EXECUTIVE SUMMARY

IT departments are under constant pressure to realign themselves in response to the fast-changing business climate and new technology developments, such as virtualization, cloud-based services, and mobile devices. In this white paper, IDC uses a survey of 201 IT leaders in North America conducted in February 2012 to delve into the storage and information management challenges IT departments face today. It probes into perceptions about the major IT trends affecting data storage (e.g., cloud storage services, Big Data) and provides insights into the storage solutions that organizations are using to address these challenges.

Two major themes emerged when IDC spoke with IT executives about the current economic environment and its impact on their IT plans. They are being more aggressive about looking for faster return on investments in new spending, and they insist that their IT investments be more closely aligned with overall business growth/change.

As respondents’ answers make clear, however, the management, protection, and provisioning of highly virtualized applications as well as the ingest, organization, and continuous mining of large yet diverse data pools will replace basic device configuration and administration as the primary tasks for IT teams in many corporate datacenters.

As organizations contend with more diverse and ever-increasing volumes of data, they need to deploy storage solutions that leverage a common, unified set of components and data protection/efficiency services. Despite being built on a standard platform, however, these solutions must enable flexible configuration of components and services into pools of storage designed to best manage different data types.

It is important to point out that a unified storage environment provides the intelligence and flexibility that companies need to deal with diverse data challenges, but it addresses only part of the problem. IT organizations must also invest in storage/data management software that can provide unified administration and more coordinated insights on data use and movement across diverse environments.
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METHODOLOGY

This IDC survey included formal phone interviews with IT executives from 201 firms in North America in February 2012. The study included only firms with more than 500 employees. To qualify, respondents had to be key decision makers or purchase influencers of their organization’s data storage environment, but they did not have to use storage solutions from any specific supplier.

IDC presents the study results in aggregate in the figures throughout this paper. We also present the results based on annual storage spending (under $1 million, $1 million to $3 million, and over $3 million) where there are significant variations.

KEY CHALLENGES FOR TODAY’S ENTERPRISE

Two major themes emerged when IDC spoke with IT executives about the current economic environment and its impact on their IT plans (see Figures 1 and 2). They are being more aggressive about looking for faster return on investments in new spending, and they insist that their IT investments be more closely aligned with overall business growth/change.

FIGURE 1

Responding to Economic Conditions

Q. From an IT perspective, how is your company preparing to respond to current economic conditions?

- Prioritizing IT investments based on time to full ROI
- Reassessing current IT initiatives to reduce IT spending
- Plan to boost IT investments in key application areas
- Looking to public/private cloud hosting services to reduce capex
- Not making any changes in our IT priorities

n = 201

Source: IDC’s Storage Trends Survey, February 2012
Q. What are the main challenges to adapting your organization’s IT strategy to the current market conditions?

In response to the current economic instability, respondents are:

- Adopting technologies such as mobile devices and virtualization while adjusting to uncertain economic conditions
- Accommodating information growth while boosting storage efficiency
- Protecting themselves from the risks associated with disaster and data misuse through better data protection and data retention practices

n = 201
Source: IDC’s Storage Trends Survey, February 2012
While a majority of respondents believe that their current storage environment is capable of addressing their needs in the next 12 months, our research reveals that 35% of respondents believe their storage infrastructure is not sufficient for anticipated needs over the next 12–24 months (see Figure 3). This concern was even more apparent within organizations with large storage expenditure (over $3 million spending). Many respondents in this group said that their storage infrastructure was not sufficient and that they are planning to take action in the coming year to address their shortcomings.

**FIGURE 3**

Perception of Storage Infrastructure

Q. Do you believe your organization’s current storage infrastructure is sufficient for your organization’s needs over the next 12–24 months?

<table>
<thead>
<tr>
<th>Annual storage expenditure</th>
<th>Total (n = 201)</th>
<th>&lt;$1M (n = 81)</th>
<th>$1M–3M (n = 61)</th>
<th>$3M+ (n = 59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(% of respondents)</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>Yes, it is sufficient for the next 12 months</td>
<td>50</td>
<td>51</td>
<td>52</td>
<td>53</td>
</tr>
<tr>
<td>No, but we are building capacity in the next 12–24 months</td>
<td>20</td>
<td>19</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>No, but we have plans to address in the next 12–24 months</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>No, it is not sufficient, and we have no plans to address it</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: IDC’s Storage Trends Survey, February 2012
IDC believes that many of the concerns about storage infrastructure stem from the massive data deluge that enterprises are currently facing as a result of the move to high virtualized datacenters, the digitization of business processes, and the rapid expansion of smart devices and applications. In fact, interviewees cited overall data growth among the top three challenges in enterprise data storage environments (see Figure 4). Disaster recovery and storage management for virtualized servers were the other two top major challenges.

**FIGURE 4**

Data Storage Challenges

Q. Which of the following challenges does your organization currently face with respect to your overall data storage environment?

- No challenges
- Uptime/availability
- Compliance and data governance issues
- Complexity within the storage environment
- Increasing utilization levels
- Storage systems management
- Managing storage for virtualized server(s)
- Business continuity — disaster recovery
- Total (n = 201) <$1M (n = 81) $1M–3M (n = 61) $3M+ (n = 59)

Source: IDC’s Storage Trends Survey, February 2012

Interestingly, many organizations with $1 million to $3 million in annual storage expenditures expressed concerns about shortcomings in their storage systems management, while organizations with less than $1 million in expenditures are much more concerned about increasing storage utilization levels.
Probing deeper into the cause of the data deluge, we found that Big Data and collaboration applications emerged as the most mentioned drivers of storage growth. According to our respondents, data warehouse/business intelligence applications are driving most growth in organizations with more than $3 million in expenditures, while collaboration is the leading driver in organizations with smaller storage expenditures (see Figure 5).

**Figure 5**

**Highest Data Growth Applications**

*Q. What key applications represent the highest data growth in your environment?*

<table>
<thead>
<tr>
<th>Application</th>
<th>Total (n = 201)</th>
<th>&lt;$1M (n = 81)</th>
<th>$1M–3M (n = 61)</th>
<th>$3M+ (n = 59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data warehouse/business intelligence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaboration (e.g., email, SharePoint)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Graphic design documents (e.g., CAD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital images (e.g., x-rays, photos)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital audio/video (e.g., music, movies, video surveillance)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual desktops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor/machine data (e.g., health monitoring, smart meters, GPS data, gene sequences)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLTP/RDBMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: IDC's Storage Trends Survey, February 2012

IDC believes that many industries are deploying a fast-expanding array of mobile devices and sensors (e.g., smart meters, RFID readers, GPS devices). IT departments are increasingly responsible for collecting, storing, archiving, and rapidly analyzing this content and machine-generated data.

Organizations across all industries are digitizing images, records, video, and graphic drawings to ensure compliance, improve productivity, and create new revenue streams. IDC expects the amount of storage capacity deployed to store the explosion of new content will increase sixfold in the next three years, exacerbating the challenges around data management, protection, and preservation.
DEALING WITH THE DATA DELUGE AND DATA DIVERSITY

The IT executives we spoke with made it clear that data security remains the leading challenge in this increasingly complex environment. When asked to rank (from 1 to 5) major data challenges, 30.3% of respondents ranked data security first.

What data security means for IT executives is evolving, however. The IT executives IDC spoke with acknowledged that their security challenges today are less about access control and virus protection and more about risk management issues such as privacy, data misuse, and data retention/recovery. Intelligent storage systems and better storage/data management solutions play a greater role in addressing these concerns.

Interestingly, after data security, respondents' first and second highest priorities were much more diverse (see Figure 6). IDC then asked respondents to identify which emerging storage technologies would play a leading role in addressing each specific challenge. The results make it clear that no one storage solution/technology will address every organization's need. You can compare your own challenges to those of the respondents to better understand what solutions may best address your organization's needs.

FIGURE 6

Biggest Data Challenges

Q. Please rank the following data challenges, with 1 being your organization's biggest data challenge.

- Data security
- Data size, volume, and rate of growth
- Data comes from multiple different sources and in different formats
- Data retention to address compliance/regulatory requirement
- Data continually changes with frequent updates

n = 201
Source: IDC's Storage Trends Survey, February 2012
Data Size, Volume, and Rate of Growth Are Too Challenging to Manage and Fund

Most respondents mentioned funding and managing data size/rate of growth as their first or second major challenge (23.4% and 18.4%, respectively). IDC believes that for many of these respondents, the digitization of the entire industry is a major factor. IDC speaks regularly with organizations in sectors such as healthcare, media/entertainment, and product design that are dealing with storage growth rates approaching 100% and/or surpassing tens of petabytes. Traditional capacity planning/provisioning processes no longer work, so these organizations are also struggling with the need to preserve that digital data in an accessible and searchable way.

When asked what storage solutions will help address data growth challenges, respondents focused on newer solutions such as scale-out NAS and object-based storage products. They also wanted solutions that maximized storage utilization (see Figure 7) and preferred using data compression rather than deduplication because content data is not as highly duplicated as backup or virtual machine (VM) images. IT leaders also wanted storage solutions that support automated data movement/tiering with a focus on moving data as efficiently as possible to very high-capacity, low-cost nearline storage pools.

**FIGURE 7**

Technologies to Address Data Growth

Q. In regard to data growth challenges, what specific technologies are you considering to address this issue?

- Scale-out NAS
- Embedded data compression
- Automated storage tiering
- Object-based storage
- Public cloud–based storage services
- Unified/multiprotocol storage systems
- No specific technologies used

n = 47

Source: IDC’s Storage Trends Survey, February 2012
Data Comes from Multiple Different Sources and in Different Formats

Our survey results show that 19.4% of respondents mentioned growing data diversity as the primary data challenge, while another 19.4% ranked it as the second major challenge.

IDC believes that the data diversity challenge is a major issue for companies in sectors such as retail, financial services, consumer goods, and telecommunications. Companies in these sectors are seeing a proliferation of internal data sources (e.g., sensors, scanners, collaboration tools) and external data sources (e.g., social media and mobile devices). Preservation and flexible organization of that information are critical requirements for effective reuse in data warehouse and Big Data analytic applications.

Major problems in this area include a proliferation of incompatible storage platforms (raising major management and staff training issues) and a limited ability to move data between disparate environments.

When asked what storage solutions address their growing data diversity issues, respondents focused on unified storage systems to reduce management complexity and improve the ability to move data across environments (see Figure 8). They also are very interested in object-based storage systems and public cloud storage offerings that may help improve access to external data sources.

FIGURE 8

Technologies to Address Data Diversity

Q. In regard to the challenge of multiple different data sources and formats, what specific technologies are you considering to address this issue?

<table>
<thead>
<tr>
<th>Technology</th>
<th>(% of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unified/multiprotocol storage systems</td>
<td></td>
</tr>
<tr>
<td>Object-based storage</td>
<td></td>
</tr>
<tr>
<td>Public cloud–based storage services</td>
<td></td>
</tr>
<tr>
<td>Scale-out NAS</td>
<td></td>
</tr>
<tr>
<td>Automated storage tiering</td>
<td></td>
</tr>
<tr>
<td>Embedded data compression</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>No specific technologies used</td>
<td></td>
</tr>
</tbody>
</table>

n = 39
Source: IDC’s Storage Trends Survey, February 2012
Business Practice Requires Data Retention for an Extended Period

Dealing with complex data retention regulations/mandates was the primary challenge for 15.9% of respondents. Another 22.4% cited data retention for regulatory compliance and eDiscovery as their second biggest challenge.

IDC recognizes that the need to retain/archive emails, documents, images, and call detail records (CDRs) is a major challenge in industries such as financial services, legal services, telecommunications, and healthcare/life sciences. Organizations struggle with two specific challenges:

- Cost-effective ingestion of data from multiple locations/sources
- Managing rapidly growing pools of retained data as retention times and scope of data covered expand

These organizations must also reduce the time and effort associated with retrieving that data in cases of audits or legal proceedings.

Many organizations surveyed believe that public cloud services (built on object-based storage systems) will ultimately play a critical role in addressing these concerns (see Figure 9), once data retention and stewardship issues are resolved. Some industries, such as financial services, will always have mandates to retain data internally, however, so they will also need to consider object-based storage systems as well as complementary data ingestion appliance products.

Figure 9

Technologies to Address Data Retention Challenges

Q. In regard to data retention challenges, what specific technologies are you considering to address this issue?

<table>
<thead>
<tr>
<th>Technology</th>
<th>(% of respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated storage tiering</td>
<td></td>
</tr>
<tr>
<td>Public cloud–based storage services</td>
<td></td>
</tr>
<tr>
<td>Unified/multiprotocol storage systems</td>
<td></td>
</tr>
<tr>
<td>Object-based storage</td>
<td></td>
</tr>
<tr>
<td>Embedded data compression</td>
<td></td>
</tr>
<tr>
<td>Scale-out NAS</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>No specific technologies used</td>
<td></td>
</tr>
</tbody>
</table>

n = 32

Source: IDC’s Storage Trends Survey, February 2012
**Data Continuously Changes with Frequent Updates**

Rapid data change was the primary challenge for 10.9% of respondents. Another 20.4% identified rapid data change as their second biggest challenge.

Organizations facing this problem appear to be the same organizations that drove most storage systems development prior to the Internet explosion. These companies and their applications generate high volumes of transaction data and rely on traditional data warehouse systems. They are in industries such as financial service (payments processing and trading), retail (in storage and online), and telecommunications. IDC believes that the key requirements remain improved reliability, protection from data loss, reduction in response time, and support for ever higher transaction volumes.

When asked what storage solutions they were looking at to help address their ongoing performance needs, surveyed IT leaders focused on automated storage tiering (see Figure 10). IDC believes that unlike companies that use automated tiering for large data archives, these organizations are looking to use automated tiering coupled with solid state disk (SSD) to drive major performance and transaction efficiency gains in their business operations.

**FIGURE 10**

**Technologies to Address Rapid Data Change**

*Q. In regard to continual and frequent data changes, what specific technologies are you considering to address this issue?*

<table>
<thead>
<tr>
<th>Technology</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated storage tiering</td>
<td>35</td>
</tr>
<tr>
<td>Embedded data compression</td>
<td>30</td>
</tr>
<tr>
<td>Scale-out NAS</td>
<td>25</td>
</tr>
<tr>
<td>Object-based storage</td>
<td>20</td>
</tr>
<tr>
<td>Public cloud-based storage services</td>
<td>15</td>
</tr>
<tr>
<td>Unified/multiprotocol storage systems</td>
<td>20</td>
</tr>
<tr>
<td>No specific technologies used</td>
<td>0</td>
</tr>
</tbody>
</table>

*n = 22
Source: IDC's Storage Trends Survey, February 2012*

SSDs can significantly improve storage utilization rates while improving performance. They can be used only at scale, however, when deployed in virtualized storage systems that automate the process of identifying and moving data sets between SSD and hard disk drive (HDD) storage tiers.
PREPARING FOR FUTURE DATA CHALLENGES

While the IT executives that IDC surveyed clearly have their hands full dealing with current data challenges, they also know that the world does not stand still. Two critical developments will have a major influence on storage decisions in the coming years:

- The growing use of cloud (private, public, and hybrid) as a model for general IT acquisition and deployment as well as for data storage and archiving
- The growing role/importance of intense analytics (often referred to as Big Data) in business processes

IDC delved into each of these issues in more detail.

Cloud Solutions for Storage Gaining Traction

Not surprisingly, a majority of respondents (66.2%) stated that they had no plans to use public/hybrid cloud storage solutions, reflecting continued uncertainty in IT organizations about the reliability and usefulness of cloud-based storage.

At the same time, 11.9% of all respondents said that they already were using such solutions (see Figure 11), while almost 20% of companies spending $1 million to $3 million on storage were already using cloud storage. Another 12.4% of all respondents said that they would consider replacing some (but less than 50%) of their existing storage with cloud storage in the next two years. This shift would represent a significant change in the storage landscape for IT organizations and their suppliers.

Figure 11

Plans to Adopt Cloud Storage Services

Q. Does your organization have any plans to adopt a public, private, or hybrid cloud storage service in the next 6–12 months?

Source: IDC's Storage Trends Survey, February 2012
When we asked respondents (both those using cloud storage and those with no interest in using it) to identify the biggest barriers to cloud adoption, they cited data security (at a third-party site) and data ownership/control (see Figure 12). Nearly as important for respondents already using cloud storage were reliability/availability and pricing models.

**Figure 12**

*Cloud Computing Adoption Concerns*

Q. *What concerns do you have for adopting cloud computing, if any?*

- Data security (at third-party site)
- Availability and reliability of data
- Loss of control
- Pricing
- Risk of corporate espionage
- Data integrity
- Other
- No issues/concerns

Source: IDC’s Storage Trends Survey, February 2012

One major issue not mentioned, but which IDC believes will be critical, is the challenge of moving and managing data between internal datacenters and external cloud environments for cloud use cases such as backup, archiving for compliance, and data analytics. Companies need to ensure that they are using storage/data management software solutions that can provide more coordinated insights into data processes across both environments.
**Big Data Is Important, But Organizations Are Not Sure Why**

In the past six months, Big Data often displaced cloud as the major new IT development, but many organizations are still unclear about the meaning/implications of Big Data. IDC asked IT executives about their organization’s plans for and attitudes toward Big Data, and the results were decidedly mixed (see Figure 13).

**FIGURE 13**

Opinion on Big Data

Q. Which of the following statements best describes your opinion about Big Data as an IT priority in your organization?

Almost a quarter (22.4%) of all respondents (27.1% of respondents with storage spending over $3 million) said that they were already deploying/exploiting Big Data at scale. Conversely, fewer than 20% said that Big Data was marketing hype.

The problem is that some people think Big Data is a specific point technology like MapReduce (Hadoop), while others see it as a fundamental reshaping of a business process based on the collection, consolidation, and rapid consumption of fast-growing and diverse data sets. IDC believes that Big Data is about leveraging new technologies and data sources to effect a material change in the value of a business process. While many companies may have "junior science" Big Data projects under way, integrating these applications into the fundamental business model takes time and considerable effort.
As the market and technologies evolve, the key to capitalizing on Big Data will be to remember that it is all about scalable data management and automated data movement. If you can't manage and move the data, you can't exploit it.

IT leaders need to look for a storage solutions partner that provides a broad but well-integrated portfolio of storage hardware and software solutions to address these requirements.

**RETHINKING STORAGE SOLUTIONS FOR TODAY'S DATACENTER**

As these survey results make clear, the management, protection, organization, and continuous mining of large yet diverse data pools will replace basic device configuration and backup, becoming the primary tasks for IT teams in corporate datacenters. IT will need to deploy a growing array of data assets optimized for different use cases:

- **I/O-intense SAN storage systems** that make extensive use of solid state storage to support high transaction volumes
- **Intelligent storage systems** that provide advanced storage virtualization and data protection/efficiency functions in support of large virtualized server pools
- **Scale-out NAS storage systems** that reduce the asset and operational costs associated with capturing and serving exploding pools of rich content
- **Archival storage systems** that consolidate, organize, and preserve critical digital assets for reduction of corporate risk (compliance and eDiscovery) and greater long-term reuse (Big Data)

These diversified needs carry a risk for the IT organization, however. It often appears easier to deploy multiple storage systems (often from different suppliers) to address each requirement on a case-by-case basis. Nevertheless, the unintended, and often detrimental, consequences of such an approach include:

- **Inefficient use** of diverse storage assets that can't be easily reallocated to meet changing needs
- **Inconsistent data management practices** that can expose organizations to data loss or misuse
- **Duplication of storage staff training** and thinly stretched staff resources to learn/support/manage incompatible systems

Such technical and organizational challenges also mean that data migration and protection within an individual datacenter and across multiple datacenters create significant business costs that should be avoided, if possible. This physical asset migration burden also prevents organizations from quickly capitalizing on new technologies.
Addressing More Diverse Storage Needs with More Unified Storage Solutions

As organizations contend with more diverse and ever-increasing volumes of data, they need to deploy storage solutions that leverage a common, unified set of components (e.g., tiered disks, active/active controllers, flexible network links) and data protection/efficiency services (e.g., RAID, data deduplication, compression, thin provisioning, and automated data tiering). Despite being built on a standard platform, these solutions enable flexible configuration of components and services into pools of storage designed to best manage different data types (e.g., I/O-intensive transactions, highly virtualized servers, disk-based backups, and rich content).

Storage Management for Scalable, Unified Storage Environments

The deployment of a unified storage environment provides the intelligence and flexibility that companies need to deal with diverse data challenges, but it addresses only part of the problem. The other, often more intractable barrier is the fragmentation of the data management process.

IT staff employ one set of tools for basic storage device management, another set of tools for data management (e.g., backup, replication), and a third set of tools for increasingly critical information service management tasks (e.g., data retention, archiving, indexing). IT staff also need to deploy different management tools for different data types (e.g., block, file, object), which adds yet another layer of complexity. Finally, the staff must deal with unique vendor-specific tools for each platform.

Ongoing Challenges

In today’s challenging business environment, IT professionals view general claims of improved IT asset utilization or reduced administrative burdens with deserved skepticism. Virtualized datacenters, service-centric IT, and unified storage/data management are still untested or embryonic concepts in many organizations, raising concerns about practical uses, more complex management, and retraining of IT staff.

Storage solutions suppliers must continue to enhance storage asset management capabilities and deliver even deeper integration with existing server virtualization and archival storage solutions. They also need to help organizations obtain quick benefits by identifying a number of specific use cases that promise immediate and long-term benefits.

Essential Guidance

IT leaders in organizations around the world are wrestling with many of the same challenges as they seek to extend virtualization while capitalizing on the continuing digital deluge (rather than capsizing in it). They are looking for storage system and storage management solutions that improve the use of existing IT assets while providing the flexibility to meet future needs. Meeting these objectives, however,
requires more than just identifying the right use case and selecting the right solution. IT teams also need to make wise implementation decisions that shield them from costly system reconfigurations, slow storage migrations, and inefficient IT operations.

IT managers who acquire storage products must evaluate suppliers based on more than just which company is providing the cheapest or highest-performing systems. IT managers need partners that can help them overcome or avoid the traditional shortcomings that doom new investments:

- Underuse of installed assets
- Less-than-optimal data/application availability
- Excessive administrative overhead

IT managers should judge suppliers based on how well their complete solutions allow IT to optimize the use of IT investments now and for an extended period. They also need to look for business partners that leverage emerging solutions to address specific application and business challenges while delivering faster, more consistent implementations with minimal risk of disruption to applications, processes, and business operations.

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