

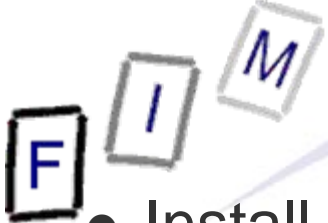


Drive investigation

Security and Privacy
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Agenda

- Install the software:
 - Filedisk
 - Cygwin
 - Optional (can be run from CD): WinHex, HxD
- Search for deleted files and reconstruct them
 - WinHex: Deleted file (FAT)
 - Reconstruct: If possible
- Discovering hidden files: Wrong extension
 - Cygwin: "file" command
- Windows ADS
 - LADS – Find the picture hidden in an ADS
- Timestamps
 - WinHex: Analyze timestamps and convert them
- Running time of your Windows computer
 - Analyze the event log

Scenario

- ①
- ②
- ②
- ③



- Source of images: <http://dftt.sourceforge.net/>
 - ❶ 6-undel-fat.zip
 - » FAT image
 - ❷ 8-jpeg-search.zip
 - » NTFS image
 - ❸ 5-fat-daylight.zip
 - » FAT image
- Requirements:
 - Operating System: Windows (XP, Vista; NT, 2K: ???)
 - Harddisk space:
 - » Scenarios: 18 MB
 - » Cygwin: 674 MB
 - » Other software: 4 MB



Software installation

- Filedisk: Mounting a disk image as a drive under Windows
 - Requires Administrator access and a reboot
 - Procedure:
 - » Copy driver (filedisk.sys) to %SYSTEMROOT%\system32\drivers
 - » Import "filedisk.reg" into the registry (double-click on it)
 - » Reboot the computer
 - Attention: When mounting an image, you must always give the full path to the file!
 - » E.g. "filedisk /mount 0 C:\temp\image.dd"
- Install "Winhex"
 - Not really needed; can be run directly from CD!
 - » Copy to harddisk for faster start if desired
- Install "HxD"
 - Not really needed; can be run directly from CD!



Software installation

- Install "Cygwin"

- Linux-like environment (and programs) under windows

- Procedure:

- » Execute "setup.exe" and choose to install from local path

- Select the subdirectory starting with "ftp..." in it as install source

- » E.g.: "E:\Software\Source"

- No spaces in the path of destination directory

- E.g. **not** C:\Program Files\...

- » Change selection to "install" on the "All" selection

- Click on the "circular arrows" icons repeatedly (once should suffice)

- Add the binary directory to the path

- » Control panel – System – Advanced – Environment Variables →

- Add to user variables the complete path, e.g. ";C:\Cygwin\bin"



Search for deleted files: FAT

- Find and recover the deleted files in image ❶!
- Your task:
 - Find out, which files did at some time exist in the image
 - » Recovery through WinHex/HxD!
 - Manual recovery in WinHex not possible due to evaluation version limitations
 - Recover these files
 - » Check their MD5 values
- Document your actions through a log and screen shots!
- Hints:
 - FAT1 starts at offset 0x1000, FAT2 (=copy) at 0x4000
 - Root directory is at offset 0x7000



Search for deleted files: FAT

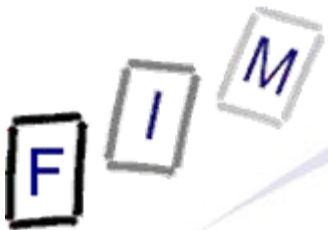
- MD5 table of correctly recovered files

→ Filename	File size	MD5 value
→ \SING.DAT	780	59B20779F69FF9F0AC5FCD2C38835A79
→ \MULT1.DAT	3801	FFD27BD782BDCE67750B6B9EE069D2EF
→ \FRAG1.DAT	1584	7A3BC5B763BEF201202108F4BA128149
→ \FRAG2.DAT	3873	0E80AB84EF0087E60DFC67B88A1CF13E
→ \DIR1\ MULT2.DAT	1715	59CF0E9CD107BC1E75AFB7374F6E05BB
→ DIR2\ FRAG3.DAT	2027	21121699487F3FBBDB9A4B3391B6D3E0



Discovering hidden files: Wrong extensions

- Find out, which of **all** the files in image ② are jpg pictures!
- Your task:
 - Collect all files, except those in archives
 - » How many are these?
 - Identify their file type
 - » Do this manually (Winhex/HxD)
 - Check first in the internet: How to recognize a JPG file
 - » Use the command "file"
 - Inspect the "magic" file and find the description for JPG files
 - » Use command "strings" (file1.jpg, file4.jpg, file12.doc, cmd.exe)
 - Identify the file type of the archives
- Document your actions through a log and screen shots!



- Find the hidden picture!
- In the image ② there is an additional picture hidden
 - This is located within an alternate data stream
- Your task:
 - Find the location of the hidden picture
 - Extract the picture into a separate "normal" file
 - Add the picture to another file and to a directory
 - » Not "into" the directory, but to the directory entry itself!
 - » Name the ADS "new*picture"
 - Could you create a normal file with this name?
- Document your actions through a log and screen shots!



Timestamps

- Find out when the two files in image ③ were actually created
- Your task:
 - Check the date through the Windows command line
 - » Would changing the local time zone influence the output?
 - » Compare this to your Windows drive (hint: FAT ⇔ NTFS!)
 - Find out where the creation time is located on the disk
 - » Don't use the WinHex UI; first think and calculate, then verify!
 - Manually calculate the creation time from the hex values
 - » Search the internet for the exact format
 - Use DCode to decode the creation time
 - When were the files created in UTC?
- Document your actions through a log and screen shots!



Windows Startup/Shutdown time

- Investigate your own computer:
 - When was it turned on and off during the last week?
 - » Investigate in the Internet which events are logged when!
 - Draw a timeline to visualize your results!



- Undelete is quite simple on FAT
 - But complex/impossible on NTFS/EXT3!
 - "Plain text" search will still work unless actually overwritten
- Hiding files is quite simple: Wrong extensions and ADS
 - Found only with good knowledge and additional tools
 - » But **VERY** difficult to **REALLY** hide information!
- Even with very simple means a lot of information can be extracted, if it is exactly known where to look for it
 - But also its limitations must be known!
- Timestamps (or timing issues) are an important aspect for every forensic investigation
 - The time zone is very important there
 - » Is the data stored in local or UTC (or ...) time?
 - » What is the difference to UTC now (and what was it then?)

F I M

Questions?

Thank you for your attention!