

APRIL 2025

Dell PowerStore Data Efficiency

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Abstract

This Technical Review from Enterprise Strategy Group, now part of Omdia, documents our evaluation of Dell PowerStore data reduction. We reviewed how Dell PowerStore combines always-on inline compression and global deduplication to increase system efficiency, drive capacity savings, and enhance sustainability.

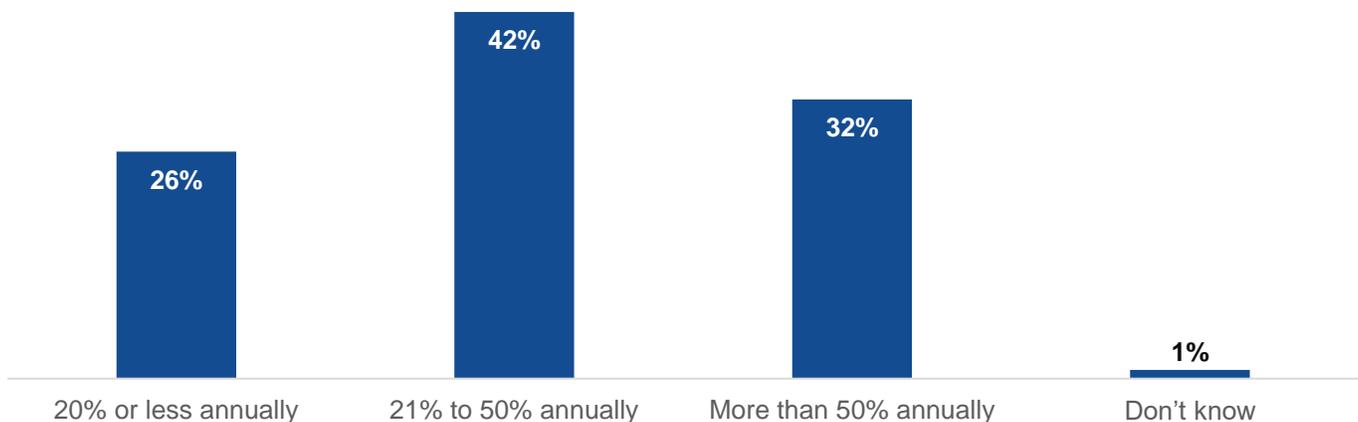
The Challenges

Data growth is a constant challenge for most organizations, compounded by the fact that annual data growth rates are not slowing down. According to Enterprise Strategy Group research, nearly two-thirds (63%) of organizations report having at least 1 PB of data, with the average organization managing approximately 3 PB of total data.¹

Thirty-two percent of organizations report more than 50% annual growth (see **Error! Reference source not found.**). The average growth rate is 40%, which means many organizations' data will double approximately every two years.

Figure 1. Annual Data Growth Rates

At approximately what rate do you believe your organization's total volume of data is growing annually? (Percent of respondents, N=376)



Source: Enterprise Strategy Group, now part of Omdia

As data growth continues to accelerate, many organizations are looking for ways to optimize their storage infrastructure to keep costs down and minimize footprint. Efficient and effective data reduction is no longer just a nice-to-have for today's storage platforms.

¹ Source: Enterprise Strategy Group Research Report, [The Strategic and Evolving Role of Data Governance](#), July 2023. All Enterprise Strategy Group research references and charts in this Technical Review are from this report unless otherwise noted.

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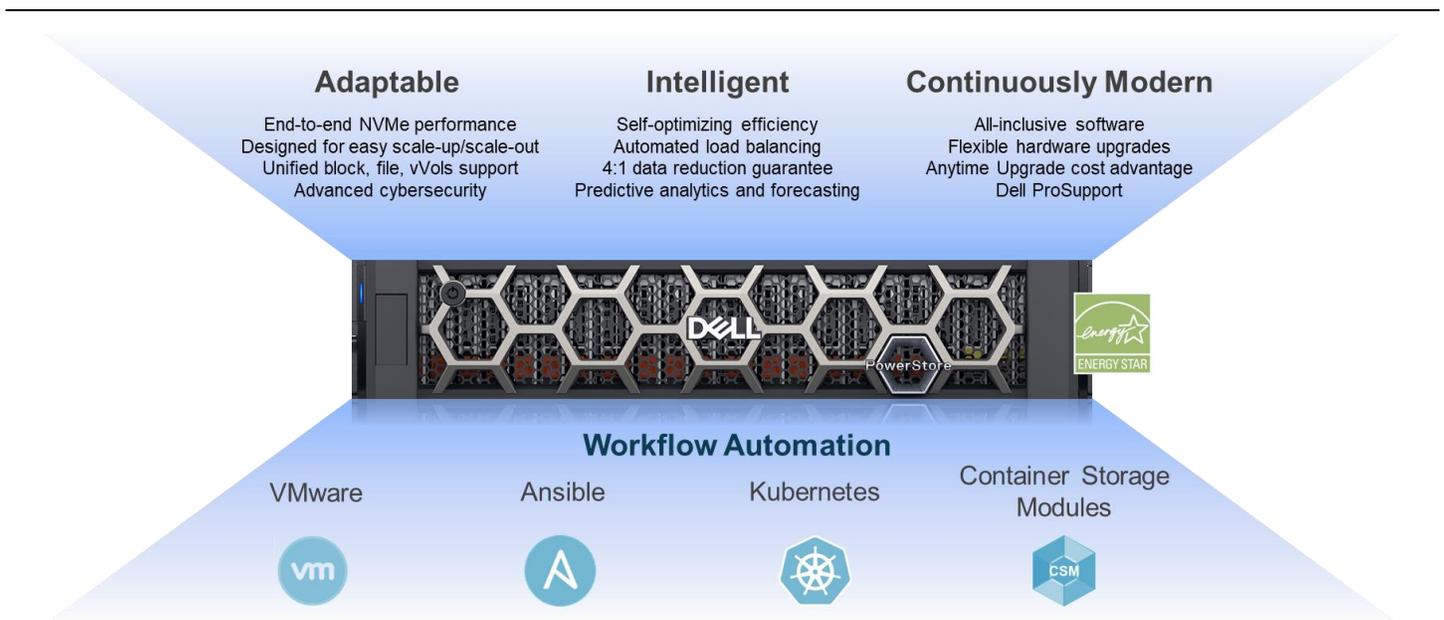
Dell PowerStore Overview

Dell Technologies utilizes a combination of the latest hardware (e.g., Intel Xeon Scalable processors and end-to-end NVMe technology) and future-proof container-based software to create the PowerStore enterprise storage solution. PowerStore is designed to simplify IT infrastructure for both traditional and modern workloads, offering single-platform support for block, file, and VMware Virtual Volumes (vVols), along with self-optimizing intelligence that automatically tunes performance, efficiency, and resiliency in the background.

PowerStore automates storage provisioning and can be deployed in minutes. The platform’s scale-up, scale-out architecture allows for single-drive expansion granularity, with auto-discovery and machine learning-based load balancing across clustered appliances. Additional automations include bidirectional VMware integrations to enable VM-level provisioning directly from vSphere, extensive DevOps support for Kubernetes and Ansible, and tight integrations with other Dell portfolio offerings, including VxRail, PowerProtect and Dell’s APEX multicloud offerings.

PowerStore efficiency features include intelligent, always-on data reduction supported by a 5:1 data reduction guarantee. The data reduction guarantee covers all reducible data and is not limited to specific workloads.

Figure 2. Dell PowerStore



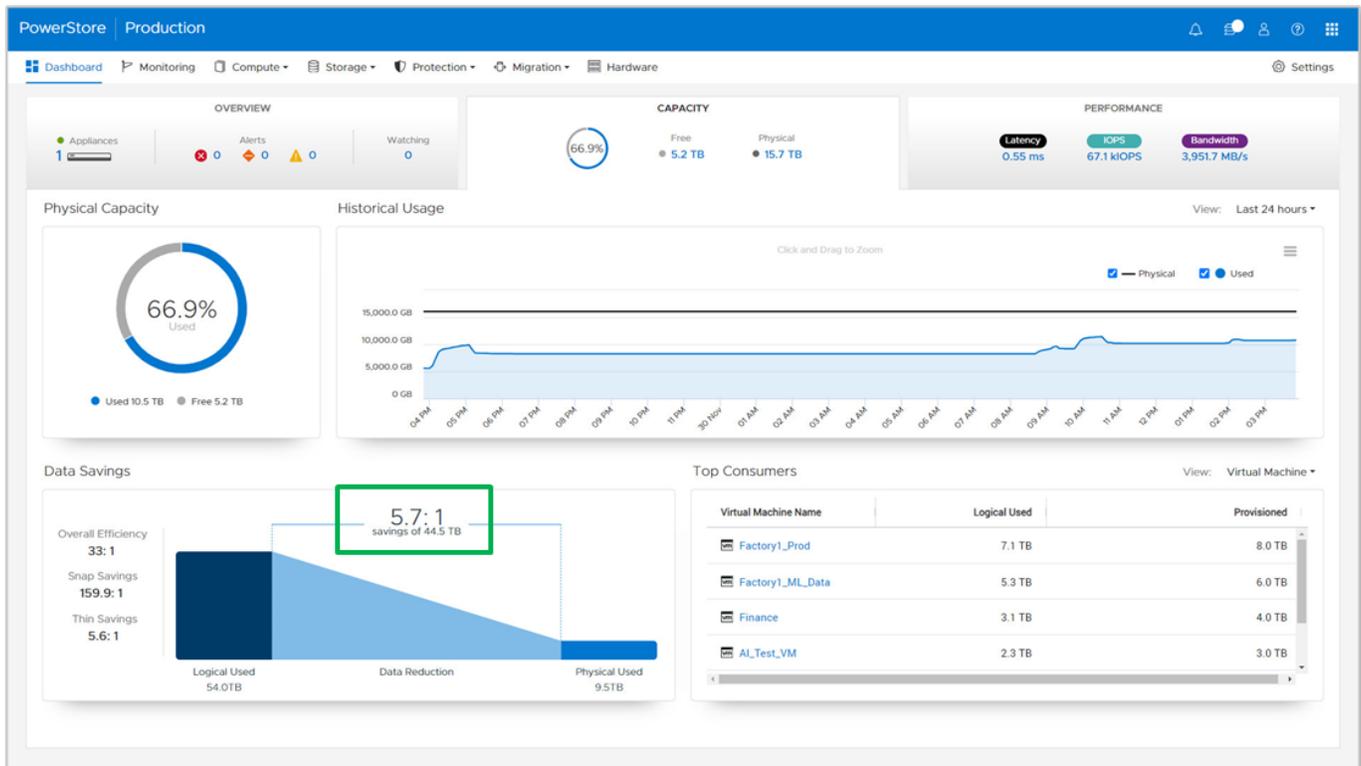
Source: Dell Technologies and Enterprise Strategy Group, now part of Omdia

Enterprise Strategy Group Tested

Data reduction technologies play a critical role in IT environments to help reduce the amount of physical storage required to store an organization’s data. Reducing the amount of data storage that is required reduces the physical footprint of the solution, power and cooling requirements, and the total cost of ownership of an organization’s storage systems.

Dell PowerStore uses advanced data efficiency techniques such as pattern matching, deduplication, and compression to reduce the amount of data that is physically stored within the system. These data efficiency methods are always on, and the amount of data reduction can be viewed in the user interface (Figure 3).

Figure 3. Dell PowerStore Dashboard



Source: Dell Technologies and Enterprise Strategy Group, now part of Omdia

PowerStore's data path includes hardware and software algorithms that work together to accept and store data as efficiently as possible. PowerStore's Dynamic Resiliency Engine (PowerStore DRE) automatically consumes the drives within an appliance, creating appropriate redundancy using all the drives in the system. PowerStore DRE supports both single- and double-drive resiliency. Numerous technologies minimize the performance impact of data reduction. Writes are cached to dual-ported NVRAM drives that are accessible to both nodes in all models except the entry-level PowerStore 500T, which uses mirrored DRAM. Compression is in hardware, and the system de-stages writes to the drives in the system in full 2 MB stripes. Deduplication runs with 4 KB granularity and is global across nodes in an appliance.

It's important to note that PowerStore efficiency has continued to improve with each software release. These releases are delivered to existing customers as nondisruptive, no-cost OS updates. The recent 4.0 release, for example, introduced Intelligent Compression, which recognizes variable data patterns to further reduce compressible workloads. According to Dell, this enhancement can improve overall data reduction by up to 20%. The 4.0 release also includes new tools that enable users to see the amount of reducible and non-reducible data on their system. This enables organizations to monitor and assess data reduction results, simplifying capacity planning.

Dell is confident enough in its data reduction technology to put its money where its mouth is. Dell provides a guaranteed average 5:1 data reduction ratio for reducible data that's not limited to specific workloads, has no pre-assessment or signature requirements, and has no additional required license costs.

While it's uncommon for Dell to *not* achieve 5:1 data reduction, in the unlikely event that it doesn't, Dell remediates quickly. It's important to note that Dell doesn't simply provide a credit toward a future purchase, which is the most

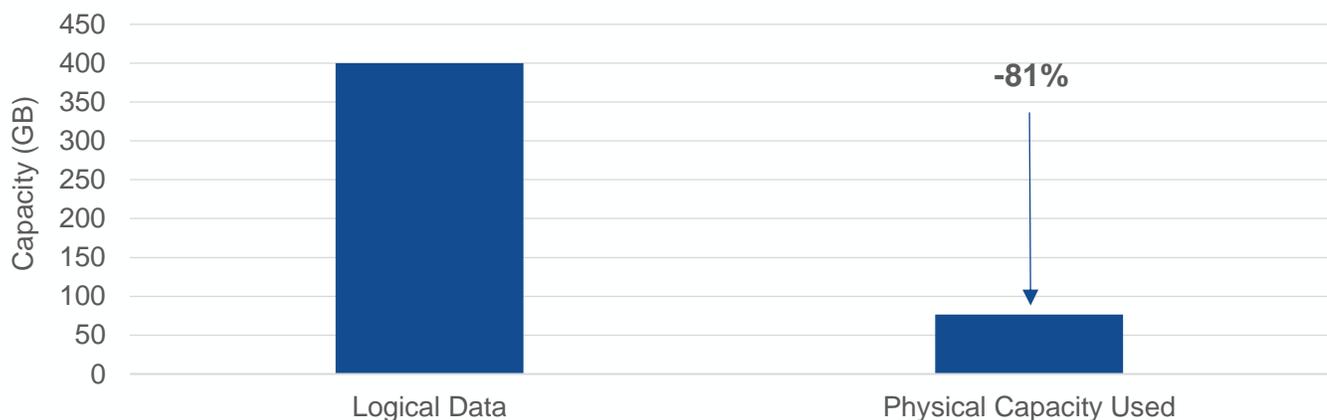
common method for remediating a guarantee like this. Instead, Dell provides enough additional drive capacity to ensure customers get the physical storage they need, free of charge.

Supporting Field Data

Enterprise Strategy Group reviewed anonymous call home data collected over a five-month period from June through October 2023 to verify the average data reduction ratio customers are achieving with Dell PowerStore. The data set includes all customers running PowerStoreOS 3.5 or higher with 400 GB or more of user data, encompassing a wide variety of workloads and data types.

Our analysis of the field data confirmed that PowerStore provided an average data reduction ratio of 5.23:1 for reducible data. The average customer reduced the footprint of this data by 81%, as seen in **Error! Reference source not found.**

Figure 4. Field Results: Average Data Reduction on Reducible Data



Source: Enterprise Strategy Group, now part of Omdia

Customer Perspective

PowerStore customers across various industries provided additional insight to Enterprise Strategy Group into the business value they have experienced with PowerStore data reduction.

State and local government: The demands of meeting the needs of up to 5,000 individuals per day by providing access to 1 million or more records annually challenged the speed, scalability, and resiliency of the IT environment in the Maricopa County recorder's office. A modern, high-performance, and cost-efficient solution with the latest security safeguards was required.

“PowerStore's ability to guarantee a phenomenal 5:1 compression ratio when it comes to block-level data is impressive...and important to us because we no longer need to purchase a full petabyte of storage...We can purchase a much smaller device that is overall much cheaper to maintain yet provides us the same amount of usability.”

— Nate Young, IT Director, Maricopa County

Civil engineering: DOWL is a firm that provides planning, surveying, and engineering services across the full spectrum of civil engineering practices. DOWL offers both public and private customers a range of services, from environmental and land development to structural design and water rights planning. The firm is dedicated to driving sustainability throughout its services, using green designs and exceeding local, state, and federal regulations on every project wherever possible.

“Migrating to PowerStore from our previous platform was simple and non-disruptive, and the huge improvement in data reduction helped us save space, power, and cooling.”

—Tim Hindley, IT Operations Manager, DOWL

Healthcare: With a medical staff of nearly 1,000 specialists, Phoenix Children’s Hospital is one of the largest pediatric healthcare systems in the United States, providing inpatient, outpatient, trauma, and emergency care across more than 75 subspecialties.

“At Phoenix Children’s Hospital, our mission is to advance hope, healing, and the best healthcare for children and their families...and we need the right technology to do it. Dell PowerStore’s always-on capabilities simplify data reduction so we can focus on what matters most—our patients and their families.”

—Scott See, Phoenix Children’s Hospital Director of Infrastructure

Education: Columbia Southern University (CSU) provides online learning for over 27,000 adult students, including active-duty military members and veterans. With continuous availability requirements, CSU hosts its critical student services system on PowerStore. CSU reports that PowerStore has provided an exceptional return on investment, including a 70% improvement in data reduction over the previous platform—without compromising performance.

“We can actually have development, test, and production running on the same storage area network. There’s no increase in space requirements, thanks to PowerStore’s deduplication capabilities. It’s a game-changer!”

—Andrew Schellhase, Senior Systems Administrator for IT Operations

Specialty chemicals: International Flavors & Fragrances (IFF) is a global leader in food, beverage, health, biosciences, and scent. From responsible sourcing to circular design to their proprietary Green Chemistry Assessment Tool, sustainability is at the center of the IFF business, and its IT infrastructure is no exception. With Dell PowerStore, IFF has achieved 8.5:1 data efficiency, enabling it to innovate further while reducing footprint and power consumption.

“Dell’s data reduction guarantee gives us the reassurance we need to move forward quickly, simplifying both purchasing and planning for the future.”

—Al Mujtaba, Global Vice President, Converged Infrastructure, IFF

Why This Matters

With organizations currently managing multiple petabytes of data and growth rates averaging 40% annually, organizations are hosting and managing more data than ever. Our research also reveals that for a majority of organizations (53%), IT is getting more complex. More than a third (34%) say that higher data volumes are the main culprit.² Enterprise Strategy Group believes that data reduction is a vital technology for storage infrastructure. What's needed is a solution that is simple to deploy and manage that can deliver significant data reduction with no impact on performance.

Enterprise Strategy Group validated through customer case studies and field data that Dell PowerStore meets and often exceeds its 5:1 data reduction guarantee without compromising performance.

A thorough review of field data revealed that Dell PowerStore achieved an average data reduction ratio of more than 5.2:1 against reducible data for customers running PowerStoreOS 3.5 or higher with more than 400 GB of data, regardless of workload or data type.

Conclusion

Driven by unabated data growth, IT organizations are storing increasing amounts of data. They need storage solutions that can scale performance and capacity while reducing costs and simplifying operations.

Dell PowerStore uses a combination of technologies to reduce the amount of physical capacity required to store written data. PowerStore data reduction is designed for efficiency, using hardware-assisted global inline compression and deduplication to minimize the impact of data reduction on performance. PowerStore automatically detects nonreducible data sets and workloads and excludes that data, conserving resources and further optimizing performance.

Enterprise Strategy Group validated that Dell PowerStore data reduction enables organizations to store more data on less physical capacity with virtually no performance impact.

Dell provides a data reduction guarantee of 5:1 with a customer-friendly, no-cost storage upgrade remediation policy. Field data showed that PowerStore provided an average data reduction ratio of more than 5.2:1 against reducible data. Real-world customers reported that not only does PowerStore deliver data reduction in excess of Dell's guarantees, but PowerStore's data reduction is transparent, automated, and intelligent—simplifying everything, including planning, purchasing, deployment, and ongoing management.

Data is an increasingly vital component of businesses today, and organizations are struggling to keep up with massive growth without compromising performance or reliability. Dell PowerStore can help organizations future-proof their data infrastructure with an enterprise storage solution that is simple to deploy, manage, and scale and that can automatically tune itself for performance, efficiency, and resilience.

If your organization is looking to address the huge and growing volume of data it must manage and overcome the limitations of legacy storage solutions, Dell PowerStore is worth your serious consideration.

² Source: Enterprise Strategy Group Research Report, [2023 Technology Spending Intentions Survey](#), November 2022.

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