

# A Good Backup is the Best Insurance

It is essential to have procedures in place that address data backup to prevent loss as well as loss of services and production.

**D**ata loss can cripple an organization, and result in huge costs. For a packaging supplier, data loss will certainly result in missed deadlines, angry customers, and lost business. The simplest insurance is a comprehensive backup system and policy. However, the sad fact is that many companies do not take this seriously until after they've lost data and must bear the resulting costs. The causes of data loss are varied and can include:

- Accidental deletion or overwriting of data (user error);
- Faulty or degraded storage media (tapes, disks);
- Hardware failure (drives, controllers, power failure, server fault);
- Physical theft;
- Viruses, worms, hackers or other malicious outside forces; and
- Catastrophes (fire, flood, storms, earthquakes).

The first step is evaluating your current back-

up system. While there are many backup systems available, there is no single solution that is right for every organization. Factors in choosing a backup system include:

- Identifying what data to back up;
- How often data is modified, and at what volume;
- Availability requirements for enterprise data and applications (What is the maximum allowable downtime?);
- Time and effort to reconstruct data;
- Confidentiality of data;
- Integrity of data;
- Knowledge of users and IT staff;
- Resources of IT department; and
- Value of lost data versus cost of archiving.

The amount of data and the frequency of its modification will determine the type of backup media you need. High data volume requires higher-capacity media: Frequent modification will increase the number of generations you must keep to effectively recover from a catastrophe.

Groups within your organization will have different *availability requirements* for their data. The maximum allowable downtime is the amount of time that they can function without access to data. Strive to back up data at intervals equal to or less than your maximum allowable downtime.

Failure to protect sensitive information can destroy your competitiveness and expose you to lawsuits. Confidential material includes sensitive customer records, personnel files, and intellectual property. If you cannot protect their sensitive information, your customers will do business with a packaging company that can. Privacy and data collection laws vary by country. Be aware of the laws wherever you do business, and adjust your



archiving procedures to comply with them.

Data may have different *integrity requirements* depending on its confidentiality, and the availability requirements. To prevent manipulation of archived data, consider using a storage solution that incorporates encryption. Encrypted data is generally secure against theft and manipulation, providing reasonable certainty that your data will remain safe.

### Staff Knowledge and Resource Levels

Ensure that all persons tasked with developing and maintaining your backup system receive adequate training. Poor training may lead to mistakes that destroy data or render archives useless. This is especially important if you have a manual system that relies on individuals to perform their own backups.

If your organization has remote offices or units, train each office in the use of its backup equipment and appropriate procedures. Training should include practical exercises that address restoration of data following a catastrophe.

Available human resources will also guide your choice of a system. *Centralized* backup systems allow for optimal use of storage media and manpower, reducing the required number of trained personnel. In *decentralized* systems, users perform their own data backup by department or workgroup. This allows users to decide what to back up and when. This type of system relies heavily on user knowledge and competence.

### Backup Media Selection Criteria

There are several types of media available, and there are several things to consider when choosing a media on which to base your system. These include *speed*, *capacity*, *reliability*, and *cost*.

*Speed* relates to the time required for retrieval and writing of data. It is important that the time required for retrieval doesn't exceed the maximum allowable downtime.

*Capacity* is the amount of data that will write to one unit of media. Higher-capacity media will free personnel from frequent media changes during backup, and make storage easier as well.

*Reliability* determines how long media can maintain integrity without degrading or failing mechanically.

*Cost* is relative to all of the previous criteria. Generally, faster, reliable, higher-capacity media

is more expensive than slower, smaller, less-reliable alternatives.

### Storage Solutions and Backup Types

Data can be stored online, near-line, and offline; and a good backup system often combines several of these storage methods.

*Online* storage usually consists of file servers with a redundant array of independent disks (RAID). These devices are available in real time and often have a high degree of redundancy to preserve service in the event of a hardware failure. Online storage should never be used as a substitute for offline backups of data; but merely to complement an offline system.

*Near-line* storage includes optical devices and local copies of backups that can be accessed quickly. These include archives stored on removable USB drives, DVD-ROM, CD-ROM, and tapes. This allows quick access to data in the event that online service is interrupted.

*Offline* storage consists of archives stored off of the network. They are typically locked in a safe space protected from theft and catastrophe. For an organization with low availability requirements, offline storage may be sufficient.

The backup interval and type of backup is determined by the availability and integrity requirements of the data. A *full backup* creates a complete new copy of all files on a new data medium. *Incremental backups* save each file that's changed since the last full backup. This is useful for maintaining multiple revisions of a file. *Differential backups* store only the files that have changed since the last full backup, and require more storage space than incremental backups.

### Types of Storage Media

There are many different types of media available; the most common storage type is *magnetic tape*. Magnetic tape is generally the slowest storage media, and is best used for offline archives. *Optical* storage media is popular in applications

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where speed and reliability are the greatest concerns. The usually expensive price reflects the increase in speed and reliability.

Removable hard drives and USB storage devices have become an economical choice for backups, now that the prices are decreasing. The low cost of DVD-ROM and CD-ROM drives and disks makes them a good choice for organizations performing backups of departments or individual workstations.

As mentioned earlier, RAID is a hard disk subsystem that writes data across several hard drives simultaneously, using a special RAID disk controller. This provides fault tolerance by mirroring, or parity. If a drive fails, it can be replaced and the RAID controllers will rebuild the data onto the replacement drive. However, RAID is in no way a replacement for offline storage.

Storage Area Networks (SAN) are linked directly to servers via a high-speed fiber channel, saving network bandwidth during backups. SAN

is a good fit for data with high availability standards, like databases or financial transactions.

Network Attached Storage (NAS) devices are similar to file servers; and usually connect to the network via Ethernet. All NAS devices offer at least one type of RAID functionality, are relatively cheap, and are usually interoperable among vendors.

The shorter the intervals between backups, the less painful and costly restoration will be. Develop a schedule for full backups (daily, weekly, monthly) and intersperse them with incremental, or differential backups as needed.

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*For computer backup best practice actions steps, visit Purchasing Guide 2008 on [www.Packaging-Online.com](http://www.Packaging-Online.com).*