

Backup and Disaster Recovery

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Understanding the Need for Backup

What data can be lost without a backup strategy?

- Whole documents
- Accounting details: work orders, invoices, etc.
- Data entry and customer details
- Projects under construction
- Undeveloped projects
- Preferences/customized spreadsheets
- Development history

Why and how can data be lost?

- Unintentional computing and human error
- Mistaken deletion of files or folders, or even entire hard disks (see below)
- Inadequate training of personnel

What about hard-disk failure?

Almost every personal computer uses a hard disk as the storage device. With spinning disks and floating magnetic heads that require precise tolerances, even the slightest bit of damage may cause a complete failure. As well, the following may occur:

- Malicious virus attack
- Computer theft
- Fire or natural disaster.

Backup Frequency

There are several different types of Backup, and no matter which methodology suits your needs best, it is important that critical information is backed up daily, and that it is as easy as possible to restore that data in the event of a disaster.

Backup Types

The most common backup types are full backup, incremental backup and differential backup.

A full backup is a backup of every file on a file system, whether that file has changed or not. A full backup takes longer to accomplish and requires the most storage space on the backup media, but it also provides the quickest restore times. As a minimum, a full backup should be performed weekly or monthly on production systems, along with daily differential backups.

An incremental backup is a backup of every file on a file system which has changed since the last backup.

An incremental backup is the fastest backup and requires the least storage space on the backup media. However, incremental backups also require the longest time and the most tapes to restore.

Incremental backups should be used only in environments where backup time or backup storage media are extremely constrained. For most environments, a weekly full backup and a daily differential backup represent a better plan.

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A differential backup is a backup of every file on a file system which has changed since the last full backup. A differential backup can be an optimal middle-ground between a full backup and an incremental backup.

A differential backup is not as fast as an incremental backup, but is faster than a full backup. It requires more storage space than an incremental backup, but less than a full backup. A differential backup takes more time to restore than a full backup, but not as much as an incremental backup.

Backup Media

Backup Media is the storage medium that is used to write your backup information to. The best media for your business depends on a number of factors:

- How much data in total does a full backup contain?
- What is the predicted growth in storage needs in the next 18-24 months?
- What backup software do you use, and what devices does it support?
- What is the rotation strategy, and therefore how many tapes are required?
- What is the budget and how can this be used most efficiently in the organisation?

Media Rotation

Typically, companies will have a set of tapes that are rotated every week or every fortnight for their backups. Here are some factors that you should be considered?

- How old are the tapes you are using right now? Are they over 6 months old?
- Where are they stored? Is it in a dust free and climate controlled environment?
- Does the rotation put aside an archive tape at certain intervals and therefore introduce a new, fresh tape to the sequence?
- What backup technology are you using? Is it still the best solution available?
- What backup software are you using, and what level of developer support does it provide?

Grandfather Father Son (GFS) Rotation Method

This scheme uses three sets of tapes for daily, weekly and monthly backup sets. It requires twelve sets of media.

The first set, "Son," represents your daily backups. Assign four tapes as incremental daily backups and label them "Monday" through "Thursday." These tapes will be used to perform daily backups and can be reused weekly on the day that they are labelled.

A second set of up to five weekly tapes, called "Father," is used to perform full backups on the day in which you do not perform a daily incremental backup. This media set should be labelled "Week 1" through "Week 5" and can be reused monthly on the day matching its label.

The final set of three tapes, called "Grandfather," is used to perform full backups on the last business day of each month and can be reused quarterly.

Often, archived data is required for periods longer than one quarter. In these cases, media sets are often pulled from the rotation and stored off-site. An Illustration of the GFS rotation scheme:

		MONTH 1				
		MON	TUES	WED	THURS	FRI
GRANDFATHER-FATHER-SON MEDIA ROTATION SCHEDULE	The white squares represent the most recent backups while the shaded squares represent previous backups. Only the daily tapes have been reused. Note that the weekly backup is performed on Fridays.					W1
						W2
						W3
			WED	THURS		W4
		MON	TUES	MONTH 1		

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Offsite Storage

Offsite storage refers to any place physically located a significant distance away from the primary site, where duplicated and vital records (hard copy or electronic and/or equipment) may be stored for use during recovery.

Offsite Storage is a key piece in the Backup and Disaster Recovery matrix. If your office burns down, and your backup tapes are inside, they are not going to be very useful tomorrow.

Several Australian Companies specialise in providing secure and managed tape storage services. BCT can liaise with these to develop the most competitive solution to match your needs.

Disaster Recovery

A disaster recovery plan covers the hardware, software, human and other resources required to restore critical business applications and the associated processes to transition smoothly in the event of a natural or human-caused disaster. To plan effectively, you need to first assess your mission-critical business processes and associated applications before creating the full disaster recovery plan. BCT is experienced in this area; in fact we encourage all our clients to develop a Disaster Recovery Plan

The document also defines the following seven-step contingency process that an agency may apply to develop and maintain a viable contingency planning program for their IT systems. These seven progressive steps are designed to be integrated into each stage of the system development life cycle.

1. Develop the contingency planning policy statement. A formal department or agency policy provides the authority and guidance necessary to develop an effective contingency plan.
2. Conduct the business impact analysis (BIA). The BIA helps to identify and prioritize critical IT systems and components. A template for developing the BIA is also provided to assist the user.
3. Identify preventive controls. Measures taken to reduce the effects of system disruptions can increase system availability and reduce contingency life cycle costs.
4. Develop recovery strategies. Thorough recovery strategies ensure that the system may be recovered quickly and effectively following a disruption.
5. Develop an IT contingency plan. The contingency plan should contain detailed guidance and procedures for restoring a damaged system.
6. Plan testing, training, and exercises. Testing the plan identifies planning gaps, whereas training prepares recovery personnel for plan activation; both activities improve plan effectiveness and overall agency preparedness.
7. Plan maintenance. The plan should be a living document that is updated regularly to remain current with system enhancements.

Links and References

Backups

<http://www.tech-faq.com>

Definitions

<http://www.drj.com/>

Disaster Recovery White Paper

<http://www.cisco.com/warp/public/63/disrec.html>

Contingency Planning Guide

<http://csrc.nist.gov/publications/nistpubs/800-34/sp800-34.pdf>

From a Disaster Recovery Plan to complete worry-free outsourcing of your IT needs, Business Cycle Technology caters to your specific requirements. Contact us today!