Versatile Portfolio of Storage Arrays

In the past, storage customers were forced to choose between capability and price. The Dell PowerVault MD family offers customers a robust portfolio to choose a storage solution that is right for their business needs. The PowerVault MD family offers customers simple storage expansion, highly available direct attach storage and now storage consolidation through an iSCSI SAN. The PowerVault MD family continues to change the economics of storage by delivering enterprise capability, scalability, availability, and performance at an industry-leading price.

The PowerVault MD family meets a wide range of customer needs, including:

Simple Server Expansion – The modular design of the PowerVault MD1000 is engineered for easy expansion - giving you more room to store data from your server. Up to three PowerVault MD1000 mixed-drive expansion enclosures can be daisy-chained together giving you 15, 30, and 45 mixed disk drives options. To keep management simple the PowerVault MD1000 connects to and can be controlled by a single PERC 5/E RAID equipped PowerEdge server.

High Availability Server Expansion – The PowerVault MD3000 modular disk storage array features a redundant architecture and delivers high performance for critical applications, particularly two-node clusters. The PowerVault MD3000 has been architected to maximize performance in a highly available solution by including RAID controllers within the storage device.

Storage Consolidation – Some customers are looking for a more scalable solution to manage growing data demands. In some cases, customers are outgrowing their direct attach storage infrastructure and are looking at storage consolidation solutions to reduce complexity and costs. The PowerVault MD3000i networked storage array leverages the modularity and availability of the PowerVault series to deliver an IP network storage solution that can consolidate up to 16 fully redundant hosts.

The entire PowerVault MD family shares common features that make them easier and more cost effective to manage and service.
Modular Flexibility
The modularity of the PowerVault MD family allows customers to easily upgrade an existing system and evolve current storage infrastructures to meet changing business needs. For example, migrating from a standard to highly available PowerVault MD3000i solution simply requires users to slide in a second controller module. No data migration or extended downtime required.

Additionally, the modularity offers easy and economical expansion for both Dell PowerEdge PERC 5/E servers and PowerVault MD storage arrays. Both the PowerVault MD3000 and the PowerVault MD3000i arrays are expandable for a total of up to 45 drives, using the PowerVault MD1000 expansion module. The modularity of the PowerVault MD family allows the PowerVault MD1000 enclosure to be repurposed behind the PowerVault MD3000 family as a customers needs grow.

Simple Yet Powerful Storage Management
The PowerVault MD3000 family features a seamless suite of intuitive, intelligent storage management software. The modular Disk Storage Manager combines a user-friendly interface, wizard-guided tools, and a task-based management structure to significantly reduce the complexity of installation, configuration, management, and diagnostic tasks. Storage Manager is a client-based Java application that can run on any server connected to the storage array or on a remote client on the network. The Storage Manager automatically configures the system for optimal performance and availability based on answers to simple questions.

Should a problem arise with the system, the administrator is alerted and the Recovery Guru tool is automatically triggered. The Recovery Guru tool provides valuable troubleshooting assistance by diagnosing system problems and helps to determine an appropriate recovery procedure.

Advanced Data Management
For enhanced data availability, Dell offers optional snapshot and virtual disk copy features with the PowerVault MD3000 family. Snapshots of your data can be taken at discrete points in time so that if a file is accidentally altered or deleted you can recover it by simply reverting to a previous good state. Snapshots are not full data copies, but a combination of changed data and pointers that present a virtual copy of the data. Snapshots can be taken instantaneously and do not require storage space to be allocated. A virtual disk copy (VDC) is a full, replicated copy of source data taken at a discrete point in time. VDCs are used for applications that require minimal performance overhead and full recoverability of the source volume.

PowerVault Storage and PowerEdge Server Commonalities
The PowerVault MD family uses the same 3.5-inch disk drive as PowerEdge servers, so customers only need to stock and order a single type of spare drive. Dell PowerVault storage arrays are designed and engineered to pair perfectly with Dell PowerEdge servers—LEDs, displays, and other operational functions are common to both PowerEdge and PowerVault products. This commonality in a complete solution enhances usability and can make support and service easier.
PowerVault MD Family Products

PowerVault MD3000i Networked Storage Array
The PowerVault MD3000i is an iSCSI SAN that simplifies data management and delivers enterprise data protection capabilities at a fraction of the cost of traditional storage consolidation solutions. iSCSI is an extremely efficient protocol and provides comparable performance to Fibre Channel for many applications—at a much lower cost and complexity. The PowerVault MD3000i array delivers up to 400MB/s of throughput and 64,000 IOPS from cache. With four host-side 1GB/s Ethernet interfaces and the superior bandwidth of SAS disk drives, the PowerVault MD3000i array enables high performance, capacity efficient consolidation without the need of an expensive and complicated Fibre Channel storage network.

**The PowerVault MD3000i array is available in two models:**

The standard model provides a lower-cost entry point. This model consists of a single controller with two 1GB/s Ethernet ports, for connecting up to two hosts directly, or up to 16 hosts when configured with an Ethernet switch.

The high availability model supports up to four 1GB/s Ethernet ports and features dual active/active controllers that mirror each other’s cache. In the event of a controller failure, the LUNs owned by the failed controller are transferred to the surviving controller and operations continue. Other high-availability features include hot-pluggable redundant power supplies, cooling modules, and disk drives; active disk scrubbing, and non-disruptive firmware upgrades.

PowerVault MD300 Modular Disk Storage Array
The PowerVault MD3000 modular disk storage array offers simplicity, performance, and availability for critical applications running on one or two PowerEdge servers, or on a pair of clustered PowerEdge servers. Additionally, the PowerVault MD3000 array can support up to four servers in environments where redundant host connections are not required.

This array is designed with redundant components and connections to enhance availability and reduce the risk of downtime. The array includes dual active/active RAID controllers with mirrored cache and multi-path I/O management to help ensure that storage processing continues without disruption. Other high-availability features include hot-pluggable redundant power supplies, cooling modules, and disk drives; active disk scrubbing, and non-disruptive firmware upgrades.

PowerVault MD1000 Modular Disk Storage Expansion Enclosure
The Dell PowerVault MD1000 modular disk storage expansion enclosure is spearheading a new era of storage expandability and versatility. The PowerVault MD1000 can be used in conjunction with a server-based Dell PERC 5/E controller or as an expansion module for the PowerVault MD3000 and PowerVault MD3000I arrays. The PowerVault MD1000 houses up to fifteen 3.5-inch disk drives in a single 3U rack enclosure. Support for either SAS or SATA II disk drives gives customers the flexibility to configure for their application needs.

The PERC 5/E RAID controller provides the capability to daisy chain up to three 15-drive expansion enclosures behind each of the two controller ports. Dell’s PERC 5/E RAID controller uses the best-in-class PCI Express interface, which provides up to four times the bandwidth capacity of the PCI-X interface.

The PERC 5/E RAID controller includes Dell OpenManage Server Assistant disk configuration and management utilities for simplified management of internal and external disk drives through a common interface.

**DELL IT INFRASTRUCTURE SERVICES**

Dell brings pure execution to IT Services. The planning, implementation and maintenance of your IT infrastructure deserves nothing less. Variability in execution can compromise your productivity, IT resources and ultimately your reputation. By leveraging our heritage of process-driven excellence, Dell Services can deliver a smarter way. We don’t claim to do everything. We focus on IT infrastructure services. And we take a customer led approach, grounded in the philosophy that you know your business better than anyone. That’s why Dell does not try to take key business decisions out of your hands, or lock you in to more than you need. Instead, we apply our world-class process management and “no excuses” culture to deliver what organizations need most today — flexibility and repeatability. That’s pure execution. That’s Pure Dell.

**Enterprise Support Services:**
With Dell, you can get maximum performance and availability out of your Dell server and storage systems. Our Enterprise Support Services offer proactive maintenance to help prevent problems as well as rapid response and resolution of problems when they do occur. We have built a robust global infrastructure that offers multiple levels of enterprise support for systems throughout your infrastructure.

**Deployment Services**
System deployment is a necessary evil that plagues nearly every organization. You must deploy new systems to help improve performance and meet user demand. With Dell’s deployment services, we help simplify and speed up the deployment and utilization of new systems to maximize uptime throughout your IT environment.

**Asset Recovery and Recycling Services**
Proper disposal, reselling and donation of computer equipment is a time-consuming task that typically falls to the bottom of many IT to-do lists. Dell helps simplify the end-of-life processes for IT equipment in a way that can maximize value for your organization.

**Training Services**
Arm your employees with the knowledge and skills they need to be as productive as possible. Dell offers comprehensive training services which include hardware and software training, as well as PC skills and professional development classes. With Dell training you can help improve system reliability, maximize productivity and reduce end-user requests and downtime.

**Assessment, Design and Implementation Services**
IT departments are continually challenged to evaluate and implement new technologies. By utilizing our technical expertise and exceptional project management, you can plan, build and manage an IT infrastructure that takes full advantage of industry standards — and realize the benefits that come along with them. Simplified operations. Improved ROI. Increased utilization. Optimized performance. More control. Less chaos. To help you get the most from your Dell systems, visit www.dell.com/services. Services vary by region.
<table>
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<th>Feature</th>
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<th>PowerVault MD3000</th>
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* SATA drives available Q4 2007