Tandberg Data, RDX® QUIKStor White Paper – Technology Advantages

RDX™—Data Backup with Portability, Reliability and Random Access Restore

How High-Performance, Removable Disk Backup take best attributes of Tape to facilitate low cost backup for Desktops and Entry-Level Servers

Introduction

The predicted marriage of tape backup with high-performance random access disk technology has been floating around the industry since the advent of disk drives. Both industry experts and storage vendors alike have predicted that customers will need to be able to choose between tape and disk in an attempt to define the ideal secondary storage solution. However, attempts to replace tape with various technologies have always failed because they could not match or surpass tape in its removal, capacity, archival or low-cost benefits that users demand. The industry has therefore been searching for and exploring technologies that both complement and address tape's biggest detractors; its relatively low performance during both backup and retrieval operations, and its' relatively high failure rates when compared to disk.

This paper explores the benefits of a new portable disk based technology, **RDX®**, 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 99.999% reliability. The RDX® QuikStor solution is the only viable removable backup for high-capacity desktops and low-end servers.

What Is RDX?

RDX is a removable hard disk drive system that handles and operates like traditional tape drives and media, yet has all of the advantages of disk-to-disk (D2D) systems. The RDX device allows for

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Time To Complete 80 GB Backup (native)
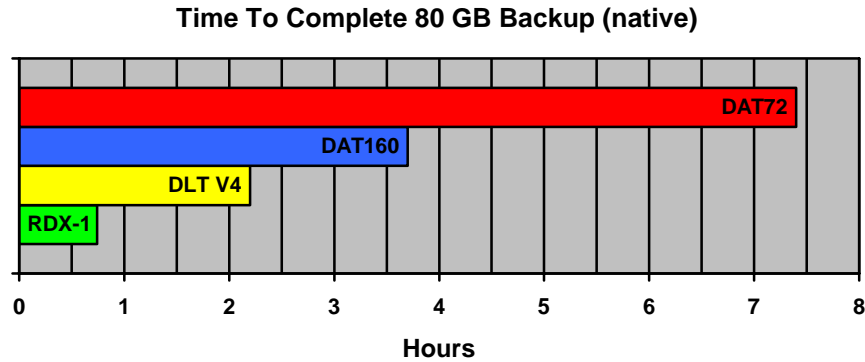
backups to be accomplished in the traditional fashion of moving data directly to a device with removable media. To the computer, the RDX cartridge looks just like a tape cartridge. However, backup performance and reliability are distinctly different.

It takes the RDX drive less than an hour to back up 80 GB of native data at its 30 MB per second transfer rate. For this same operation in the tape world, a DLT V4 drive takes over two hours, a DAT160 drive takes almost four hours, and a DAT72 drive requires over seven hours.
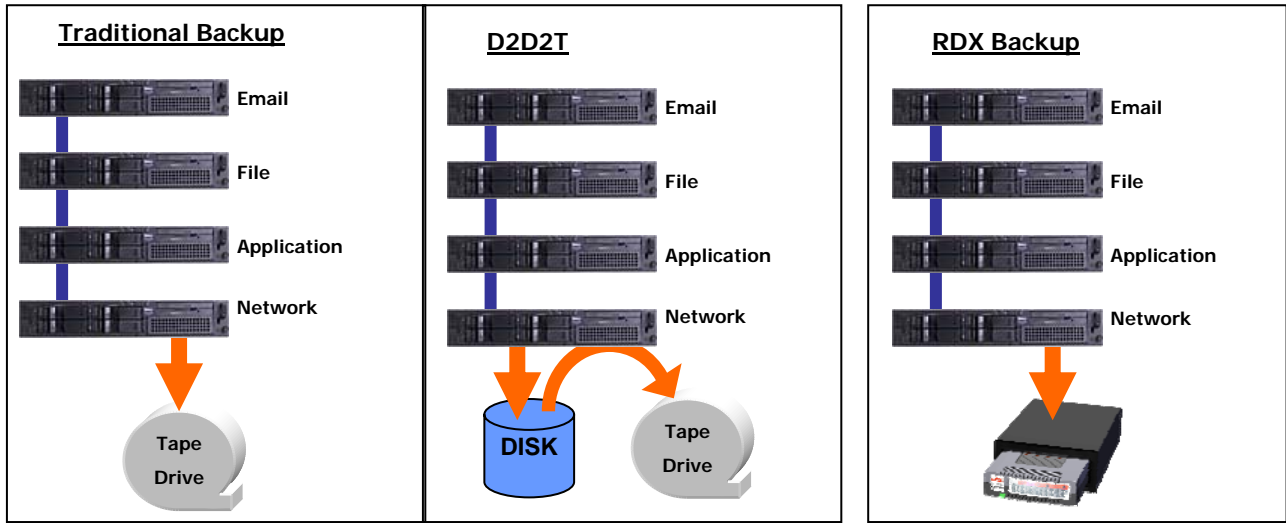
And on a restore, the RDX media has all of the read/write advantages of a hard disk drive. What also takes hours of serialized search in the tape world, takes milliseconds with the RDX drive. In brief, a RDX backup lets you vastly improve customer response times by allowing you to recover customer files in minutes instead of hours.

D2D Systems

The most successful tape replacement offerings to date have been the disk-to-disk (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 off-site 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.

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Traditional Backup	D2D2T	RDX Backup
Email	Email	Email
File	File	File
Application	Application	Application
Network	Network	Network
Tape Drive	DISK / Tape Drive	
• Standard Architecture	• Higher Cost • Higher Complexity	• Lower Cost • Standard Architecture • D2RD

RDX Advantages

Removability and Portability

The 3.5-inch form factor RDX drive system utilizes a unique removable media that is ruggedly designed for portability. RDX media 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 cartridge passes drop tests in excess of 36 inches (91.4 cm) onto a tiled concrete floor without damage.

Archivability and Reliability

Small-form-factor HDDs like the ones used in RDX 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 head-media contact or disk sticking. In fact these mobile HDDs now boast a mean time to failure of 500,000 hours.

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Compatibility

The RDX system is compatible with all common backup applications and will plug-and-play in all backup architectures. IT professionals do not need to change designs, complicate backup processes, or even add cost to derive the benefits of using RDX backup 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 can often be quite complex. The RDX device has all of the benefits of using a disk drive, with no special setup required. In fact, managing an RDX device with a backup application is easier than using a tape device with simple drag and drop icons.

RDX Advantages over Tape

Performance

Like all tape drives, hard disk drives 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 can access and read data randomly, which essentially eliminates seek time and vastly improves single file restore times.

Reliability

RDX has a level of reliability never before seen in tape backup. The life span 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. The RDX system has no such direct contact and features a much less complex design that is inherently more reliable in its simplicity. This gives the RDX drive 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 100 times. Depending upon the frequency of use, this limits most tape media to less than a single year of reliable usage.

RDX media is a complete, self-contained HDD and, as such, has a simple connector as its interface. Since the RDX HDD essentially never wears out, the cartridge's life is limited only by the

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life of this connector. This physical advantage means that the RDX cartridge is specified to handle more than 5,000 load/unload actions, giving the RDX media a usage life span 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, you must purchase new tape drives and new media. The RDX system has no system obsolescence! RDX features both backward and forward compatibility. Each year as higher-capacity cartridges are introduced they will work with your existing RDX drive. This means that all RDX systems are usable with all RDX media, now and into the future. For your 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 with RDX

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 cartridges are available in capacities ranging from 40 GB to 160 GB (native). High native storage capacity combined with the RDX drive's 100 GB/hour speed means full backups can be performed every day in much less time than it takes to do incremental backups to tape.

RDX drives 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.

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RDX Head-to-Head with Today's Tape Technologies.

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

	RDX® QuikStor	**Travan**	**DAT72**
Capacity (native)	40 – 120GB	20GB	36GB
Performance (native)	30MB/s	3MB/s	4MB/s
Backward and Forward Compatibility	Yes	No	No
Reliability (MTBF)	500,000 hrs	40,000 hrs	50,000 hrs
Media Uses	5,000	50-100	50-100
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 there is a viable alternative - users can choose RDX—the only backup technology that offers the best of both worlds: tape (removability, affordability, archivability) and disk (higher performance, simplicity, reliability) — all in one cost-effective package.

RDX® is a registered trademark of ProStor Systems, Inc

Specifications subject to change without notice

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