

# Make Information Manageable

Cut through the clutter with efficient storage strategies for backup, restore and archiving.

Virtually every government agency and educational institution has developed some kind of plan for backing up the terabytes of data that reside in applications, systems and databases. But in the quest to manage information effectively, it's also clear that too many organizations take a mix-and-match approach. The end result is systems and processes that are overly complex, lack speed and efficiency, increase the risk of failure and break the budget.

Today, data storage and backup demands are growing at a 50 percent annual clip. A complex array of options and possibilities now confront IT administrators. While tape backups still handle a heavy load — particularly for disaster recovery — options such as virtual tape libraries, emulation of tape drives, distributed disk-to-tape (D2T), disk-to-disk-to-tape (D2D2T) and other methods are gaining favor.

Understanding the nuances of backup, recovery and archiving can determine whether an organization hits the mark or winds up with a black mark. It is essential to examine backup windows, recovery time objectives (RTO), recovery point objectives (RPO), decentralization of data and overall costs. “Building an integrated approach

requires insight and oversight,” says Shawn McIntosh, a senior manager at Atlanta-based consulting firm AGSI.

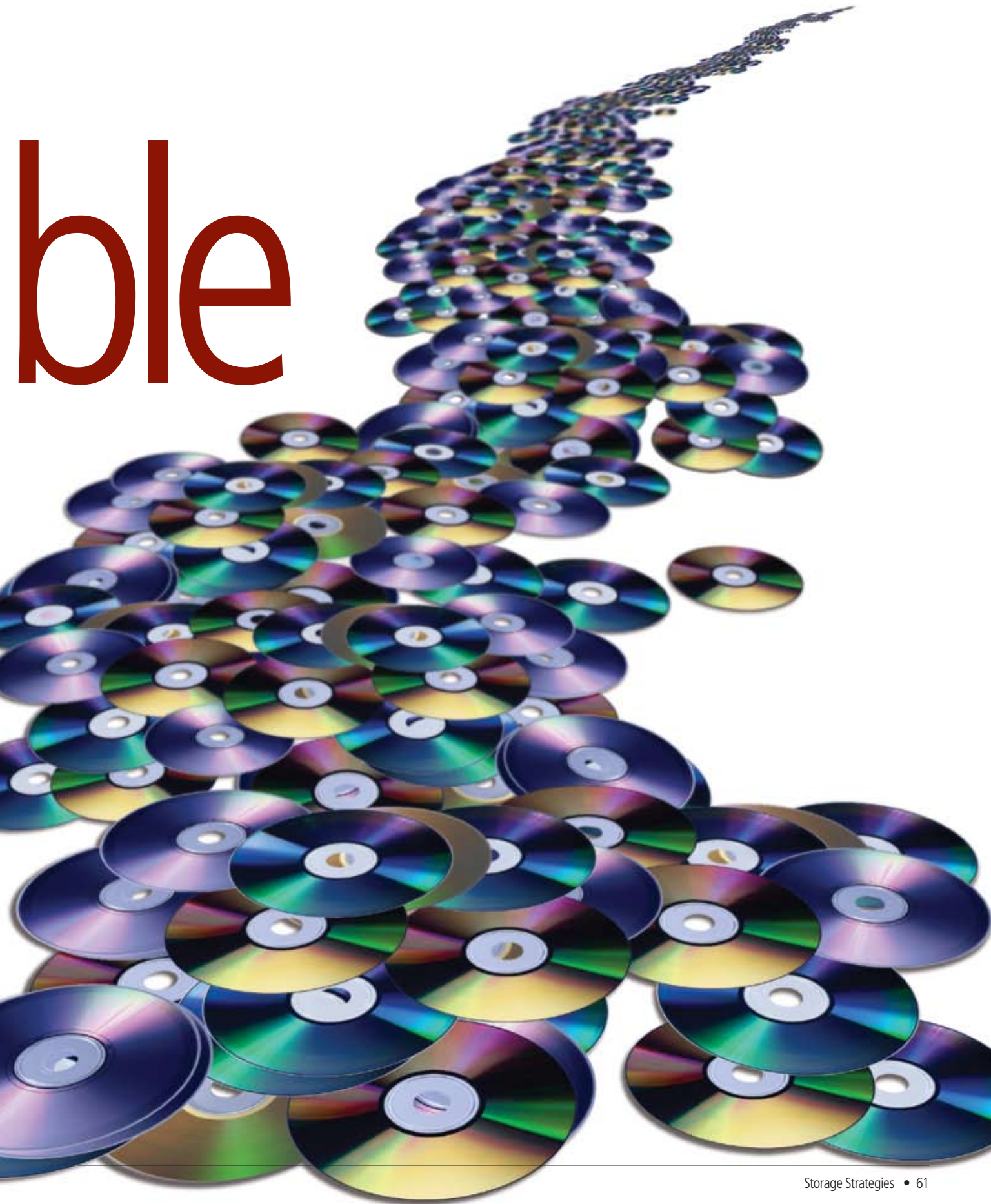
## Moving Forward, Backing Up

For years, organizations have used tape systems to back up data. Devices from Imation, Quantum and others have evolved into a mainstream way to manage backups, recovery and archiving — and they are well suited to handle disaster recovery and offsite backups efficiently and cost-effectively. In fact, many tape libraries now use robotic automation to enable hands-off backup operations.

Yet, as systems and networks grow more sophisticated, tape is giving way to more advanced methods. One of the biggest challenges with tape systems is data bottlenecks. Too often, the best-designed processes and procedures fray because systems cannot keep up with the demands of a data-intensive environment. “A system that's too slow or unable to manage data efficiently can create significant problems,” McIntosh explains. “It can compromise data internally and externally.”

Building an effective data-management environment requires upfront analysis and a thorough inventory of existing systems. There is no shortage of possible ▶

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approaches, and every organization has distinctly different needs. Organizations also must pay attention to regulations and compliance requirements, such as the Health Insurance Portability and Accountability Act (HIPAA). These regulations can determine how data is stored.

It is important to determine up front whether data should be backed up or archived. Backups are generally copies of active or important production data that an IT department can restore. Most backups are designed for short-term use and frequently are overwritten. Archives, on the other hand, typically contain static data, such as e-mail, document files or old and inactive records. Oftentimes, as data ages it is moved to an archive to save disk space and simplify data administration.

Although many organizations rely on tape, CD or DVD-based solutions to store data, technology is continuing to evolve. Dedicated devices are beginning to make their mark. For example, the Imation ComplianceVault Email Archiving Appliance continuously indexes and archives an unlimited number of mailboxes using almost any IMAP/POP3-based e-mail system. It offers disk capacity as high as 800GB and offers tape storage options. The Veritas TrustWorthy Mailbox Archiving Appliance also offers advanced e-mail archiving capabilities.

Specialized systems also are changing the way organizations archive data. Active online archiving boosts performance and availability of mission-critical applications by removing historical data from production and placing it in an “active” archive. Users can browse and selectively restore this “active reference data” as needed. This approach can reduce or delay expensive hardware and software upgrades.

The challenge for any organization is to determine the specific mix of backup, recovery and archiving tools that work best and integrate various systems to maximize data protection and minimize IT time and expense. “It’s important to understand the value of data and, in many cases, the value for different data elements,” observes McIntosh. “Too often, organizations over-buy, under-buy or simply don’t match the technology to their needs.”

## Driving Results

It is no longer acceptable to adopt a one-size-fits-all approach to data backup, archiving and restoration. Stephanie Balaouras, a senior analyst for computing and networking at the research firm Yankee Group, says organizations that embrace an effective data-management strategy move from a reactive mode to a proactive mode, and are able to accomplish goals far more effectively.

Today, many organizations are turning to disk-based systems that complement or replace tape. In many instances, these systems provide high availability as well as effective data and disaster recovery. In addition, manufacturers have introduced affordable Advanced Technology Attachment (ATA) and Serial Advanced Technology Attachment (SATA) drives that offer improved reliability and performance — as well as a high level of compatibility with existing software. Whereas a few years ago the cost of disk-based storage was about 10 times the price per gigabyte of tape media, disks now run about twice the price of tape but total cost of ownership (TCO) is rapidly tilting in favor of disk storage.

Disk-to-disk systems also simplify synthetic backups — which typically involve a full backup followed by incremental backups. This approach uses fewer resources and less bandwidth than tape-based methods. Moreover, disks — while susceptible to errors and crashes — are more resilient and less prone to the wear and tear that eventually forces organizations to replace tape storage. Finally, if a single cartridge fails during a restore operation, IT can spend hours getting things back on track. Unlike tape, files stored on disk are instantly accessible, even during a full synthetic backup. EMC, Exabyte, Hitachi, Legato, Network Appliance, Snap, StorageTek, Tivoli and VERITAS are among the leading providers of disk-based backup and recovery systems.

## New Strategies Gain Favor

Organizations also are turning to a hybrid D2D2T approach. This approach transfers data from one disk-based system to another on an hourly, daily or weekly basis and eventually transfers the data to a tape system for offsite backup. This will

## Storage Technologies at a Glance

Technology:	How It’s Used:
Tape Backup	The most basic and inexpensive approach for backing up and archiving data. In most cases, organizations move data from disk to tape.
Disk-to-Disk (D2D)	Hardware and software that move data from PCs or centralized databases to another disk-based system. This makes the data highly accessible.
Disk-to-Disk-to-Tape (D2D2T)	A data backup-and-recovery method that uses disk technology as an intermediary step before archiving the data to tape.
Tape Emulation	A disk-based data recovery solution that emulates a tape device.
Replication-Based Backup and Recovery	Software that copies changed data or data residing on central storage over an IP network. The organization can then back up centralized data to a tape system for archival purposes.
Point-in-Time Copy	A physical or virtual copy of data stored on a disk. The data is typically used as a read-only copy for data recovery purposes.

ensure that recent data is accessible and it keeps data sets smaller — thus speeding transfers in either direction. “It allows an organization to do some dynamic caching and bring information back in near real time,” McIntosh explains.

Tape emulation is another approach that’s gaining favor. It uses hardware or software to make a disk-based system appear as a tape library to backup software. An advantage of this approach is that it is usually seamless to deploy and use because it does not require any changes to underlying processes. In most cases, tape emulation is easier and less expensive to manage while offering performance improvements over straight backup to disk. The reason is because it avoids disk fragmentation that usually occurs in disk-based environments. Another advantage to tape emulation is that it speeds access to production data because it can complete backups more quickly.


Still another approach is point-in-time copy. It is particularly effective for organizations with extremely tight backup windows. That is because point-in-time copy generates a snapshot or mirror of data, which an organization can split up and store on disks as needed. An index keeps track of where the protected data exists on all the various storage arrays. This makes it possible for an IT administrator to roll back a system to a specific point in time and break recovery points down to four- or six-hour intervals.

Finally, there’s replication-based backup. It also takes a

snapshot of an environment but it handles the task on an ongoing basis — either synchronously or asynchronously among storage arrays — rather than transferring to tape once or twice a day. This technique drastically reduces the need for tapes and cuts bandwidth and processing requirements. In addition, an organization can strengthen its disaster recovery strategy by storing the replicated data at a remote site. Ultimately, it provides powerful recovery point and recovery time capabilities.

### A Positive Spin

Ultimately, all backup, archiving and recovery tools lead in the same general direction. “The organization needs must drive the strategy,” McIntosh points out. “It’s important to know how much data to retain, how to store it and how to retrieve it in the future. When an organization understands what data it must retain and how accessible the data must be at any given moment, it can make smart decisions about the technology and maximize its return on investment.”

Government agencies and educational institutions that develop a solid backup, recovery and archiving strategy can begin to address the uncertainty and unpredictability of today’s world. They are in a position to take control of the challenging world of data management and protect their data in good times and bad. 

## Getting the Process Started

Here’s a checklist of steps that can help an organization manage data backups, recovery and archiving more effectively:

- **Analyze applications and data requirements.**

The first step to devising an effective strategy is to understand which applications pose challenges or potential problems. By addressing these issues at the start, it is possible to develop a backup, recovery and archiving strategy that is flexible and efficient.

- **Examine the data.** Too often, static data winds up residing in backup systems — taking up storage space and bandwidth. A thorough examination of various data elements provides insights into how an organization can move data into an active archive.

- **Pay attention to timeframes.** In addition to internal and general legal requirements, HIPAA and other regulatory statutes mandate that organizations keep data for specified periods, ensuring that data is accessible is essential.

- **Know how much downtime is acceptable.** Not all data is created equal. In some cases, it’s important to have data back online within minutes, and in other cases, hours or days will suffice. Designing systems effectively is the key to managing costs and achieving a solid ROI.

- **Conduct a risk-return analysis.** It is easy to wind up with legacy systems that are outdated and inflexible. It is also easy to overspend and deploy an overly complex system when a more basic technology is adequate. It is important to examine upfront overall technology costs, media costs, offsite placement expenses and potential upgrades.



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