

Tape or Disk Backup – Which is Best?

Disk-to-Disk-to-Tape Strategy Guide

How often are we reminded that what goes around comes around? This can be said for the fashion industry, but does it hold true for technology? It does, and an example of this is the interest in disk backup today. Capacity breakthroughs and big cost reductions have revived this dated technology causing significant industry buzz. But are disk-based backups really the wave of the future?

To better understand today's requirements for backup it helps to know how the process has evolved over the years. In the beginning of the computer age, backups were a problem because memory and disk were tiny and prohibitively expensive (tape wasn't invented until later). The only way to get information out of a computer was by outputting paper tape and punch cards – hardly ideal backup devices. It was years before the industry developed a more effective backup technology based on washing machine sized removable disk drives and refrigerator sized open reel tape drives. While miles ahead of punching holes in paper, early removable disk and tape methods typically required an evening shift that often worked all night to finish backups before workers arrived to start the next day's morning shift.

Exabyte Corporation revolutionized the backup market when it launched the Exabyte 8200 8MM tape drive. This relatively low cost device held 2.3GB of uncompressed data on one small 8MM tape cartridge and offered "lights out" or unattended backup. Innovation quickly expanded 4/8MM tape drives to greater capacity by first implementing hardware-based compression logic and then continually improving the recording density and length of the tape media. This, and other innovations, in tape drive and library technology, made backing up to tape the most cost comprehensive strategy for data protection. Tape backup became far cheaper than disk, and also offered more flexibility.

Disk drive technology, however, wasn't just standing still. Coinciding with the tape drive technology enhancements, hard disks continued to improve, and it wasn't long before the large removable disk packs were completely replaced by sealed Winchester fixed drives. At first they used 14 inch platters in 300MB fixed drives, soon reducing the size to eight-inch disks and so on until now, over twenty-years later, you can get a 4GB hard drive so small it is interchangeable with a Compact Flash card in a digital camera. Disk technology in the last five years has simply exploded to produce inexpensive capacity that has finally provided end-users a cost effective alternative to tape backups. To better understand where we are today in backup technology, let's now explore tape's new reality.

Tape is still the gold standard by which backups are judged today. However, many organizations are now scrutinizing their sole reliance on tape because of past reliability issues. To fan the fire, some biased industry representatives are quoting sky-high unreliability percentages to promote end users to switch from tape to a disk-based backup strategy. While the accuracy of such quoted figures might be in question, there

is no argument that problems can and do occur using tape backup. The key to tape reliability is the time frame used in reporting problems. If the span is 12 months, tape can be excellent. On the other hand, if the span is 60 months, literally every end user will have experienced some kind of problem. With this in mind, perhaps companies with vested interest in selling disk-based backup solutions are simply quoting raw statistics to their best advantage. Whatever the case might be, the bottom line is many end users are frustrated with the tape problems they have experienced, and want to find a more reliable way to protect their valuable data assets.

A daily backup regime doesn't do a company much good if it periodically fails to work. The number one end user complaint with tape is that it periodically misfires. When such a failure coincides with a critical event, like a corrupted database or hard drive meltdown, data can be irretrievably lost. Since disk and tape backup have complimentary advantages that promote safety-net backups, why not consider doing both?

Backup to disk no longer means simply copying data between two physical disk drives connected to one machine. Today's definition of disk-to-disk backup has expanded to include backing up across a network. Basically this means backing up a local disk resource to remote hard drives physically connected to a remote machine. Now disk-to-disk backup can take many forms, including backing up to a UNC share path, an FTP device, and/or a Tivoli Storage Manager (TSM) server. In other words, users can now back up the contents of a local machine to literally any available network connection.

Disk-Based Backup Benefits Include:

- 1) Users are no longer relying on tape as the primary storage medium
- 2) Backups can be faster depending on the type of network
- 3) Restores are almost always faster (no tapes to find and mount)
- 4) Network backups provide superior disaster recovery protection

Tape-Based Backup Benefits Include:

- 1) Inexpensive and virtually unlimited media size (via libraries)
- 2) Small form factor
- 3) Multiple redundant backup sets
- 4) Easy off-site media storage

There are pros and cons to using either method as the sole strategy for protecting your data assets but, with today's low hardware and software costs, there is now compelling justification to incorporate both backup strategies for a disk-to-disk-to-tape backup regime.

Disk & Tape Backup Benefits Include:

- 1) **Every** disk **and** tape benefit quoted above

Using this strategy, an organization would implement a backup product such as UltraBac.

It is then a simple matter to set up a network backup where every server is automatically backed up to an online network resource. Ideally this would be a large disk array connected to a storage server. Each server can be backed up serially or in parallel to the available disk on the storage server. This provides fast, reliable daily backups that are always online for immediate restores. UltraBac also provides options for full, incremental, differential, and other policy based backup strategies. The backup folders on the storage server can be one level deep, or any number of levels, depending on the size of the available resource and the data being backed up. More sophisticated users can even back up to FTP devices for off-site storage, or to TSM targets to leverage their IBM investment.

An even more exciting prospect for consumers are the options available for performing file-by-file and/or low-level image-based backups. Everyone understands the critical nature of performing regular file-based backups, but what is less understood (or in some cases is unknown) are the benefits of imaging a server's operating system (OS) partition so a quick, dependable disaster recovery operation can be performed when required. While image can be employed on any partition, it is typically used to image each protected machine's OS partition to a network location that is always online. UltraBac Disaster Recovery (UBDR) Pro and Gold manage this process by coupling the backed up image with a universal disaster recovery CD. The CD is used to boot a failed machine into a temporary Windows OS where the UBDR software can then be used to locate and restore the failed machine's image backup file in the absolute minimum of time. This can even be fully automated for unattended disaster recovery. In other words, an image backup can be either a primary or secondary backup of an OS partition so a failed machine can be recovered quickly – this is often referred to as "Bare Metal Restore." Previous to image, recovering a failed machine (which could happen for any number of reasons, e.g. a corrupt Registry setting) could take anywhere between two hours to two days. In comparison, UBDR Pro or Gold allows users to fully recover a typical 4 to 8GB OS partition image from start to finish in less than 15 minutes on a fast network. A single quick recovery can save an organization thousands of dollars in what otherwise would be wasted time in recovering the same machine using traditional file-by-file techniques. Having built a strong case for using disk-to-disk backups, let's now address how to leverage tape to its greatest advantage.

Even though disk is relatively inexpensive nowadays, disk cannot begin to compete with tape when it comes to storing multiple backups. Another essential part of any sound backup strategy is to also have the information stored off-site for additional protection

against data loss. Tape is ideal for this requirement. An optimally balanced backup strategy is to store the latest backup to online disk for fast, reliable restores, while also copying the disk-based backups to low cost tape for long-term storage and off-site removal. Therefore, when reviewing new choices in backup, a disk-to-disk-to-tape strategy should definitely be considered.

There are many “hard wired” storage devices that can now be purchased to perform disk-to-disk-to-tape backups. These devices, however, can limit your choices and options. Alternatively, organizations can consider implementing a product like UltraBac with UltraCopy. The latter is a special purpose utility designed to copy disk-based backups off to tape. UltraBac and UltraCopy provide disk-disk-to-tape capability without locking end users into hardware specific vendors.

With UltraBac, users have the flexibility of designing file and image-based backups to local disk, local tape, local libraries, remote libraries, UNC share paths, FTP devices, and TSM servers. UltraBac is a general-purpose backup product with every competitive feature and function available to the Windows server market, and also works as the engine that performs image backups for UBDR Pro and Gold disaster recoveries. UltraCopy then provides an extra level of protection by allowing end users to seamlessly schedule copying disk-based backups to tape for inexpensive redundancy and off-site backups.

In closing, history has taught us many times over that a single strategic backup or restore failure can be devastatingly harmful to any organization. Disk and tape backups are no longer mutually exclusive and should be viewed today as a dual safety-net approach at reducing backup failure liability. The ability to use both backup processes now provides both large and small organizations the most comprehensive continuity and data protection available. UltraBac can be used to provide the best of both worlds by allowing disk to be your primary backup medium with tape being the secondary storage medium. This solution provides organizations with fast, reliable backups and restores, multiple backup redundancy, low cost off-site storage, and image-based bare metal disaster recovery. Every organization should implement the fastest, most reliable, feature rich backup technology they can find. The reason is simple – to avoid preventable downtime and data loss. Server downtime statistics show costs of anywhere from \$5,000 an hour to much more astounding costs per minute for big businesses. Disk and tape vendors will continue to argue over which backup method people should use, but now we know which is best – they both are. Disk-to-disk-to-tape is truly the wave of the future.