



## WHITE PAPER

# How Dell Storage Aims to Redefine the Economics of Enterprise Storage Today and Tomorrow

Sponsored by: Dell

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## EXECUTIVE SUMMARY

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Today's IT leaders face pressure to reduce infrastructure cost, increase operational efficiency, and provide faster response to the business while evolving from traditional to new IT infrastructure models. It is with these imperatives in mind that storage executives continue to move virtualized workloads to hyperconverged, cloud-based, and/or lower-cost storage approaches. The challenge for these storage professionals is in managing both traditional SAN and NAS storage environments that exist today while evolving to software-defined, server-based, and workload-driven storage approaches in the future.

This IDC White Paper analyzes how Dell Storage is helping its customers meet these cost and operational challenges by laying out a vision for redefining the economics of storage. To achieve this, Dell is integrating best-of-breed technologies including flash optimization, data placement, and storage efficiency techniques into a common storage architecture, offering easy capacity expansion to reduce overprovisioning.

From a solution perspective, Dell Storage is offering flash performance with the economics of disk as well as innovative licensing models. And from a platform perspective, Dell – as a leading x86 server supplier – is well positioned to leverage its server expertise to offer new storage architectures. As Dell strives to execute on its mission, the company is accelerating the availability of these optimal design attributes from across the Dell Storage portfolio.

Dell Storage continues to invest in its existing storage portfolio and customer base. These investments not only provide investment protection today but also enable Dell Storage customers to transition, over time if they choose, to new IT infrastructure and software-defined storage models in the future.

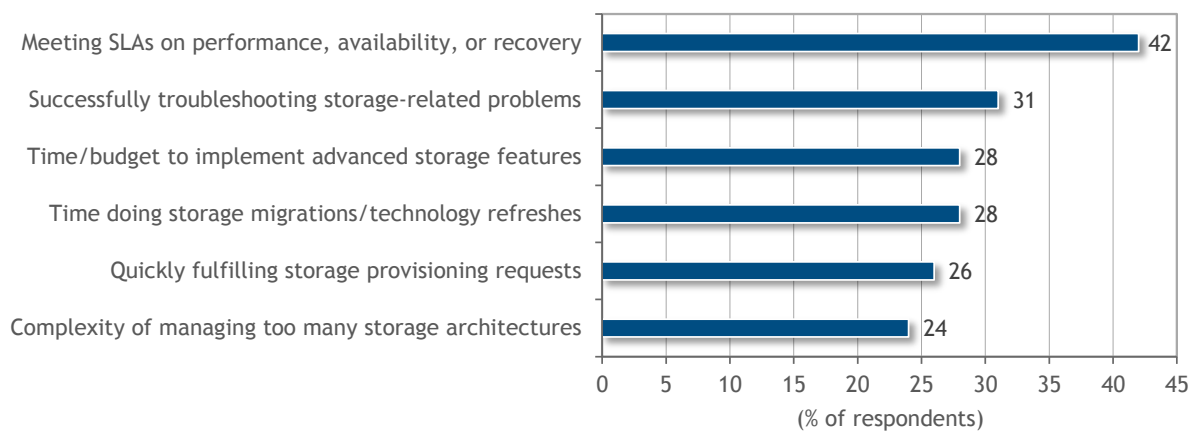
## Challenges in Storage Environments Today

Storage executives and organizations today face business and operational pressures to reduce cost, increase agility, and mitigate risk. These challenges manifest themselves in a number of ways, including the need to meet more stringent service-level objectives, increase performance for specific workloads, automate provisioning and migration tasks, and reduce storage-specific capital and operating costs.

In a recent study of 307 storage managers and professionals in the United States, IDC asked respondents to identify their leading storage challenges (see Figure 1). Other than managing data growth, leading storage challenges include meeting SLAs (42%), troubleshooting storage problems (31%), the necessary budget or time available to implement advanced features such as thin provisioning or storage efficiency (28%), managing storage migrations (28%), quickly fulfilling provisioning requests (26%), and the complexity and operational overhead of managing diverse storage architectures (24%).

**FIGURE 1**

## Leading Storage Challenges



Source: IDC, 2014

## Addressing Today's Storage Challenges: Dell's Approach

Dell recognizes that its customers are facing change driven by factors such as the proliferation of mobile applications, the need to analyze and monetize large volumes of data, the prevalence of cloud computing, and the insatiable need for greater performance and lower cost. Confronted with these new business and technology requirements, the storage industry is in transition. To differentiate itself among storage suppliers, Dell is helping customers manage traditional, external shared NAS or SAN storage today as well as evolving its offerings to include server-based, workload-driven storage approaches of the future.

### *Business Agility and Performance*

To offer business agility in the form of greater IOPS, reduced latency, and faster support for new business initiatives, Dell has incorporated server-based, hybrid, and all-flash array configurations into its flash strategy. This strategy provides material economic benefits by optimizing price and performance and leveraging a mix of SLC, MLC, and high-density TLC flash. Dell's auto-tiering software places data on the right tier at the right time, accelerating applications and optimizing cost savings.

### *Availability and Recovery*

Customers must address varied recovery (RPO and RTO) and availability goals for different workloads. Dell's storage portfolio includes approaches (both native and optional) such as snapshots (also referred to as replays), clones, replication, and backup to meet different SLAs. Customers can choose from near-continuous, image-level backup and fast, full system recovery to highly scalable enterprise system options that support active/active datacenter designs, workload portability, and geodistribution of data using a range of data replication choices. Dell's SC Series Enterprise Manager Live Volume and Volume Advisor have features that offer transparent, nondisruptive volume movement among arrays, allowing the combined capacity and cache of the entire system to be seamlessly utilized.

## ***Troubleshooting, Migrations, and Technology Refresh***

For any storage environment, there is a time-intensive triage process to identify storage availability and performance problems. And data migration projects are often months in the planning, requiring planned downtime. Dell Storage PS Series (EqualLogic) and Dell Storage SC Series (Compellent) software address these customer challenges. Dell's PS Series Array Software (and associated options) streamline troubleshooting and migrations. Dell's SC Series Storage Center offers SupportAssist remote diagnostic and monitoring tools coupled with automated alert and notifications. And SC Series Volume Advisor proactively recommends the best volume placement for data, constantly monitoring and analyzing all SC arrays to improve performance and/or alleviate high storage usage. Both the Dell SC Series arrays and the Dell PS Series arrays offer nondisruptive data migrations, firmware updates, and controller upgrades.

## ***Data Growth, Automation, and Ease of Use***

Data growth impacts both capex and opex and also exacerbates the already high operational costs associated with managing a nonstandardized, highly complex, and disparate storage environment. In addition, server, storage, virtual infrastructure administration, and networking-specific tasks for provisioning often stymie infrastructure automation. Dell's unified management strategy combines with best-of-breed storage efficiency algorithms to address and reduce the data footprint and minimize operations costs. Dell provides datacenter management tool integration with VMware, Microsoft, OpenStack, and Oracle. The SC Series Enterprise Manager PowerShell API automates storage tasks and pulls storage metrics and statistics.

## ***Dell Redefines the Economics of Enterprise Storage***

Being a worldwide leader in x86 servers, Dell is in a position to capitalize on the server-based, software-defined era of storage. New IT models for enterprise storage systems enable customers to leverage industry-standard compute and storage components. Dell is committed to helping its customers if they choose to evolve from traditional IT made up of external storage, appliances, and converged infrastructure to new storage models where virtualized or abstracted workloads run on hyperconverged, cloud-based, and/or server-based software-defined infrastructure.

Dell Storage continues to take steps to redefine the economics of enterprise storage. Evidence of success against this objective includes both current features and ongoing development projects:

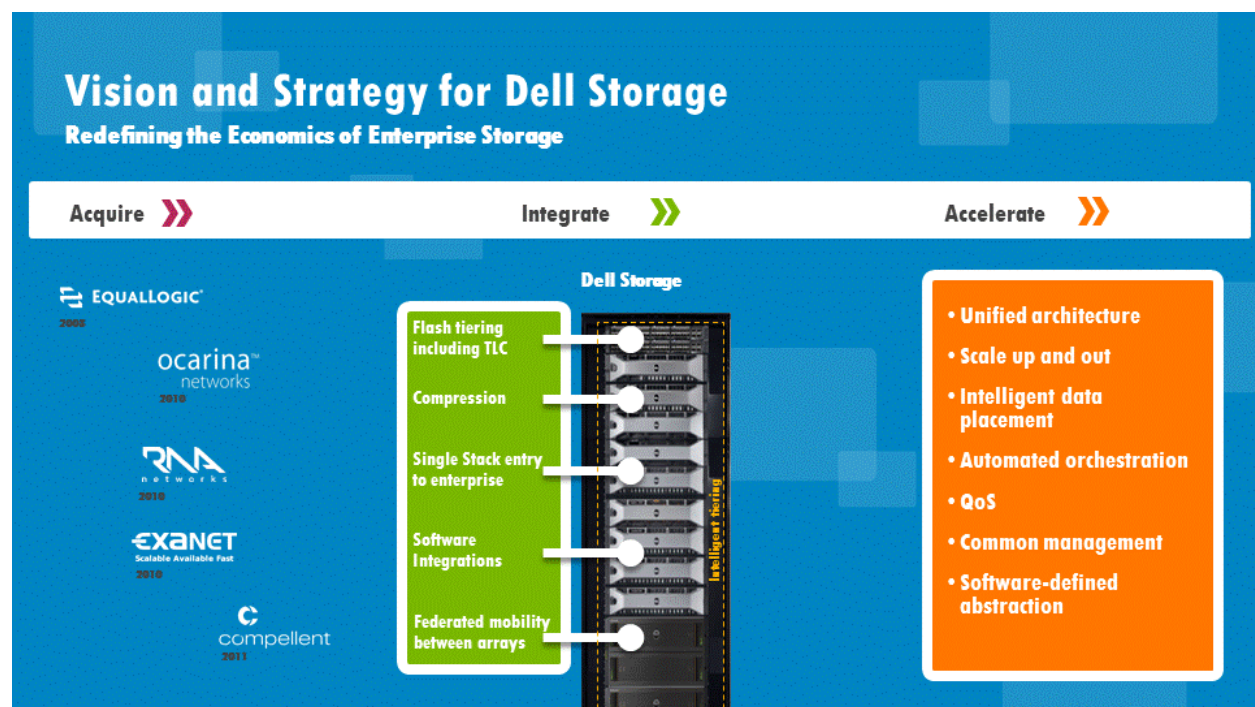
- Flash optimization and data placement capabilities placing hot data on performance storage and cold data on capacity storage, thus placing the right data on the right cost profile
- Storage efficiency features such as compression, thin provisioning, and space-efficient snapshots (replays), thereby reducing storage requirements and the data footprint
- Seamless capacity expansion to mitigate overprovisioning, thus saving operational overhead in manual provisioning tasks while procuring only the capacity needed
- Flash performance at the price of disk by combining a range of SLC, MLC, and TLC flash technologies to optimize the price and performance criteria
- Licensing simplification/perpetual licensing allowing for bring-your-own-license (BYOL) strategies where the cost of software licenses can be transferred to new systems
- Ongoing development toward common management of mixed environments, including both the Dell SC Series and the Dell PS Series storage array families
- Continued engineering projects to offer data replication between mixed environments, including migration of data between SC Series and PS Series for customer investment protection and resource optimization/reuse of assets

Dell's acquisitions of EqualLogic and Compellent, which are the underlying PS and SC Series technology, were seminal events for the company in securing its own intellectual property and providing the foundation for implementing its storage vision. Since then, Dell has been on a mission to redefine the economics of enterprise storage and has transformed its storage portfolio over the past five years. Following several strategic acquisitions, today Dell Storage is made up of highly differentiated intellectual property native to the company. But Dell also recognizes the growing importance of an ecosystem. Dell has also established strategic partnerships with industry leaders that enable the company to provide more flexibility and a broader set of capabilities for customers across its entire enterprise solutions portfolio. A few examples are Microsoft, Oracle, and VMware, along with numerous open source and software-defined storage vendors. These partnerships give customers tightly integrated solutions that are based on the most advanced technologies available anywhere.

Dell's mission is to enable customers to leverage the Dell storage they have today while also delivering new solutions that work within customers' current environments. This approach not only provides investment protection but also allows customers to transition, over time and at their own pace, to new architectures. Dell characterizes this journey it is on, together with its customers, as "integrate and accelerate" (see Figure 2). The process of integrating new solutions into existing environments allows for greater economic leverage of existing assets, while acceleration brings forward the best design attributes across the Dell Storage portfolio. These design attributes, already visible within Dell's current portfolio, include a scale-out architecture, storage efficiency, seamless capacity expansion, flash optimization and data placement, and end-to-end management, which change the game on the economics of storage infrastructure.

**FIGURE 2**

## Dell Storage Vision and Strategy



Source: Dell, 2015

## Dell Storage Integration

For Dell Storage, "integrate" means bringing best-of-breed intellectual property and thought-leading innovation and storage technologies into a single portfolio and leveraging those technologies to develop storage solutions for the datacenter of the future. As evidence of its progress, Dell Storage has completed the integration of best-of-breed technology from Exanet, Ocarina, and RNA into its PS and SC storage offerings. Evidence of this integration includes embedding of storage efficiency from Dell's acquisition of Ocarina and flash optimization into Dell's NAS offering for optimal placement of data on the right tier at the right cost.

Dell Storage has also integrated SAN and NAS solutions that can scale to petabytes and support a full range of storage media. These solutions automatically move data up and down the stack from high-performance SSDs to an extremely dense and cost-optimized compressed HDD tier. By leveraging SC's intelligent tiering and flash optimization technologies, Dell can deliver flash performance for the price of spinning disk.

The Dell Storage portfolio is the strongest it has ever been. While other suppliers may offer annual product refreshes, Dell has been on a pace of announcing multiple products per quarter, thereby delivering capabilities that align with its stated mission and customer commitments.

## Dell Storage Acceleration

The next step for Dell Storage is to "accelerate" its ability to deliver innovation to market. Dell Storage will continue to take the best attributes from the PS and SC Series and combine them into a unified Dell Storage architecture for environments that range from enterprise to entry level. In addition, the creation of one team brings together skills and ideas and increases innovation. Future unified Dell Storage architecture deliverables include, but are not limited to, scale-up and scale-out capabilities, quality-of-service (QoS) controls, orchestration integration, further intelligent and automated data placement from server to SAN, and deduplication and compression.

The multiyear vision is exciting and reflects Dell's commitment to storage and the strength and maturing of the Dell Storage organization. The company's vision is especially relevant because it is both a goal and a current strategy. Dell is over one year into this strategy and has been delivering on its commitments through product releases and Dell Storage road maps and planning activities, which are multiyear in nature. The integration of the PS and SC Series into an SC-based Dell Storage architecture provides the foundation that will allow the company to accelerate innovation and delivery of capabilities.

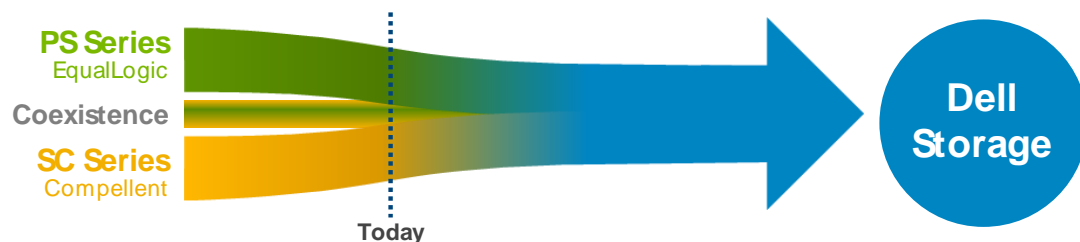
## Dell Storage Journey: From Entry to Enterprise

Over the next several years, Dell Storage will continue to accelerate the integration, offering current customers unparalleled investment protection. Dell Storage has provided today's customers with a long-term vision and is encouraging them to select the path that fits their requirements and timing. Figure 3 outlines the Dell journey and how customers can leverage and evolve their Dell Storage portfolio investments.

FIGURE 3

## Dell Storage Evolution

# The Future Brings Together the Best of Both



Source: Dell, 2015

For Dell Storage PS Series customers, this means product investment and support. Since Dell announced its vision, the company has delivered a major new firmware (v8) version for the PS Series, with the addition of snapshot compression and VMware VVOLs support. In addition, two new products, the PS4210 and the PS6610, have been added for entry-level and dense configurations, respectively.

For PS Series customers that have also invested in SC Series, enhancements for cross-platform replication and common management with Dell Storage Manager will provide further investment protection. Dell Storage customers deploying both midrange storage and high-end storage into environments will benefit from a thin import feature allowing for the import of PS data into an SC environment. From a management perspective, Dell Storage will support mixed PS Series (EqualLogic) and SC Series (Compellent) environments, releasing a common Dell Storage Manager solution where storage administrators can perform day-to-day activities of both PS and SC environments. Simultaneously, Dell Storage will release cross-platform replication, allowing customers to replicate data between the two product families. Dell Storage will provide ongoing introduction of new hardware and firmware releases as the company moves closer to its vision of the Dell Storage common architecture. All this best-of-breed integration offers customers protection of their storage investment.

Dell aims to provide the best of both formerly separate storage technologies. For Dell Storage SC Series customers, this means incorporating many of the features and attributes from the PS Series into the SC Series design. The future Dell Storage architecture will be based upon the SC Series, incorporating virtualization, scale-out, and field-level implementation attributes. Capabilities from the PS Series added to the SC Series will include scale-out enhancements, iSCSI support, and ease-of-use features for field installs, among others. In fact, many of the capabilities that customers value in the PS Series are already inherent in the SC Series, although with differences in implementation and naming conventions.

## Opportunities and Challenges

The storage and IT industry is in the midst of transition. The proliferation of mobile devices, the next wave of cloud computing, hardware disaggregation, software-defined infrastructure, and the use of new storage technologies to accelerate performance are all factors driving change in storage and computing architectures. For the datacenter leader, the challenge is in managing the environment today while evolving it to support new deployment and procurement models. For Dell and other IT suppliers, this challenge presents an opportunity to help customers on their journey. However, a successful journey requires adequate planning, product development, and open collaboration and communication. Dell, among its peers, is leading the way in helping customers leverage and protect their current infrastructure investments while also evolving on their terms in the future.

## Conclusion

The mission of Dell Storage is to help its customers meet storage cost and operational challenges by integrating best-of-breed technologies, including flash optimization, data placement, and storage efficiency techniques, into its portfolio of modern storage solutions. In conjunction, Dell Storage aims to change the economics of enterprise storage for its current and future customers. To achieve this, Dell will continue to invest in its storage business by focusing on cross-product feature integration, blended road map planning, and communication and helping customers make decisions on their terms, on their schedule, and based on their business needs.

While other vendors look to divest their storage portfolios, Dell is accelerating the availability of optimal design attributes from across the Dell Storage portfolio, both shared storage and server-based software-defined storage approaches. As Dell Storage continues to invest in its existing storage portfolio and customer base, its investments are geared to provide investment protection today as well as allow customers to transition, over time, to new IT infrastructure and software-defined storage models in the future.



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