

# STORAGE SWITZERLAND REPORT

## A UNITED FRONT - USING BACKUP VIRTUALIZATION TO OPTIMIZE DISK AND TAPE



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When it comes to data protection, the predictions have been wrong time and again. For years since disk backup has become a reality, tape's demise has been forecast many times. Yet most studies show that a very small minority of data centers are actually 'disk only' and most environments have several different target devices (both disk and tape) that backups are directed to. Also, data centers by now were forecasted to consolidate their data protection into one backup application. But most environments still have more than one data protection application often running on many different platforms. Multiple forms of disk and tape, multiple backup applications, different platforms -- this is the reality for today's backup administrator. Backup virtualization is the way to optimize this reality.

For a recording medium that could support the volumes of data that a typical company backed up regularly, tape was originally the only solution for enterprise data centers. Most backup applications were architected around writing large amounts of data to many of these serial devices. Modern backup involved so much data and so many client servers that multiple tape drives and automated tape libraries were needed to provide enough real time targets in order to complete them in a reasonable timeframe.

In the early part of this decade, disk backup became an option with the introduction of economical ATA drives. While the prospect of backing up to disk and eliminating tape altogether was possible, it was still unrealistic. Given the amount of redundant data that the typical backup contained, and the need to store backups for extended periods of time, even cheap ATA disk was still too expensive. And, LTO5 looks to further expand this cost differential with 3TB per cartridge capacity.

Overall, most organizations need both disk and tape to efficiently support their data protection processes. Disk provides a simple, multi-target storage architecture, without having to implement a separate storage device for each backup stream recorded. With RAID protection and other data integrity features, disk arrays can be more reliable than tape drives in the short term. They offer a faster restore option for single file recoveries because disk allows individual files to be accessed in a random fashion - not serially like tape. Disk also supports advanced storage management 'services', like deduplication, replication, snapshots, etc. A disk backup appliance, for example, can record a backup, deduplicate it and send it to an off-site location for disaster recovery. But what about retention?

Long-term storage of data on spinning disk has some significant costs associated with it. In addition to per-GB acquisition costs, the TCO for storage on disk must also include power, rack/floor space, administration and maintenance of those disk-based systems. Even when assuming a considerable percentage of effective data reduction from deduplication, the amount of data sent to the backup system can still be in the tens of TB, or more. Removing tape is just not feasible for most organizations because of these costs. Plus, since tape is the incumbent medium and the historically trusted methodology, moving off tape to a disk-only backup system can bring the 'pain of uncertainty' as users get accustomed to a new technology. Data protection, like insurance, needs to instill a measure of confidence, something that may take time to develop after the switch to a 'tapeless' backup system.

Another aspect is the backup application. Ripping out a functional system (especially one that's providing insurance) in the interest of consolidation is relatively low on most priority lists. Most enterprise environments have a number of backup applications on different platforms with dedicated storage systems, many of which have been in place for years. The challenge becomes figuring out how to manage and provision these disparate backup systems, without doing a 'rip and replace'.

So, if using both disk and tape is the prudent decision, the question becomes how to support both of these technologies effectively, while maintaining resource utilization. And, how do you manage the resulting complex data protection environment, with the existing backup applications, and still keep administration costs under control?

New technologies come out and often the benefits they bring create a better, 'hybrid' solution, as opposed to simply replacing existing products. Such is the case with disk and tape in a data protection system. What was once exclusively the domain of tape storage, most backup systems now include high capacity disk storage as well. But disk isn't just a simple replacement for tape. Both provide unique benefits and, for many organizations, a combination of these technologies produces a more capable solution.

Backup virtualization systems, like [Tributary Systems' Storage Director](#), integrate multiple backup applications running on different platforms and consolidate their operation and storage infrastructures. These systems eliminate the silos of data protection equipment and dynamically share existing resources like tape drives, libraries and disk targets. Supporting both disk and tape, backup virtualization presents a disk pool to backup applications, allowing a 'bucket' of random access storage to capture multiple-stream backup jobs in the shortest possible window. These backup jobs can then be put off to tape in the background, freeing critical applications for production.

On the front end, backup virtualization systems emulate standard interfaces, providing connectivity to backup servers that reside on most platforms and OSs in use today, as well as some less common platforms like IBM AS400 and HP NonStop. Using virtual tape libraries, these servers can have a dedicated library target configured for its particular needs. On the back end, a pool of existing physical library assets can be provisioned as needed to support these virtual libraries. The result is a hybrid data protection solution, one which leverages the benefits of both disk and tape while maintaining support for legacy applications.

In a virtualized server environment, one physical host can support many virtual machines, running almost any OS or application. Part of the value of server virtualization and one of the reasons for its success is its ability to keep existing applications intact and centralize the resources that support them. In the data protection environment, existing backup systems may be running fine but the organization needs to consolidate and simplify the infrastructure. Like server virtualization does with the compute environment, backup virtualization optimizes resources that support backup applications, providing real consolidation without simply eliminating existing applications.

Backup virtualization provides many of the same benefits that server virtualization does. It can save money on infrastructure as it consolidates hardware and save on admin time as it simplifies the backup environment. It can also increase flexibility and business agility by enabling dynamic provisioning and non-disruptive system growth.

Backup systems have historically been developed to support linear tape cartridges and automated tape libraries. With the advent of economical disk storage, disk-to-disk backup has enhanced what formerly tape-only backup systems provided. But this didn't mean disk-only backup was the best solution. On the contrary, factors such as cost, power consumption and data center footprint, especially long term, have maintained tape's viability. Backup virtualization systems are enabling the consolidation of tape and disk for most IT environments. In addition, these systems allow multiple backup applications to likewise be consolidated into a single management and storage infrastructure - even those running on different platforms. Backup virtualization is combining disk and tape to optimize the data protection environment.

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