



451 Research Vanguard Report

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Rising data challenges drive storage modernization

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Introduction

Organizations should proactively evaluate their existing storage strategies to identify opportunities for modernization and address challenges related to data growth, rising costs, management complexities and environmental, social and governance (ESG) considerations. The emergence of new workloads such as GenAI is expanding storage requirements, not only for scalability but for higher performance, data quality and integrity, and tighter integration with the infrastructure.

The Take

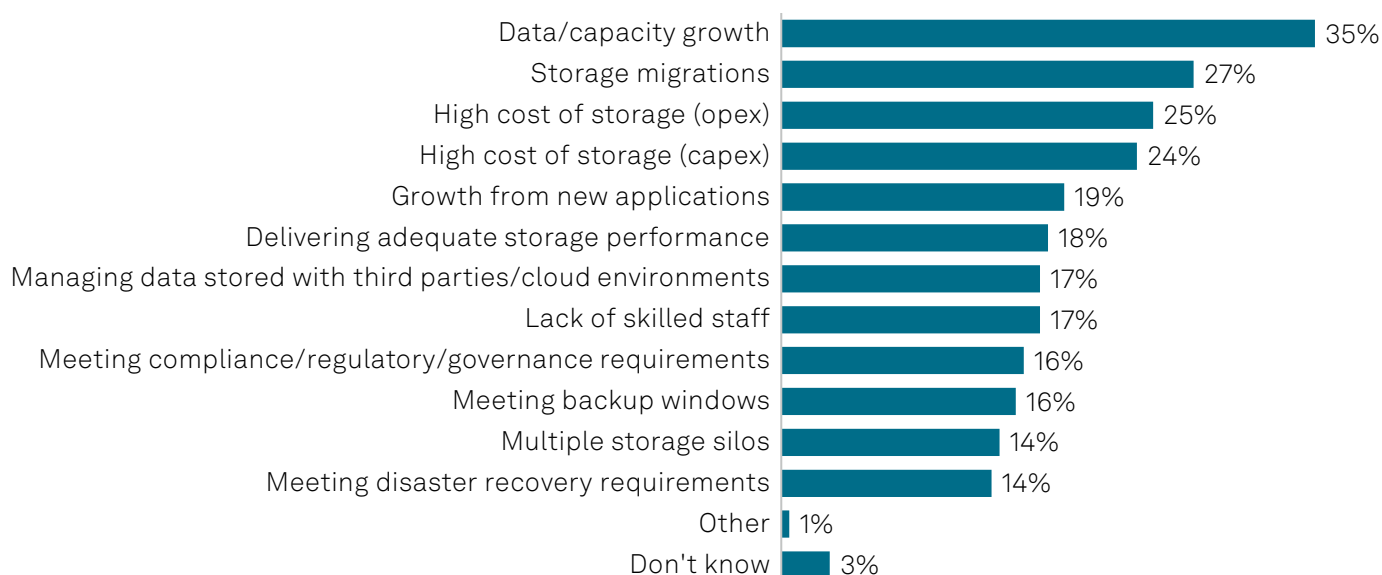
Organizations must derive greater value from their storage investments while ensuring the infrastructure can keep up with ongoing innovations to servers, graphics processing units (GPUs), networking and applications. New workloads such as GenAI require scalable, high-performance storage solutions that integrate well with existing infrastructure. Strategies must also address traditional needs while emphasizing operational efficiency, data mobility and cost-effectiveness, ensuring organizations can meet future demands and remain competitive in evolving markets. The pace of technological advancement, particularly in AI-driven analytics and hybrid cloud environments, will stress traditional storage architectures even more, making modernization an urgent priority. Companies need to embrace agile, flexible and scalable storage technologies to remain competitive in rapidly evolving markets.

Key challenges

Organizations face significant challenges that are driving the modernization of storage and data management practices (see Figure 1). Key factors behind this shift include accelerating data growth, increasing storage costs, and ongoing management and migration complexities.

Rapid data growth remains the most pressing challenge, according to 451's Voice of the Enterprise (VotE): Storage, Budgets and Optimization 2025 study. Respondents on average expect moderate data growth of 29% in the next year, up from 23% in last year's study. Nearly one in five organizations (17%) anticipate extremely rapid growth rates exceeding 50% over the next 12 months. Additionally, the proliferation of new applications is a notable driver of increased storage capacity demands, cited by 19% of respondents. Modern workloads such as GenAI often require large datasets to build and enhance models, which highlights the need for scalability. In the unstructured storage space, products of technological progress such as larger, higher-resolution media files (e.g., videos, audio and images) add to the storage burden.

Figure 1: Organizations overwhelmed with many storage pain points



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=187).

Source: 451 Research's Voice of the Enterprise: Storage, Budgets & Optimization 2025.

Resiliency requirements remain stringent across many workloads. In particular, mission-critical workloads — which are transaction-heavy, often run on block storage and need data protection technologies such as replication and snapshots — are necessary to meet the recovery time and recovery point objectives (RTOs/RPOs) to comply with workload service level agreements.

Rising storage costs are significantly influencing storage strategies. For example, 58% of surveyed organizations are being affected by price increases (implemented or announced) of at least 10% for traditional storage systems, and 64% are being affected by cloud storage service price hikes. As a result, nearly half (48%) of organizations are seeking competitive bids, and 35% have started transitioning to alternative vendors or service providers. Beyond the acquisition costs for storage assets, respondents indicate that operational expenditures are a major concern and a top pain point.

Storage and data management complexity remains a considerable obstacle. Challenges in this area include a shortage of skilled personnel (17%), managing multiple storage silos (14%) and managing data across third-party and cloud environments (17%). Storage migrations have become increasingly problematic, exacerbated by the adoption of multicloud infrastructures and evolving hypervisor and cloud-native platforms.

Given these challenges, modern storage solutions must not only address traditional needs such as scalability, reliability and performance, but they also need to address operational efficiency, data mobility and cost-effectiveness.

Requirements for storage modernization

Organizations should consider a variety of essential capabilities when modernizing storage infrastructure. These include:

Multiprotocol storage flexibility to concurrently provide file, block and object storage as well as software-defined storage (SDS) based on workload requirements. Eliminating storage silos is a challenge that requires the consolidation of systems and the storage protocols to significantly enhance efficiency and streamline data management.

Workloads typically dictate which storage protocols applications can work with, and historically, production applications were able to interoperate with block storage or various file service protocols such as CIFS and NFS. However, newer applications for GenAI and analytics must be able to handle large unstructured datasets. This has increased the popularity of incorporating object storage, which was previously used for secondary use cases such as backup and archiving, into production environments where performance and resiliency are essential. A modern storage infrastructure that can simultaneously support a variety of storage protocols will greatly simplify management while ensuring that data is presented to workloads using the appropriate protocol.

Intelligent and proactive management capabilities are essential for mitigating skill gaps and reducing the operational burden on IT teams overwhelmed by alerts. Security teams have had a hard time keeping up with alert volume. For example, only 5% of respondents to our VotE: Information Security, SecOps 2024 study said they are able to respond to all their security alerts in a typical day, and 43% are missing over half their daily security alerts. Intelligent tools can highlight the most important alerts to investigate, which can help teams prioritize issues and reduce the potential for extensive downtime. Modern storage tools should also make insights, alerts and data available via multiple methods, including SaaS interfaces or on mobile applications, to ensure teams can make decisions quickly as situations arise.

Advanced management tools with AIOps and observability functions that offer proactive insights specific to infrastructure and workloads can enhance infrastructure efficiency by optimizing resource use as demand spikes during peak periods and maintaining adequate reserve capacity based on historical utilization trends.

Automation is necessary for reducing operational burdens, enabling rapid deployment and efficient management of routine tasks such as patching, provisioning and migrations. For instance, automation can improve overall system reliability by minimizing human errors. A key use case for automation is storage migration since it is extremely time-consuming and could lead to data corruption or security incidents if not managed proactively.

With the advancement of infrastructure as code, organizations need storage platforms that support automation APIs. This support allows for the repeatable creation of infrastructures across various environments while maintaining strict version control to track changes and facilitate rollbacks when incompatibilities arise.

Environmental, social and governance factors are increasingly integral to storage modernization strategies. Organizations prioritize storage solutions that improve rack space and power efficiency as well as reduce CO2 emissions, directly impacting operational costs. The rise of AI and the rapid sales of servers and GPUs also increase the need for storage ESG improvements since these power-hungry datacenter components are already creating concerns about power, rack space and datacenter cooling.

The high costs of logistics, transportation and disposal of hardware systems are also top concerns, making it extremely important for organizations to choose storage systems that are designed to run for extended life cycles (10 years+) and capable of in-place upgrades to meet future demands.

Governance will also drive organizations to invest in data classification and data immutability capabilities, not only to make it easier to search and access data, but also to ensure that compliance-sensitive data is retained based on corporate guidelines and protected in the event of a cybersecurity incident. Ransomware recovery guarantees have also become relevant given the high frequency of such incidents.

Looking ahead

Evolving workloads and DataOps create additional requirements

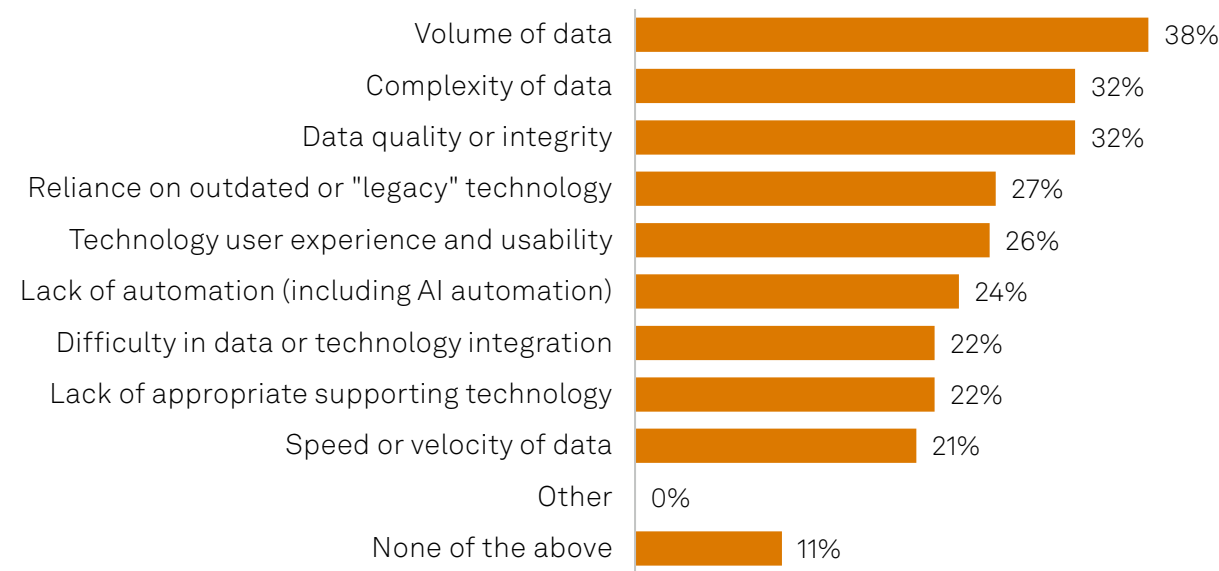
Improving storage infrastructure will help organizations enhance their operations while preparing for future demands. Emerging workloads, such as generative AI, and the adoption of DataOps practices introduce additional technological challenges (see Figure 2). Organizations struggle to manage large volumes of data, maintain data quality and integrity, integrate diverse technologies and address the accelerating velocity of data.

To navigate these challenges effectively, organizations need modernized storage solutions that enable efficient management and optimization of storage resources aligned with contemporary data demands. The rapid pace of technological advancement, particularly in AI-driven analytics and hybrid cloud environments, will further stress traditional storage architectures, making modernization an urgent priority. Companies must adopt agile, flexible and scalable storage technologies to remain competitive in rapidly evolving markets.

Additionally, increased regulatory compliance and data governance requirements will necessitate more sophisticated data management solutions capable of automating compliance and governance tasks. This includes enhanced capabilities for data classification, access control and audit readiness.

Ultimately, organizations that invest proactively in modern storage infrastructures and integrated management platforms will be better positioned to capitalize on emerging opportunities presented by new data-intensive workloads and evolving DataOps frameworks. The strategic modernization of storage will thus become a key differentiator in organizational success over the coming years.

Figure 2: Data and storage challenges drive need for modernization



Q. What are some of the most significant technological challenges your organization currently faces in the effort to apply data management and/or DataOps practices to support business outcomes? Please select all that apply.
Base: All respondents (n=222).
Source: 451 Research's Voice of the Enterprise: Data Analytics, DataOps 2025.



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