THE DELL POWERVAULT MD1120: HIGH-PERFORMANCE DIRECT ATTACH STORAGE

By Rohit Bhat

Vishal Kadam

The new Dell™ PowerVault™ MD1120 storage enclosure is designed to provide high-performance direct attach storage for ninth-generation and later Dell PowerEdge™ servers. Taking advantage of energy-efficient, rack-dense 2.5-inch Serial Attached SCSI (SAS) drive technology, this enclosure is well suited for applications requiring high I/O or throughput rates.

Related Categories:

Data consolidation and management

Dell PowerVault storage

Serial Attached SCSI (SAS)

Storage

Visit DELL.COM/PowerSolutions for the complete category index.

The new Dell PowerVault MD1120 direct attach storage (DAS) enclosure takes advantage of energy-efficient 2.5-inch Serial Attached SCSI (SAS) drives to provide exceptional I/O performance coupled with optimized rack density. As a high-performance JBOD (Just a Bunch of Disks), this 2U enclosure supports up to 24 drives, and can be daisy-chained with up to two other enclosures for up to 72 total drives. Its modular design utilizes the same type of drive as Dell PowerEdge servers and a common set of hardware and software components used across PowerVault MD Series storage, allowing it to integrate easily into existing infrastructures and scale to help meet future requirements.

The PowerVault MD1120 can connect to ninth-generation and later Dell PowerEdge servers through a PowerEdge Expandable RAID Controller (PERC) 6/E. It can function in both unified and split modes, and can be managed using Dell OpenManage™ Server Administrator, Dell OpenManage Storage Services, and Dell PowerEdge Diagnostics software. While the comparable PowerVault MD1000 enclosure is designed for general-purpose storage and supports both SAS drives and cost-effective, high-capacity Serial ATA (SATA) II drives, the PowerVault MD1120 is primarily suited for applications that require high I/O-per-second

performance or high megabyte-per-second through-put rates (see Figure 1).

KEY ENCLOSURE FEATURES

The PowerVault MD1120 is designed for high performance and efficiency, and is based on a modular architecture utilizing upgradable components and designed to integrate seamlessly into existing environments. The 2.5-inch drives used in the PowerVault MD1120 offer several advantages over the standard 3.5-inch drives commonly used in storage enclosures. By offering higher random I/O performance and higher drive densities per shelf than comparable 3.5-inch drives, 2.5-inch drives can help meet the dual objectives of high performance and efficient use of space. Because they typically use less power than comparable 3.5-inch drives, they can help reduce operational costs and total cost of ownership. And their small form factor also allows increased airflow, helping provide efficient system cooling.

The PowerVault MD1120 enclosure offers several advantages in enterprise data centers:

- **High performance:** The PowerVault MD1120 supports 2.5-inch, 3 Gbps SAS hard drives (10,000 rpm and 15,000 rpm) well suited for applications requiring high I/O or throughput rates. Its external

	PowerVault MD1000	PowerVault MD1120
Rack space	3U (rack only)	2U (rack only)
Drive bays	15 (3.5-inch drives)	24 (2.5-inch drives)
Supported drive types	3 Gbps SAS and 3 Gbps SATA II	3 Gbps SAS (designed for future support for SATA)
Expandability	Three shelves for a total of 45 drives per host port (unified mode only)	Three shelves for a total of 72 drives per host port (unified mode only)
Management	In-band, using Dell OpenManage Server Administrator	In-band, using Dell OpenManage Server Administrator
Backplane options	Unified or split JBOD	Unified or split JBOD
Supported RAID controllers	PERC 5/E and PERC 6/E	PERC 6/E only
Cluster support	No	No
Hot-pluggable drives	Yes	Yes
Hot-pluggable fans and power supplies	Yes (combined fan and power supply modules)	Yes (combined fan and power supply modules)
Enclosure management configurations	Redundant and nonredundant	Redundant and nonredundant
Fan and power supply configuration	Redundant	Redundant
Primary use	General-purpose storage utilizing cost-effective, high-capacity drives	High-performance storage for applications requiring high I/O or throughput rates

Figure 1. *Comparison of Dell PowerVault MD1000 and PowerVault MD1120 storage enclosures*

cable supports a SAS x4 wide lane for a total interface bandwidth to the host controller of up to 12 Gbps.

- **High availability:** The PowerVault MD1120 supports RAID-0, RAID-1, RAID-5, RAID-6, RAID-10, RAID-50, and RAID-60. It is designed with redundant, hot-pluggable physical disks and combined fan and power supply modules, as well as redundant enclosure management modules (EMMs) for managing internal enclosure functions such as temperature regulation, LED control, and alarm control even following the failure of one EMM.
- **Scalability:** Administrators can daisy-chain up to three PowerVault MD1120 enclosures per PERC 6/E connection, allowing them to scale their storage to up to 72 SAS drives in 36 GB, 73 GB, or 146 GB sizes, for a potential total capacity of over 10 TB per PERC 6/E

connection. Organizations can also deploy it alongside PowerVault MD1000 enclosures to help build a tiered environment, using PowerVault MD1120 enclosures with high-performance applications and PowerVault MD1000 enclosures for general-purpose storage based on cost-effective, high-capacity SATA II drives.

- **Ease of use:** The PowerVault MD1120 utilizes a set of hardware and software components common across Dell MD Series storage, helping increase

flexibility and allowing the system to integrate easily into existing infra-structures. Administrators can use standard Dell OpenManage Server Administrator software for monitoring and management functions.

FLEXIBLE ENCLOSURE MODES
Administrators can set the PowerVault MD1120 enclosure to either unified or split mode using a switch located on the front panel. Changing modes only takes effect when the enclosure is powered up, meaning that administrators should be sure to power down and then power up the enclosure after changing its configuration. Administrators should also ensure that the mode switch is in the appropriate position each time they power up the enclosure; if the position of the switch changes inadvertently, data loss could occur if the controller then recognizes an incorrect number of attached physical disks. When power cycling a PowerVault MD1120, all attached servers must be powered down.

Unified mode
In unified mode, a single server has access to all 24 physical disks in the enclosure through a single SAS cable. This mode can also provide a single server with access to the maximum of 72 physical disks per PERC 6/E connection when three enclosures are daisy-chained from a single host port. The primary advantage of unified mode is its high degree of physical disk scalability. Administrators should note that when using this mode, they can connect only a single host to the primary EMM (EMM 0) controller.

Figure 2 shows a fully scaled unified-mode deployment in which two sets of

"The Dell PowerVault MD1120 is designed for high performance and efficiency, and is based on a modular architecture utilizing upgradable components."

three daisy-chained PowerVault MD1120 enclosures are attached to a single host server, providing up to 144 physical disks of storage for that server.
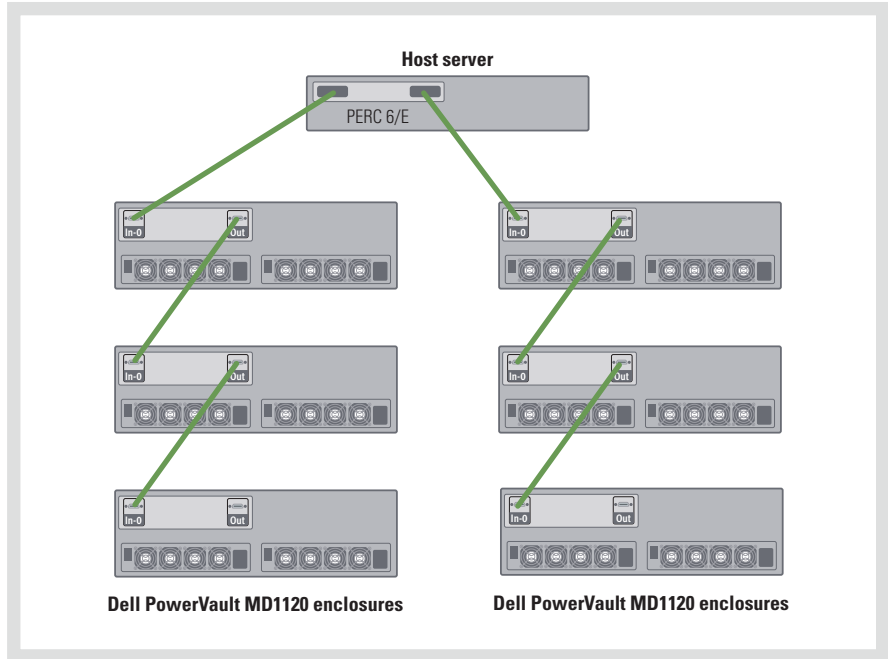
Split mode

In split mode, the enclosure is divided into two logical enclosures, with each host connection accessing its own set of physical disks. The primary EMM—located on the left side of the enclosure when viewed from the rear—accesses physical disk slots 12–23, while the secondary EMM accesses physical disk slots 0–11. Each host server sees only its own physical disks.

To connect a server to an enclosure in split mode, administrators should attach the "in" port of each EMM to a connector of a PERC 6/E controller. Because this mode does not support daisy-chaining additional enclosures, the "out" port of each EMM is disabled in this mode. A system with a single EMM can function properly in this mode, but the server sees only the physical disks connected to that EMM. Split mode is primarily useful in deployments where a single PowerVault MD1120 enclosure provides limited amounts of storage for two different servers.

Figure 3 illustrates a split-mode deployment in which two host servers are connected to a single PowerVault MD1120 enclosure, with each server accessing its own set of physical disks in the enclosure.

HIGH-PERFORMANCE DIRECT ATTACH STORAGE

The new Dell PowerVault MD1120 is designed to provide an efficient, high-performance DAS enclosure for ninth-generation and later Dell PowerEdge servers that can be deployed on its own or as a complement to the cost-effective, high-capacity general-purpose storage of the PowerVault MD1000. Based on rack-dense, energy-efficient 2.5-inch SAS drives, the PowerVault MD1120 is well suited for enterprises relying on performance-oriented applications in their data center environments.⏻

Figure 2. *Fully scaled unified-mode deployment of Dell PowerVault MD1120 storage enclosures*
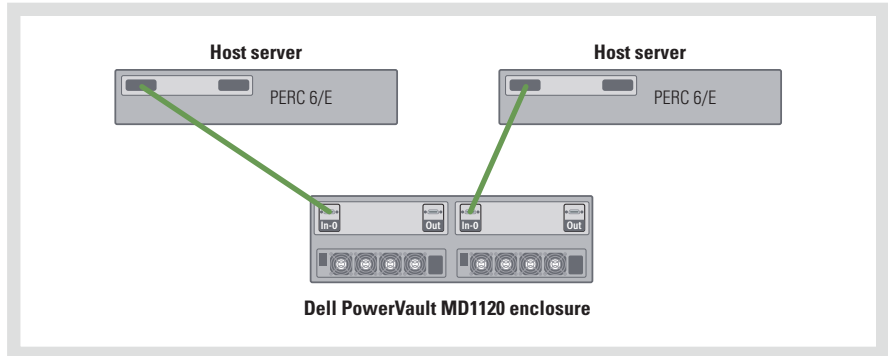
Figure 3. *Split-mode deployment of a Dell PowerVault MD1120 storage enclosure*

Rohit Bhat is a Product Group test analyst on the Enterprise Storage Test team at the Dell Bangalore Development Center. He has a degree in Electronics and Communication and is a Storage Networking Industry Association Certified Professional (SCP), Brocade Certified Fabric Professional (BCFP), and Brocade Certified SAN Manager (BCSM).

Vishal Kadam is a senior test analyst on the Enterprise Storage Test team at the Dell Bangalore Development Center. He has a diploma in Electronics and Communication and is currently pursuing a degree in Information Technology from the University of Mysore. He is a Microsoft Certified Systems Engineer (MCSE), Sun Certified System Administrator (SCSA), and Brocade Certified Fabric Professional (BCFP).

MORE
⏻**NLINE**
DELL.COM/PowerSolutions

QUICK LINK

Dell PowerVault MD1120:
DELL.COM/Storage