

Backup and Restore

BACKUP

Backup is the activity of copying data, files and database systems, so they will be preserved in the event of equipment failure or another catastrophic failure, such as corruption of the original disk or a natural disaster. Backup is useful primarily for two purposes:

1. To restore a computer to an operational state following a disaster. This is also called disaster recovery.
2. To restore small numbers of files after they have been accidentally deleted or corrupted.

If you view the properties of a file or directory in Windows Explorer, you will note an attribute called Archive. This attribute is used to determine whether a file or directory should be backed up. If the attribute is on, the file or directory may need to be backed up.

The basic types of backups are:

1. **Normal/full backups:** All files that have been selected are ticked up, regardless of the setting of the archive attribute. When a file is backed up, the archive attribute is cleared. If the file is later modified, this attribute is set which indicates that the file needs to be backed up.
2. **Copy backups:** All files that have been selected are backed up, regardless of the setting of the archive attribute. Unlike a normal backup, the archive attribute on files is not modified. This allows us to perform other types of backups on the files at a later date.
3. **Differential backups:** Designed to create backup copies of files that have changed since the last normal backup. The archive attribute indicates that the file has been modified and only files with this attribute are backed up. However, the archive attribute on files is not modified. This allows us to perform other types of backups on the files at a later date.
4. **Incremental backups:** This is designed to create backups of files that have changed since the most recent normal or incremental backup. The presence of the archive attribute indicates that the file has been modified and only files with this attribute are backed up. When a file is backed up, the archive attribute is cleared. When the file is modified, this attribute is set, which indicates that the file is backed up. Table 1.2 gives differences among various types of backups.

Compression among various type of backup

Backup Type	Description	Advantages	Disadvantages
Full backup	A complete set of all files you wish to back up. Think of this as your 'reference set'. You only need perform a full backup occasionally.	Provides a complete copy of all your data; makes it easy to locate files which need restoring.	Takes a long time and maximum space on backup media; redundant backups created, as most files remain static.
Incremental backup	A backup of those files which have changed since the last backup of any type.	Uses the least time and space as only those files changed since the last backup are copied; lets you back up multiple versions of the same file.	Makes the job of restoring files fiddly, as you have to reinstall the last full backup first, then all subsequent incremental backups in the correct order; also makes it hard to locate a particular file in the backup set.
Differential backup	A backup of those files which have change since the last full backup. Should be performed at regular interval.	Takes up less time and space than a full backup; provides for more efficient restoration than incremental backups.	Redundant information stored, because each backup stores much of the same information plus the latest information added or created since the last full backup. Subsequent differential backups take longer as more files are changed.

Media for Backup

Many devices are available for backing up data. Some are fast and expensive. Others are slow but very reliable. The backup solution depends on many factors. These factors are as follows:

- **Capacity:** The amount of data that you need to back up on a routine basis. Can the backup hardware Support the required amount of data, given time?
- **Reliability:** Can we afford to sacrifice reliability to meet budget or time needs, and resource limitations?
- **Extensibility:** The extensibility of the backup solution. Will this Solution meet our needs as the organization grows?
- **Speed:** The speed with which data can be backed up and also recovered. Can we afford to sacrifice speed to reduce costs?
- **Cost:** The cost of the backup solution. Does it fit into your budget?

Example of Backup Media

- Magnetic Tape
- Hard Disk
- Optical Disc
- Solid State Storage
- Remote/ Network - Online Storage

Exercise:

- 1: What is Backup?**
- 2: Compare between incremental and differential backup.**
- 3: What are the main factors in choosing backup media?**