COST-EFFECTIVE ARCHIVING WITH THE DELL POWERVAULT RD1000

By Jeff Boles

The Dell™ PowerVault™ RD1000 removable disk drive provides a flexible, cost-effective way for small and medium businesses to meet data growth and long-term archiving requirements—designed to provide both higher performance and simpler management than traditional tape media while being more portable and durable than traditional external hard drives.

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Small and medium businesses (SMBs) are often challenged by tremendous data growth and seemingly ever-increasing demands for data retention. IT managers, for example, face a litany of regulations and requirements—such as those of the Sarbanes-Oxley Act, Federal Information Security Act, and Health Insurance Portability and Accountability Act (HIPAA)—that prescribe how they must archive and maintain aging data. Facing these rapidly increasing requirements, these organizations need storage that combines high performance, long-term data integrity, and ease of use in a single system. Unfortunately, traditional low-end tape and hard drive solutions typically force them to compromise on at least one of these needs.

Advances in removable disk drive technology have now made high-performance, reliable, simple-to-use storage significantly easier to obtain than it has been in the past. The Dell PowerVault RD1000 removable disk drive can provide multiple advantages for SMBs seeking to meet the challenges of data growth and retention requirements by delivering high performance, simple management, optimal portability, and exceptional durability in a single cost-effective storage system.[1]

TRADITIONAL ARCHIVING AND THE DELL POWERVAULT RD1000

For SMBs, traditional approaches to long-term data retention can carry a variety of disadvantages. For example, many archiving applications continuously add and delete data from long-term storage media such as tape, as new data is captured and old data ages beyond its specified retention period. Over time, this process can lead to large amounts of non-contiguous storage or gaps in utilization, resulting in poor performance, fragmentation, and decreased capacity—and making it difficult for administrators to recover unused space and maintain the required levels of performance.

Built in a 3.5-inch form factor using industry-standard 2.5-inch removable hard drives, the Dell PowerVault RD1000 incorporates a hardened case designed to tolerate a wide range of physical forces (such as dropping and crushing) and environmental conditions (such as high heat and humidity). This removable cartridge can help meet the demands of data growth and retention while avoiding some of the disadvantages of traditional low-end tape and hard drive backups. It combines the advantages of

[1] For an introduction to the PowerVault RD1000, see "Introducing the Dell PowerVault RD1000: A Portable Disk-based Replacement for Traditional Low-End Tape Backup," by Curt Krempin, in *Dell Power Solutions*, February 2007, DELL.COM/Downloads/Global/Power/ps1q07-20070207-RD1000.pdf.

> **"The Dell PowerVault RD1000 removable disk drive can provide multiple advantages for SMBs seeking to meet the challenges of data growth and retention requirements."**

both tape and disk media, is easy to use, has few parts that can fail or wear out, and can handle many cycles of removal and insertion. By combining removability and high-performance disk, the PowerVault RD1000 provides high sequential and random I/O performance, simple implementation and management, scalability, ongoing capacity optimization, and long-term integrity.

The ruggedized removable drive cartridges used by the PowerVault RD1000 can be accessed through the PowerVault RD1000 dock, which is designed for simplicity, contains no read/write mechanisms, and utilizes a minimal number of components to help maximize its life span. The Serial ATA (SATA) II removable drive cartridges—available in 80 GB, 120 GB, 160 GB, and 300 GB capacities—are designed not only for easy off-site storage, but also for capacity scaling similar to tape by allowing enterprises to build and add to a pool of rotated cartridges. This removability also helps minimize power consumption compared with always-on near-line disk systems; for more information, see the "Power conservation with the Dell PowerVault RD1000" sidebar in this article.

KEY ADVANTAGES OF THE DELL POWERVAULT RD1000

Both traditional SMB tape and hard drive solutions for long-term storage require compromises. In comparison with these solutions, the PowerVault RD1000 can provide higher performance, equivalent or better removability and scalability, better cost-effectiveness, and higher durability.

High performance. Dynamic access to traditional tape backups can be extremely slow, and even basic backup performance with tape can suffer when backup clients are unable to sustain consistent throughput rates to help avoid tape stops and starts. PowerVault RD1000 disk cartridges are designed to deliver high levels of performance for both sequential and random I/O—including data transfer speeds of up to 45 MB/sec—that are well suited for the dynamic nature of near-line archival storage and retrieval.

Removability and scalability. The PowerVault RD1000 is designed to exceed the performance of traditional low-end tape while matching its advantages in removability and scalability. The removable cartridges provide SMBs with quickly accessible near-line archival storage and protected backup storage in a single system that can be easily expanded simply by adding cartridges. Administrators can also easily archive and protect data offline without performing complex data migrations or managing multiple types of media.

Cost-effectiveness. Over time, the cost of replacing worn tape can far exceed the initial cost of the tape system itself. PowerVault RD1000 disk cartridges are designed to handle far more read/write cycles than typical tape media can, and typically should not require replacement over a normal archiving life span—helping significantly reduce the total cost of ownership for data retention.

POWER CONSERVATION WITH THE DELL POWERVAULT RD1000

Energy efficiency has become increasingly important to help control power and cooling costs in enterprise IT environments, and backup and archiving systems are no exception. The Dell PowerVault RD1000 removable disk drive is designed to balance high performance and durable archival storage with efficient power conservation. For example, in addition to enabling administrators to remove the cartridges for long-term archiving and storage, these cartridges are designed to rapidly spin down during periods of inactivity even when plugged in. This feature helps reduce not only the power consumption that other disk-based storage devices typical require to continue running, but also the daily wear on drive components, helping extend the system's life span and further reduce total cost of ownership.

—Curt Krempin
Product marketing manager,
Dell Enterprise Product Group

Dell PowerVault RD1000 removable disk drive

> **"The Dell PowerVault RD1000 offers high-performance, durable, easy-to-use disk-based storage in a single system. Its versatility and long life expectancy make it well suited to help SMBs meet the challenges of data growth and long-term data retention in a flexible, cost-effective way."**

Durability. Durability is critical to long-term storage media, and PowerVault RD1000 storage is designed to outlast typical enterprise data retention requirements. Best practices for digital preservation recommend that enterprises regularly migrate media to reduce the risk of data loss from both media failure and access mechanism obsolescence. The PowerVault RD1000, however, helps avoid these risks by providing removable backup and archival storage using durable, highly protected disk cartridges that integrate both the access mechanism and the media itself. Key features include the following:

- Special-purpose 2.5-inch drive cartridges that secure drive heads by ramp loading them at the end of activity, helping remove a source of accidental media and head collisions that can damage traditional drives
- Inactive-state spin down to help avoid wear on drive components
- Casing and enclosure designed for high insertion rates
- Ruggedized shell designed to withstand a three-foot drop onto concrete as well as prolonged exposure to heat, dust, electrostatic discharge, and other environmental contaminants

To help validate these product specifications, in July 2007 Percept Technology Labs, an independent testing and consulting company, tested the PowerVault RD1000 to evaluate how long its cartridges might typically last during real-world use. These tests were designed to provide rough estimates of the expected service life of the drives under specific storage and handling conditions.

The Percept team tested a total of 80 PowerVault RD1000 cartridges. After writing data to each drive to completely utilize its capacity, verifying the data, and establishing a baseline for performance, they separated the cartridges into five groups. Each group was placed into its own environmental chamber set at high temperature and humidity levels, with temperatures in different chambers ranging from 140°F to 176°F and humidity levels ranging from 10 percent to 85 percent. At specified intervals of between 336 and 1,000 hours, the test team removed the cartridges and checked the data for error. Failed drives—defined as those returning an unrecoverable read error when reading any data on the disk—were removed from the test, with the rest returned to the environment chamber for another monitoring interval. This process was repeated until the total duration for each chamber was reached, a period of between 2,000 and 4,000 hours.

The Percept team next plotted the test results in ReliaSoft ALTA, a software package designed to calculate predicted life spans based on data from accelerated conditions such as those used in the environmental chambers. The results indicated that a PowerVault RD1000 cartridge stored in moderately controlled conditions (78°F with 95 percent noncondensing relative humidity) can provide a potential life expectancy of 30 years or more. In stringently controlled conditions (68°F with 30 percent relative humidity), the results indicated that this potential life expectancy can increase to 100 years or more—well over the typical requirements for long-term enterprise data storage.

HIGH-PERFORMANCE, DURABLE, COST-EFFECTIVE ARCHIVING

The Dell PowerVault RD1000 is designed to provide significant advantages over both traditional low-end tape and traditional external hard drives, offering high-performance, durable, easy-to-use disk-based storage in a single system. Its versatility and long life expectancy make it well suited to help SMBs meet the challenges of data growth and long-term data retention in a flexible, cost-effective way.

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