



Solution Brief

Optimize storage for focused, multi-tiered workloads with Dell EqualLogic hybrid arrays

Benefits of Dell™ EqualLogic™ hybrid storage arrays

EqualLogic automatic tiering features unique to the PS6100XS, PS6110XS, PS6500ES and PS6510ES arrays help improve storage performance and efficiency for specialized, multi-tiered workloads, and enable:

- Reduced costs through the automated alignment of workloads within a single storage array with media best suited to the required I/O load
- Improved performance through the intelligent application of low-latency SSD media for both high I/O data and advanced write caching
- Automatic Tiering functionality at the sub-volume level to achieve better optimization of multi-tiered storage workloads and SAN media
- Simplified management of all PS Series SAN arrays via Group Manager and SAN Headquarters graphical management and monitoring utilities

Enterprises of all sizes have consolidated data on shared storage infrastructures to help improve data management efficiency and protect critical data. Shared storage infrastructures—such as storage area network (SAN) and network-attached storage (NAS) solutions—allow multiple servers and applications to share storage resources, and help simplify centralized data protection operations such as managing snapshots and replication. Because broad adoption of shared storage has increased the diversity of the applications requiring storage support, enterprises in growing numbers have adopted storage tiering, a Best Practices approach that directs application workloads to the storage media with the most suitable performance and cost characteristics.

Dell™ EqualLogic™ unified, virtualized IP-based storage is built on the Dell™ Fluid Data™ architecture, a ground-breaking approach to IT that enables users to put their data in the right place, at the right time—for the right cost. Designed from the outset to offer high ease-of-use and low total cost of ownership (TCO), this approach to unified storage provides a range of features for automating tiered storage across three or more arrays. EqualLogic hybrid storage arrays extend the flexibility with which IT organizations can apply these automated tiering features by allowing tiering across SSD and SAS or NL-SAS media within a single enclosure.

Hybrid SSD/SAS design addresses the needs of targeted, multi-tiered application workloads

An enterprise typically runs a varied mix of applications—each with its own particular set of performance requirements and capacity considerations—in the course of business operations. Certain applications—e.g., online transaction processing (OLTP)—require high-performance or SSD arrays. By the same token, more inactive file or application data can leverage more affordable NL-SAS arrays. Flexible automated tiering tools in an EqualLogic virtualized storage solution thus allow IT managers to both reduce costs and improve performance.

Other common workloads, however, actually contain both infrequently accessed (i.e., “cool”) data and highly dynamic (“hot”) data within a single volume. Virtual desktop data provides one example of such a multi-tiered workload: data volumes associated with virtual desktop infrastructure (VDI) usually consist of a single hot, read-intensive “gold image” reference desktop, along with numerous cool, user-specific data that capture desktop customizations and other user preferences. Similarly, certain database volumes—as may support online college course registration systems or e-commerce sites—may contain both a hot, frequently accessed component (e.g., a fixed list of class offerings, products, or size or color options) and a cool component (including student data, customer records or credit card information) with

sporadic reads and writes.

For multi-tiered workloads, volume-level tiering may provide only limited benefit, since any storage medium choice – SSD, SAS or NL-SAS – can optimally suit only a portion of the volume workload. Moreover, specific workloads within the volume may shift between cool and hot over time, further minimizing the benefits of any single storage medium.

To help optimize storage for multi-tiered workloads, the EqualLogic 1Gb Ethernet-based PS6100XS and PS6500ES arrays, as well as the 10Gb Ethernet-based PS6110XS and PS6510ES arrays, incorporate several hardware and software design innovations that expand the capabilities of EqualLogic Automatic Tiering. The PS6100XS and PS6110XS arrays combine low-latency SSD and 10K RPM SAS drives to provide two tiers of storage within a single EqualLogic member. Similarly, the PS6500ES and PS6510ES arrays combine SSD and NL-SAS drives to provide two tiers of storage in a high-density, 48-drive array. Moreover, the advanced automatic tiering features on these specialized arrays enable them to categorize and operate on data workloads within each volume. These workloads are categorized as hot (high I/O), “warm” (medium I/O), or cool (low I/O), and then placed as appropriate onto either SSD or conventional hard-drive tiers. The unique hardware and software design innovations of the EqualLogic hybrid storage arrays can thus perform workload optimization, even on volumes

containing a mix of workload types and storage needs, within each array.

Automated sub-volume tiering provided standard as part of EqualLogic all-inclusive feature set

EqualLogic sub-volume Automatic Tiering capabilities come standard on the PS6100XS, PS6110XS, PS6500ES and PS6510ES storage arrays, with no additional licenses or maintenance fees. In addition to these automatic tiering capabilities, all EqualLogic PS Series SANs offer virtualized iSCSI SAN storage benefits such as high performance, simplified operations, seamless scalability and advanced data protection, all of which can help minimize TCO and maximize ROI.

Dell also provides two vital management tools with each PS Series array: Group Manager and SAN Headquarters (SAN HQ). Group Manager is a centralized SAN graphical management interface that enables secure access and easy provisioning of storage volumes. SAN HQ provides historical monitoring across virtualized SAN groups, consolidates performance and event statistics both on a near real-time and trended basis, and even provides the ability to export the data collected, including capacity, IOPS and networking statistics. Both Group Manager and SAN HQ provide essential tools for designing, implementing and managing tiered storage architectures.

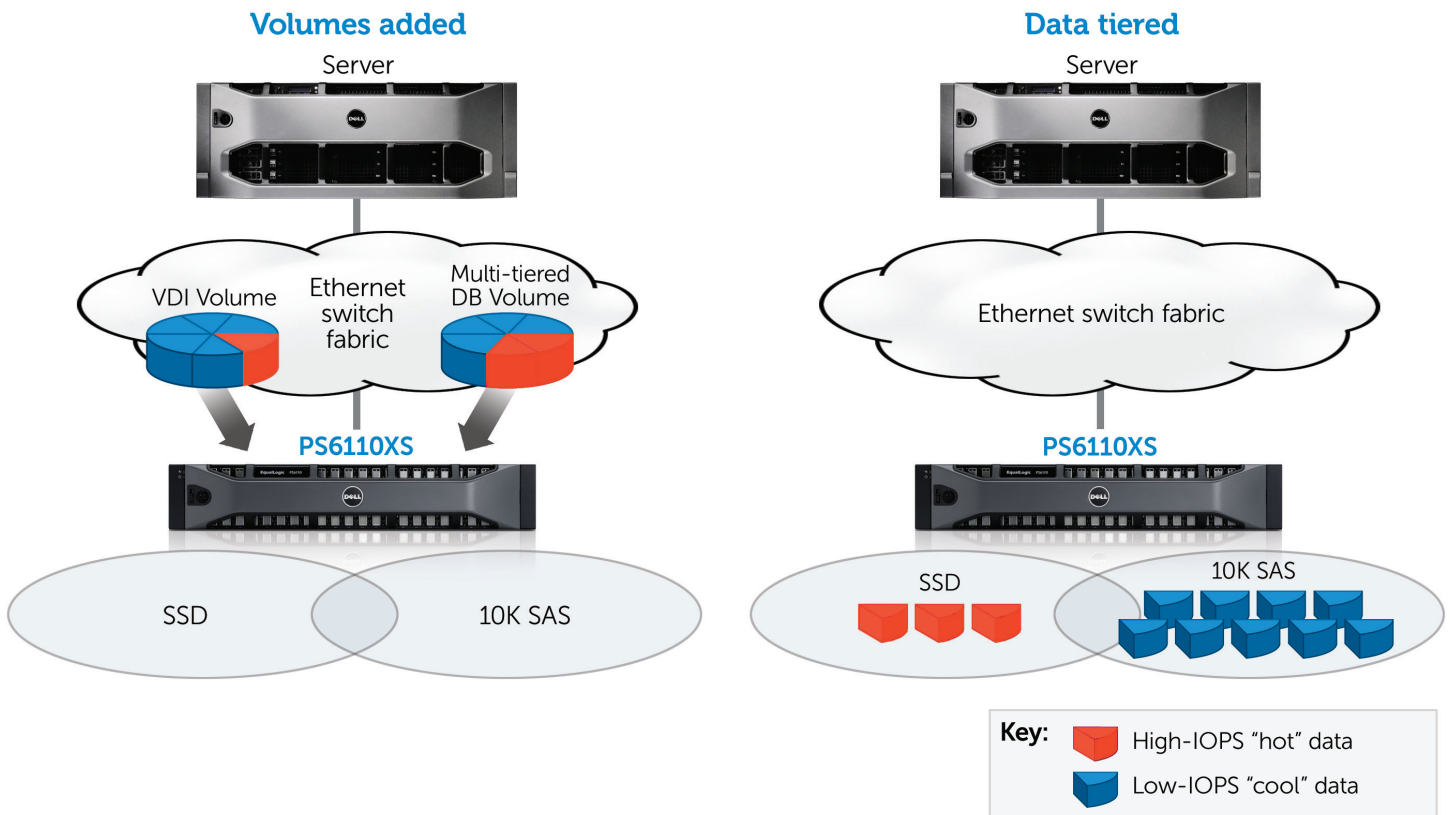


Figure 1. Automated Sub-Volume Load Balancing, as shown with the EqualLogic PS6110XS hybrid storage array.

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