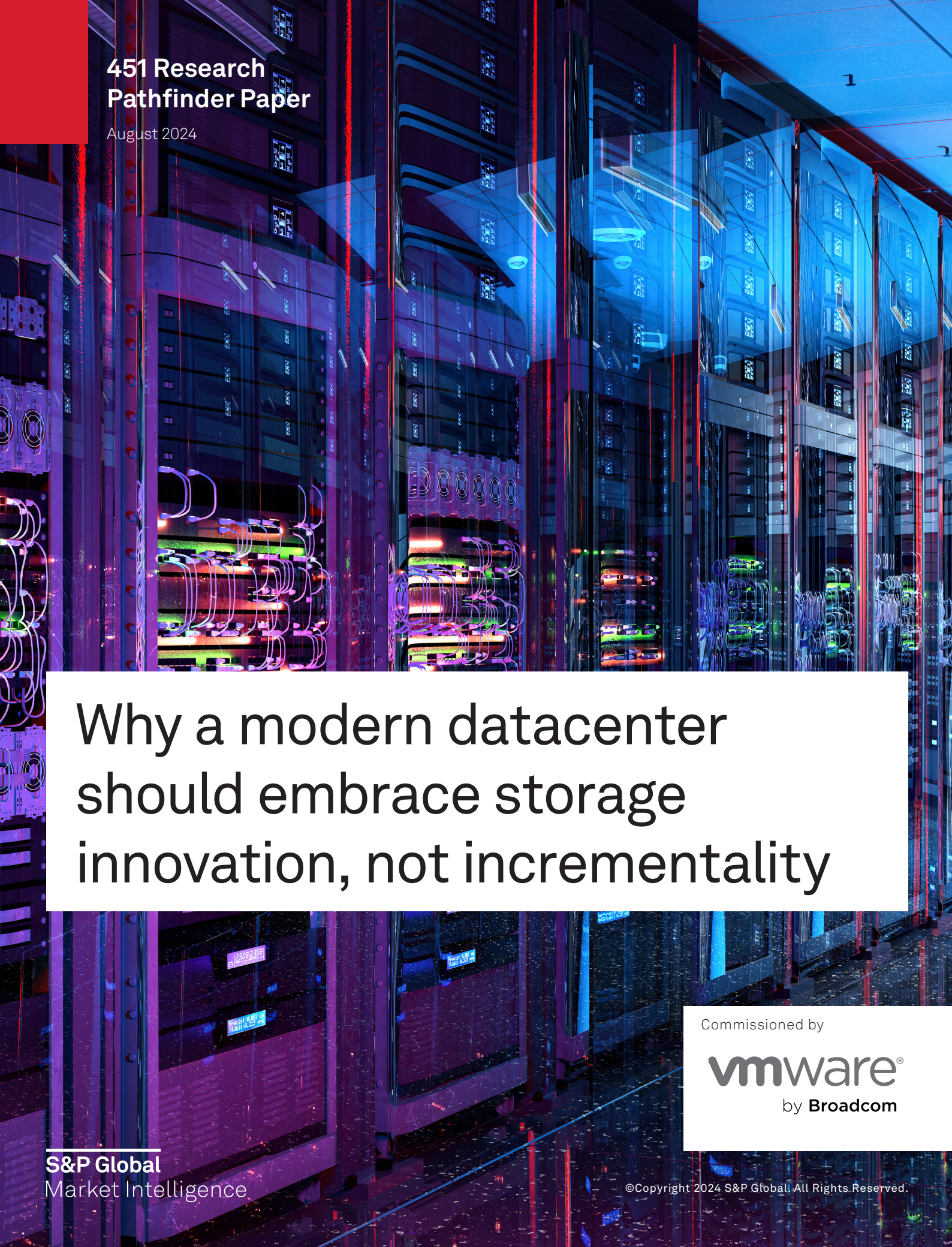


451 Research
Pathfinder Paper

August 2024

Why a modern datacenter should embrace storage innovation, not incrementality

Commissioned by

vmware® by Broadcom

S&P Global
Market Intelligence

Table of contents

Executive summary

Storage challenges are intensifying at an alarming rate, and they will only get worse as data volumes continue to grow rapidly. In a recent 451 Research survey, respondents ranked the ability to efficiently manage data across third-party and public cloud environments as their second highest pain point, which highlights how important it is for organizations to upgrade their capabilities in this area.

Cost is a key concern for organizations considering storage infrastructure purchases, and this includes both acquisition and operational costs. Regarding operational costs, organizations are not just concerned with storage management costs, but also with the growing impact of environmental, social and governance (ESG) requirements, which are placing pressure on organizations to reduce their rack space and power consumption along with their CO2 emissions.

Although appliances have been a popular choice to fulfill data storage requirements, newer offerings that leverage software-defined storage and hyperconvergence have the potential to deliver cost, efficiency and performance improvements. Newer storage architectures with scale-out designs and the ability to effectively leverage flash storage media can handle storage requirements more efficiently than existing storage arrays. Organizations should also consider proactive, AI-enhanced management tools and automation to reduce operational burdens while improving the reliability and flexibility of their storage infrastructure.

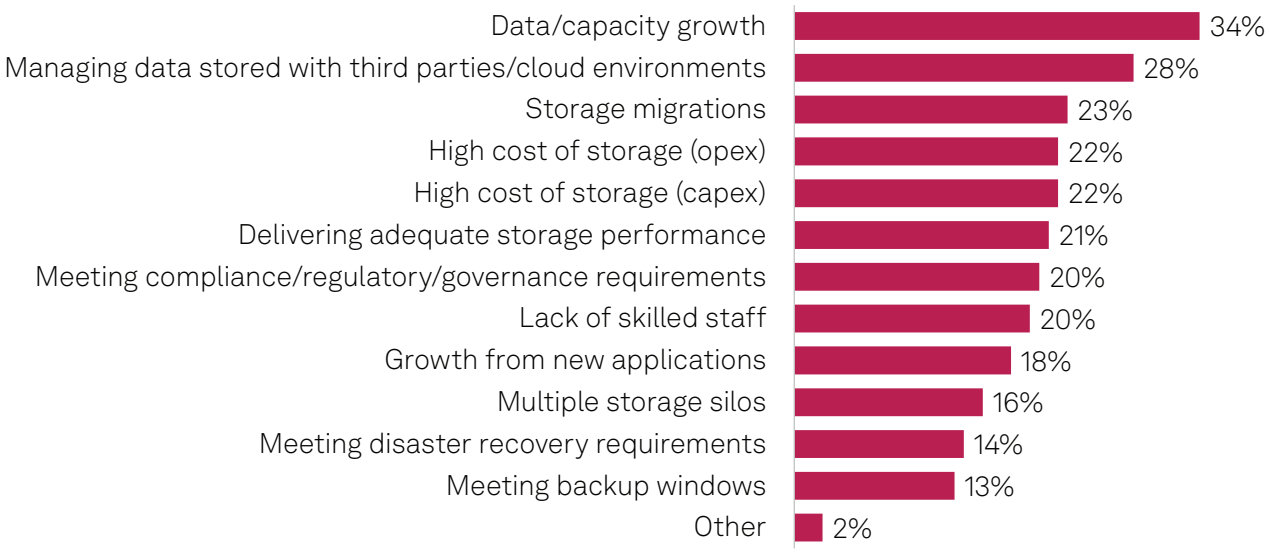
Key findings

- Rapid data growth remains the top reported storage challenge, cited by 34% of respondents. Surveyed organizations on average expect the volume of data under management to grow 23% over the next 12 months.
- Managing data across third-party and cloud environments is the second highest storage pain point, according to survey respondents; this will drive the need for software-defined storage capabilities.
- More than two-thirds (68%) of respondents either experienced or expect significant storage price increases (above 10%).
- One in five respondents (20%) cited a lack of skilled staff as a top storage pain point.
- Top ESG goals associated with storage decisions include reduced power and rack space consumption, extended life cycles for storage systems and reduced carbon emissions.
- Insufficient performance from on-premises and cloud storage systems has negatively impacted 37% of respondents in the past three years. These performance issues have led to a loss of employee productivity, decreased employee satisfaction and disruption for software development teams, among other negative outcomes.
- Storage management is a top area in which organizations are looking to leverage automation to improve IT operations.

Organizations face numerous storage and data management challenges

Data storage has long been a key area of concern for organizations, but rising challenges (see Figure 1) and the emergence of workloads such as AI are increasing the urgency for organizations to revamp their storage infrastructures to improve across a wide variety of dimensions to enhance scalability, performance, data mobility and management across cloud environments, and to assist organizations that are having difficulty filling skill gaps.

Figure 1: Data growth and management across environments are top challenges



Q. What are your organization's top pain points from a storage perspective? Please select up to three choices.
Base: Follow-up survey respondents whose organizations use various storage systems (n=128).
Source: 451 Research's Voice of the Enterprise: Storage, Budgets and Optimization 2024.

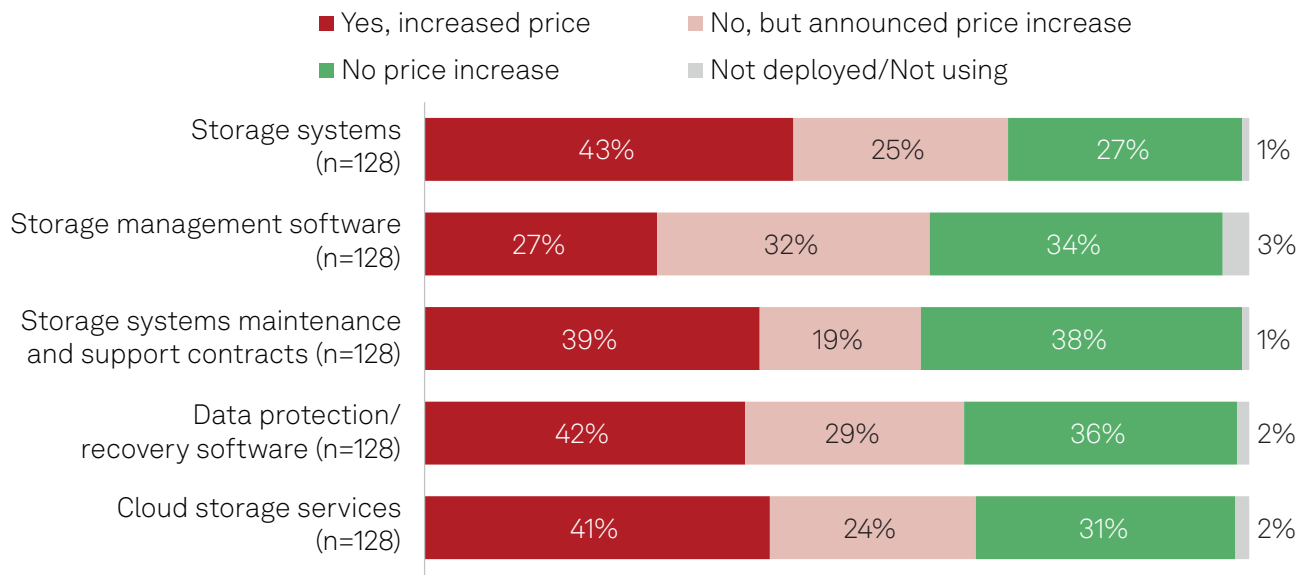
Scaling is required to accommodate storage growth

According to a recent 451 Research survey, respondents expect data under management to grow by 23% on average over the next 12 months, and this constant growth is the top reported storage challenge for enterprises and midsized companies. About one in eight organizations (12% of respondents) expect annual data growth exceeding 50%, while just 1% expect their volume of data under management to shrink. Storage infrastructures must evolve to better handle data capacity growth while keeping management burdens under control.

Storage costs are rising

While storage systems have historically gotten less expensive on a cost-per-terabyte basis over the years, supply chain shortages and inflation have changed that dynamic. In our Voice of the Enterprise: Storage, Budgets and Optimization 2024 study (see Figure 2), 43% of respondents reported that they have recently experienced significant storage system price increases, while an additional 25% said they expect price increases in the near future. Organizations are also dealing with price increases for storage system maintenance and support contracts, with 39% reporting recent price increases and an additional 19% expecting increases soon. Data protection and recovery software is an area of concern as well, with 42% reporting increased prices and an additional 29% expecting price increases soon.

Figure 2: Significant price increases for storage systems are common



Q. Over the past 12 months, have the vendors and/or service providers you currently use implemented or announced a price increase (10% or higher) on any of the following categories?
Base: Follow-up survey respondents whose organizations use various storage systems (n=128).
Source: 451 Research's Voice of the Enterprise: Storage, Budgets and Optimization 2024.

When evaluating total cost of ownership for storage, organizations must also evaluate the impact of rising operational costs, which could surpass the impact of acquisition costs over the life span of a storage system. In the study, an equal percentage of respondents cited high operating expenditure (opex) and capital expenditure (capex) costs as a top pain point (22% each). Opex costs not only include management and maintenance costs for storage systems, but also power and rack space costs, which have been rising due to inflation and other factors.

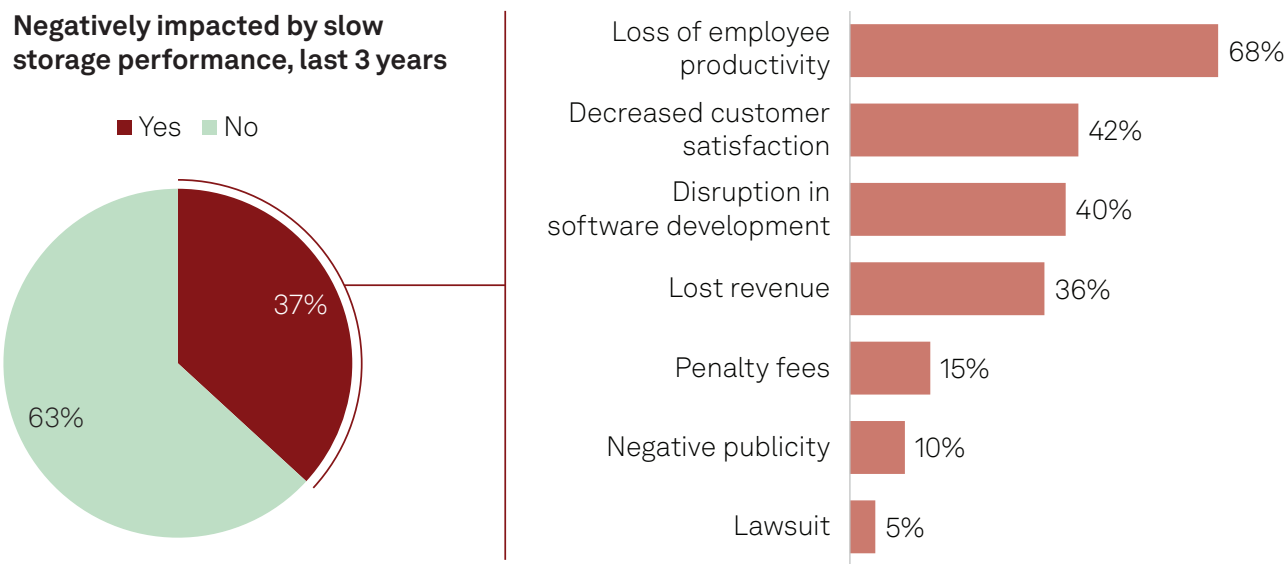
Hybrid and multicloud data management is complicated, and critical

Hybrid and multicloud infrastructures are the preferred landing spot for modernized workloads, according to the Voice of the Enterprise: Cloud, Hosting & Managed Services, Application Modernization 2023 study. However, respondents ranked the ability to manage data across public cloud and third-party environments as the second highest storage pain point. The issues related to data management for cloud also apply to edge environments and other remote locations where skilled IT staff may not be readily available to handle problems. Organizations are also looking for simplified and consistent management that can keep track of data regardless of where it resides because stakeholders often complain about the negative impacts of slow and inconsistent data access, especially for use cases where rapid data insights are required.

Inadequate storage performance has tangible consequences

More than a third of respondents have been impacted by poor storage performance either on-premises or with cloud storage services (see Figure 3). These performance-related incidents have led to several negative outcomes, including lost worker productivity (68%) and lost revenue (36%). Inadequate storage performance has also had a negative impact on the perception of the organization, including decreased customer satisfaction and negative publicity. In rare cases, these incidents have led to lawsuits against the organization and penalty fees for not meeting service-level agreement requirements.

Figure 3: Performance-related incidents impact productivity and customer satisfaction



Q. In the last three years, has your organization been negatively impacted by slow performance from an on-premises storage system or cloud storage service?
Base: Respondents whose organizations use on-premises storage infrastructure (n=353).
Q. What was the result of the slow storage performance incident? Please select all that apply.
Base: Respondents whose organizations were impacted by slow performance from their on-premises or cloud storage service (n=128).
Source: 451 Research's Voice of the Enterprise: Storage, ESG Attitudes 2023.

Skilled staff remain in short supply

A fifth of respondents in the study say that a lack of skilled staff is one of their top three storage pain points. Storage administration specialists have become rare and more difficult to attain in recent years; therefore, many companies have been forced to leverage IT generalists to take over specialist responsibilities such as the provisioning, tuning and patching of storage systems.

Lack of skilled staff is a dangerous issue for organizations because storage systems are equipped with essential data protection capabilities such as snapshots and replication, which are often required to rapidly recover data in the event of a disaster or a security incident. The expertise needed to locate potential issues and fix them before they become problematic can also help organizations avoid or reduce the downtime caused by incidents.

Without skilled staff, organizations cannot optimize resource consumption to prioritize performance-sensitive workloads and ensure that lower-priority workloads are not consuming excessive resources. Optimization can also help ensure organizations are not prematurely upgrading or expanding systems and will help keep storage infrastructure spending in check.

Five strategies to modernize storage

Storage modernization will be essential for organizations to keep up with growing demands for data accessibility, performance and resiliency. Next-generation storage infrastructures must have several key capabilities including flexible scale-up architectures, all-flash storage, cost optimization and forecasting, and intelligent management tools that not only keep track of on-premises systems but also data migrated to cloud environments.

Leveraging scale-out architectures can simplify storage management

While organizations have historically dealt with the data growth issue by purchasing larger storage systems following scheduled three- to five-year storage array refresh cycles, the age of blindly throwing new equipment at the issue is quickly coming to an end. Respondents to our Voice of the Enterprise: Storage, Budgets and Optimization 2024 study are struggling with data growth from new applications, while several also indicated that managing data across multiple storage silos is a top storage pain point.

Though dedicated on-premises storage systems are unlikely to disappear from customer datacenters anytime soon, organizations are looking to leverage alternative offerings to meet their storage needs, including public cloud storage and software-defined storage offerings such as hyperconverged infrastructure (HCI).

HCI is built on flexible scale-out architectures that can easily expand resources such as storage capacity through the addition of nodes. Newer iterations of HCI have granularity to allow customers to expand compute and storage capacity independently so they can add performance and/or storage capacity to an HCI cluster as needed. In contrast, when customers reach the scalability limits of a modular storage system, they often must purchase a larger replacement system and conduct time-intensive storage-migration operations to move data to the new system.

Using converged architectures can reduce datacenter and power consumption

More than 90% of respondents to our Voice of the Enterprise: Storage, ESG Attitudes 2023 study said that power efficiency and rack space consumption are somewhat or very important factors when choosing storage resources for their datacenters. Beyond the rising costs for power and rack space, organizations implementing GPU servers to drive AI projects may have to find ways to save in other portions of the infrastructure to accommodate the higher power consumption of these AI servers.

Although storage appliances such as fiber channel storage area network (SAN) arrays, network-attached storage (NAS) systems and unified storage arrays have been mainstays in traditional datacenters for decades, the need for modern and sustainable storage infrastructures opens opportunities for software-defined storage and hyperconverged systems.

Software-defined storage solutions run on commodity server hardware with the storage stack running as an application or as the operating environment for the hardware. Hyperconverged infrastructure systems are a form of software-defined storage that consolidates compute and storage resources on a common hardware platform.

With rack space, power and cooling costs greatly impacting the total cost of ownership of storage systems, organizations may benefit from HCI offerings because they consolidate compute and storage resources and allow customers to avoid adding racks of dedicated storage arrays to handle their data storage needs.

Leveraging all-flash storage can improve performance and consistency for primary workloads

The role of all-flash storage has expanded dramatically in recent years as storage performance and resiliency requirements have continued to rise. Nearly 9 in 10 (87%) respondents to our Voice of the Enterprise: Storage, ESG 2023 study are already using all-flash storage for their primary storage use cases. However, we note that only 23% of respondents reported using all-flash for all of their storage requirements, including secondary storage workloads such as backups and archiving.

Compared with legacy hybrid storage designs, which leverage hard drive and flash media together, the random-access capabilities of all-flash storage not only provide higher top-end performance, but they also provide the ability to seek and retrieve data faster than spinning-disk media, which use physical actuators to read and write data. The performance capabilities of all-flash storage should reduce the frequency of performance-related outages that we discussed above.

The consistent performance benefits of all-flash storage will likely be amplified further as server virtualization and containers drive data consolidation to shared storage resources. Many organizations have experienced the detrimental effects of “noisy neighbor” workloads, which are subject to utilization spikes that impact other workloads residing on shared infrastructure.

Selecting modern storage platforms can help to enable hybrid cloud

Many organizations are struggling with storage migrations, the third-highest-ranked pain point in the study, selected as a top challenge by 23% of respondents. To function well in hybrid and multicloud environments, modern storage offerings must provide replication capabilities to move data between on-premises and cloud environments. Automated data tiering capabilities that can identify infrequently accessed data and migrate it to cloud storage can help organizations free up on-premises storage resources for active data while making use of low-cost cloud storage to retain idle data. Data residing in hybrid and multicloud environments requires intelligent data management to ensure consistent operations while maintaining efficient life cycle management from data creation through various stages of data use and mobility, to the cycle's end with archiving or secure deletion.

Using proactive management tools and automation can reduce operational burdens

Modern management tools leverage machine learning to detect potential issues and proactively recommend preventive actions or automatically remediate problems. Intelligent management tools can provide insights to generalists on resource consumption and optimization, which can help organizations with their sizing and planning exercises to ensure that the right storage systems and capacity are added at the appropriate time.

In the Voice of the Enterprise: DevOps, IT Automation 2023 study, respondents ranked storage management as the third highest area requiring automation, trailing only security management and database management. With automation in place, organizations will be able to provide capabilities such as self-service provisioning and data recovery, which can greatly reduce the day-to-day operational burden for IT staff.

About the author

Henry Baltazar

Research Director, Storage

Henry Baltazar is research director of the 451 Research Storage channel within S&P Global Market Intelligence, with a focus on data storage. In his current role, Henry analyzes the market trends around environmental, social and governance (ESG) storage challenges, infrastructure modernization and resiliency. He publishes reports on trends in data storage, disaster recovery and hybrid cloud. He is often cited as a subject expert by publications such as MIT Technology Review, Forbes and TechTarget.

Henry arrived at S&P Global Market Intelligence through its 2019 acquisition of 451 Research, where he began working as an analyst in August 2006. After spending three years running the storage research practice at Forrester, he returned to 451 Research in 2015 to fill the research director role and lead the storage practice.

Henry graduated from the University of California, Berkeley with a bachelor's degree in environmental sciences.

About this paper

A Pathfinder paper navigates decision-makers through the issues surrounding a specific technology or business case, explores the business value of adoption, and recommends the range of considerations and concrete next steps in the decision-making process.

About S&P Global Market Intelligence

At S&P Global Market Intelligence, we understand the importance of accurate, deep and insightful information. Our team of experts delivers unrivaled insights and leading data and technology solutions, partnering with customers to expand their perspective, operate with confidence, and make decisions with conviction.

S&P Global Market Intelligence is a division of S&P Global (NYSE: SPGI). S&P Global is the world's foremost provider of credit ratings, benchmarks, analytics and workflow solutions in the global capital, commodity and automotive markets. With every one of our offerings, we help many of the world's leading organizations navigate the economic landscape so they can plan for tomorrow, today. For more information, visit www.spglobal.com/marketintelligence.

CONTACTS

Americas: +1 800 447 2273
Japan: +81 3 6262 1887
Asia-Pacific: +60 4 291 3600
Europe, Middle East, Africa: +44 (0) 134 432 8300

www.spglobal.com/marketintelligence
www.spglobal.com/en/enterprise/about/contact-us.html