DATA RECOVERY SERVICE CENTRE TRAINING (WORKSHOP TRAINING)

Module D-1 LOGICAL DATA RECOVERY TRAINING

D1 .1 Introduction to Storage Device , Hard disk types , Models and O.S

- HDD Traditional Hard disk drives
- Floppy Disk , Zip Drive, Tape Disk,CD/DVD, USB pen drive, Mobile technology storage
- Types of hard disk 3.5" 2.5" 1.8"
- Different hard disk converter, (1.8 zip, scsi, id, sata , micro sata , sca80,)
- SSD solid state disk
- Different types of Hard disk Converter usd
- Difference between HDD & SDD disk drive
- Basic understanding between different OS with different version
- Windows (FAT16, FAT32, NTFS, NTFS5)
- Unix (UFS, EAFS, HTFS, VxFS, FFS)
- Linux (Ext2, Ext3,Ext4 JFS, ReiserFS)
- Apple Macintosh (HFS, HFS+)
- Novell Netware (NWFS, Net386, NSS)
- Difference between FAT & NTFS
- Hard disk different models
- Identify hard disk size from models no

D1.2 Hard Disk Data recovery common problems, with fault

A . LOGICAL DATA RECOVERY PROBLEMS (disk detected in BIOS are mainly logical problems)

Common faults of logical problems

- Failure of Boot Sector.
- Master Boot Record MBR Failure:
- Operating System Malfunction or Crash:
- Partition shows but not access
- Partition automatic loss
- Data loss due to virus
- Format error message
- Your system will not boot. You might get a message. "no boot-up disk available"
- A file may contain no data or just partial, even incorrect data.
- Message hard disk not recognize
- Message that there is no free space available on disk
- Corruption of files on files systems
- Corrupt File System Structure
- Cross Linked Files
- Reformatted or Repartitioned Hard Drive:

- recently accessed the data and suddenly you cannot access it.
  We can used logical software for user mistakes for recovery
  Formatted hard disk
  Deleted files & folders
  Accidental Deletion of Data
  Improper Shutdown:
  Memory card error
- Format
- Card error
- No data shown

PHYSICAL PROBLEMS (not detected in bios are main physical problems)

B. HARD DISK ELECTRONICS FAILURE MAIN PROBLEMS

Logic board (controller) failures.

- Totally dead Hard Drive does not spin up
- When hard disk connects to computer, computer does not start or hangs
- Broken power connectors
- Broken data connectors
- Spindle/arm driver chip failure
- You can see a burned component on the hard drive circuit board.
- Connector of motor or head is damaged
- Printed circuit board failures including pre-amplification
- TVS diode blow up
- Protection fuse, 0ohms resistor open
- PCB Damaged due to liquid
- Fire Damage
- Ceramic capacitor short
- Mosfet short, or not giving output
- Data connector resistor open
- Electric shock
- Pcb circuit open / short

C. HARD DISK MECHANICAL FAILURE PROBLEMS

- Clicking hard drive
- Drive not spinning
- Head crash
- Damaged Platters
- Actuator failure
- Stepper motor failure
- Spindle bearing seizure (block)
- More voice from hard disk
- Head stuck on platter
- Liquid Damage
- Fire Damage

- Dropped Hard Drives

D. HARD DISK FIRMWARE FAILURE PROBLEMS

- Hard disk not found in bios at all
- Model of hard disk shows wrong
- Head sticking voice (may be due to firmware if hardware ok)
- Shows up with wrong S/N
- Show up with wrong Model no
- Hard disk spinning but not shown in bios
- Hard disk asked for password
- Bad sector
- Hang up on particular sectors
- Identifies fine but fails to read any data or boot up operating system giving I/O Device errors
- Smart error
- Primary Master Hard Disk Fail
- No operating system found
- USB Device malfunctioned
- S.M.A.R.T. Capable But Command Failed
- Disk boot failure. Insert system disk and press enter
- Hard drive not recognized
- Drive Mount Failure or some other hard drive boot error.
- The hard disk will spin up when powered on, but be incorrectly recognized / not recognized at all by the computer
- The hard disk will spin up & be recognized correctly by the computer but the system will then hang during the boot process

HARD DISK LOGICAL DATA RECOVERY

D1 .3 Understanding Hard Disk Structure

- Hard disk structure
- Disk Platter
- Read Write Head
- Spindle motor
- Head arm
- Head actuator (voice coil actuator)
- Air Filter
- Tracks
- Sectors
- Cylinders
- Cluster
- Cluster size in FAT& NTFS
- CHS cylinder head sector addressing
- ZBR zoned boot record
- Types of connection

- SCSI, SATA, PATA
- LBA& CHS calculation
- Sector Cluster addressing
- Logical & physical addressing

D1.4 INTERNAL PARTS OF HARD DISK DEMO HARD DISK from INSIDE

IDENTIFICATION OF INTERNAL PARTS, DISASSEMBLE SATA 3.5 DRIVE1TB ST31000333AS

- HDA head and disk assembly
- PCB printed circuit board
- MCU micro Controller Unit
- VCM voice coil motor controller
- Buffer Memory
- Flash chips
- Shock sensor
- TVS diode transient voltage suppression diode
- Breath hole
- Head contacts
- Motor Contacts
- Recirculation filter
- Top dumper
- Top platter
- Platter clamp
- Top magnet
- Plate with heads and connectors
- HSA head stack assembly
- HSA stopper
- VCM voice coil motor
- VCM HSA Actuator
- Arm
- HGA Head Gimbals Assembly
- Bearing
- FPC flexible printer circuit
- Gasket
- Sliders
- ABS air bearing surface
- Preamp
- Heater
- Gimbal
- Platter Clamp
- Spacer ring

- WD Internal parts demo

D1.5 Understanding data stored on hard disk & Microsoft files structure

- What is a file system?
- Types of files systems
- DOS 3.3 (FAT12)
- DOS 5.0 (FAT16)
- Windows 3.1 (FAT16)
- Windows 95 (FAT32 OSR 2)
- Windows 98/ME (FAT32)
- Windows NT/2K/XP (FAT32 / NTFS)
- FAT file allocation table
- NTFS New technology files system
- FAT/NTFS COMPARISON
- How FAT works
- How data store in hard disk in fat
- Explaining disk block allocation method
- File slack space
- Linked allocation
- Attributes of files systems
- NTFS File attributes
- MFT files working idea
- Deleting NTFS FILES

D1.6 working concept of Format, Partition & computer booting process,

- Initializing a Hard drive
- Low level Format (factory)
- Initializing a hard drive with FDISK
- Master partition table
- Partition type codes
- Partition table entry
- Single primary partition
- One primary with extended partition
- Boot process
- Hard disk boot sequence (dos)
- Windows 2000 boot process
- Post, MBR, Boot Record
- MBR (Master Boot Record)
- GPT (GUID Partition Table)
- NTFS
- Partition boot sector
- MFT (master file table)
- Used of different software

D1.7 Data recovery Software used for different problems, steps with features

- Data Recovery of MBR corrupted
- Data Recovery of Deleted Files

- Data Recovery from Deleted Partition
- Data Recovery from Reformatted Partition
- Data Recovery from External Drives
- Data Recovery from USB Drive
- Data Recovery from Camera Card
- Data Recovery from CD/DVD
- Data Recovery as RAW Recovery
- Data Recovery from Damaged Sector
- Data Recovery from RAID

Recovery Features

- FAT Support
- NTFS Support
- Quick Scan
- Deep Scan
- Media File Recovery
- Email Files Recovery
- Microsoft Office File Recovery
- Recovers from Unbootable Drive

Search and Recovery Options

- Search by File Extension
- Search by Date
- Search by File Size
- File Preview
- Batch Recovery
- Saves Scan Information
- Network Recovery
- Help & Support
- Supported Configurations
- Windows 7
- Windows Vista
- Windows XP

Top common data recovery software used in market

- Stellar Phoenix
- R Studio
- Data rescue
- Get data back
- Icare
- Power data recovery
- Salvation
- Encase
- Kernel
- Ptods
- Hard disk Stennar
- Hard disk Regenerator

Corrupted files repair software

- Excell repair
- Access repair
- Power point repair
- Jpg repair
- Backup files
- Repai video master avi, divx,xvid,mpeg, rm, rmvb, asf, wmv, wma , ac3

Understanding Basic concept of RAID

D1. 8 Pen drive and Memory card logically data recovery concept

- Pen drive data recovery
- Memory card data recovery concept
- Data recovery from Pen drives
- Data recovery from memory card
- Data recovery from Zip drives concept
- Data recovery concept of iPods, Digital cameras, Mobile phone, etc