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Data Recovery Using Restoration Tool

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Abstract—Data recovery is the process of salvaging data from damaged, failed, corrupted, or inac- cessible secondary storage media when it cannot be accessed normally. Often the data are being salvaged from storage media such as internal or external hard disk drives, solid-state drives (SSD), USB ash drive, storage tapes, CDs, DVDs, RAID, and other electronics. Recovery may be required due to physical damage to the storage device or logical damage to the file system that prevents it from being mounted by the host operating system. The most common "data recovery" scenario involves an operating system (OS) failure (typically on a single-disk, single-partition, single-OS system), in which case the goal is simply to copy all wanted files to another disk. This can be easily accomplished with a Live CD, most of which provide a means to mount the system drive and backup disks or removable media, and to move the files from the system disk to the backup media with a file manager or optical disc authoring software. Such cases can often be mitigated by disk partitioning and consistently storing valuable data files (or copies of them) on a different partition from the replaceable OS system files.

1. INTRODUCTION

1.1 The Essence of Data Recovery

Data recovery means retrieving lost, deleted, unusable or inaccessible data that lost for various reasons. Data recovery not only restores lost files but also recovers corrupted data.
On the basis of different lost reason, we can adopt different data recovery methods. There are software and hardware reasons that cause data loss, while we can recover data by software and hardware ways. Being different from prevention and backup, data recovery is the remedial measure. The best way to insure the security of your data is prevention and backup regularly. To operate and use your data according to the normative steps, you can reduce the danger of data loss to the lowest. 3. The scope of data recovery There are so many forms and phenomenon on data problem, we can divide the

objects or scope of data recovery according to different symptoms.

1.1.1 System Problems:

The main symptom is that you cannot enter the system or the system is abnormal or computer closes down. There are complex reasons for this, thus we need adopt different processing methods. Reasons for this symptom may be the key file of system is lost or corrupted, there is some bad track on hard disk, the hard disk is damaged, MBR or DBR is lost, or the CMOS setting is incorrect and so on. Bad track of hard disk .There are logic and physical bad track. Logic bad track is mainly caused by incorrect operation, and it can be restored by software. While physical bad track is caused by physical damage, which is real damage, we can restore it by changing the partition or sector. When there is physical bad track, you better backup your data for fear that the data cannot be used anymore because of the bad track.

1.1.2 Partition Problem:

If partition cannot be identified and accessed, or partition is identified as unformatted, partition recovery tools such as Partition Table Doctor can be used to recover data. Files loss If files are lost because of deletion, format or Ghost clone error, files restoring tools such as Data Recovery Wizard can be used to recover data.

1.1.3 Data loss:

Actually, there are various reasons that cause data loss; software, hardware, factitious, natural, intended, unintended, all may cause data loss or damage on storage devices.
Generally, there are two main reasons for data problem: software and hardware whose corresponding reasons are software reason and hardware reason.

Software reasons

Virus, format, miss-partition, miss-clone, miss-operation, network deletion, power-cut during operation all may be the software reasons. The symptoms are usually miss-operation, read error, cannot fired or open file, report no partition, not formatted, password lost and troubled characters. A: Computer Viruses: some malicious virus programs will destroy data,

overwrite, or erase the data contents. B: Miss-format: fast or completely format partition, thus changing the file system form (NTFS, FAT32) of partition. C: Miss-Clone:
when backing up the hard disk, miss-clone or overlay the original data on hard disk. For these, we can use software tools to recover it. So called soft recovery means data can be recovered by software, not referring to hardware operation for its fault is not because of hardware failure.

Hardware reasons:

Sometimes data loss is because of hardware, such as bad sector in hard disk, power cut, head damage, circuit panel problem, etc. When your hardware has some problems, you probably will fiend: the speed of hardware becomes slow, you cannot operate successfully; you cannot read data, etc, which are most often physical bad track failures. Correspondingly, data recovery in hardware fix is considered as hard recovery, such as memory medium damage, track damage, hard disk scrape, head damage, electric machinery damage, chip burnout and so on. The most distinct feature or difference between soft recovery and hard recovery is whether the memory medium itself can be normally accessed by replacing parts
The following are prompts that system cannot start up normally:

2. Technologies already in use

DDRESCUE:

Imagine, one of your partitions is crashed, and as there are some hard errors, you don't want to write to this hard disk any more. Just getting all the data of it and retiring it seems to be suitable. However, you can't access the files, because the whole system is damaged. Now, you want to copy the whole partition into a file. You burn it on DVD, just to never lose it again. You can setup a loop device, and repair (fsck) it and hopefully are able to mount it. Copying this partition with normal UNIX tools like cat or dd will fail, as those tools abort on error. dd rescue instead will try to read and if it fails, it will go on with the next sectors. The output file naturally will have holes in it, of course. You can write a log file, to see where all these errors are located.

TEST DISK:

Test Disk is open source software with many features.
Features:

- Recovery boot sector.
- Repair partition table and recover deleted -and formatted partition
- Rebuild Boot sector and many more.

Proposed System:

In proposed system we are developing a data recovery software tool by adding some features of two open source forencis tools. It is independent software not depending upon the operating system. It can recover data up to 2 GB on a single scan. The recovered data will be stored on remote desktop for security purposes. As we know that a remote desktop can be secured using some password protected system.

Diagrams:

1)

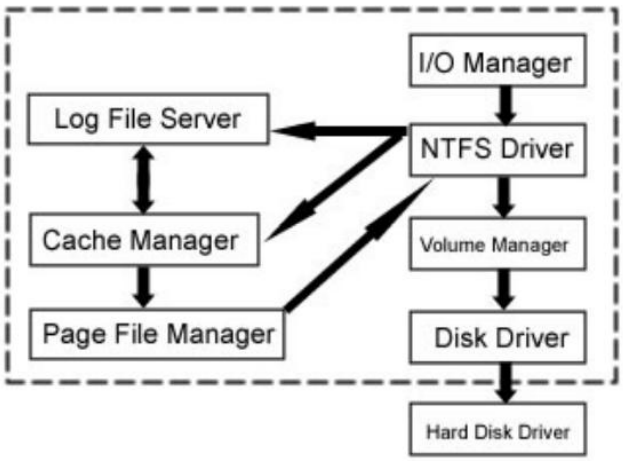

Figure 1.KERNAL STATE

DBR of NTFS File system:

The effect of boot-sector of NTFS is the same as that of FAT16 and FAT32: MBR boots to DBR of active partition, then DBR boots operating system; for Windows NT/2000/XP/2003, DBR calls in fold NTLDR, and then NTLDR calls in system kernel.

In NTFS volume, there is an extended BPB formed by data fields that follow the BPB. Data in these fields enables NTLDR to find master file table $MFT in starting process. In the NTFS volume, $MFT isn't placed in a pre-definition sector, which is different from that in FAT16 volume and FAT32 volume. So if there is some bad sectors in normal position of MFT, we can move the $MFT to another place. But, if the data is destroyed, the position of $MFT cannot be found out; then Windows 2000 will consider this volume as unformatted. Therefore, if a NTFS volume prompt unformatted, it is possible that $MFT is not destroyed. And it may reconstruct BPB according to the meaning of each fields of BPB.

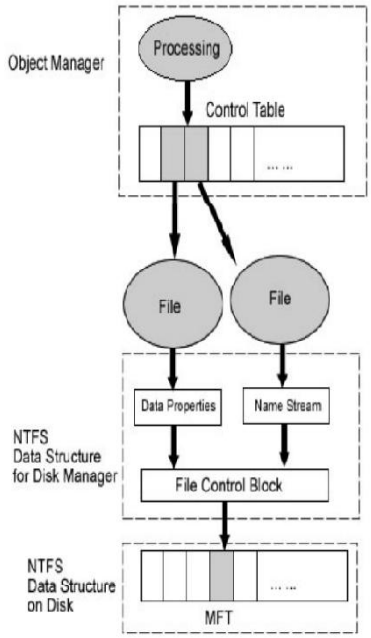

Figure 2. NTFS STRUCTURE

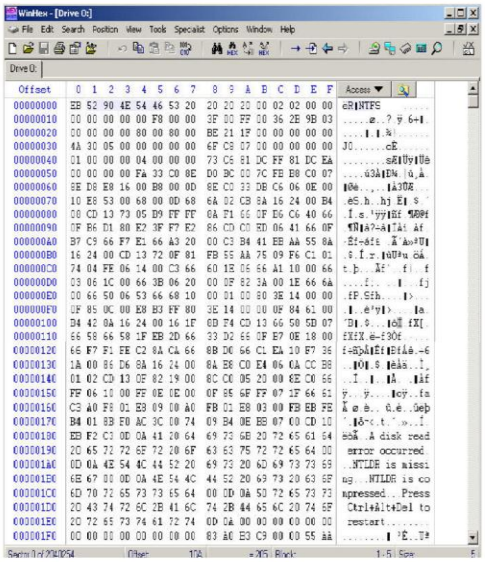

Figure 3.DBR of NTFS

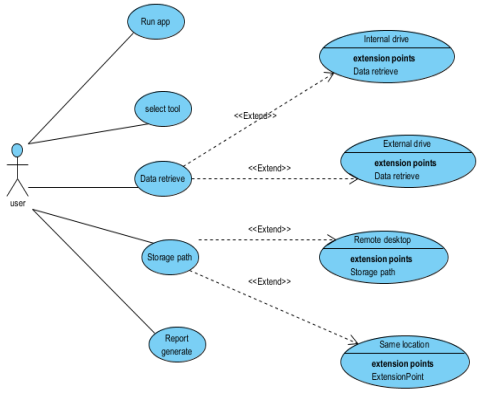

Figure 4. USE CASE DIAGRAM

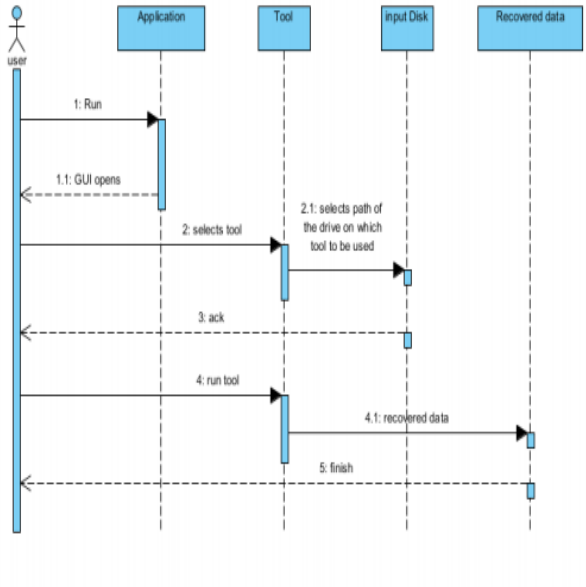

Figure 5.Sequence Diagram

SYSTEM REQUIREMENTS AND SPECIFICATION:

a) Hardware and software requirements:

Platform 1

OS Windows (32bit)
OS Windows 7
Eclipse
Net beans

Platform 2

Pentium IV 1.7 GHz
256 MB DDR SDRAM
40 GB ultra HDD 7200 RPM
15" color monitor

3. Future Scope:

As this an open source tools, there is always a scope for modification and making it a better tool for recovering data and also of free of cost. There is also an additional property added to this tool is that it securely store the recovered data to a remote server so as to keep it away from further damage.

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