

There is no shortage of storage technologies to help organizations deal with their backup pain points. Traditional backup processes rely on a central media server to transfer data across a LAN or SAN to tape. Tape performance is improving, but tape's much slower seek times and lower data transfer rates make tape comparably slower versus disk for both backup and restore.

While traditional tape-based backup and recovery remains the cornerstone of the majority of data protection strategies today, a growing number of new disk-based implementation scenarios have emerged. The introduction of new storage and storage networking technologies, such as Serial ATA (SATA) disks and iSCSI, has driven the implementation of disk for protecting a company's most critical data. New storage paradigms such as Data Lifecycle Management (DLM) advocates tiered-storage strategies, like disk-to-disk (D2D) and disk-to-disk-to-tape (D2D2T), that take into account the value of the data over time.



Tiered storage allows organizations to assign different categories of data to different types of storage media. The categories may be based on levels of protection needed, performance requirements, frequency of use, and more. For example, tier-1 storage might hold mission-critical or recently access files on RAID disk arrays; tier-2 storage might house operational or seldom-used files on less expensive media in a storage area network (SAN); while tier-3 storage maintains event-driven or rarely-used files on tape media.

The benefits of implementing a tiered storage strategy include improved IT cost structure, optimized asset utilization and increased service levels. However, implementing tiered storage can be labor-intensive and operationally complex. Virtual tape technology that offers data mover functionality and policy-based data management can overcome many of today's tiered storage implementation challenges.



### Disk-Based Data Protection

The first of the continuum of tiered storage platforms is disk. Disk-based backup and recovery has solved the performance and reliability issues plaguing traditional tape-based strategies. The nightly backup window problem is solved due to higher transfer rates between host disk and backup target disk, and improved reliability and fault-tolerance of RAID disk. For restores, access to data on disk is almost immediate since there is no tape to mount or to rewind, and no searching through tape volumes for data files.

But which type of disk-based strategy should be adopted? One option is to let the backup software back up data to disk directly. There are a few drawbacks to doing this. The expected performance may not be achieved due to file system overhead and/or fragmentation. There is a lot more up-front planning required for sizing disk

partitions/file systems per backup media server, especially since some backup applications cannot span from one disk volume to another when the first becomes full. Because the files are being backed up on a file system they are also susceptible to virus attacks. Finally, should offsite tapes be required, the media server will have additional CPU and bandwidth overhead to create tapes. Basically, the backup software will have to repeat the backup session, which adds time to your backup window.

Another option for disk-based backup is to deploy virtual tape technology to facilitate the D2D data transfer. Virtual tape technology typically referred to as a virtual tape library (VTL) incorporates tape emulation software and disk arrays to make disks appear as a tape library and/or tape drives to the host backup application. This D2D method requires little or no backup software re-configuration. That means that existing backup processes don't have to be changed because the backup application is already tape-aware. VTLs also enable disk sharing by multiple backup application servers, often eliminating the need for costly storage sharing software.

### **VTL-enabled D2D2T**

There are two potential drawbacks to VTL-enabled D2D backup. The first has to do with how VTLs impact backup software licensing costs. VTLs can present multiple virtual devices to the host backup application to enable parallel backup streams, thereby improving performance. Depending on the backup vendor, backup software licensing for tape targets may be based on quantity of tape drives or quantity of tape slots. For every additional virtual drive configured over existing physical drives, additional licenses are required. If virtual drives simply replace existing physical drives one-for-one, then no additional fees will be incurred. However, if both physical tape library and virtual tape library are connected to the backup media server and physical media, as well as virtual media, are backup targets, then licensing fees double.

What if a company requires physical tapes for offsite archive for disaster recovery or regulatory requirements? There are multiple ways to manage the creation of physical media from disk-to-tape (D2T). In a backup server-driven model, the physical tape library and the virtual tape library are connected to the backup media server. The backup media server moves data from virtual tapes to physical tapes over the network. This method preserves the integrity of the backup software's data-base and catalogs. If the backup media server writes data directly to the physical tape library, then catalog and database consistency is maintained, but the aforementioned doubling of licensing fees may occur.

Another model of tape creation involves the VTL and a copy or export command. The physical tape library is physically connected to the VTL (and the VTL is physically connected to the backup media server). An export or eject command is issued and the data stored on the VTL is copied from virtual media to physical media, without passing through the backup media server. While this process satisfies the need for physical media, it does not ensure that the backup software's catalog and database are maintained. And, if the virtual media is expired and is no longer available on disk, the media will have to be manually imported for recovery.

Yet another implementation of physical tape creation through a VTL is to allow the VTL vendor's data mover software to perform the D2T data transfer. The data doesn't pass through the backup server so the backup software's database and catalog are not updated. It then becomes the responsibility of the VTL software to maintain the one-to-one mapping of virtual media to physical media in a second database and catalog.

### Policy-Based Data Management

Tiered storage solutions shouldn't introduce management complexities or operational overhead. Policy-based management within the tiered storage continuum can greatly simplify administration and operation of the solution. Organizations can realize cost savings in storage management through automated implementation of policies.

Primary to secondary to long-term archival storage infrastructure, such as D2D2T, is enabled through VTL technology and data mover functionality. A policy framework that links business requirements with access, protection and retention practices will automate data protection strategies, delivering efficiency and cost savings.



Some VTL solutions, especially those modeled after mainframe virtual tape systems, have policy management engines that dictate actions based on age of data, host origination, data types, retention requirements, availability requirements (time-to-data), performance requirements, and more, within robust security parameters. Such policies ensure that tiered storage operations can be executed in a reliable and repeatable manner aligned with business

expectations. These solutions fully automate the entire media lifecycle, ensuring that critical data can always be found and is always accessible, regardless of location--on virtual media on disk, on physical tape in a tape library, or on archive media off site.

### Benefits of VTL-enabled Tiered Storage

Virtual tape solutions address backup issues, such as missed backup windows, recovery time objectives not being met, and the need to share disk and tape resources by enabling high-performance and reliable D2D backup. VTL solutions that incorporate data mover capabilities and policy frameworks to enable D2D2T tiered storage also provide new efficiencies in data protection strategies, allowing organizations to store data on the most appropriate storage resource at any stage of the data's lifecycle. Employing user-defined policies, the movement of data through the tiered storage continuum is automated, saving operational overhead. The performance, reliability and efficiency benefits translate into capital and operational savings.

### Formulating the Right Plan

Our team of storage solutions specialists will identify your current as well as future business requirements for data protection and work with you to formulate both a short and long term strategy for ongoing data protection as well as disaster recovery. With storage becoming less expensive while the amount of data stored continues to double on average every 18 months, having the right technology and a plan that maximizes on your ongoing investment in that technology ensures that your organization is positioned well to meet market and growth demands, and will always have access to the data that it needs to sustain that growth.

To learn more about how our team of storage professionals can help you design and maintain your data protection needs, contact a SolutionsMark business solutions specialist today!