WHITE PAPER

Customer Storage Priorities — Breaking down Storage Tradeoffs

Sponsored by: Infinidat

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IDC OPINION

Enterprise storage environments are increasingly strained in handling organizations' data requirements. Based on the broadening adoption of cloud, mobile, social, big data, and Internet-of-things technologies, the IT industry is shifting to a new platform for industry and enterprise innovation and growth. This 3rd Platform of computing will enable the transformation of every industry in the coming years and beyond.

As they look to leverage 3rd Platform technologies to achieve new competitive advantages and growth opportunities, organizations are more dependent than ever on their IT infrastructure in general and on their storage systems in particular to execute this transformation. Nevertheless, many of them are coping with a situation in which data growth outpaces storage capacity growth and in which budgets are not increasing proportionally to the increasing needs for storage space and performance.

Hindered by budget constraints and the limitations of current storage architectures, organizations are increasingly forced to compromise on key requirements for storage performance, capacity, scalability, reliability, manageability, and cost. To avoid these increasingly unacceptable compromises, a need exists for new architectures that can turn enterprise storage into a true enabler rather than a problem to be solved.

IN THIS WHITE PAPER

This IDC White Paper discusses the storage challenges facing enterprises, focusing on budget and architectural constraints that are forcing customers to constantly compromise between capacity, performance, reliability, ease of use, and cost. This report presents key findings from an IDC end-user survey and provides an overview of Infinidat, an emerging storage vendor that aims to tackle these challenges based on a new storage architecture model.

METHODOLOGY

Information for this White Paper came from an April 2015 IDC end-user survey. IDC reached out to enterprises in the banking, insurance, business services, communication service provider, healthcare, manufacturing, and retail/wholesale industries to gain insight into their storage priorities, challenges, and investment plans. In all, 254 businesses from the United States, the United Kingdom, France, and Germany responded to the survey. The respondents were at the director level or above, ranging from IT management roles (e.g., storage manager, IT director, and storage administrator) to C-level executives (e.g., CTO and CIO). All respondents were involved in decision making for storage, including the acquisition of storage solutions and/or the management of storage solutions in their companies.

SITUATION OVERVIEW

The computing world undergoing a period of dramatic change driven by the convergence of mobility, social networks, cloud computing, virtualization, big data analytics, the Internet of things, and other technology megatrends, which IDC refers to as the 3rd Platform of IT. The cause of this tectonic shift is data. We are heading into an era in which businesses expect to be able to leverage data regardless of format, regardless of where it resides – for any purpose, in any action they take, anytime, anywhere.

Data is becoming a key enabler of business, and enterprise IT infrastructure must be adapted accordingly. Enterprise storage plays a key role in this regard. As the layer in which data lives, storage should be able to store and keep available huge volumes of data and scale with data growth, all in a cost-effective manner. It must also provide unprecedented levels of reliability, as any loss, unavailability, or even inability to access data in a timely manner has a direct impact on business performance.

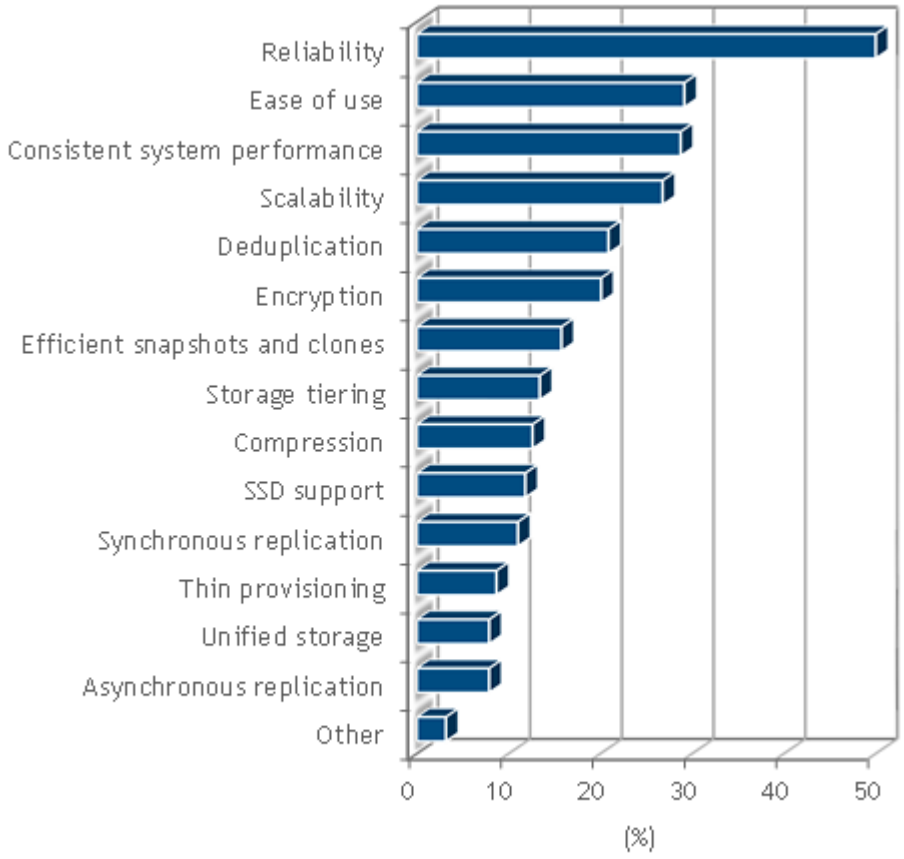
This complicated set of requirements is placing the storage industry at a crossroads. As they struggle to address the ever-growing demand for capacity, performance, reliability, flexibility, and ease of use that are essential to support ongoing business operations in the 3rd Platform era, organizations are constantly pushing their storage infrastructures to the limit. As a result, they frequently deal with operational issues.

Concerns over getting the value expected from storage systems are evident in the results of our recent IDC end-user research. When asked which feature and capability is the most important when purchasing storage systems, exactly one-half of the respondents selected reliability. Other key capabilities included ease of use and consistent system performance (29% each), as well as scalability (27%). In other words, customers expect first and foremost that their storage infrastructure will be up and running with minimal disruption. Then it should be able to meet their performance and scalability/capacity requirements.

FIGURE 1

Most Important Storage Features and Capabilities

Q. Which of the following features and capabilities are the most important when purchasing storage systems?



Note: Total = 254

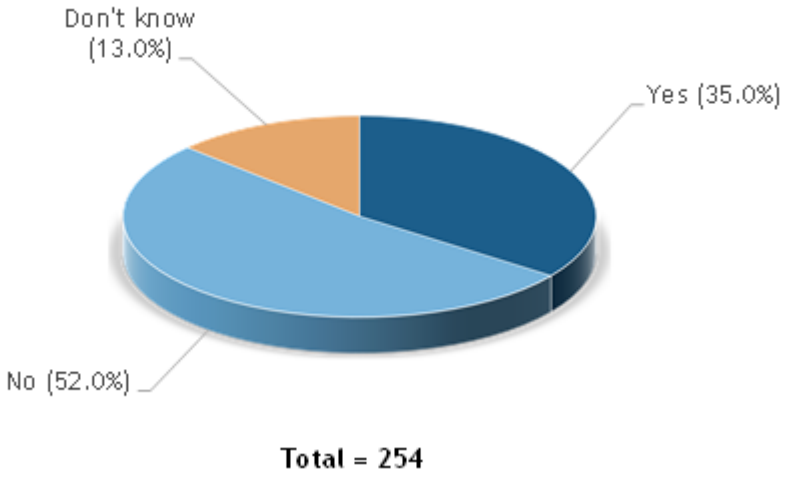
Source: IDC, 2015

The need for improved reliability makes sense, as, according to IDC's survey, many customers are facing availability challenges. Apparently, even in our modern IT infrastructure, storage outages are a common phenomenon. More than one-third (35%) of the respondents reported that their organizations experienced at least a single event of storage service unavailability over the past 18 months. Storage outages appear to be more common among larger organizations. More than one-third (37%) of organizations with 10,000 employees or more and 36% of organizations with 5,000–9,999 employees, reported storage unavailability events, compared with 33% of organizations with 2,400–4,999 employees.

FIGURE 2

Frequency of Storage Service Unavailability Events

Q. Has your organization experienced any storage service unavailability over the past 18 months?



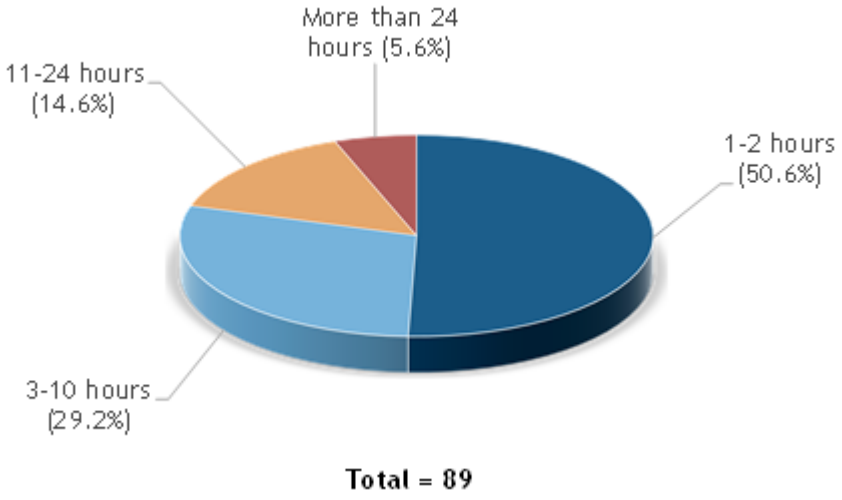
Source: IDC, 2015

Demand for improved reliability is understandable, since storage unavailability can have severe consequences on business performance. However, one-half of the organizations that experienced a storage service unavailability event or events over the past 18 months reported an outage of more than two hours. More than a quarter (29%) of the respondents reported an outage of 3-10 hours, while 15% reported an outage of 11-24 hours. Furthermore, 6% of the respondents reported a severe outage of more than 24 hours.

FIGURE 3

Duration of Storage Service Unavailability Events

Q. How much time, on average, were your services/applications unavailable during a storage outage?



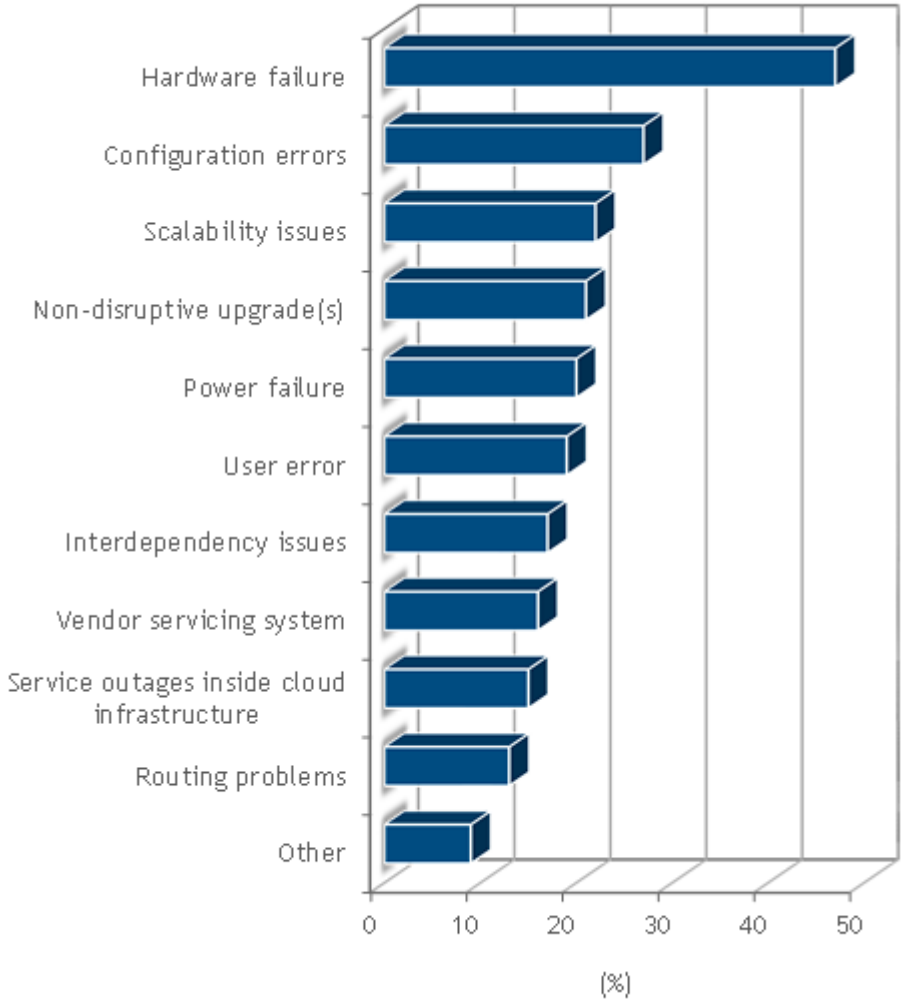
Source: IDC, 2015

Hardware failure is the primary cause of storage unavailability or reduced availability, as mentioned by 47% of the respondents. Other common causes include configuration errors (27%), scalability issues (22%), a non-disruptive upgrade or upgrades (21%), power failure (20%), and user error (19%).

FIGURE 4

Causes for Storage Unavailability Events

Q. To your best knowledge, what were the primary causes for storage unavailability or reduced availability in your organization in the past 18 months?



Note: Total = 89

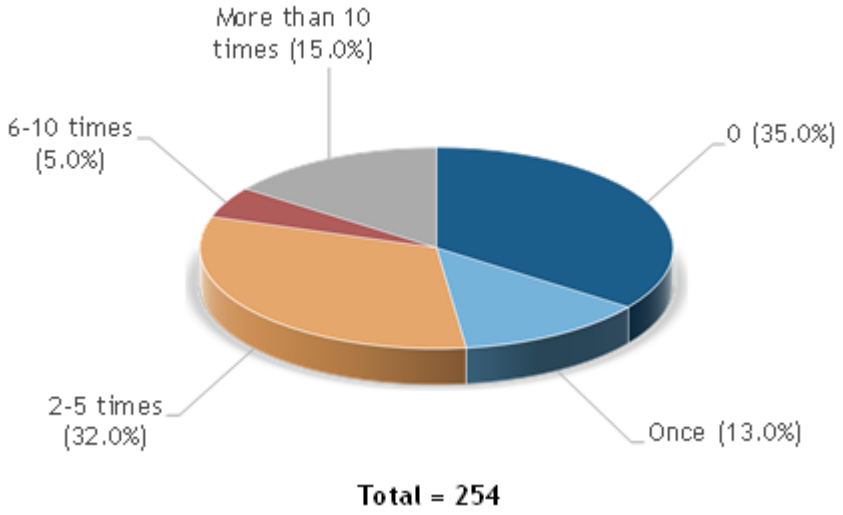
Source: IDC, 2015

The need for improved hardware reliability is also evident in the fact that 65% of the respondents experienced at least a single disk (hard disk drive [HDD] or solid state drive [SSD]) failure event over the past 18 months. Again, these events involved long recovery, as 57% of the respondents reported a rebuild time of more than two hours.

FIGURE 5

Frequency of Disk Failure Events

Q. How many times has your organization experienced disk (HDD or SSD) failure events over the past 18 months?

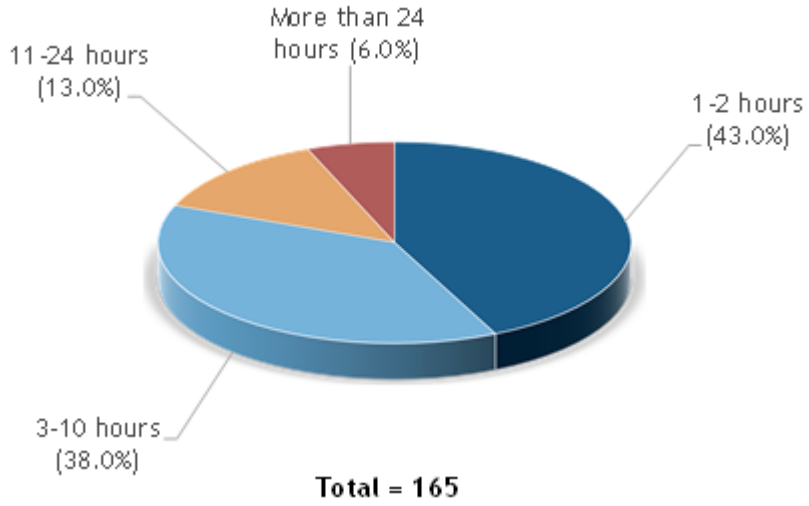


Source: IDC, 2015

FIGURE 6

Disk Rebuild Time

Q. How much time did it take your organization, on average, to recover (rebuild) from a disk failure event?



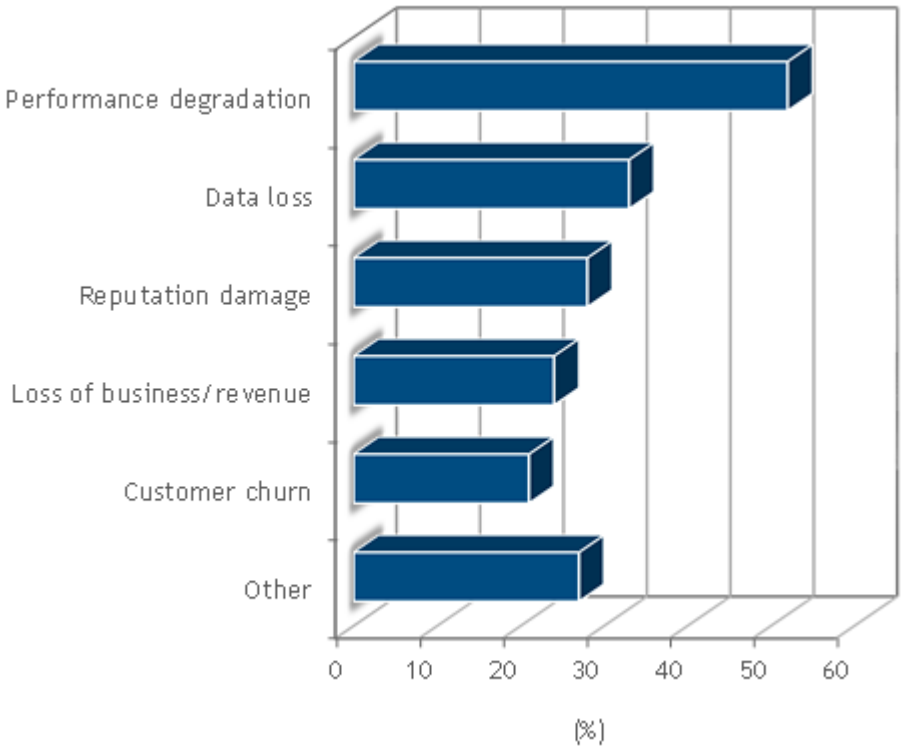
Source: IDC, 2015

Performance degradation was the most common damage caused by disk failure, as mentioned by 52% of the respondents who reported at least a single disk failure event, followed by data loss (33%), reputation damage (28%), loss of business/revenue (24%), and customer churn (21%).

FIGURE 7

Damage from Disk Failure Events

Q. Have you experienced any of the following damage due to disk failures over the past 18 months?



Source: IDC, 2015

These statistics clarify why customers do not feel they are getting adequate levels of reliability and availability from their storage systems. To a large extent, lack of reliability is a major symptom of the current state of enterprise storage. But many other symptoms of this problem hinder organizations from effectively utilizing their storage. This problem is rooted in the way storage systems have traditionally been designed and deployed.

Storage Cost Constraints

On the surface, thanks to major technological achievements in the storage industry, organizations have more options than ever to design, deploy, and manage a storage infrastructure that is suitable for their needs. But why, despite the availability of innovative technologies and concepts in the market today, are customers still required to compromise on capacity, performance, and/or reliability? For the most part, it is a matter of cost effectiveness. In theory, storage compromises could be largely avoided if no limits existed on the amount of hardware that can be thrown at the problem or on the ability to combine various storage architectures to take advantage of the unique strengths of each. In practice, cost and architectural constraints make this unfeasible for almost any organization.

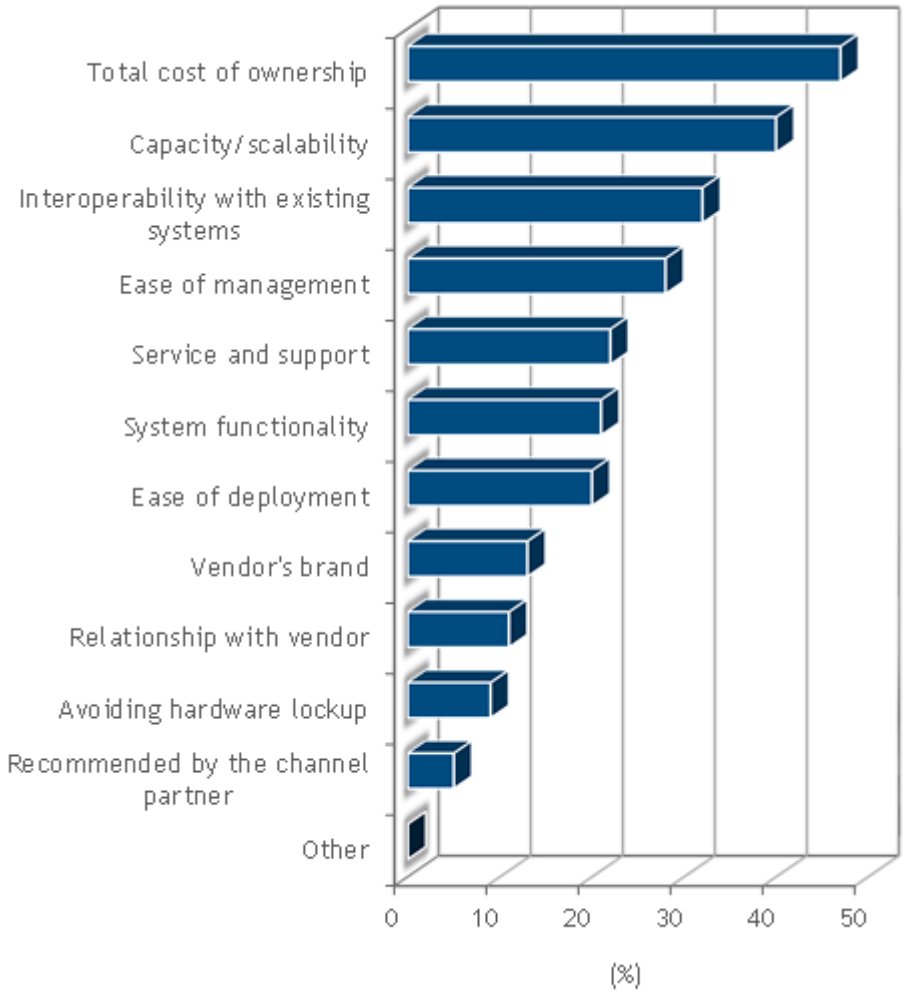
The need for cost control also has a critical influence on organizations' storage purchase decision making. Almost a half (47%) of the participants in IDC's survey mentioned total cost of ownership (TCO) as the most critical factor in their decision to purchase a storage system, followed by capacity/scalability (40%). Not surprisingly, TCO was particularly critical for large companies (with 10,000 employees or more); it was selected by 52% of the respondents in this category. Among TCO

components, hardware costs are clearly the biggest item, as respondents mentioned adding more storage capacity (46%) and hardware replacement (45%) as the main storage cost components.

FIGURE 8

Key Factors Influencing Storage Purchase Decisions

Q. What are the most critical factors in your decision to purchase a storage system?

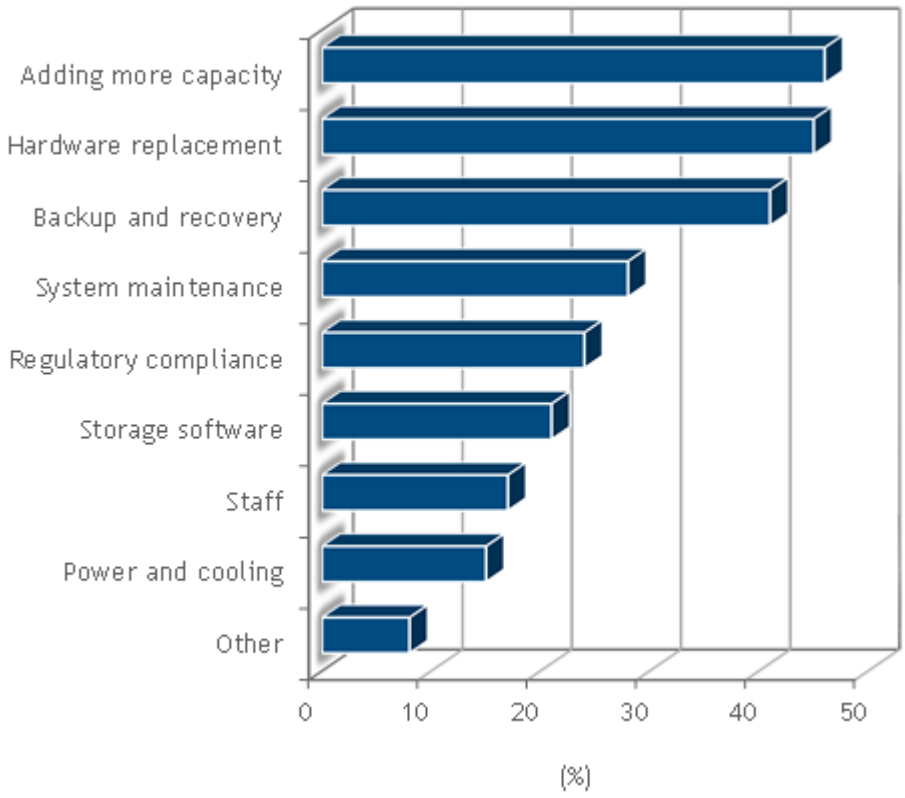


Source: IDC, 2015

FIGURE 9

Storage Cost Components

Q. Which of the following components accounted for the majority of your storage costs over the past 18 months?



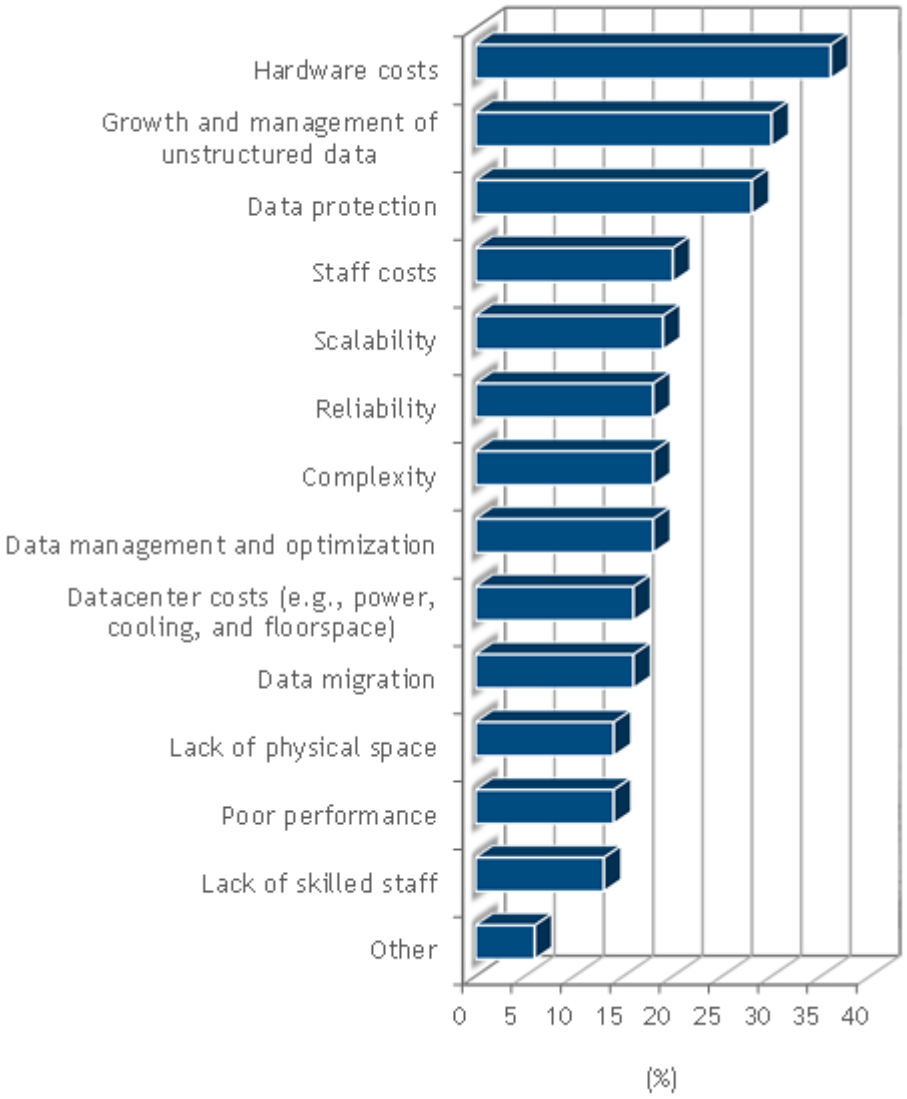
Source: IDC, 2015

Furthermore, 36% of the respondents selected hardware costs as their biggest storage challenge. These findings reflect the current situation, in which organizations must keep increasing their hardware investments (initial purchase and replacement) to accommodate data growth.

FIGURE 10

Storage Challenges

Q. What are your organization's biggest storage challenges?



Note: Total = 254

Source: IDC, 2015

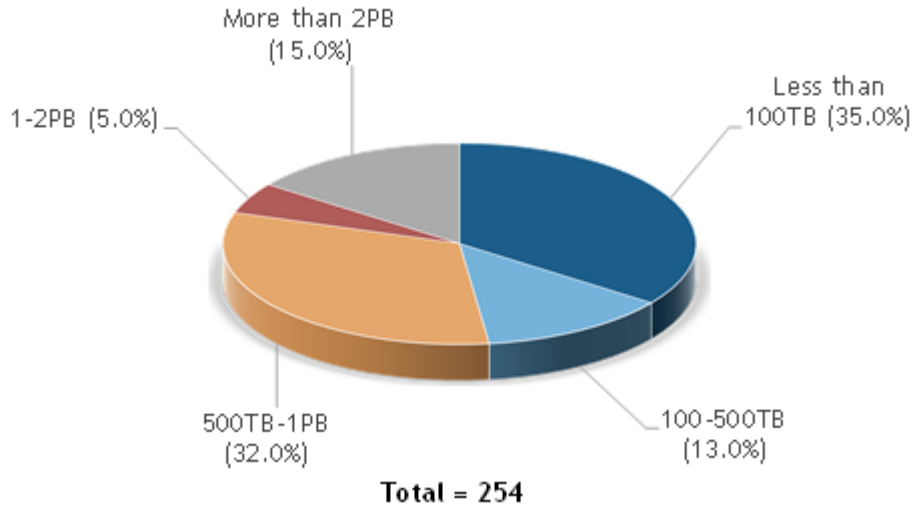
Beyond the hardware CAPEX, storage growth leads to a substantial increase in OPEX (e.g., system maintenance and staff). Power and cooling are other major cost factors, as is evident from 15% of the respondents in IDC's survey mentioning it as the budget component that accounted for the majority of their storage costs over the previous 18 months. This number reflects the overall increase in datacenter power and cooling costs, which, according to IDC's estimations, may account, on average, for around 25% of corporate datacenters' entire annual operating budgets. Storage is a major consumer of datacenter power and cooling resources due to the large amount of heat emitted during the processing of I/O requests.

Another significant cost component is datacenter footprint. Due to the massive workloads executed in datacenters today, organizations often fully utilize their power and cooling capacities while they are still far from using their entire floor space, which requires additional CAPEX to build a new datacenter. This problem is expected to be exacerbated in the coming years, in parallel with the continuous data explosion and the massive increase in I/O overhead. In this situation, petabyte-scale data growth is likely to become common among enterprises. However, according to IDC's survey, the majority of organizations are not quite prepared for such massive growth. In fact, only 16% of the respondents estimated the average density of the usable storage capacity in their organization at more than 1PB per floor tile. An average density of less than 500TB per floor tile was reported by two-thirds of the respondents.

FIGURE 11

Average Density of Usable Storage Capacity

Q. What is the average density of the usable storage capacity (per floor tile) in your organization?



Source: IDC, 2015

Limitations of Storage Architectures

As storage costs continue to escalate, budget constraints increasingly prevent organizations from meeting their targets. IDC's research consistently shows that corporate storage budgets do not increase proportionally to the growing needs for storage space. And, as mentioned above, limited datacenter footage, growing operational costs, data management complexity, and other issues create additional pressure for end users to look for more efficient ways of using their existing storage assets. As they do so, organizations are often faced with the limitations of current storage architectures, which force them to settle on key requirements. This is where different storage compromises typically begin to surface.

The limitations of legacy storage architectures are becoming increasingly apparent as the unfolding 3rd Platform revolution continues to drive the need for computing and storage at scales and in densities never before seen in the IT industry. As storage environments continue to grow at an unprecedented pace, they also become more complicated to manage.

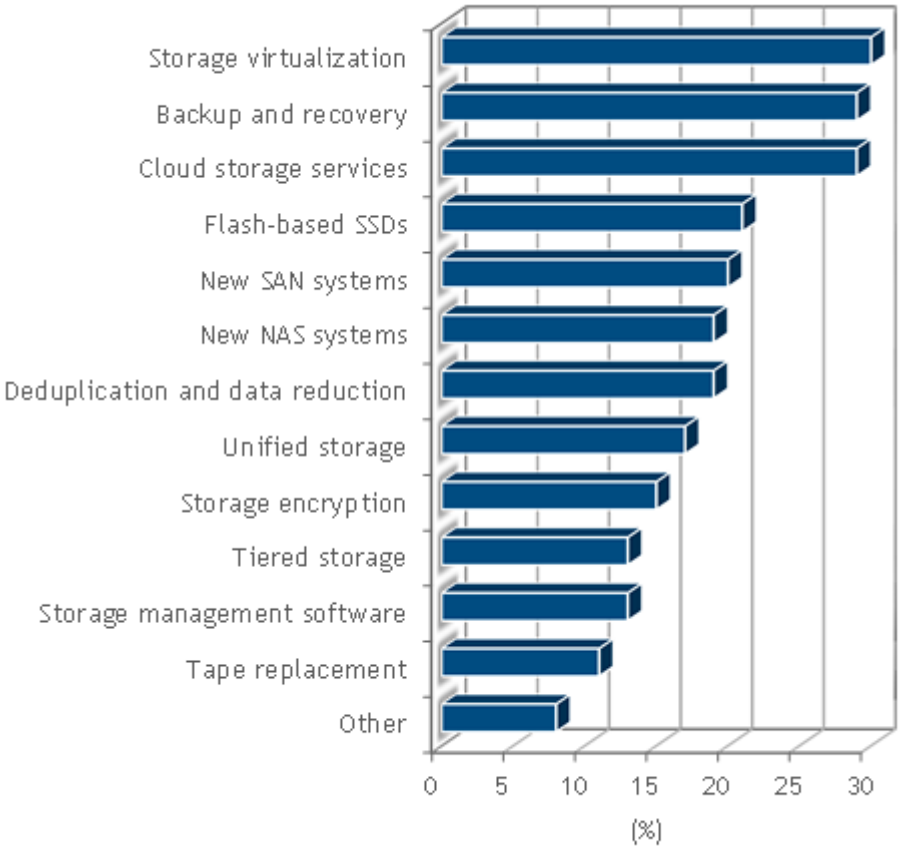
IDC's research finds that traditional workloads (e.g., relational databases, messaging and collaboration systems, and file-based home directories) are being actively migrated to virtual infrastructure by most businesses. That same infrastructure is being used to host a variety of new 3rd Platform computing workloads, driven by mobile computing, social media, big data analytics, and cloud storage. These mixed virtual workload types place demands on storage performance, scalability, and agility that cannot be met in a cost-effective manner by legacy storage architectures.

IDC's recent end-user survey provided a strong indication of this trend, as 30% of the respondents mentioned storage virtualization as the area in which they plan to make the most significant investment in the next 12–18 months. Close behind, 29% of the respondents mentioned cloud storage services as their primary investment area.

FIGURE 12

Storage Investment Priorities

Q. In which of the following areas does your organization plan to make the most significant investment over the next 12–18 months?



Note: Total = 254

Source: IDC, 2015

The migration from legacy architectures built around monolithic scale-up designs to newer architectures including hybrid storage arrays, software-defined storage platforms, and public cloud-

based storage is essential in order to make storage environments ready for the 3rd Platform. This change is also fueling demand for new solutions to tackle the growing complexity of managing such heterogeneous storage environments.

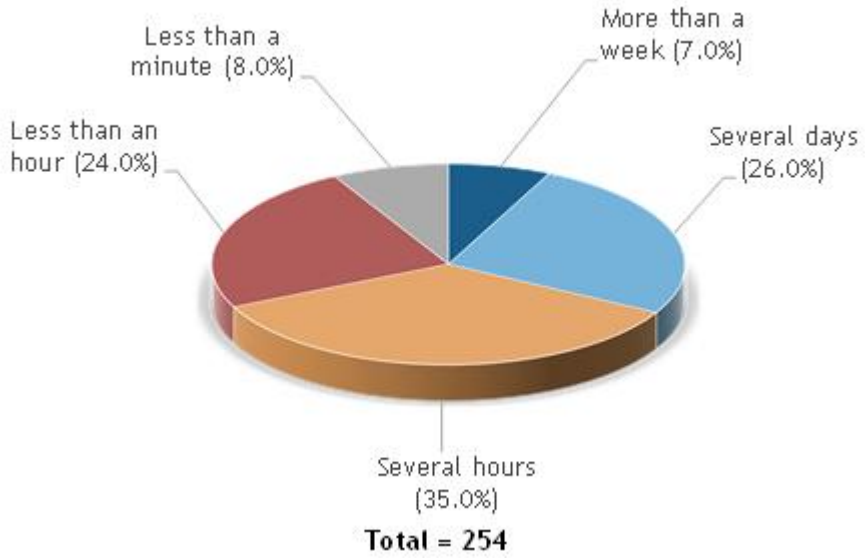
Legacy storage systems have traditionally been highly complex and environment-specific. As a result, storage administrators had to deal with multiple management tools, each of which with its own graphical user interface (GUI) and command line interface (CLI). Furthermore, many of these traditional storage tools were designed years before the cloud era; hence they are still highly reliant on tedious, time-consuming, and error-prone manual tasks. The inefficiency of legacy storage management tools is manifested, for example, in application recovery tasks. The process of restoring a single logical unit (LUN) to the point before it was corrupted might have been relatively straightforward in monolithic environments. Now, however, given the multiple application dependencies and as IT operational tasks are increasingly performed in VM management platforms, this approach can no longer scale.

LUN provisioning is another example of a complex, time-consuming process when done manually, as it requires both storage and host configuration. Furthermore, the process must be repeated every time a new host is installed. IDC's survey showed that, despite the growing availability of tools to automate storage management procedures, routine processes such as LUN provisioning are still time consuming. An overwhelming 33% of the survey respondents reported that, in their organizations, provisioning a new LUN (LUN and a file system on the host) typically takes several days or more. More than one-third (35%) of the respondents spend several hours on this process, while 32% spend less than an hour.

FIGURE 13

LUN Provisioning Time

Q. How long does it typically take your organization to provision a new LUN?



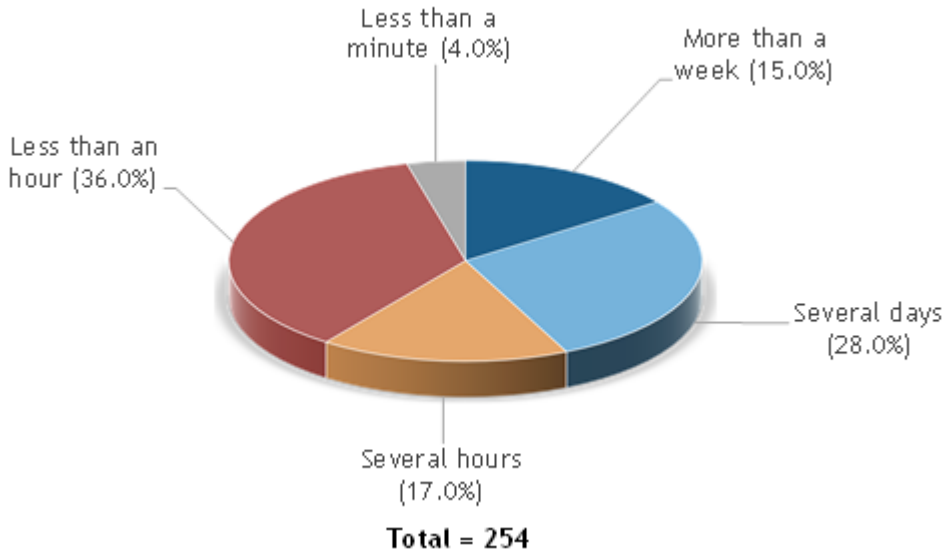
Source: IDC, 2015

Similar findings were reported with regard to the provisioning of new NAS file systems, another common operational task in storage environments. In this case, 43% of the respondents reported that this process typically takes several days or more, including 15% who reported a provisioning time of more than a week.

FIGURE 14

NAS Provisioning Time

Q. How long does it typically take your organization to provision a new NAS file system?



Source: IDC, 2015

Given these statistics, it is clear that reducing operational complexity and automating routine tasks are becoming acutely important in order to achieve operational agility in the 3rd Platform era. This fact was further evident in IDC's survey, with results highlighting storage management as a critical issue – one that influences storage purchase decisions. Most notably, interoperability with existing systems (32%) and ease of management (28%) were selected among the top three factors by the respondents (see Figure 12).

FUTURE OUTLOOK

The Need for New Storage Architecture

In the 3rd Platform era, organizations are highly dependent on their IT infrastructure to maintain their productivity and deliver critical, revenue-generating, services. As a result, they require unprecedented low latencies, rock-solid reliability, 24/7 availability, massive throughput and scalability, rapid response, and low cost for their primary applications. Settling for anything less may have an immediate negative impact on their business performance. In addition, customers expect their storage environments to be flexible enough to support their secondary applications with many of these capabilities, but at a significantly lower cost and with lower levels of absolute performance.

To address this exacting set of requirements, demand is rising for new storage architectures that are natively designed for the 3rd Platform. I/O profiles in these environments have also changed. In the older, dedicated-application, server model, it was easier to tune storage to meet the specific requirements of a particular application. In the new environment, the data streams and data sets of mixed virtual workloads will demand hundreds of thousands to millions of I/O operations per second, exhibit a variety of read/write ratios, and use a wide distribution of block sizes. They are also heavily skewed toward random I/O, have a high percentage of data that is reducible, and are characterized by I/O bands that drift over time. Flash is required to handle this kind of I/O profile in a cost-effective manner. In addition, features including inline data reduction, VM-aware storage management, self-

provisioning, and self-tuning storage performance will become essential in order to tackle the complexities of managing modern storage environments in the 3rd Platform era.

ABOUT INFINIDAT

Infinidat is a storage system developer that aims to eliminate the need for compromises between storage capacity, performance, reliability, and cost. The company has developed a proprietary technology that enables it to turn standard, off-the-shelf, components into an enterprise-grade storage system for data-intensive applications. According to Infinidat, it can provide up to five times more usable capacity per dollar than traditional storage systems without compromising on the system's performance or reliability, all while reducing storage-related OPEX.

Infinidat's flagship product, InfiniBox, is a unified storage system that provides SAN (block), NAS (file), and Object storage under a single platform. The product serves as a data hub for enterprise customers, offering 2PB of usable capacity in a single 42U rack, over 12GB per second of sequential throughput and memory, and SSD Cache capacity of 25TB per system. According to Infinidat, the product's architecture enables it to ensure uptime of 99.99999% (less than three seconds of downtime per year); to sustain failures at the controller, disk, and disk enclosure levels, as well as uninterruptible power supply (UPS) and power distribution unit (PDU) failures; and provide 15-minute disk rebuilds with dual-parity RAID data protection. Other functionalities InfiniBox provides include the ability to create multiple snapshots without performance impact, as well as enabling advanced storage management, including the automation of multiple tasks, embedded HMTL5 Web-based GUI, cross-platform CLI and RESTful application programming interfaces (APIs), and integration with OpenStack, VMware, and other environments. The product was designed as a green storage solution with an energy consumption of 8KW at peak and floor space of 0.72 sq m.

Infinidat was founded and is headed by Moshe Yanai, a prominent storage entrepreneur who led the development of EMC's Symmetrix system, which created the concept of SAN. After leaving EMC, he founded Israeli storage startup XIV in 2003, which was acquired by IBM in 2007.

Infinidat raised a total of $230 million in funding, including a recent $150 million round led by private equity firm TPG Growth at an estimated valuation of $1.2 billion, to support its global expansion.

OPPORTUNITIES/CHALLENGES FOR INFINIDAT

Infinidat caters primarily to the high-end storage market, where it faces competition from the storage incumbents. The company spent a long time in stealth mode, focusing on the development of a series of proprietary technologies aimed at introducing a new storage architecture and concept. Eliminating traditional storage compromises was a key design goal in Infinidat's R&D efforts. As depicted in this report and as is evident in IDC's recent end-user research, organizations are increasingly facing the need to balance conflicting demands for capacity, performance, reliability, ease of use, and cost. Meanwhile, as a growing number of businesses are using 3rd Platform technologies to develop new types of competitive advantages, IT departments are under pressure not to compromise on any of these requirements.

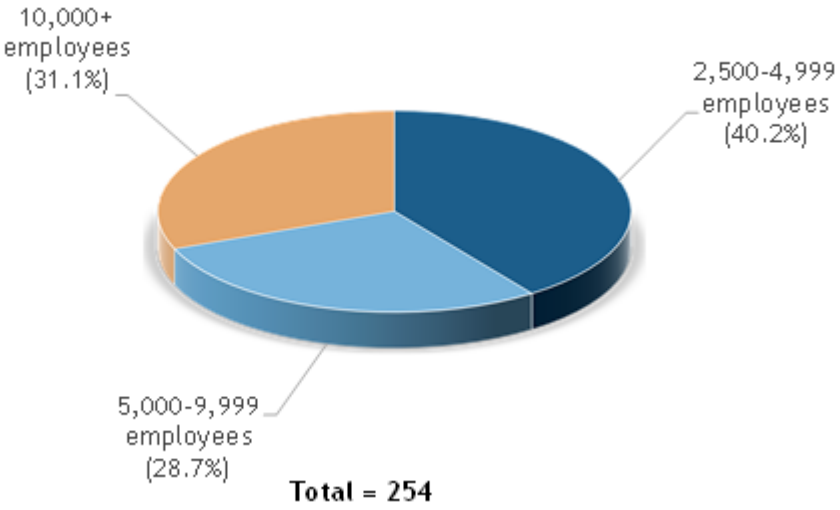
Given the rapid transformation of the IT industry, IDC expects rising demand for new storage architectures such as those provided by Infinidat, which are natively designed for the 3rd Platform era. As it looks to capitalize on this opportunity, the company is likely to face intense competition from the storage market incumbents. In order to establish its position in the high-end market for storage systems, Infinidat will have to invest significantly in developing its worldwide sales organization and channel strategy. In addition, it is recommended that Infinidat identify specific use cases and target audiences that are likely to be in need of new storage models, especially fast-growing organizations with intensive computing needs.

APPENDIX

Survey Demographics

FIGURE 15

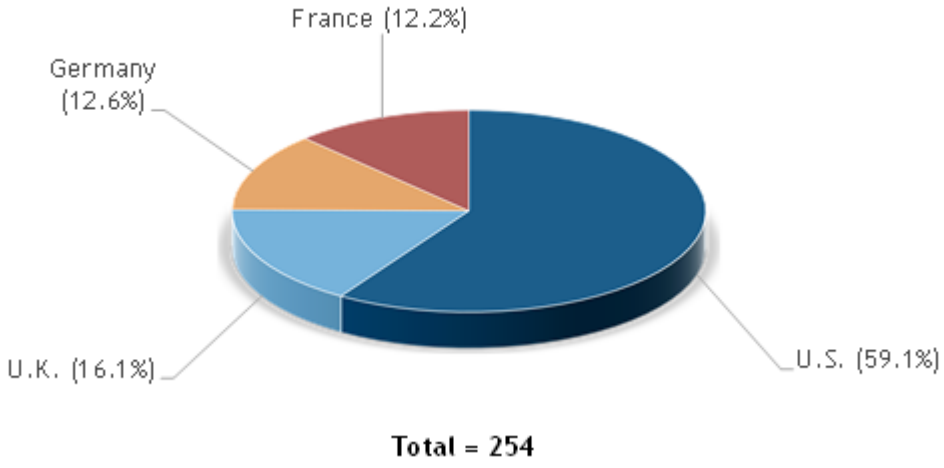
Survey Sample by Company Size



Source: IDC, 2015

FIGURE 16

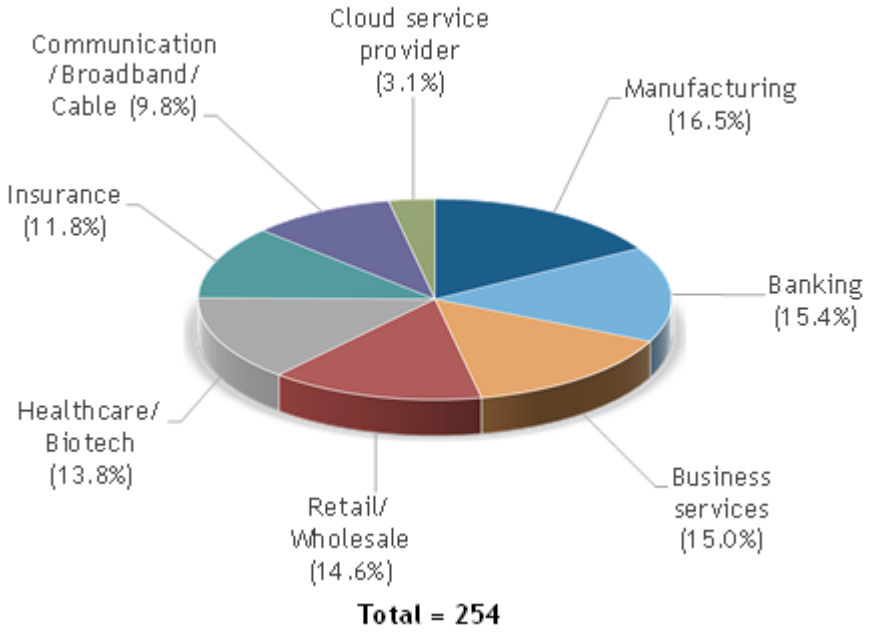
Survey Sample by Country



Source: IDC, 2015

FIGURE 17

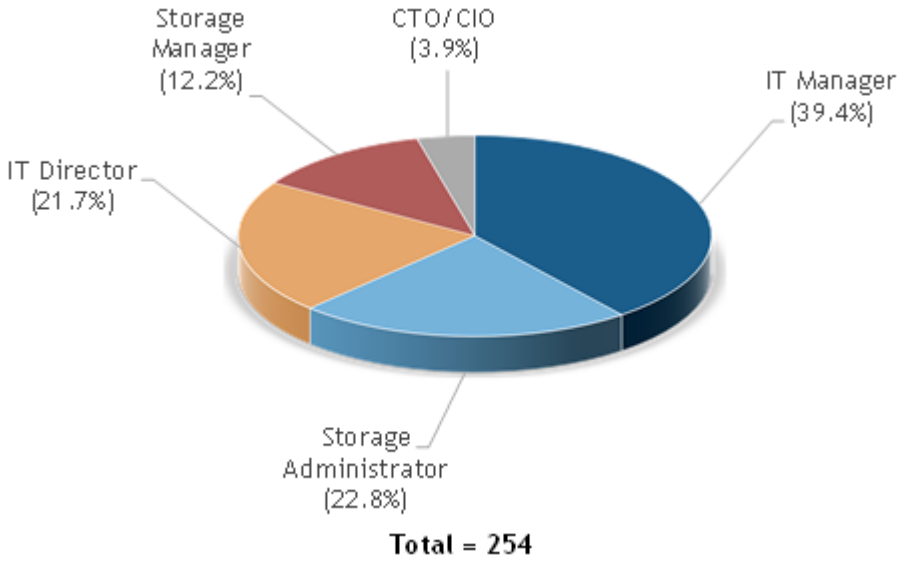
Survey Sample by Industry



Source: IDC, 2015

FIGURE 18

Survey Sample by Business Role



Source: IDC, 2015

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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