

Backup Options

The need for backups

Imagine coming to work and finding that all your data was gone. That's everything: e-mail, documents, spreadsheets, the accounts, quotes – everything. What would you do if all of your staff were unable to work for days while you waited for the data to be recovered? How would your business cope? The cost in terms of lost productivity – or worse lost reputation – could be substantial.

People tend to think of their computer systems, the tangible equipment, as being valuable. What they often don't realise is that it's actually the data inside that has the greatest value. Computer equipment can be replaced; the business' data on the other hand is unique.

Data loss can happen at any time, some of the more common causes are:

- User error – unintentional deletion of files is quite common
- File corruption – due to an application 'crashing' and not closing properly
- Hardware failure – disk drives have a finite lifespan and will eventually fail
- Virus attacks – for the most part avoidable, a virus strike can cause data loss or corruption
- Computer theft – laptops are extremely vulnerable, but servers can be stolen too
- Fire or other disaster

Backups provide insurance against data loss. A business that has good backups will always be able to recover lost files. A backup system is not a guarantee that data loss will never occur; rather, backups offer insurance to mitigate the consequences of data loss.



Types of Backup – System versus Data

A backup can either be a 'total system' or 'data' (sometimes referred to as 'partial data') copy of the information on a computer.

A 'data' backup is one that includes only selected data files on the computer (e.g. e-mail, documents and spreadsheets).

A 'data' backup does NOT include operating system files, installed applications and operating system configuration files (e.g. registry).

Only a 'total system' backup can restore a "broken" computer system to an operational state.

In a scenario where a computer, say the main server, is "broken" due to a software update that had significant unexpected consequences that could not be undone. A 'total system' restore would be required to make the server operational, and then a 'data' restore would be required to recover all of the users' documents (e.g. e-mail, spreadsheets, accounts etc.)

This paper describes 'data' backup options only. 'Total System' or 'Disaster Recovery' backups, are covered in a separate paper.

Backup Options

Tapes

Tape backup systems have been extensively adopted by business due to their larger storage capacity than Zip disks, CD's and DVD's; and the fact that the tapes themselves are portable which means that they can be readily stored off-site.

However anyone who has been responsible for an organisations backups' and has worked closely with tape backup systems would realise that tape-based systems are not without their faults:

- Media management

Tapes have to be changed regularly, generally at least daily. If there is no tape in the tape drive, then there is no backup. If the wrong tape is inserted in the tape drive, then either (potentially vital) data is overwritten, or if overwrite protection is in place, again there is no backup. Long weekends or holidays, often result in tape rotation and backup job schedules becoming "messed up".

Moreover tapes need to be constantly rotated off-site, to ensure that in the event of a disaster (e.g. fire) there is a safe copy of the business' data. In short, tape backup systems require an enormous amount of on-going monitoring and human intervention, the "ownership costs" are significant.

- Capacity

Up to 40GB tape backup systems (both the media and the tape drive) are quite affordable. Beyond this level the cost of both the media and the tape drives sky-rocket.

Today the standard workstation or laptop will often have at least 40GB of storage capacity. With the rapid increase in disk drive storage capacity in the past few years, the widespread adoption of e-mail coupled with the increasing trend towards electronic document storage; server storage capacities in the 300 - 400GB range and beyond are typical. A tape drive system including media suitable for this storage capacity will cost in excess of \$10,000.

- Media life

All computer components have a finite life. But tapes particularly so, even if cleaning tapes are used weekly (which unfortunately in our experience isn't always the case). Tapes that are used on a weekly basis (the 'daily' tapes) should be replaced each year.

Issues can arise with individual tapes, which may become dirty or damaged. However if tape maintenance issues are not addressed then dirty or worn tapes can move the alignment of the heads on the tape drive (much like a VCR). This can result in older tapes, which were written when the tapes heads were on the original alignment, not being able to be read (or only partially) by the tape heads in their new alignment.

Tape backup systems have come a long way since the early days, and the media management features are much improved, to provide early indication of potential media failure. Nevertheless with tape backup systems, the potential for 'gradual' media failure and the consequent loss of some data is far greater than with say a removable disk drive which is either working (all data available) or dead (no data available).

- A tape drive is required to restore the data from tapes

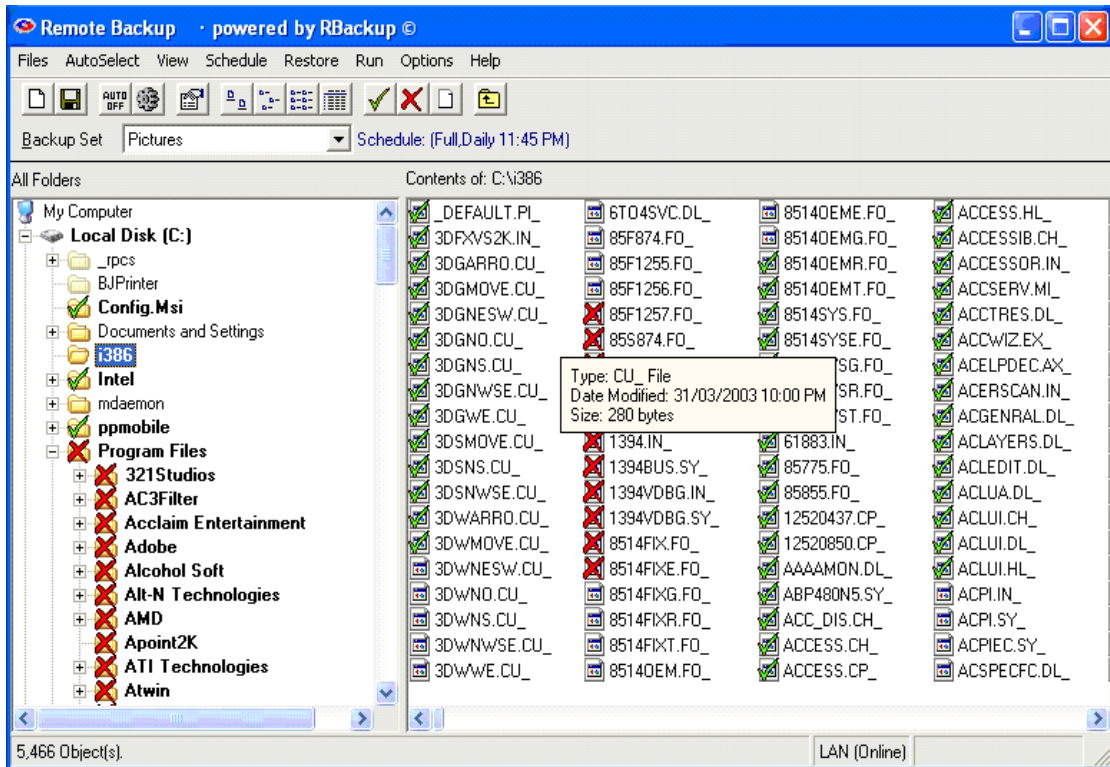
Stating the obvious, but one of the disadvantages of a tape backup system, is that the tapes can only be restored on a computer system that has a compatible tape drive. Often an organisation will only have one tape drive, generally located in the server, which means that any data that needs to be restored has to be done from the server. By contrast: CD, DVD, removable disk drives or network-based backup systems are far more flexible in that the media can typically be accessed from any workstation; which means that the data can be restored at any location.

We will now examine four alternatives to tape backup systems that address the issues that have been highlighted:

1. Remote Backup System
2. The 'Vault'
3. Snapshot
4. Removable Hard Drives

Remote Backup System

The Remote Backup System (RBS) works like regular data backup software, but with one important difference. Instead of sending backups to a tape drive or other media attached to the computer it is backing up, RBS software sends the backup over the Internet, regular telephone lines, or other network connections to a backup server safely off-site. It does this (usually) at night while computers are not being used. Backups can also be done on-demand, at any time.



RBS is completely automatic. In fact, you may even forget that it's working.

One of the requirements of a good backup system is 'redundancy'. One must keep multiple copies of the same files at different points in their development, called versions. As an example, if your hardware fails and you lose all your data, then you will want to restore from yesterday's backup – therefore daily backups are essential. However, if a user inadvertently deletes or makes incorrect changes to the contents of a file, this may not become apparent for days or weeks. Therefore having the ability to "go back" and restore older backups is just as important. RBS includes an easy to use version control system.



RBS backups are compressed and encrypted for complete security. Tape backups are generally not encrypted, so anyone that has access to the media and a tape drive can read them and gain access to client database, billing records, payroll, tax info, and everything else on computers.

Benefits – Remote Backup System

- ✓ Works 7 days per week (weekends, Public Holidays etc). Completely automatic, no media management, no human intervention required.
- ✓ Data is stored off-site, so even in the event of a disaster at your business premises; your backups are completely safe.
- ✓ Full version control, so you have the ability to restore older versions of files, not just the most recent version.
- ✓ Backups are encrypted, so while the data is stored off-site, it is secure from prying eyes.
- ✓ Reports to monitor the status of backups can be automatically sent to designated users.

Considerations

- ✓ Ideally suited to sites that don't want the hassle or expense of dedicated hardware and software for backup and restore.
- ✓ As all data is being transferred across the Internet off-site, a broadband connection is recommended.
- ✓ Ideally suited to sites with transfers of up to 5GB per week



Implementation – Remote Backup System

Level 1

- ✓ \$10ex per week
- ✓ Will suit sites with small-to-medium backup requirements
- ✓ Allows for backups of 5GB compressed data per/week¹
- ✓ Plus initial setup costs of:
 - Setup and configuration: \$550ex

Level 2

- ✓ \$20ex per week
- ✓ Allows for backups of 10GB compressed data per/week¹
- ✓ Plus initial setup costs as per Level 1

Level 3

- ✓ \$30ex per week
- ✓ Allows for backups of 15GB compressed data per/week¹
- ✓ Plus initial setup costs as per Level 1

¹Backups are charged on a monthly basis, so that the site gets the benefit of averaging over the month. Excess bandwidth is charged at \$0.50 per 100MB.

Note: All ZEN backup systems include a quarterly “health-check” at no additional charge. The “health-check” includes a test restore of randomly selected data files to verify the integrity of the backup process. Plus a review of the backup selection to verify that any changes to the directory structure on the data volume are being archived (this should happen automatically) and that no unnecessary ‘system’ files are being captured in the backup process.



The 'Vault'

Like the Remote Backup System (Option 1) the Vault automatically backups all the important data on your network on a daily basis, or on demand at times that you specify.

The Vault is a backup package that operates on a Microsoft Windows® platform. The package includes easy-to-use commercial Windows®-based backup software to configure and automate the backups which are stored on dedicated hard-drive storage at your business' premises. This means that once the backup is configured, the backup process is fully automated: no tapes to be changed, no human intervention required.

When it comes to restore data, the Vault makes data retrieval easy and fast, simply select the files from the backup archive using the graphical interface.

You can select the date and version of each file that you want from the archive, going back months or perhaps years.

Benefits

- ✓ Works 7 days per week (weekends, Public Holidays etc). Completely automatic, no media management, no human intervention required.
- ✓ Full version control, so you have the ability to restore older versions of files, not just the most recent version.
- ✓ Backup capacity virtually unlimited, a configuration can be tailored to accommodate your storage and "backup window" requirements.
- ✓ Reports to monitor the status of backups can be automatically sent to designated users.

Considerations

- ✓ Data is stored on-site, so the 'Vault' needs to be implemented in conjunction with another backup option to provide off-site data storage so that in the event of a disaster at your business premises; you also have an off-site backup that is completely safe (consider using 'Snapshot').



Implementation - Vault

- ✓ Depending on your storage requirements, and existing computer equipment, a Vault package can be implemented in an existing computer system thus reducing deployment costs.

For example a 300GB Vault package installed as an upgrade into a surplus computer system, which typically would provide a 12 month backup window for an organisation with 27GB of data storage¹, costs: \$1,350ex².

- ✓ Alternatively a 300GB Vault system supplied in a new computer system costs: \$2,450ex or \$26 per week over 3 years².
- ✓ High capacity solutions (1,000GB plus) can be accommodated through a built-to-order Vault system.

¹ 27GB is the 'native' uncompressed storage capacity; this is the minimum guaranteed backup capacity with a 12 month backup window. Using compression, we can increase the effective capacity of the backup store. Actual compression for each site varies depending on the type and mix of data files being archived, however a compression rate of 30% is typical for most sites. Assuming 30% compression, the 27GB of native capacity equates to a data store of 35GB.

² The quoted price includes deployment and configuration of the Vault to backup all data except Microsoft Exchange mail boxes. Add \$250ex to include mail boxes from a Microsoft Exchange mail store.

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Snapshot

Snapshot is a utility for configuring, scheduling, and consolidating online data backups of Windows® computer systems to an off-site server.

Snapshot provides scheduled data replication of Windows® data stores to maintain an online backup on a remote file server. That is, Snapshot creates a “mirror” or “synchronised” copy of the data on the remote file server by just transmitting the changes that have occurred since the last “snapshot” was taken.

Snapshot is normally used in conjunction with the ‘Vault’ (Option 2) to provide a complete backup solution.

Benefits

- ✓ Works 7 days per week (weekends, Public Holidays etc). Completely automatic, no media management, no human intervention required.
- ✓ Fast and efficient. Only the differences between files and directories are transferred between local folders and their corresponding remote mirrors.
- ✓ Reports to monitor the status of the snapshot can be automatically sent to designated users.

Considerations

- ✓ As all data is being transferred across the Internet off-site, a broadband connection is recommended.
- ✓ Snapshot does not provide version control, only the latest versions of files are maintained off-site. Other backup options need to be used to provide version control (typically the ‘Vault’ – Option 2).



Implementation - Snapshot

Level 1

- ✓ \$10ex per week
- ✓ Allows for backups of 5GB data per/week¹
- ✓ Plus initial setup costs of:
 - 300GB Removable Hard Drive (\$410ex) for data storage at the off-site server
 - Setup and configuration: \$550ex

Level 2

- ✓ \$20ex per week
- ✓ Allows for backups of 10GB data per/week¹
- ✓ Plus initial setup costs as per Level 1

Level 3

- ✓ \$30ex per week
- ✓ Allows for backups of 15GB data per/week¹
- ✓ Plus initial setup costs as per Level 1

¹Backups are charged on a monthly basis, so that the site gets the benefit of averaging over the month. Excess bandwidth is charged at \$0.50 per 100MB.

Note: All ZEN backup systems include a quarterly “health-check” at no additional charge. The “health-check” includes a test restore of randomly selected data files to verify the integrity of the backup process. Plus a review of the backup selection to verify that any changes to the directory structure on the data volume are being archived (this should happen automatically) and that no unnecessary ‘system’ files are being captured in the backup process.

Removable Hard Drives

Removable Hard Drives (RHD) can be thought of as “super tapes”. They have the following characteristics:

- ✓ Vast storage capacity (100 – 300GB)
- ✓ Inexpensive (\$210 - \$410ex)
- ✓ Fast
- ✓ Portable (although larger than tapes)
- ✓ Reliable
- ✓ Easy-to-use, stand-alone devices

RHD are generally plug-and-play storage, which means Windows® will automatically recognise the drive and add another drive letter in ‘My Computer’, which means unlike tapes you don’t need another device (e.g. a tape drive), to perform a backup or restore.

RHD is a good option when you already have a significant investment in an existing backup system (e.g. ARCserve, Backup Exec) and you have established and reliable media management practices in place.





Benefits – Removable Hard Drives

- ✓ Easy-to-use
- ✓ Speed of backup and restore
- ✓ Inexpensive and high storage capacity
- ✓ Flexibility – easy to add additional disks as needed
- ✓ Compatible with traditional backup systems

Considerations

- ✓ Require reliable media management practices, just like tapes. Disks need to be rotated off-site on a daily basis.

Implementation

- ✓ Straight-forward
- ✓ 100GB capacity, \$210ex per drive¹
- ✓ 200GB capacity, \$320ex per drive¹
- ✓ 300GB capacity, \$410ex per drive¹

¹Prices correct as at 30th June 2005, please contact us for current pricing.

Zero Effort Networking (ZEN) is experienced in accurately identifying computer network problems and acting swiftly to fix them. Since 1996 we have helped clients implement stable, reliable computer networks that take the worry out of network management. For further information you are welcome to contact us.

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