Replacing Tape with RDX® Removable Disk

Cost-Effective, High-Performance, Removable Disk Backup to Replace Tape in Desktops and Entry-Level Servers

Introduction

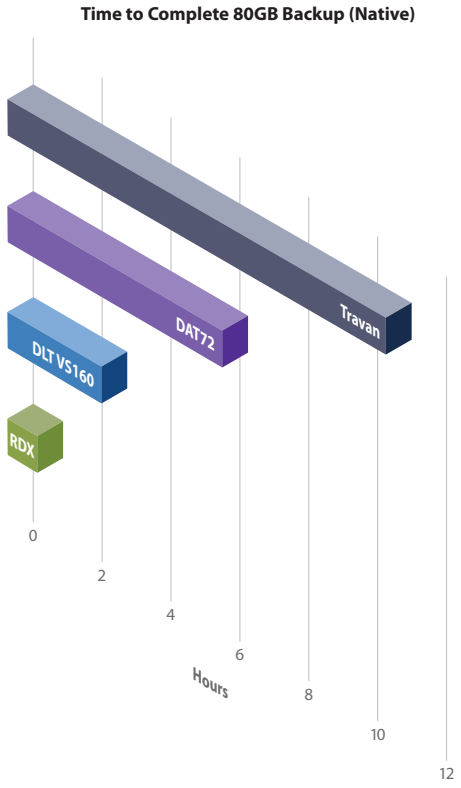
The concept of replacing tape backup with high-performance, random access technology has floated around the industry since the advent of disk drives. Both industry experts and computer storage companies alike have predicted the demise of tape for years. However, attempts to achieve this goal with various technologies have always failed, because they could not match or surpass the removability, capacity, or low-cost benefits of tape. In fact, tape's biggest negatives have been its low performance during both backup and retrieval operations, need to forward-migrate data when drive technology changes, and its relatively high failure rates.

This paper explores the benefits of a new tape replacement technology, RDX® technology, which successfully and cost-effectively matches and surpasses tape in all of its key aspects, and provides the backup and retrieval performance of random access disk with five 9s or 99.999% reliability. RDX technology is the only viable, removable backup solution for high-capacity desktops and low-end servers.

What is RDX technology?

RDX technology is a removable disk drive and internal or external dock that handles and operates like a traditional tape drive and media, yet has all of the advantages of disk-to-disk (D2D) systems. RDX technology allows for backups to be accomplished in the traditional fashion of moving data directly to a device with removable media. To the user, the RDX removable disk cartridge looks just like a tape cartridge. However, backup performance and reliability are distinctly different.

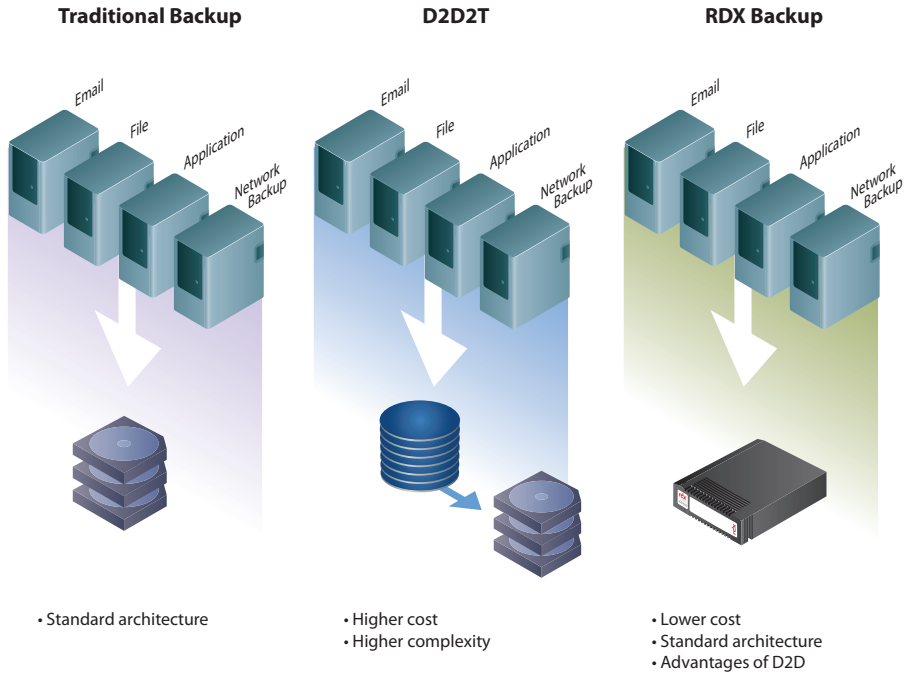
It takes RDX technology less than an hour to back up 80GB of native data at a transfer rate of 25MB per second (USB version). For this same operation in the tape world, a DLT VS160 drive takes over two hours and a DAT72 drive requires over six hours.



And on a restore, the RDX removable disk cartridge has all of the read/write advantages of a disk drive. What also takes hours of serialized search in the tape world, takes milliseconds with the RDX removable disk cartridge. In brief, a backup to a RDX removable disk cartridge vastly improves customer response times by allowing users to recover files in minutes, instead of hours.

D2D systems

The most successful tape replacement offerings to date have been the D2D systems. Nonetheless, these systems do not really replace tape so much as they change the backup architecture. Instead of backing up data directly to tape, D2D systems are added as an interim step to increase performance. The backup application writes data to the D2D target, and then, at some later time, moves the data to tape for offsite disaster recovery and long-term storage. This architecture is commonly known as disk-to-disk-to-tape (D2D2T). While D2D2T has performance and availability advantages over a tape-only design, it doesn't really replace tape. And these advantages come at the expense of increased cost, more management, and system complexity.



RDX Technology Advantages

Removability and portability

The form factor of an RDX removable drive cartridge is a unique removable media that is ruggedly designed for portability. An RDX removable disk cartridge consists of a mobile 2.5-inch hard disk drive (HDD) suspended in a highly durable cartridge. The same 2.5-inch drives are most often used in laptop computers due to their size and locking head feature. With its protective, shock-proof cartridge design, the RDX removable disk cartridge passes drop tests in excess of one meter onto a tiled concrete floor without damage.

Archivability and reliability

Small-form-factor HDDs like the ones used in RDX technology have undergone significant advancements in the most-recent generation to significantly improve their mechanical reliability and life. Design features such as ramp-load heads and fluid dynamic bearings eliminate any concern about headmedia contact or disk stiction. In fact, these mobile HDDs now boast a mean time to failure of 550,000 hours.

Compatibility

RDX tehcnology is compatible with all common backup applications and will plug-and-play in all backup a rchitectures. IT professionals do not need to change designs, complicate backup processes, or even add cost to derive the benefits of using RDX technology.

Simplicity and security

Anyone who has ever configured a multi-disk server can tell you that setup and security are never as simple as advertised and often quite complex. RDX technology has all of the benefits of using a disk drive, with no special setup required. In fact, managing an RDX removable disk cartridge with a backup application is easier than using a tape device.

RDX Technology – Advantages versus Tape

Performance

Like all tape drives, HDDs vary in throughput and performance. The advantage that disk drives have over tape is the ability to randomly access data once it's recorded. Even if data is written in a sequential format, RDX technology can access and read data randomly, which essentially eliminates seek time and vastly improves single file restore times.

Reliability

RDX technology has a level of reliability never before seen in tape backup. The lifespan of a tape drive is limited by the magnetic head that is in actual contact with the tape media as it reads and writes data. The physical contact causes wear of both the head and the tape, limiting their life and eventually resulting in failure of both drive and media. RDX removable disk cartridge has no such direct contact and features a much less complex design that is inherently more reliable in its simplicity. This gives the RDX removable disk cartridge an expected reliability that is at least 10 times better than that of most tape drives.

Because of its direct contact with the read/write heads, tape media life is determined by the number of uses. While sometimes specified somewhat higher, industry experts agree that a single piece of tape media can only safely be used about 50 to 200 times. Depending upon the frequency of use, this limits most tape media to less than a single year of reliable usage.

RDX removable disk cartridge contains a complete, self-contained HDD and, as such, has a simple connector as its interface. Since the RDX removable disk cartridge essentially never wears out, the cartridge's life is limited only by the life of this connector. This physical advantage means that the RDX removable disk cartridge is specified to handle more than 5,000 load/unload actions, giving the RDX cartridge a usage lifespan that is more than 50 times that of tape media.

Affordability

The progression of tape drives and media is well known. To take advantage of storage capacity advancements, users must purchase new tape drives and new media. RDX technology has no system obsolescence. It features both backward- and forward-compatibility. Each time a higher-capacity cartridge is introduced, they will work with existing RDX dock. This means that all RDX docks are usable with all RDX removable disk cartridges, now and into the future. For a budget, this means that the simplicity of the RDX design allows for a very low initial cost and a superior total cost of ownership when compared to any tape products.

Backing Up Disk Volumes to RDX Removable Disk Cartridges

With the typical incremental backups used by tape users because of tape's slow transfer rate performance, recovery of an entire backed up disk volume requires the time-consuming process of going through every piece of tape media that has been used in the backup process. And if the backup catalog is somehow contaminated, it can only be recreated by a time-consuming search of every piece of affected media. Even with an intact catalog, finding a targeted file requires a slow serial search of the correct tape cartridge.

RDX removable disk cartridges are available in capacities ranging from 40GB to 120GB (native). High native storage capacity, combined with the RDX technology's 90GB/hour speed (USB version) means full backups can be performed every day in much less time than it takes to do incremental backups to tape.

RDX removable disk cartridges automatically keep track of how many times a cartridge has been loaded. This saves the user from the tedious task of keeping track of how many times each cartridge has been used, especially in complex media rotation systems.

RDX technology head-to-head with today's tape technologies

In a nutshell, the following table clearly shows how the RDX drive and cartridge far surpass existing tape technologies in overall cost and performance.

	RDX Technology	Travan	DAT72
Capacity (native)	40-640GB	20GB	36GB
Performance	Up to 45MB/s	2MB/s	3.5MB/s
Backward- and forward-compatibility	Yes	No	No
ESD-protected cartridge	Yes	No	No
Cartridge status indicator	Yes	No	No
Drag-and-drop capability	Yes	No	No
Cleaning cartridge required	No	Yes	Yes
Reliability (MTBF)	550,000 hrs	370,000 hrs	125,000 hrs
Media uses	5,000	200	200
Relative price	1x	1.5x	2x

In Conclusion

Before the arrival of RDX technology, users had to choose between tape, disk, or a combination of both to back up their high-end desktops and low-end servers — each with architecture, performance, and cost issues. Now users can choose RDX technology — the only technology for backup that offers the best of both worlds: tape (removable, affordable, archivable) and disk (performance, simplicity, reliability) — an all-in-one, cost-effective package.

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