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PART 1 → Disk imaging w/ FTK Imager

A) Using FTK Imager to create a bitstream image of a USB drive

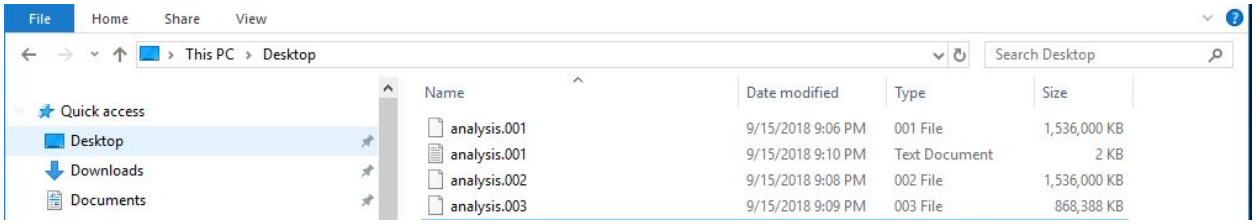
→ Steps for USB drive in Raw (dd)

Select File → Create Disk Image...
Choose Physical Drive
Choose USB Device
Press Finish
Add the image destination
Select Raw (dd) as format
Provide destination folder and image filename information
Press Start

1. After the imaging process was complete, FTK Imager created the following files..

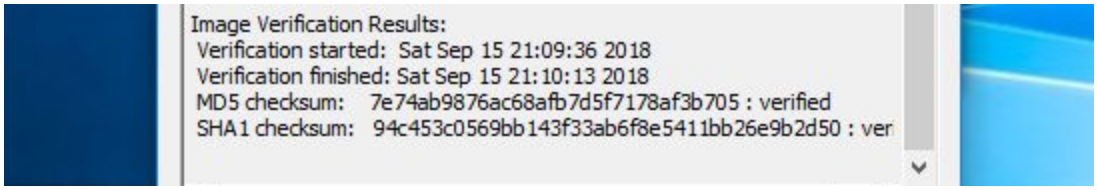
- **The image file with extension of .001**
- **A text file for image summary**

→ (Image of files created by FTK imager)



2. During the imaging process, you should have noticed that “Verify images after they are created”; is checked by default. The result is..

- **FTK imager will compute the MD5 and SHA1 hashes of the USB drive and the MD5 and SHA1 hashes of the image, and verify the hashes match**.



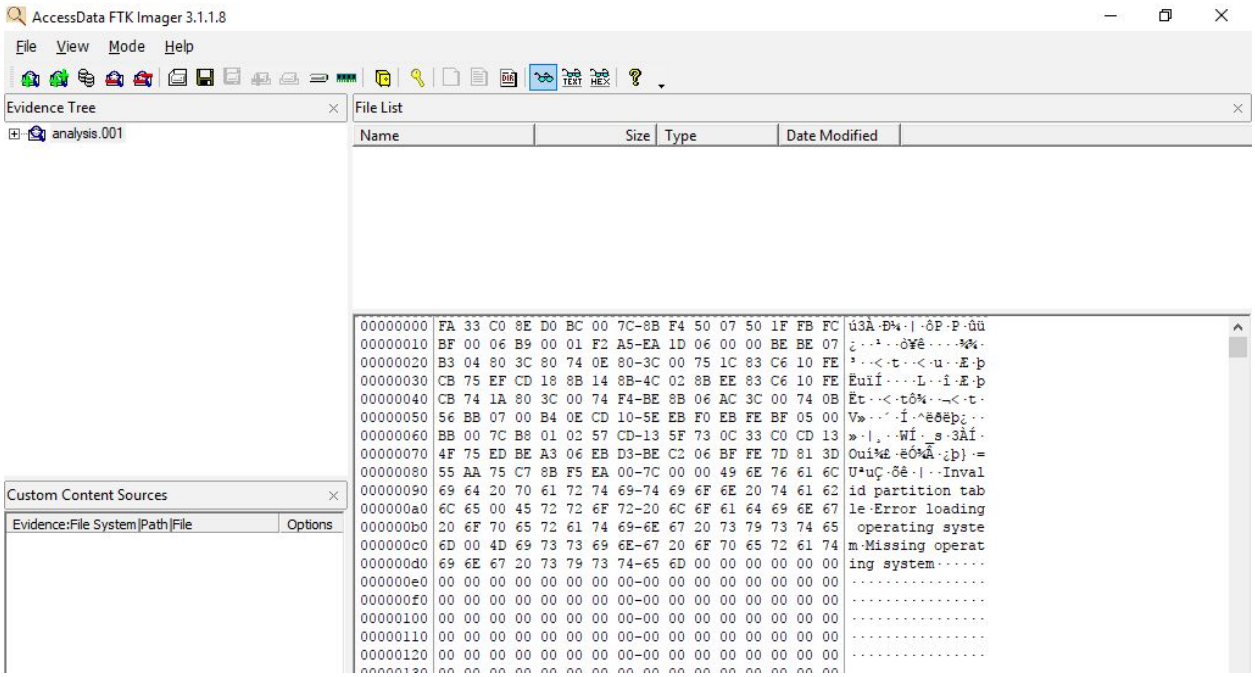
3. FTK imager created the following hash algorithms to verify the image had not been altered..

- **Four hash algorithms → A computed Hash & Report hash for MD5 & SHA1**

Name	analysis.001
Sector count	7880776
MD5 Hash	
Computed hash	7e74ab9876ac68afb7d5f7178af3b705
Report Hash	7e74ab9876ac68afb7d5f7178af3b705
Verify result	Match
SHA1 Hash	
Computed hash	94c453c0569bb143f33ab6f8e5411bb26e9b2d50
Report Hash	94c453c0569bb143f33ab6f8e5411bb26e9b2d50
Verify result	Match
Bad Sector List	
Bad sector(s)	No bad sectors found

B) Load USB image to FTK imager, and examine the content

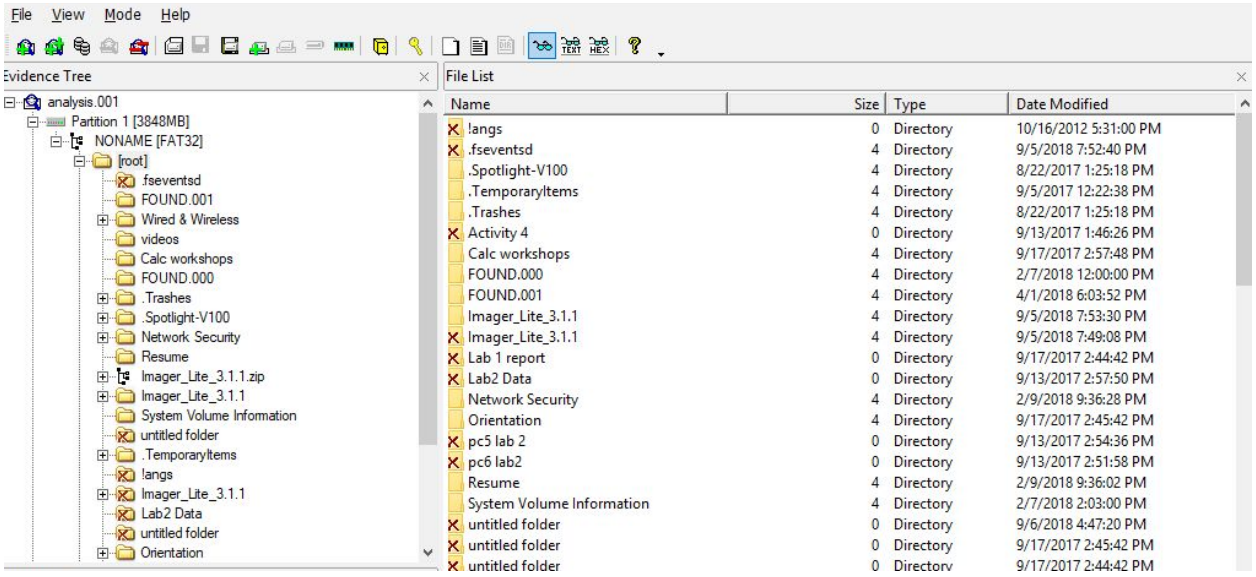
1. screenshot of the FTK imager after you have loaded your USB image



2. Cool FTK Imager features and screenshots**.**

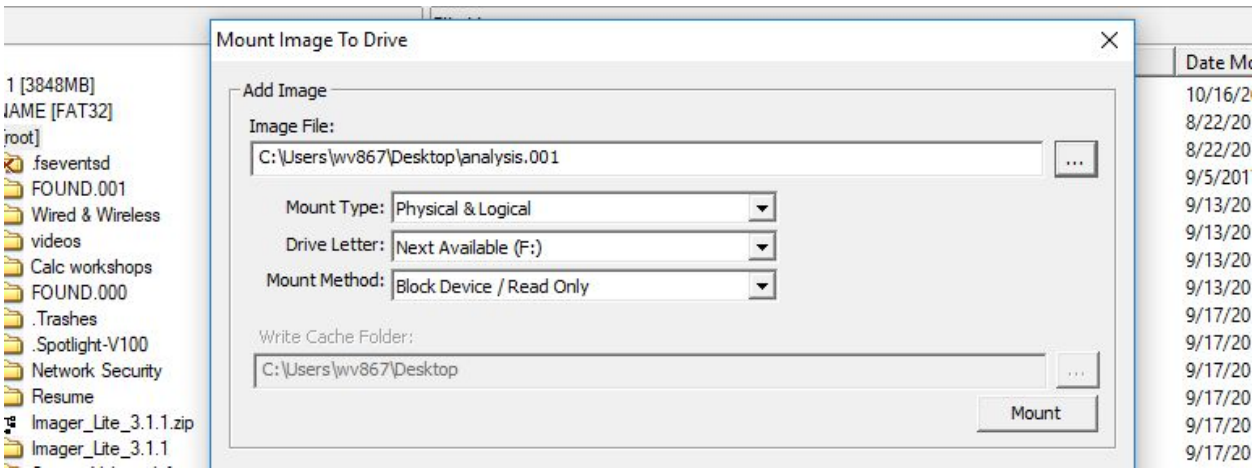
Expand partition/root to uncover and export deleted files →

- Expanding the evidence tree [analysis.001 / partition / root / ...]
- Directories & files with red x's have been deleted in the past.
- These files can be recovered by running the export command



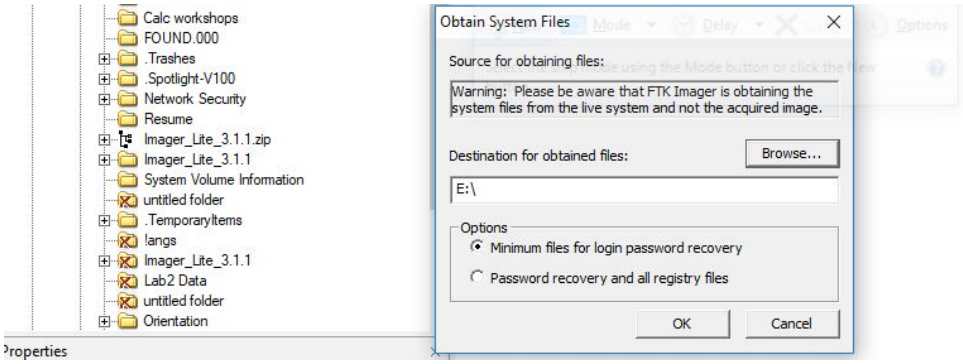
Mount Image →

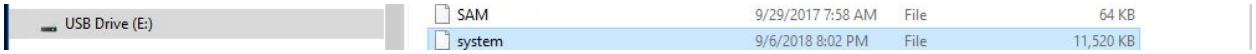
- FTK Image becomes a drive letter on your machine
- Local disc f now has the same thing
- Retrieved forensically, can see things that would not have shown up originally
- Can now run files against a malware scanner (before working in files)



Obtain system files →

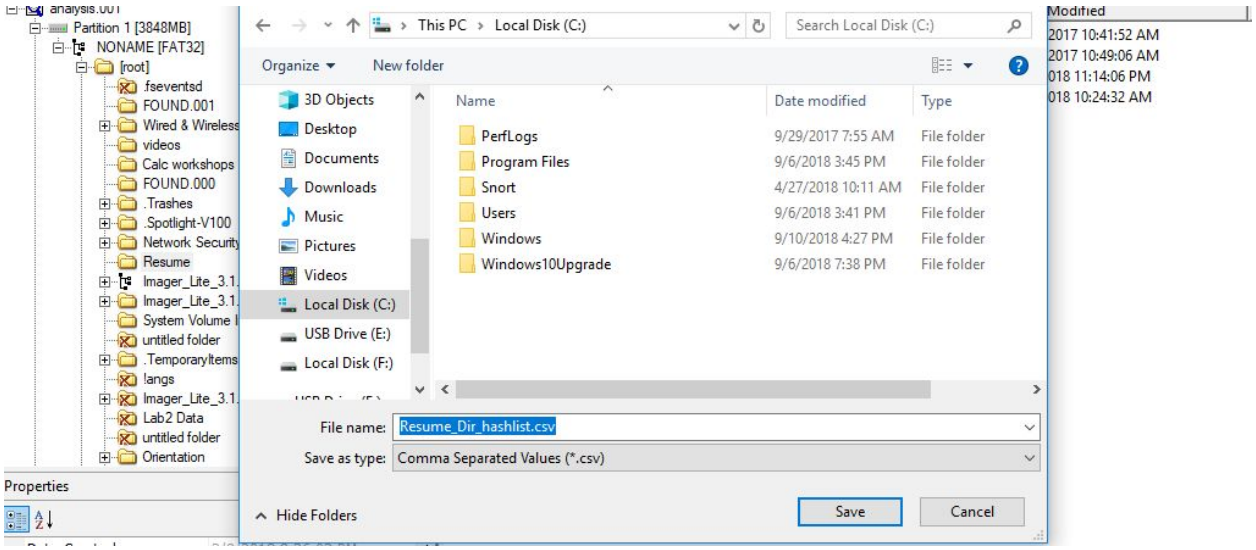
- For form/browser passwords
- In this case, SAM & System files were created
- Forensically, data stored in these files can be very helpful

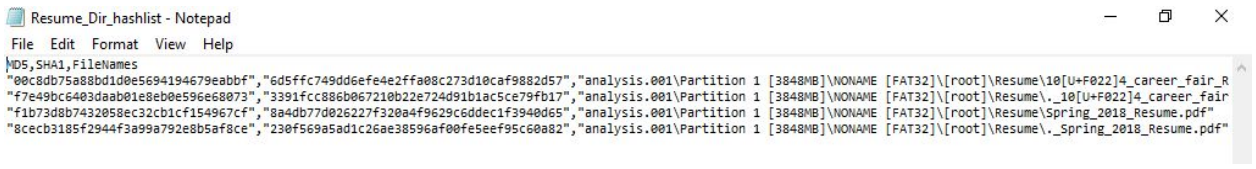




Export file hash list →

- Will create a MD5 hash for everything inside of the selected directory.
- \Create a CSV file with all hashes saved in (C:)
- Hashes can be compared against a white-list for further analysis





PART 2 → Imaging with dd & Netcat

Description: **dd** and netcat (**nc**) can be used for imaging over a network. This process can be mimicked by sending a full image of a USB from one terminal(ex: **suspect machine**) to another terminal(ex: **forensic machine**).

→ Steps for imaging over the network

Create the md5 and sha1 hashes for the USB
`md5sum /dev/sdb1`
`shasum /dev/sdb1`

Use dd to make a full image of your USB and pipe to netcat `nc -l 8888 > usb.dd` (ex: on forensic machine) `dd if=/dev/sdb1 | nc 127.0.0.1 8888 -w 3` (ex: on suspect machine)

Create the md5 and sha1 hashes for usb.dd
`Md5sum usb.dd`
`Shasum usb.dd`

Ensure the md5 hash of the USB device matches the md5 hash of USB image **Ensure the sha1 hash of the USB device matches the sha1 hash of USB image**

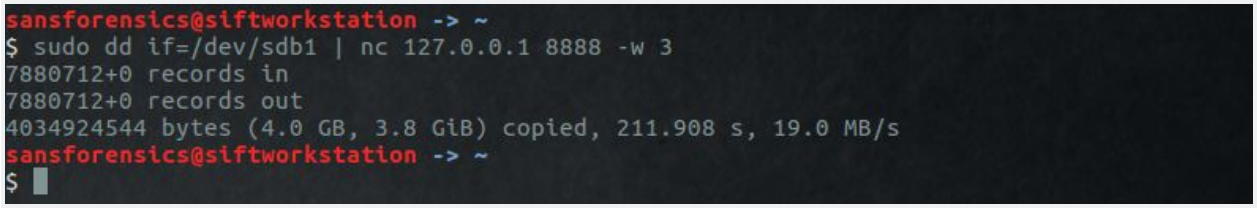
4. Commands & screenshots used

- Command used on the forensic machine to receive data on port 8888 and save the received data as usd.dd

  `nc -l 8888 > usb.dd`

- Command used on the suspect machine to use dd to make a full image of USB and use netcat (nc) to send the USB image to the forensic machine terminal

  `dd if=/dev/sdb1 | nc 127.0.0.1 8888 -w 3`



- Commands used to generate both MD5 and SHA1 hashes of **USB device**

```
md5sum /dev/sdb1
shasum /dev/sdb1
```

- Commands used to generate both MD5 and SHA1 hashes of your **USB image**

```
Md5sum usb.dd
Shasum usb.dd
```

- When comparing the hash values of usb.dd with the hash values of the raw image created by FTK imager in Part 1, **the values are different.**

Unfortunately, generating the different hashes can be caused by plugging in and unplugging the USB when switching from a windows VM (FTK Imager) to a Linux VM(SIFT Workstation), when the USB doesn't automatically mount. Additionally, to be guaranteed that these hashes do match, a write blocker can and should be utilized. Due to the expense of a write blocker, one was not used in this exercise.

Part 3 → Linux memory acquisition using LiME

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5. **<u>Using LiME to dump SIFT Workstation memory</u>**
[screenshot of lsmod result]

→ shows lime grep successful

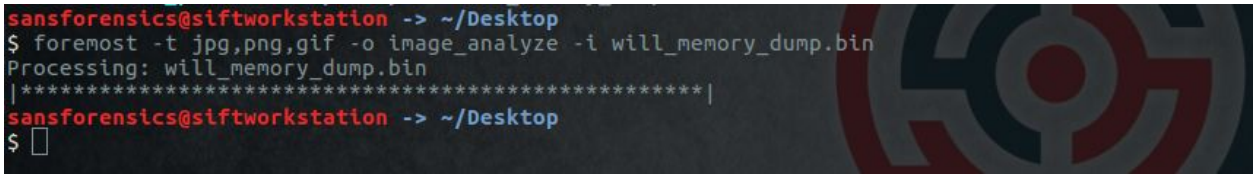
6. **<u>Extracting information from memory dump with Foremost</u>**
[commands and options used to extract information]

→ Breaking down the Foremost Commands

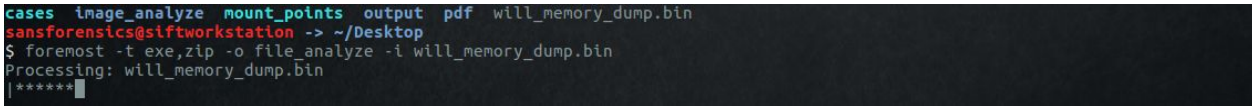
'**man foremost**' for options on what search parameters can be used
[-t] to define the file types you are interested in collecting. In this case → (jpg,gif,png) & (zip,exe,doc) were completed.
[-o] to define the output directory / filename
[-i] to define the input or which file to search within. In this case → (mempory_dump.bin file)

→ Commands used:

Foremost -t jpg,png,gif -o image_analyze -i will_memory_dump.bin



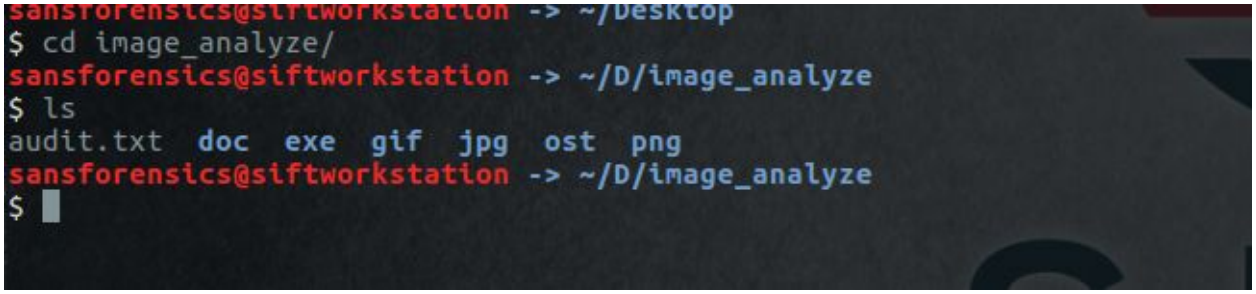
Foremost -t exe,zip -o file_analyze -i will_memory_dump.bin



7. **Directories / subdirectories created & files extracted after running Foremost**
[Interesting data in memory]

After defining [**-o**] output, [**image_analyze**] & [**file_analyze**] folders were created
Inside each output directory is [**audit.txt** file] & folders corresponding to each [**-t**] file type
[**audit.txt**] will show a summary of files extracted & "file offset", exactly where file was found
file type folders, ex: [**doc, jpg, exe, zip**], will contain all extracted files of that type

→ **Image_analyze** directory created
[Audit.txt file & doc, exe, gif, jpg, ost, png subdirectories created]



Results: Lists total number of each file type extracted

File_analyze directory created
[Audit.txt file & doc, exe, ost, zip subdirectories created]

Results: Lists total number of each file type extracted