

## ART OF DATA RECOVERY

1. In computing, data recovery is a process of salvaging inaccessible data from corrupted or damaged secondary storage, removable media or files, when the data they store cannot be accessed in a normal way. Recovery techniques.

2. Recovering data from physically damaged hardware can involve multiple techniques. Some damage can be repaired by replacing parts in the hard disk. This alone may make the disk usable, but there may still be logical damage. A specialized disk-imaging procedure is used to recover every readable bit from the surface. Once this image is acquired and saved on a reliable medium, the image can be safely analyzed for logical damage and will possibly allow much of the original file system to be reconstructed.



Fig. 1: Repair and Data recovery

### Phases of data recovery

3. Usually, there are four phases when it comes to successful data recovery, though that can vary depending on the type of data corruption and recovery required.

(a) Phase 1(Repair the hard disk drive): Repair the hard disk drive so it is running in some form, or at least in a state suitable for reading the data from it. For example, if heads are bad they need to be changed; if the PCB is faulty then it needs to be fixed or replaced; if the spindle motor is bad the platters and heads should be moved to a new drive.

(b) Phase 2 (Image the drive to a new drive or a disk image file): When a hard disk drive fails, the importance of getting the data off the drive is the top priority. The longer a faulty drive is used, the more likely further data loss is to occur. Creating an image of the drive will ensure

that there is a secondary copy of the data on another device, on which it is safe to perform testing and recovery procedures without harming the source.

(c) Phase 3 (Logical recovery of files, partition, MBR and MFT): After the drive has been cloned to a new drive, it is suitable to attempt the retrieval of lost data. If the drive has failed logically, there are a number of reasons for that. Using the clone it may be possible to repair the partition table, MBR and MFT in order to read the file system's data structure and retrieve stored data.

(d) Phase 4 (Repair damaged files that were retrieved): Data damage can be caused when, for example, a file is written to a sector on the drive that has been damaged. This is the most common cause in a failing drive, meaning that data needs to be reconstructed to become readable. Corrupted documents can be recovered by several software methods or by manually reconstructing the document using a hex editor. Nearly all kind of data can be retrieved from a corrupted drive which is symbolically shown below:-



Fig. 2: Storage Sectors

### **Advantages and disadvantages of data recovery software**

4. Most of businessmen and entrepreneurs somehow love their data, and it is very important to them, but what shall they do if it is lost? The answer is searching for reliable data recovery software in any respectable data store.

5. The importance of any data means, how significant the data is to the user and if the data is of an organization or a group, than the data should be the most important and have to be recovered at any cost. The best data recovery software is provided by the variety of companies. Data recovery can retrieve or recover the user's personal photos, files, etc. which are precious and important to them. If talking about, the disadvantages of a data recovery than some data recovery companies seek and charge high fee to retrieve the data. If the level of sector corruption is high then the data retrieval becomes highly complex and requires high end applications to recover data and the technicians can offer their expertise at very high cost.

## Understanding Backup Methods: Advantages and Disadvantages

6. Most persons that are not familiar with computer backups, would think that a backup is just an identical copy of all the data on the computer. In other words, if a backup was created Tuesday evening, and nothing changed on the computer all day Wednesday, the backup created Wednesday evening would be identical to the one created on Tuesday. To understand more about this, we must first understand the different types of backups that can be created. They are:

(a) Normal (Full) Backups:- Full backup is the starting point for all other backups, and contains all the data in the folders and files that are selected to be backed up. Because full backup stores all files and folders, frequent full backups result in faster and simpler restore operations and is good when the project includes not large amounts of data.

(b) Incremental Backups:- An incremental backup stores all files that have changed since the last backup. The advantage of an incremental backup is that it takes the least time to complete. However, during a restore operation, each incremental backup must be processed, which could result in a lengthy job. This approach is good when the project includes too many files to back up them all each time. It's fast and takes less time for incremental backups. Incremental backups take less disk space. It allows you to create backups frequently. However, to restore all the files, you have to restore the last full backup, and all the following incremental backups.

(c) Differential Backups:- A differential backup contains all files that have changed since the Previous full backup. The advantage of a differential backup is that it shortens restore time compared to an incremental backup. However, if you perform the differential backup too many times, the size of the differential backup might grow to be larger than the baseline full backup. This is a intermediate between the first two approaches.

(d) Mirror Backups:- Mirror backup includes all files that have changed since the last normal (full) or mirror backup, missing files are also be deleted from the backup set. The resulting backup archive consists of either one compressed file or one folder.

8. Conclusion: The technology landscape will only continue to become more complex as hardware and software are constantly updated, and offer faster capabilities and larger storage capacity every day. As vendors try to gain a competitive advantage over one another, they create new updates to their file systems that require additional research and development. In turn, individuals and organizations are becoming increasingly reliant on these ever changing data storage technologies, with their critical data being housed in various types of environments.