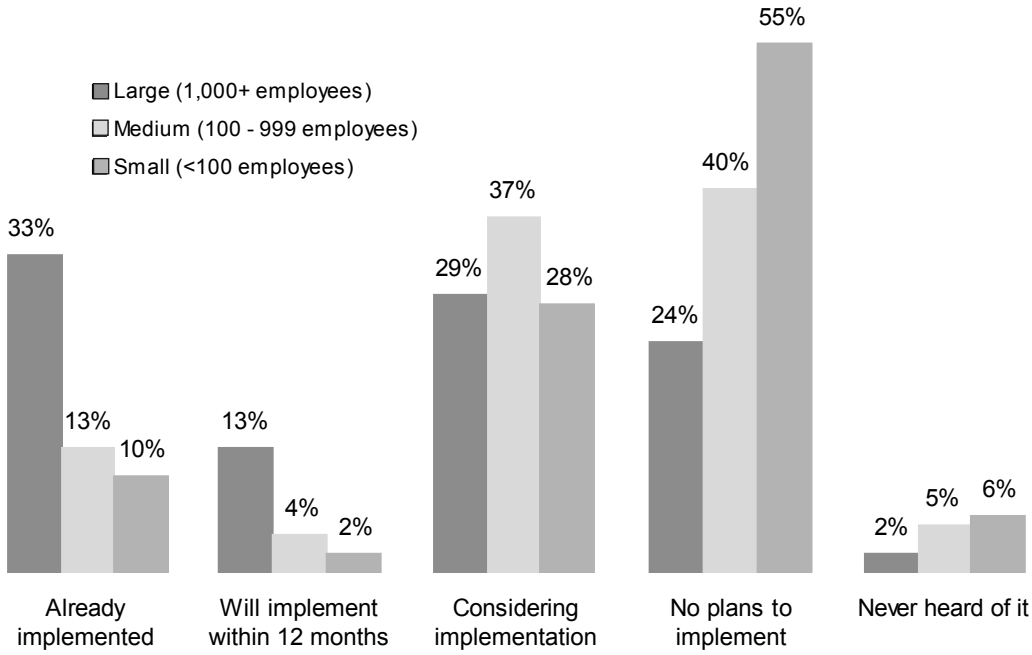


***Figure 5a:* iSCSI Status by Company Size**



The main promise of iSCSI is that it is easier and less expensive to install than Fibre Channel. One-fourth of respondents in this study said ease of installation actually exceeded their expectations, and another 61% indicated ease of installation met their expectations. Therefore, the technology has delivered on this promise. In addition, the technology does not require specialized storage experience (this met or exceeded expectations for 87% of respondents).

In terms of costs, 9% indicated it exceeded their expectations for being inexpensive, and 74% said it met expectations. While the technology delivered in terms of ease of use and cost, it also met expectations for performance (met or exceeded for 88%) and in its ability to carry block and file data (met or exceeded expectations for 91%).

***Table 5:* Ability of iSCSI to Deliver Benefits**

	NET EXCEEDED OR MET	EXCEEDED OUR EXPECTATIONS	MET OUR EXPECTATIONS	DID NOT MEET OUR EXPECTATIONS	TOO SOON TO TELL
Use of the LAN to carry both block and file data	**91%**	16%	75%	0%	9%
Good enough performance for mid-tier applications	**88%**	18%	70%	4%	9%
Doesn't require specialized storage experience	**87%**	12%	75%	11%	2%
Ease of installation	**86%**	25%	61%	9%	5%
Inexpensive	**83%**	9%	74%	14%	4%

Base = 57 (Among respondents who have already implemented iSCSI)

Respondents either considering implementation or those with no plans were asked which factors were holding them back from deploying iSCSI. The top two reasons were "No need" (37%) and "Lack of financial/internal resources" (35%). The lack of resources percentage is a bit surprising considering that low costs and ease of installation are benefits associated with deploying this technology. This response could be due to lack of familiarity with the technology and its capabilities.

Table 6: **Factors Holding Back iSCSI Adoption**

	% RESPONDING
No need	37%
Lack of financial/internal resources	35%
Concern with the technology	17%
Too new/unproven	5%
Other	14%

Base = 177 (Among respondents without definite implementation plans)
Multiple Responses Allowed

Virtual Tape Libraries

There are numerous ways to protect data — each with its own set of goals and objectives. Virtual Tape Libraries (VTL) fall into the category of disk-based data protection strategies. IDC defines a VTL as a solution that utilizes virtualization software, hard disk drives, and one or more server engines to emulate tape drives or tape libraries. Basically, the idea is to use disk instead of tape to back up and recover data faster.

There has been concern that VTLs are not "sturdy" enough for enterprise-class backups. The results here show enterprises are taking a cautious approach to deployment, with 16% having already implemented VTLs and another 7% implementing within 12 months, bringing deployment to 23%. A large percentage of respondents (48%) indicated their organization has no plans to implement VTLs. Larger companies in this study are most interested in this storage technology. While 39% of large companies have or will implement VTLs within 12 months, this percentage drops to 13% among medium-sized companies and 4% for small companies (see Figure 6a).

Figure 6: **Virtual Tape Library Status**

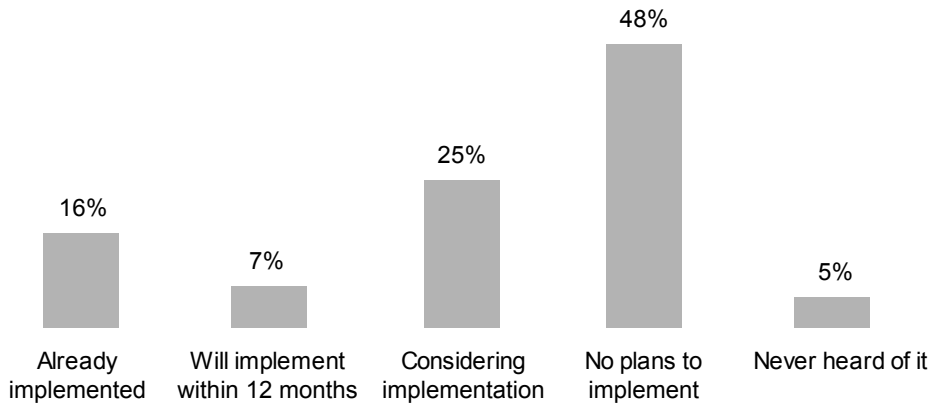
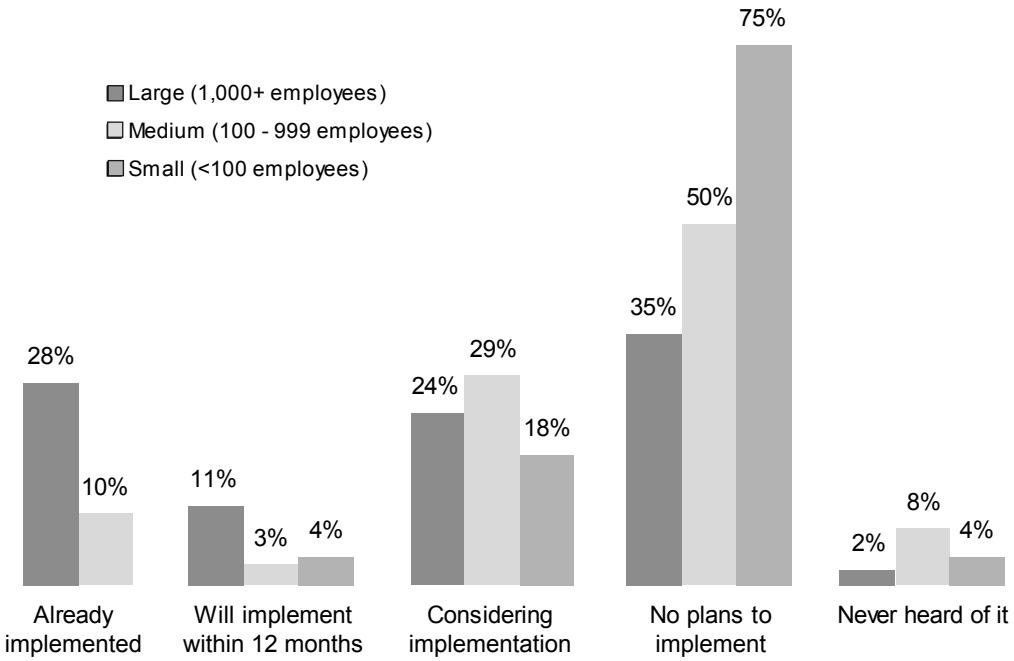


***Figure 6a:* VTL Status by Company Size**



An impetus for moving to a VTL is faster back-up times. Also, because virtual tape emulates the tape library, it is often not necessary for companies to change any software or update back-up or restore processes. Thus, virtual tape is billed as being a low-cost back-up method. Has the technology delivered on these important benefits? As seen in Table 7 below, 26% of respondents who have deployed VTLs said availability exceeded their expectations, which is significant because some have questioned its usage for enterprise-class backup. VTLs met availability expectations for 61% of respondents. In addition, respondents who deployed have found VTLs to deliver on faster back-up times (86% indicted the technology met or exceeded their expectations), reliability (expectations met or exceeded for 81%) and lower back-up costs (expectations met or exceeded for 77%).

***Table 7:* Ability of Virtual Tape Libraries to Deliver Benefits**

	NET EXCEEDED OR MET	EXCEEDED OUR EXPECTATIONS	MET OUR EXPECTATIONS	DID NOT MEET OUR EXPECTATIONS	TOO SOON TO TELL
Availability	**87%**	26%	61%	2%	12%
Faster back-up times	**86%**	19%	67%	9%	5%
Reliability	**81%**	16%	65%	9%	9%
Lower back-up costs	**77%**	14%	63%	16%	7%

Base = 43 (Among respondents who have already implemented VTLs)

Respondents who were considering implementation or had no plans were asked which factors were holding them back from deploying VTLs. The main reason for not deploying is "No need" (mentioned by nearly half of respondents).

Table 8: **Factors Holding Back VTL Adoption**

	% RESPONDING
No need	48%
Lack of financial/internal resources	28%
Concern with the technology	18%
Too new/unproven	9%
Other	4%

Base = 193 (Among respondents without definite VTL implementation plans)
Multiple Responses Allowed

Storage Virtualization

Storage is a classically underutilized resource, with estimates of unused disk space ranging from 60% to 80% in most organizations. This is neither cost effective nor efficient. The problem lies in the fact that storage is typically dedicated to systems that support specific functions and is configured to accommodate long-range growth of those functions' expectations. Storage growth estimates are always overstated to "play it safe" and are often never met.

Storage virtualization should solve this problem by pooling resources and allocating them to systems/functions on an as-needed basis. While there has been a lot of buzz about storage virtualization, based on the results of this research companies are proceeding cautiously as wide-scale deployment has not yet materialized. Figure 7 shows virtualization has been implemented in 15% of organizations, with another 10% implementing within 12 months. This brings deployment to just one-quarter of organizations (25%). More than one-third of respondents (39%) are considering implementation.

The storage technology has penetrated more larger companies than smaller ones (see Figure 7a). Specifically, while 33% of large organizations will have implemented storage virtualization within the next 12 months; this drops to 17% for medium-sized companies and 22% for small organizations (see Figure 7a).

Figure 7: **Storage Virtualization Status**

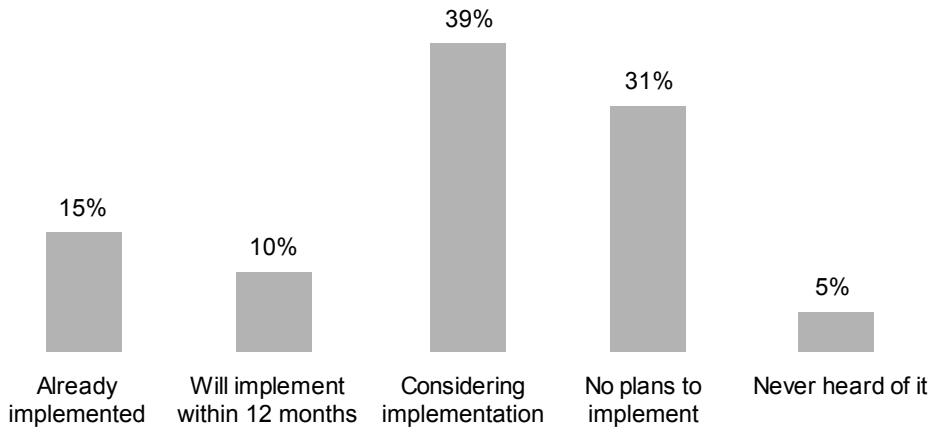
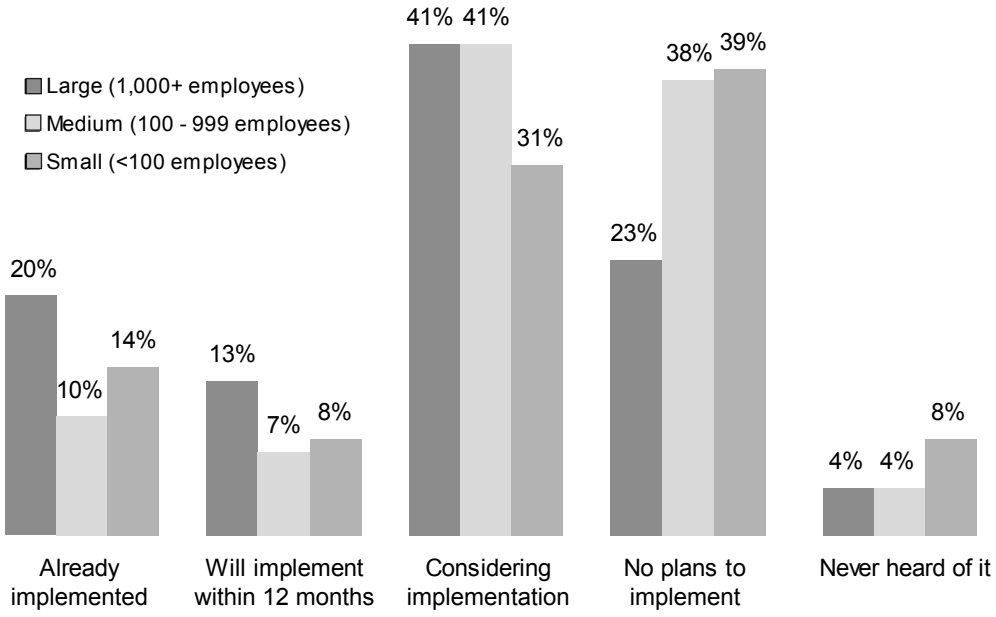


Figure 7a: **Storage Virtualization Status by Company Size**



The main idea behind storage virtualization is to better utilize storage resources, and 30% of respondents who have already deployed the technology indicated it exceeded their expectations (see Table 9). Another 60% indicated it met their expectations, so based on the results of this survey, the technology has delivered on this key benefit. The technology has exceeded expectations for approximately one-quarter of users on three more benefits – easier replication/migration of data (25%), reduction in the number of servers and/or storage appliances (25%), and reduction in storage management costs (23%).

Table 9: **Ability of Storage Virtualization to Deliver Benefits**

	NET EXCEEDED OR MET	EXCEEDED OUR EXPECTATIONS	MET OUR EXPECTATIONS	DID NOT MEET OUR EXPECTATIONS	TOO SOON TO TELL
Better utilization of storage resources	**90%**	30%	60%	3%	8%
Easier replication, migration of data	**88%**	25%	63%	3%	10%
Reduction in number of servers and/or storage appliances	**85%**	25%	60%	8%	8%
Reduction in storage management costs	**81%**	23%	58%	5%	15%
Lower data center powering costs	**68%**	15%	53%	5%	28%

Base = 40 (Among respondents who have already implemented storage virtualization)

While early adopters are reaping the benefits of storage virtualization, why aren't more implementing the technology? Respondents who were considering implementation or had no plans to implement were asked which factors were holding them back from deploying storage virtualization. The results in Table 10 below show that cost is the top reason (38% mentioned this factor) followed by the perception of "No need" (31%). Since the technology allows for better utilization of storage resources (which should save organizations money), it is possible that there is confusion over the technology and the benefits it offers.

***Table 10:* Factors Holding Back Storage Virtualization Adoption**

	% RESPONDING
Lack of financial/internal resources	38%
No need	31%
Concern with the technology	20%
Too new/unproven	10%
Other	9%

Base = 187 (Among respondents without definite implementation plans)
Multiple Responses Allowed

Data de-duplication

De-duplication is a data reduction technology intended to eliminate redundant data on a storage system. De-duplication looks at new data, compares it to data that already exists on the system, and then stores only that which doesn't match existing data.

With the amount of data that resides on enterprise systems growing steadily, a technology that reduces storage needs should be extremely appealing. However, study results found de-duplication deployment to be limited, with only 10% using it and another 10% with definite plans for the technology. Just over one-quarter (26%) are considering implementation.

While current and planned deployment does not vary much by company size, based on the results of this research, smaller organizations are less likely to consider implementation (see Figure 8a).

Figure 8: **Data De-duplication Status**

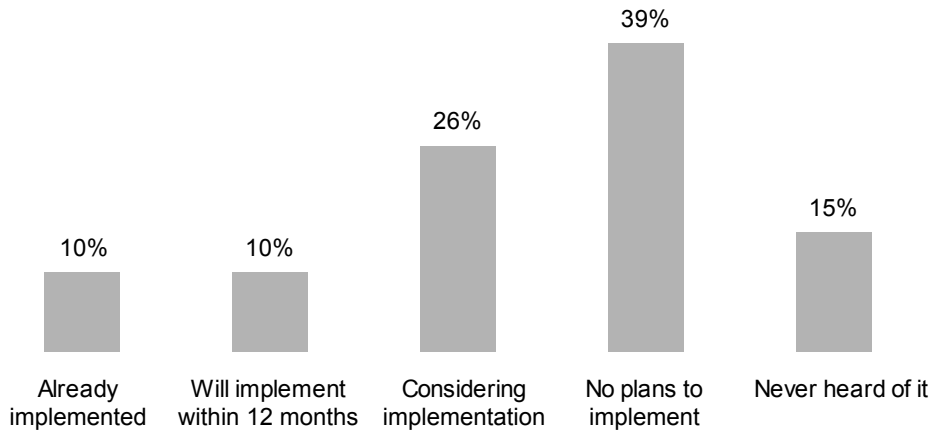
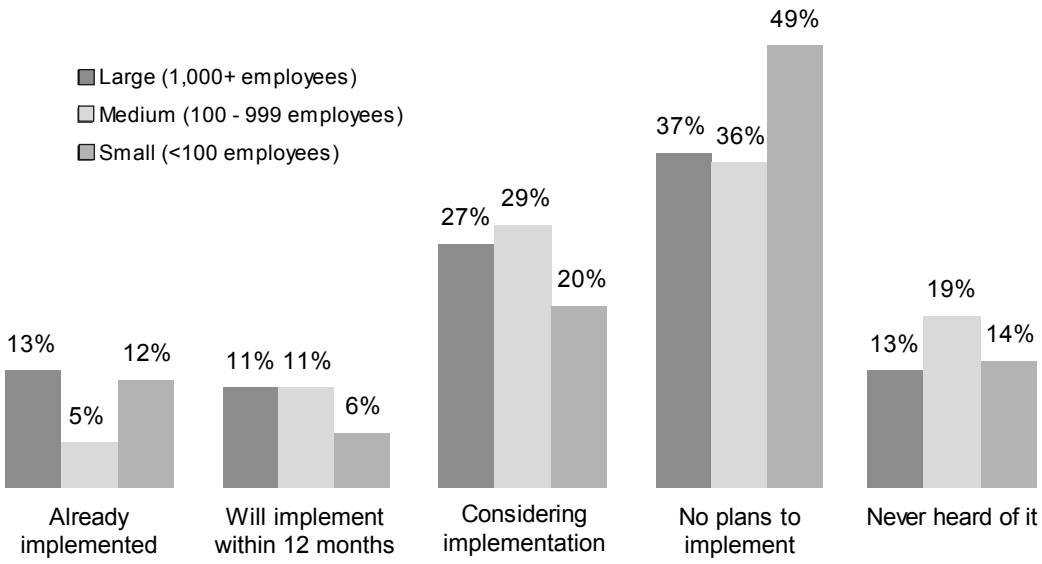
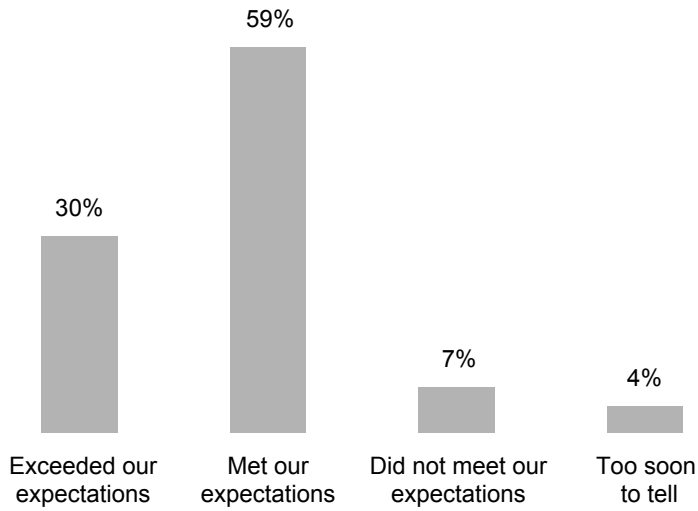


Figure 8a: **Data De-duplication Status by Company Size**



The value of data de-duplication is reducing the amount of data that needs to be managed, and the technology has delivered on this benefit as seen in Figure 9 below. Just under one-third of respondents (30%) said data de-duplication exceeded expectations for reducing the amount of data that needs to be stored, and 59% said it met expectations.

Figure 9: **Ability of Data De-duplication to Reduce Amount of Data that Needs to be Stored**



Base = 27 (Among respondents who have already implemented de-duplication)

Respondents who were either considering implementation or had no plans were asked which factors were holding them back from deploying data de-duplication. The main reason cited for not adopting the technology was "No need" (35%). Yet, with the amount of data that needs to be stored growing rapidly, this response may be the result of not understanding the technology's ability to reduce the amount of data requiring storage.

Table 11: **Factors Holding Back Data De-duplication Adoption**

	% RESPONDING
No need	35%
Lack of financial/internal resources	27%
Concern with the technology	16%
Too new/unproven	10%
Other	14%

Base = 173 (Among respondents without definite implementation plans)
Multiple Responses Allowed

File Area Networks

File management is more important than ever before as organizations are dealing with a rapidly growing number of files to manage, increasingly complex file systems and large-scale applications that utilize files. A File Area Network (FAN) provides a flexible and intelligent platform to move and manage file data in a cost-effective and controlled manner. A FAN integrates hardware, software and services to organize and route file data – or unstructured data stored within a file system – into a central database. In contrast to SANs that handle block-level data, such as from database management systems, FANs deal with unstructured data, such as Word files, spreadsheets, digital images and PDF files.

While industry observers believe the technology is ready for mainstream adoption, they feel a lack of market awareness is hindering adoption. The results of this study found that only 5% of respondents have implemented FANs, and another 3% will implement within 12 months. It should be noted that just over one-quarter of respondents (26%) indicate they have never heard of the technology. Larger companies are more likely to have deployed FANs (although the percentage is still low) and consider deploying them compared to medium-sized and smaller organizations (see Figure 10a). Because deployment was so low, the base size was not sufficient to look at the benefits the technology has delivered.

Figure 10: **File Area Network Status**

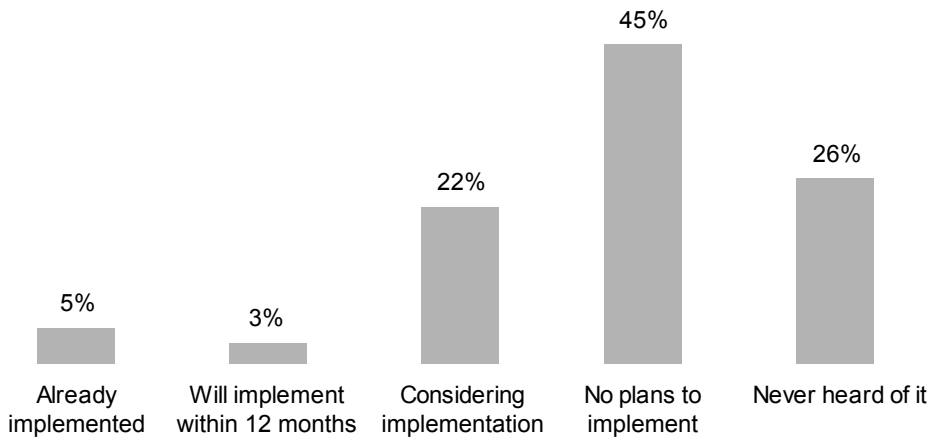
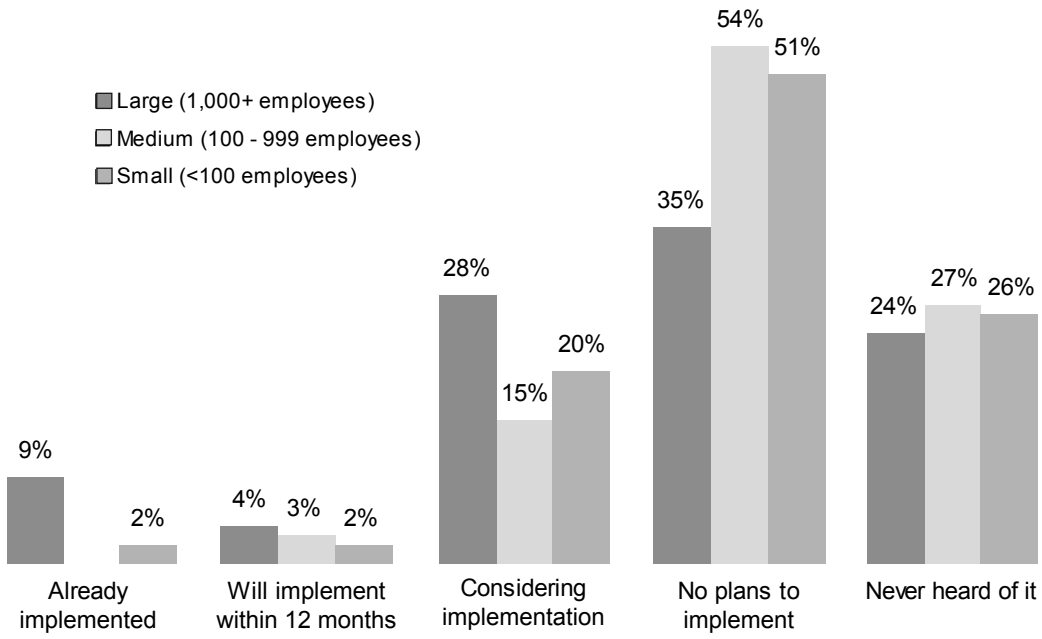


Figure 10a: **FAN Status by Company Size**



Respondents who were either considering implementation or had no plans were asked which factors were holding them back from deploying FANs (see Table 12). The main inhibitor is no perceived need (mentioned by 49% of respondents). Yet, it is unlikely that these organizations would not benefit from a better file management system. The FAN concept is relatively new and is just starting to be embraced by vendors. Thus, as more potential users become educated on the technology, adoption should increase as more organizations understand how the technology helps with managing storage.

Table 12: **Factors Holding Back FAN Adoption**

	% RESPONDING
No need	49%
Lack of financial/internal resources	22%
Concern with the technology	14%
Too new/unproven	11%
Other	9%

Base = 177 (Among respondents without definite implementation plans)
Multiple Responses Allowed

PURCHASING STORAGE

Purchase Plans for Storage Products

Table 13 below shows specific storage products that are being considered or planned for purchase in the next 12 months. Almost all organizations surveyed (97%) will make a storage purchase. Disk storage/RAID arrays will be purchased by approximately two-thirds of organizations (64%). With the exception of data de-duplication and off-site storage back-up services, large companies are more likely to purchase in the categories investigated than small and medium-sized companies.

Table 13: **Storage Products Plan to Purchase**

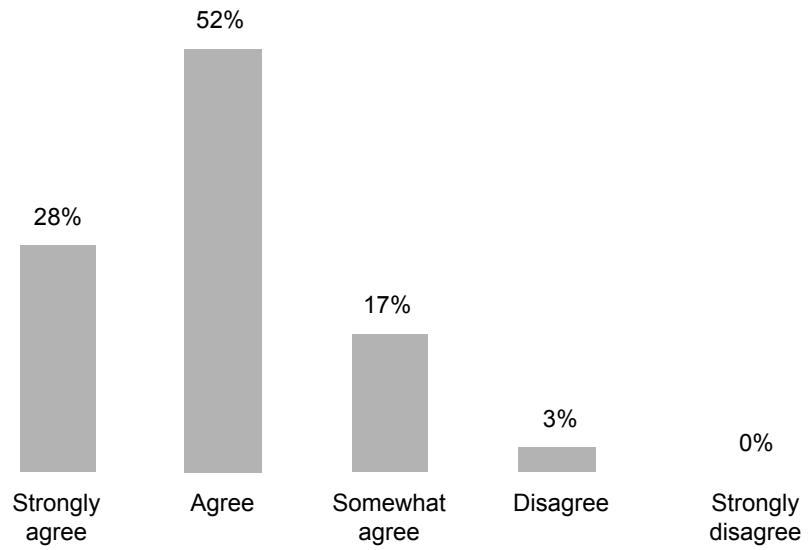
	TOTAL	LARGE COMPANIES	MEDIUM COMPANIES	SMALL COMPANIES
Net purchase plans	**97%**	**100%**	**98%**	**90%**
Disk storage/RAID arrays	64%	68%	60%	61%
Archiving software and hardware	41%	46%	37%	35%
Back-up software	41%	44%	41%	31%
Business continuity/disaster recovery	37%	39%	36%	31%
Back-up tape, tape library	34%	41%	35%	16%
Storage management software	33%	38%	29%	28%
IP SAN (iSCSI) hardware and software	32%	40%	30%	14%
Off-site storage back-up services	30%	31%	28%	29%
Fibre Channel Storage Area Network	25%	37%	14%	16%
Wide-area file services	21%	33%	10%	14%
Compliance software and hardware	18%	22%	13%	16%
Virtual tape	17%	26%	9%	14%
De-duplication software/appliance	17%	15%	20%	16%
NAS aggregation software	14%	20%	9%	8%
Will not purchase any storage-related products	3%	—	2%	10%

Multiple Responses Allowed

Selecting Storage Vendors

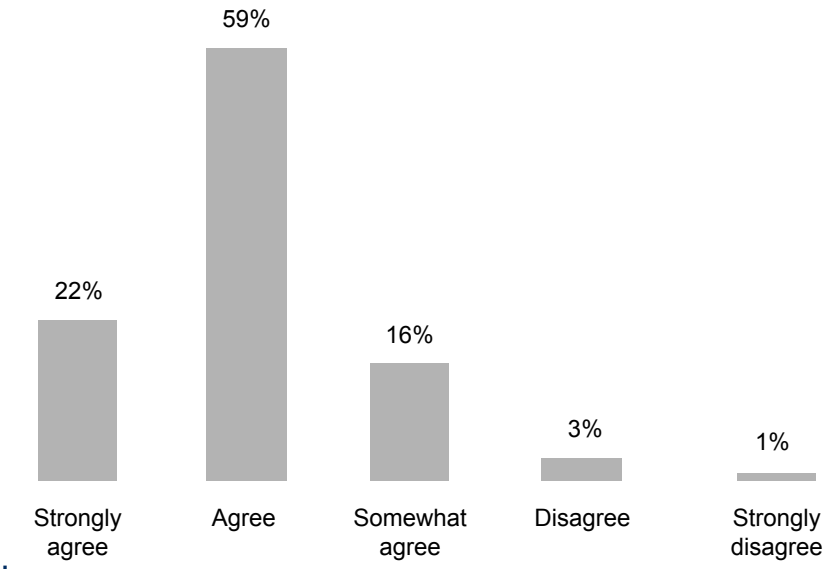
In order to provide insight into the storage vendor selection process, the importance of a vendor's ability to provide security, storage management capabilities and management capabilities across heterogeneous environments was investigated. Security is becoming an increasingly important dimension of storage management because of the growing amount of sensitive data that needs to be stored. In addition, incidents of misplaced tapes containing customer information have received much attention in the news. The result is that IT professionals are keeping security top-of-mind when it comes to data storage. In this study, 8 out of 10 respondents either "Strongly agree" or "Agree" that storage security solutions are important when selecting a storage vendor.

Figure 11: **Storage security solutions are an important consideration when we are selecting a storage vendor**



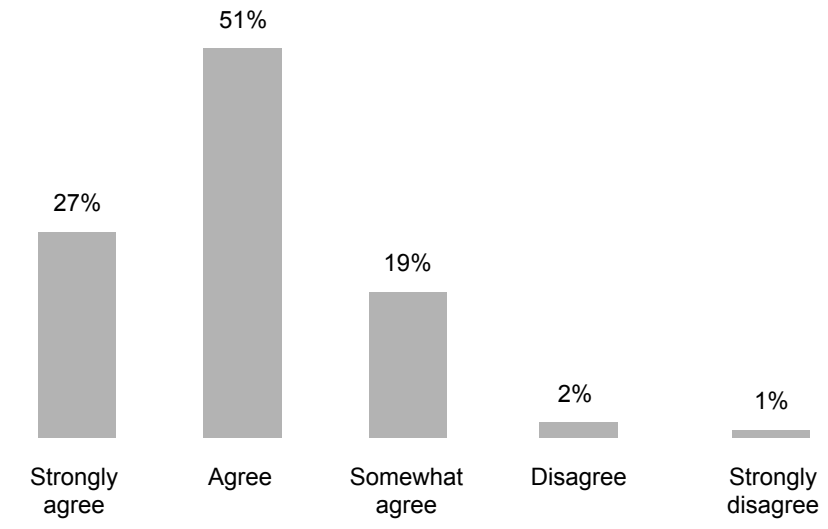
The growing volume of data that needs to be stored, dealing with regulatory compliance issues and security concerns have made managing a storage infrastructure more complex than ever. Thus, it is not surprising that organizations want tools to help them better manage storage. Figure 12 shows that 81% of respondents either "Strongly agree" or "Agree" that integrated storage management solutions are important when selecting a storage vendor.

Figure 12: **Integrated storage management solutions are important when selecting a storage vendor**



Organizations are dealing with the migration of data between platforms and want to more easily manage multi-vendor storage systems. In this research, 78% of respondents either "Strongly agree" or "Agree" that the ability to manage heterogeneous storage environments is important when selecting a storage vendor.

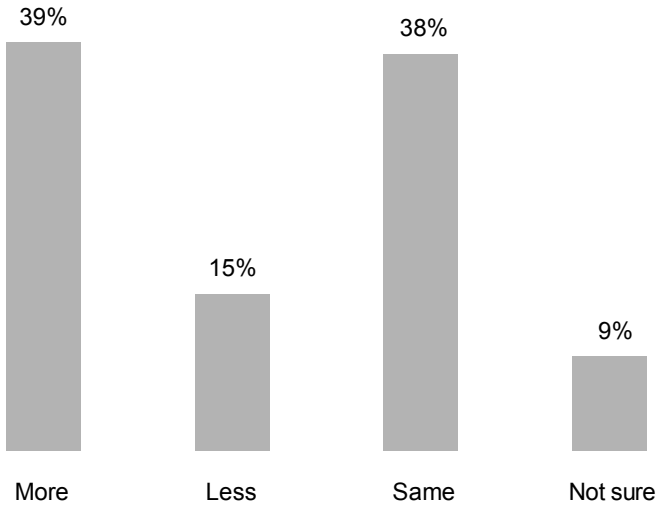
Figure 13: **Ability to manage heterogeneous storage environments is important when selecting a storage vendor**



Resources Dedicated to Storage

Respondents were asked if the amount of financial resources dedicated to their organization's storage efforts will be more, less or the same as it was last year. More than one-third of respondents (39%) said their organization will increase spending on storage endeavors, and 38% will maintain spending levels. Only 15% will decrease storage spending.

Figure 14: **Change in amount of financial resources dedicated to storage efforts**



Buyers Speaker Out: Advice to Improve the Purchase Process

Respondents were asked what feedback they would give vendors that would improve the purchase of storage at their organization. The verbatim responses were organized into different areas and are shown below.

Quite a few respondents want vendors to focus on improving interoperability and compatibility among platforms and products:

- Better information about interoperability, less promoting of own management solutions.
- Heterogeneous environments are a fact of life. Stop trying to lock out other vendors and try to have a superior open product. This includes FULL SMI-S compliance for hardware and software.
- I would like to see better compatibility matrixes. In addition, a number of these vendors need to be more nimble when new products are released. If they have staff onsite in Redmond, there is no reason they should wait over 6 months to have software and/or publish guidance.
- Provide integrated storage devices and back-up software. Provide bit-by-bit backup. Most Medical and Dental Management Software does not allow backup of their programs with normal back-up programs. A bit-by-bit image is the only thing that will work. Takes more space and the data files keep growing at a tremendous rate. The programs also do not allow for deletion of old files, only archiving, which leads to huge data back-up space and time.
- Would like to be able to use older EIDE/PATA hard drives as back-up media for server RAID arrays; each PATA drive should be "seen" as a tape cartridge — when one drive is full it should prompt for the next drive. This would allow older low-capacity PATA drives (i.e.. 80GB - 250GB) to be used as back-up media for medium to large (i.e. > 600GB) RAID arrays.
- Your storage solution should be able to connect to open systems as well as the IBM mainframes.
- Please be honest about the ability to integrate solutions with existing technology!
- Integration with MS Operating Systems and Fibre Channel is key to all of our purchases.

There also seems to be some passion around storage simplicity. Quite a few respondents want storage solutions that are easier to manage:

- Backups should not be so difficult. Managing Backup Exec can be a real nightmare. I just want it to work. How unique of a task is it to back up a Windows AD Domain with a file and Exchange server? The configuration steps should be minimal to get successful backups, but that is rarely the case.
- I am interested in conceptually simple solutions that work within open standards. The contents of archived media need to be portable to new media and new storage/back-up system (although portability of the metadata describing the contents might be less critical).
- Make the products less complicated. Making a good product that does the job but sounds too complicated just because vendors want to make it sound like it's cutting-edge technology actually turns off buyers.
- Make them easier to implement and use plain English in the manuals.

- Make it so easy and friendly it is as second nature as waking up in the morning and getting the paper.
- Reduce complexity of installing and managing products.
- Simplify the management as much as possible.
- Simplify.... simplify.... simplify.
- We need easier overall management tools for your storage products.
- Virtualization needs to be easy to manage. Offsite storage must have security guarantees. Large drives are not always better: If drive fails, you lose more data per drive. Redundant arrays can use smaller drives.
- An easier, open-standards-based restoration without specialized s/w or h/w, which you can use from nearly anywhere. Something along the lines of Novell's ZAmanda, but OS independent, perhaps something you can just pop a CD and boot up with any white box and start restoring after plugging in say, a USB encryption key or floppy disk.
- Easy to integrate and manage.

Lower costs were mentioned by several:

- Have less-expensive options for smaller players like us.
- It is very pricey for the SMB market.
- Keep the costs reasonable AND make it easy to administer!
- Like most other technologies, storage vendors need to find a way to reduce the cost in order to gain a larger customer base.
- Lower costs, simplify management.
- Lower prices.
- Not so expensive.
- Lower your prices.
- Pricing is always an issue for most companies no matter what size.
- Pricing needs to be a serious factor. Growing technology and features to justify pricing increases doesn't help a customer whose primary need is storage space and additional features are secondary.
- Reliability and cost.
- Google at a VC Conference yesterday said the price of storage will significantly decrease over the next 12 months. Maybe you should start lowering your prices now or firms will just wait for the Google Storage services.

Some respondents offered specific product improvements they would like to see offered:

- We need a product that offers a more stable database engine to manage the millions of files we back up daily. We experience too much database corruption.
- Make it fast and make it invisible to users.
- More small business storage and back-up solutions requested.
- Need a wider product selection of SMB and enterprise iSCSI products.
- Consider network performance and reconfiguration for Large Distributed Data Centers.

- The architecting of the system is imperative,e and the design must focus on the application's ability to perform — or in some cases — under-perform in an environment. Too often, an application can wreak havoc if given the horsepower of a SAN.
- Don't darken my door with product(s) using anything to do with Microsoft!!!! Go with what has and continues to work, UNIX!
- It's getting so large it's hard to find a great solution in storing data.
- Notification when my needs warrant new hardware based on how much I'm backing up.
- Over 10 years ago Storage Dimensions offered a feature called "Dynamic Growth and Reconfiguration" on their RAID arrays. This technology allowed creating a virtual RAID array with the FAT showing i.e. 6 1TB disks with only i.e. 3 400GB physical disks. The virtual (non-existent) disk space was mapped in the FAT as virtual files. Adding disks or increasing disk size only required, at the disk controller level, deleting virtual files thereby making the added disk space available. I have seen this technology demonstrated on a NetWare server where one disk was replaced with a larger disk, and the array was allowed to re-sync. No increase in available space - can't have parity on one disk. A second disk was swapped for a larger one and after re-sync the added disk space was available. I really need a six-port SATA controller card with this capability.
- We LIKE Dell's SAS offerings; i.e. MD-1000 arrays, etc. We have already purchased two MD-1000 arrays for our new Primary (Dell 5th Generation) MS SQL Server, and they are exceeding our wildest performance expectations! We have also purchased additional "stand-by" Dell Servers to be used with XOSoft's (now, unfortunately, Computer Associates') Disaster Recovery software; "WANSyncHA+AR – SQL Enterprise Edition" and "WanSyncHA – IIS"; for a real-time, off-site, replication solution. Our application group within the IT department has completely abandoned Network Appliance NAS products, due to VERY UNSATISFACTORY performance! Additionally; we will NEVER consider a "virtualization solution" for our group's n-tier, Web-based applications.
- Great products.
- Keep innovating.

Standards were also mentioned:

- More standards-based tools.
- Establish and maintain industry standards beyond the bus (for backups, etc.)
- Standards!
- Realize the core of your business and stick to doing it well rather than diversifying so much that you do a lot of things mediocre. Secondarily, stick to industry standards rather than continually creating proprietary solutions. Lastly, realize that solutions are bigger than the technology itself. The people and process that surround and are enabled by technology are just as important, if not more.

Some respondents offered suggestions on how the sales process could be improved:

- Focus on the business case... not the latest greatest technologies.
- Implementation case studies would be useful.
- Under promise and over deliver.

- Virtualization is still somewhat young, and the industry does not seem to understand it very well. There is more of a cut and run, than helping customers "fit into" the virtualization glove. I get the impression that it's on the sales card, but the reps don't have a clue to support it.
- More real-world design input from users. I get the impression that some of these people have never actually tried to store/manage data in a multi-site environment.
- Need to put out more information that shows the advantages and disadvantages to the varying technologies.
- Compliance reporting and mapping storage locations to services offered.
- Some organizations do not need all the bells and whistles to keep their data secure.
- Storage vendors can be more helpful AFTER the sale has been made.
- Unbundle.
- Different environments are useful for different business needs. One-size-fits-all solutions make us very skeptical. Also, every year EMC comes sniffing around, bungles the contacts, and we never hear from them until the next year. This was the third straight year.