#OSDFCon
OPEN SOURCE DIGITAL FORENSICS CONFERENCE

Introducing the Autopsy Logical Imager

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Basis Technology

Introduction

- What is Logical Imager:
  - Command line program that runs on target computer and collects:
    - Files of interest
    - System information (such as users)
  - Results can be easily imported into Autopsy as a data source
- Use Cases:
  - Search warrant at an organization with a large number of computers. Use to collect basic information from each computer and then decide which to fully image first.
  - Collect only a subset of folders (such as for a specific user) that you have consent for.
  - Time-sensitive situation where you want to prioritize what files get collected.

Benefits Over Other Tools

- Parses raw drive data using The Sleuth Kit:
  - Can access locked files and bypass rootkits that hide files
  - Does not update time stamps during search
  - Can access dual boot volumes (Linux for example)
- Can create a full image if you keep it plugged in long enough.
- Tightly integrated with Autopsy to configure and review the results.

Requirements

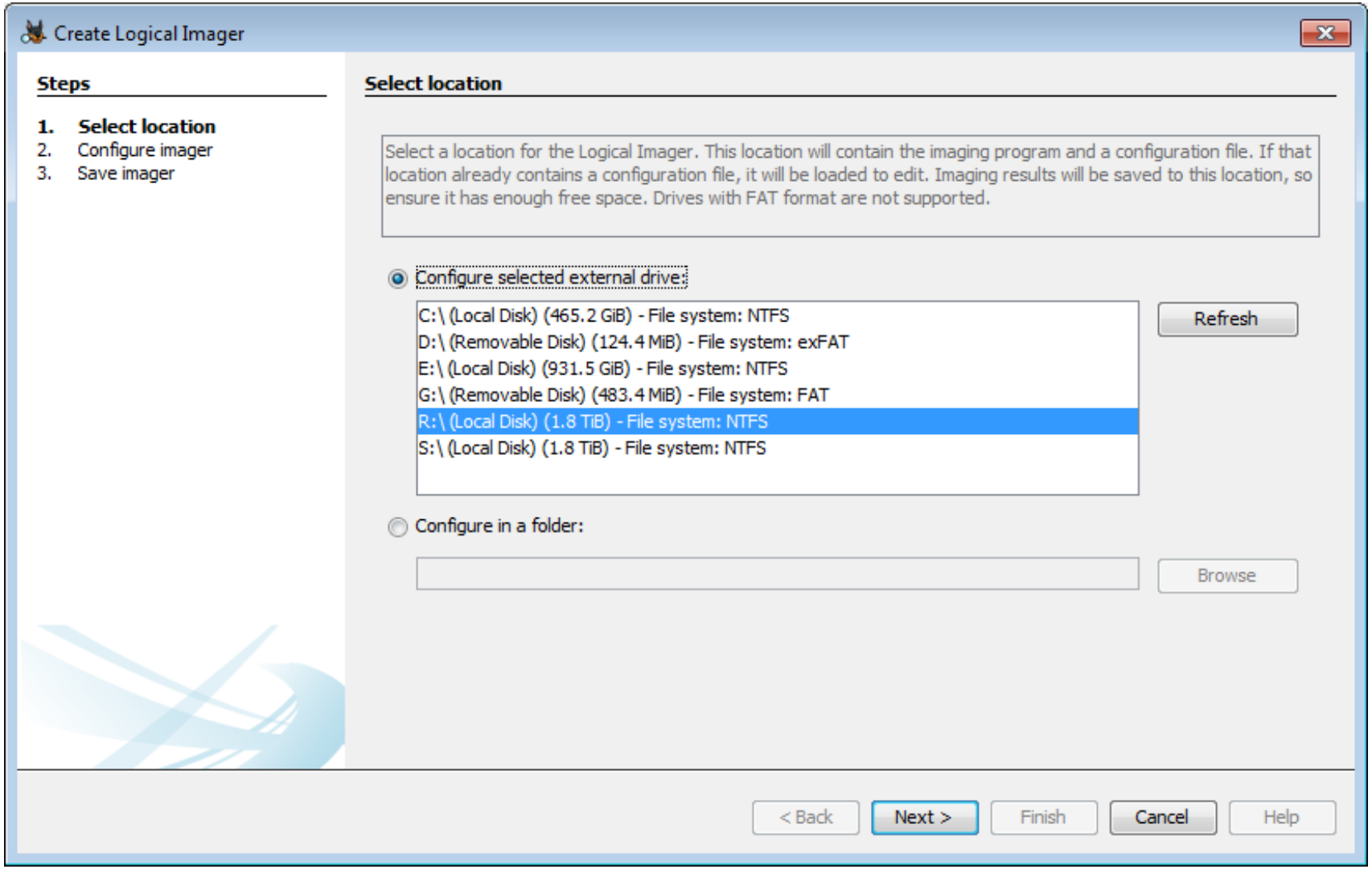
- You need to configure logical imager from a Windows computer.
- The target machine must be running Windows.
- You need to be able to run with administrator rights on the target machine.
- You must have an NTFS or ExFAT external drive to run from.

Configuring Logical Imager

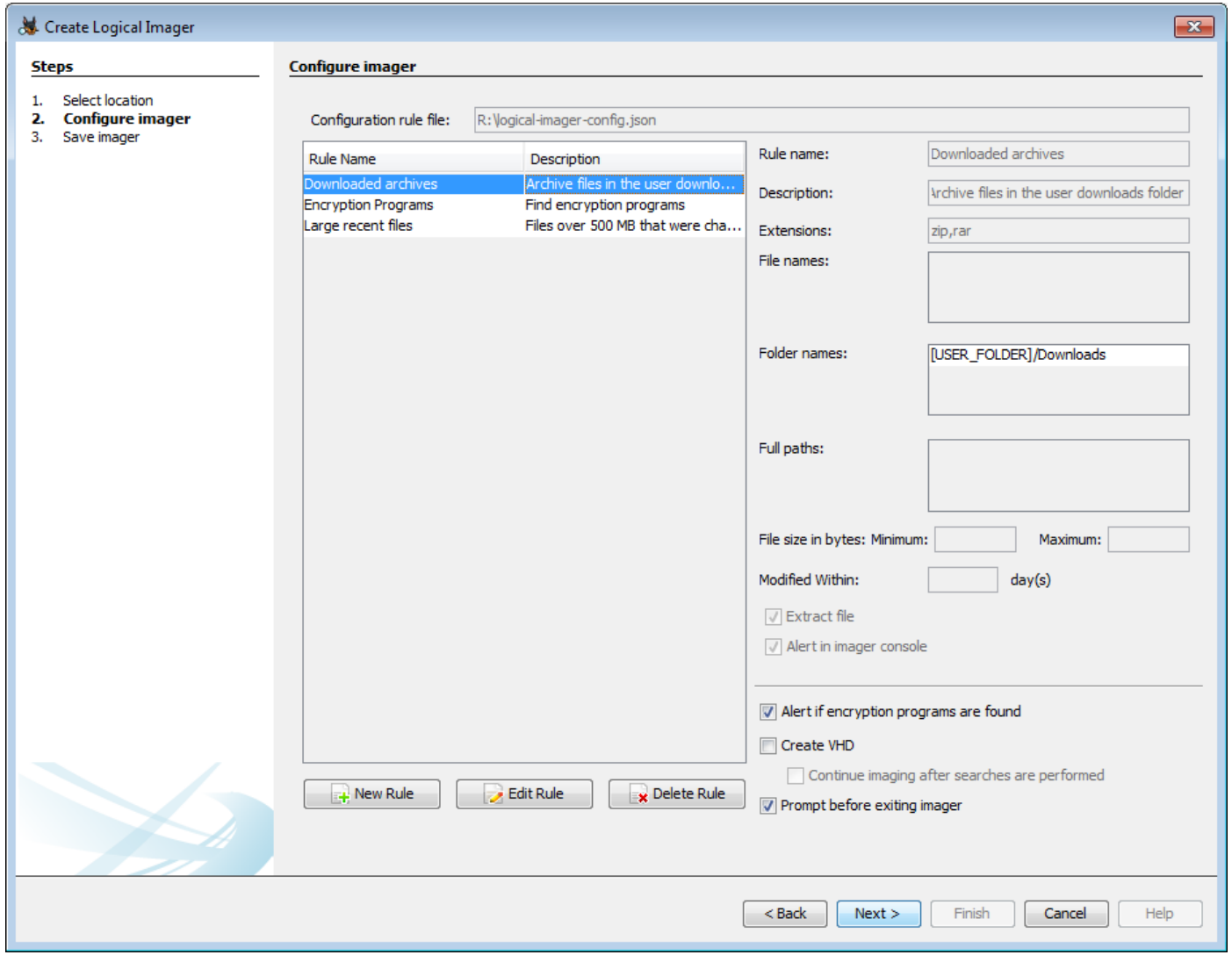
Overview

- General configuration process:
  - Go to Tools->Create Logical Imager
  - Pick a USB drive to configure
  - Create a set of rules
  - Choose your global settings
  - Save your configuration and the logical imager executable to the drive selected

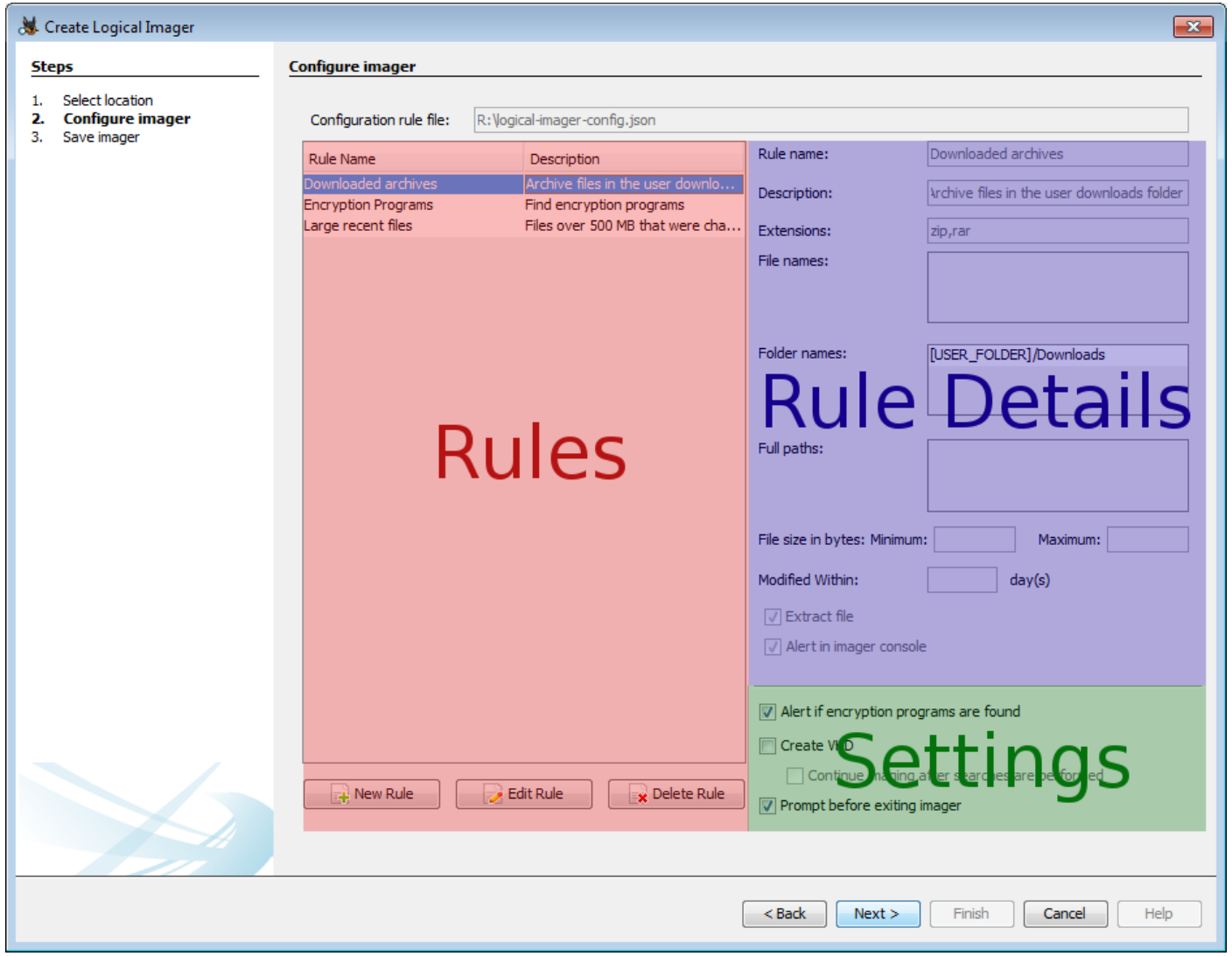
Selecting a Drive



Main Configuration Panel

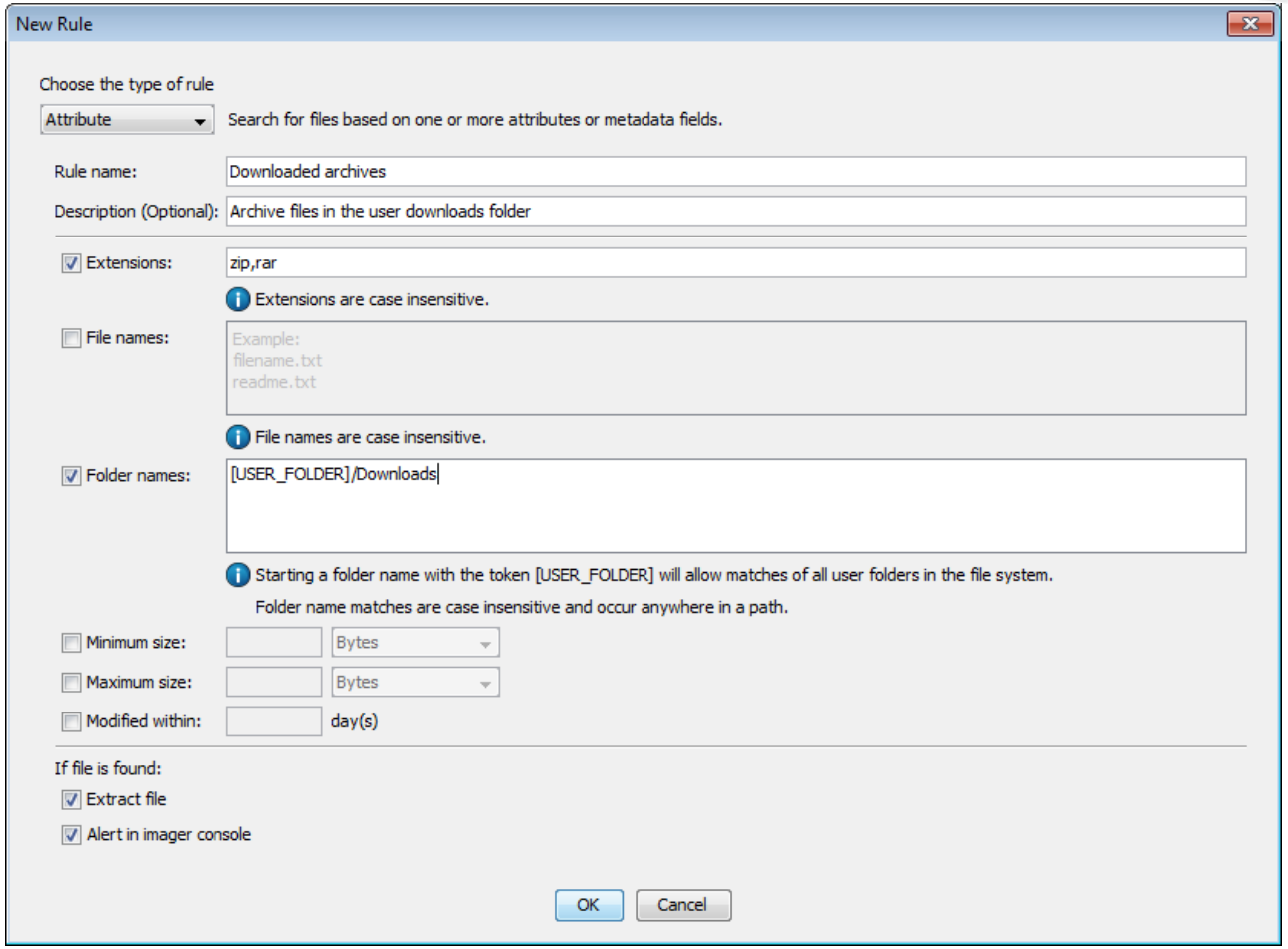


Main Configuration Panel



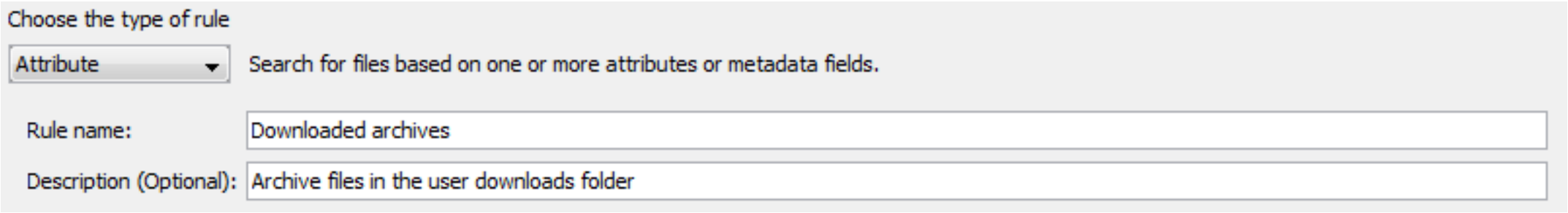
Making Rules

- Click on “New Rule” to create a new rule.
- You can either make a rule based on file attributes or to make a rule based on the full path to the file



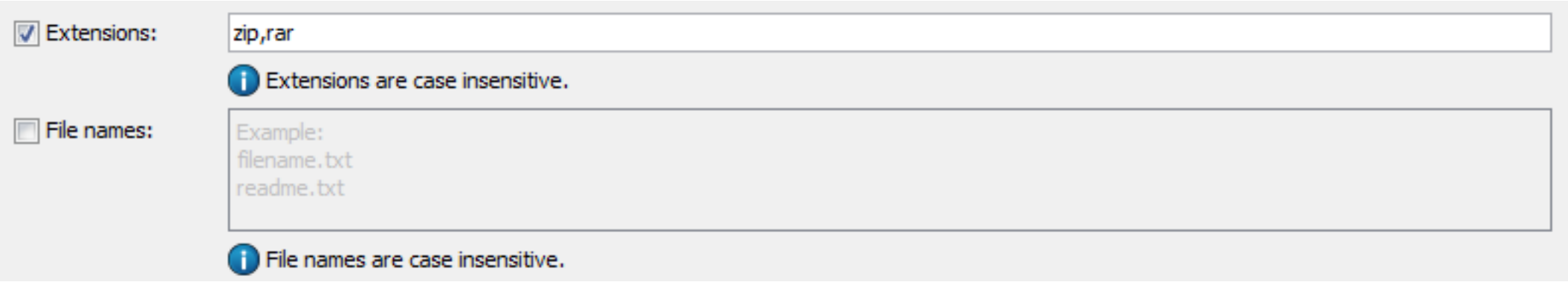
Attribute Rules

- Similar to Interesting File rule sets – you can match by extension, file name, path, size, and last modified date.
- Select “Attribute” in the combo box at the top to make an attribute rule
- Enter a rule name and optional description



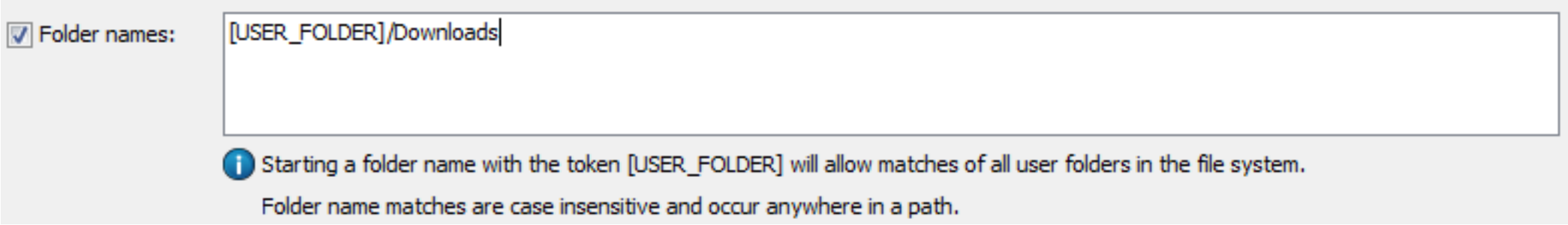
Attribute Rules – Extension and Name

- You can enter any number of extensions or file names.
- Note that each file name should include its extension, so you can not specify both exceptions and file names.



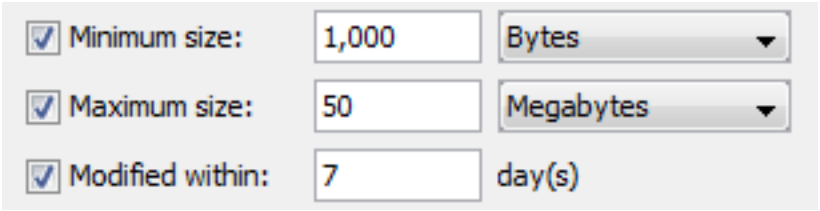
Attribute Rules – Folder Name

- You can enter any number of folder names.
- The folder names can appear anywhere in the path
- You can use “[USER_FOLDER]” to match Windows or Linux user folders.



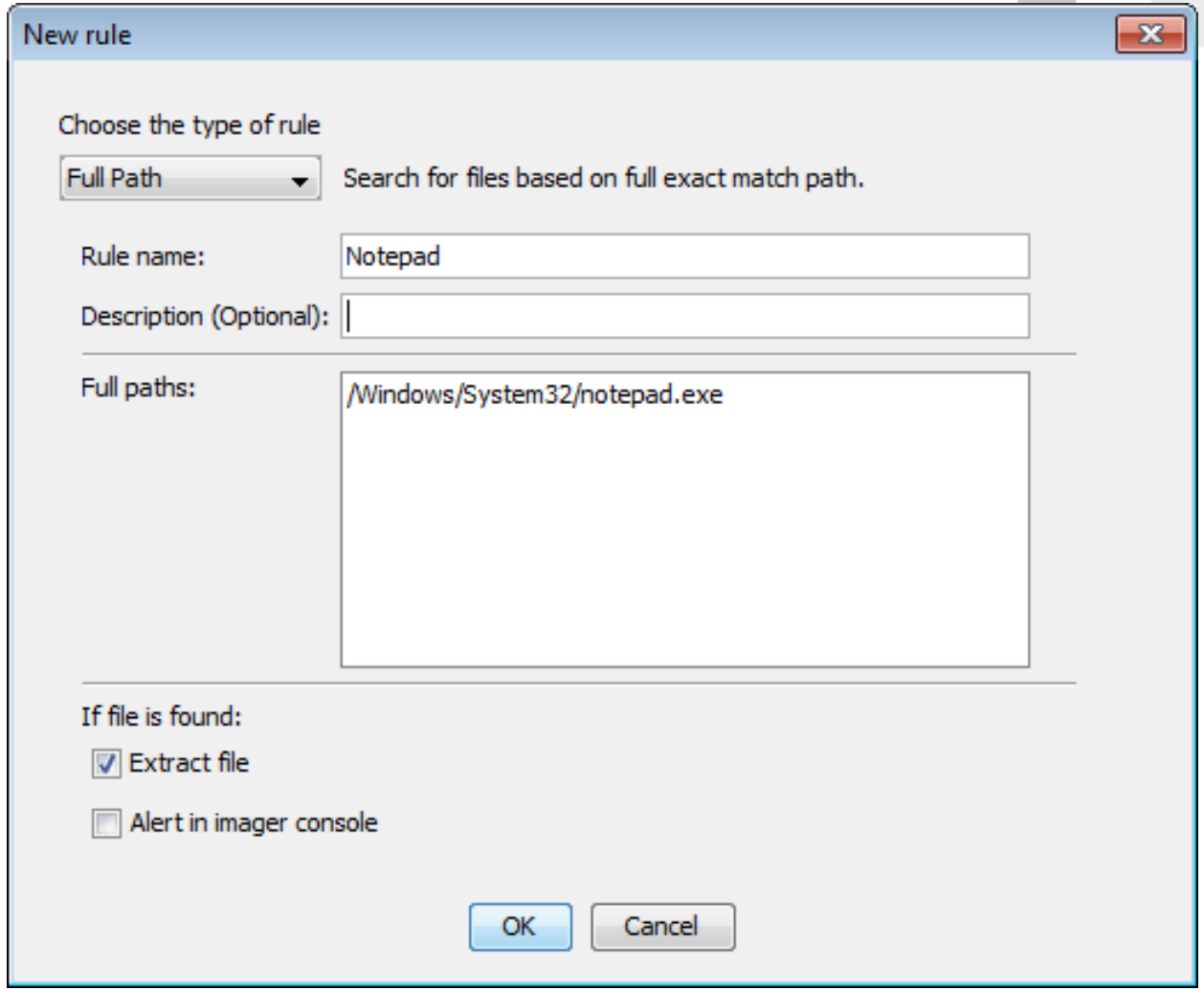
Attribute Rules – File Size and Date

- You can specify a minimum and/or maximum size
- You can also require that the file was modified in the last X days



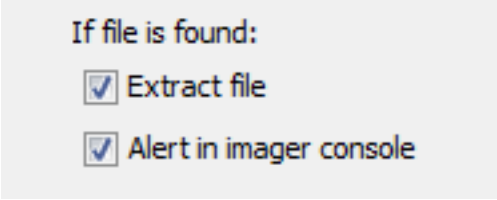
Full Path Rules

- File must exactly match the name and path given
- Multiple paths can be entered on separate lines



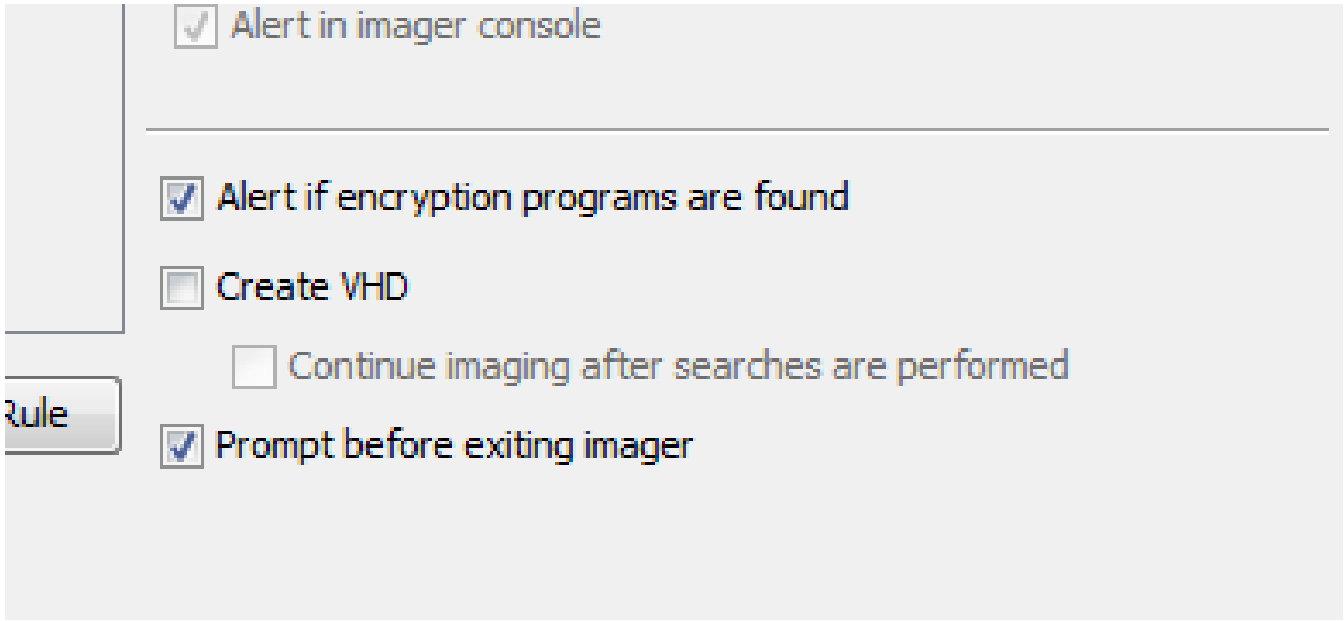
All Rules – Choose Action for Match

- Extract the contents of the file
- Write an alert to the imager console that a match was found
  - Best for cases where few matches are expected



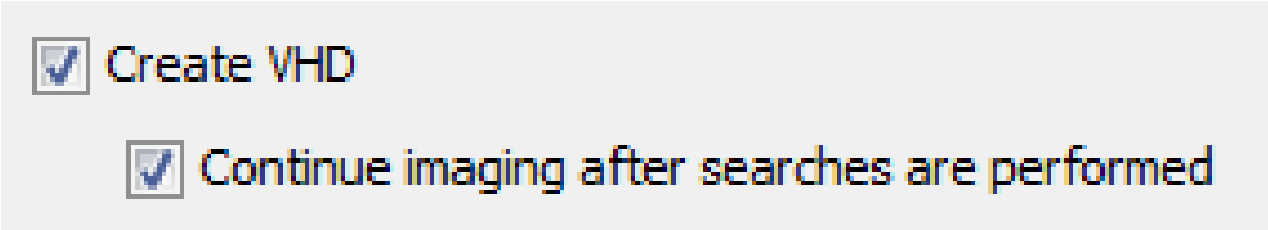
Settings – Encryption and Console Setting

- Alert if encryption programs are found
  - Preset rule that looks for “truecrypt.exe”, “VeraCrypt.exe”, etc.
- Prompt before exiting imager
  - Keeps the console window open so you can quickly see any alerts or error messages.



Settings - Output Format

- Default – Each matching file will be saved to a folder
- Create VHD – All blocks read by logical imager will be written to a sparse VHD, which will include the full contents of all matching files
  - Continue imaging after searches are performed – When the search is done, continue to acquire blocks until the program is terminated.

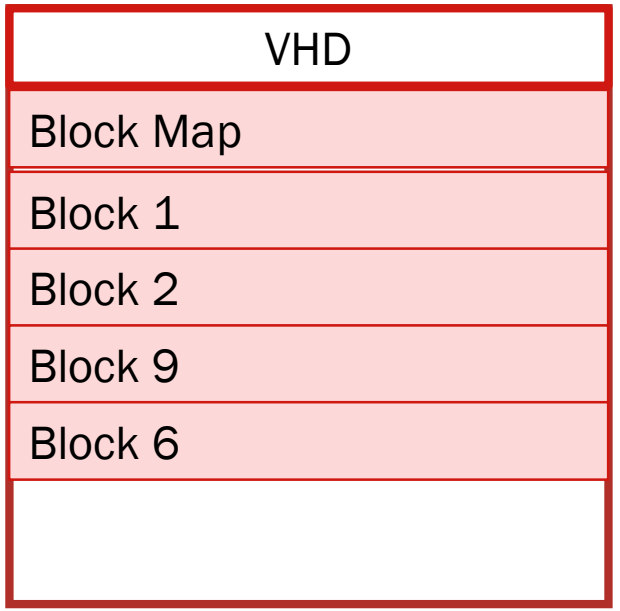


Sparse VHD

- A Virtual Hard Disk (VHD) is a file representing a hard disk.
- A Sparse VHD is a variation where:
  - Blocks may occur in any order (the header maps original offsets to offsets in the VHD)
  - Any blocks that aren't present are interpreted as all null bytes
- Since unused blocks are not included, sparse VHDs can be much smaller than the hard drive they represent.

Sparse VHD

- Each block read by logical imager will be written to the VHD.
- Since logical imager will read the metadata for every file on the system, metadata will also be present in the VHD.
  - The full partition tables and master file table(s) will be included
- Logical imager will read the complete data for any matching files, so they will be copied to the VHD in full.
- Will optionally continue filling in any missing blocks after the search is complete.
- In testing, the sparse VHDs created were typically around 10% of the full image size after the search completed.



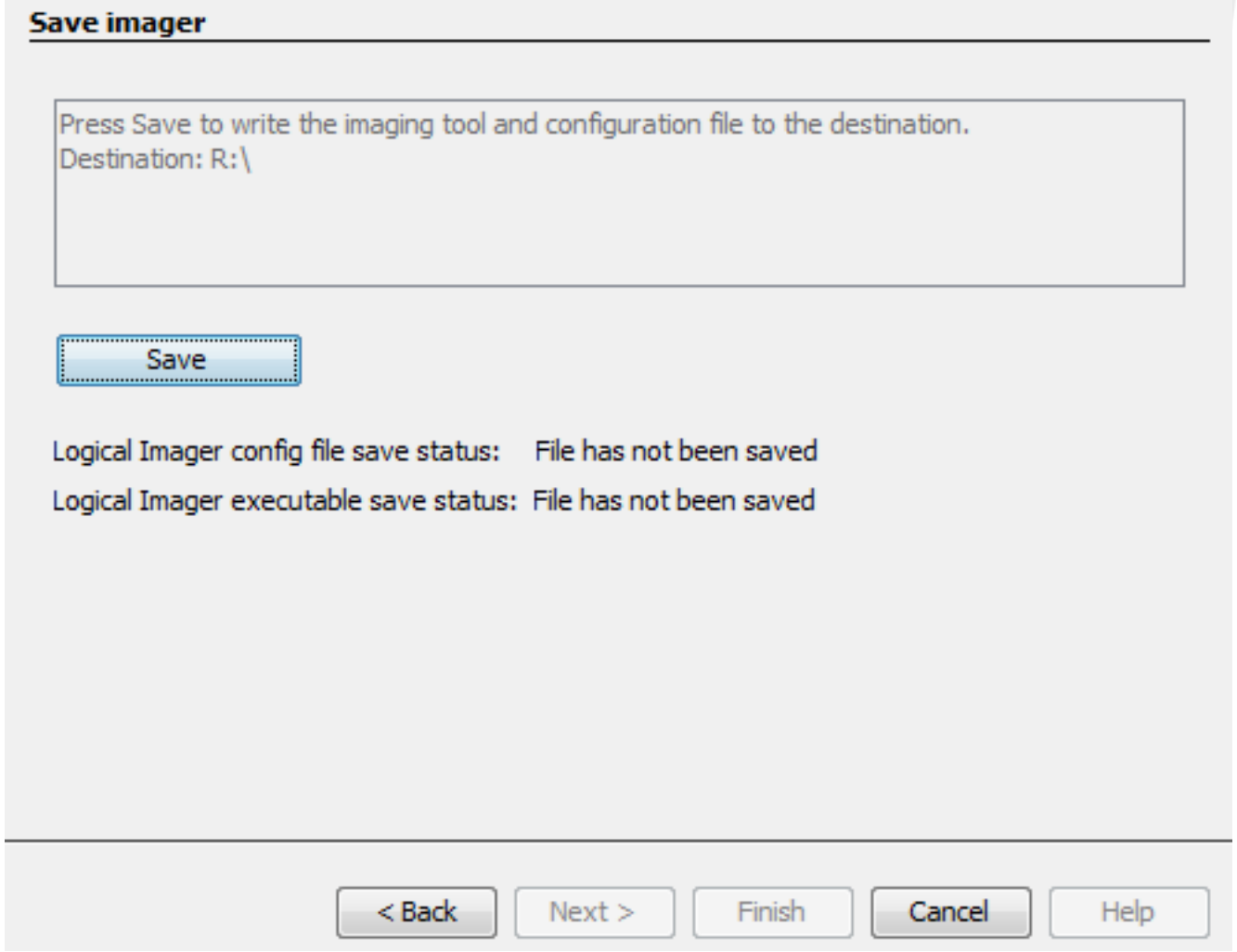
Extracting Files vs. Using a VHD

- File mode
  - Pros: Typically much faster and will use significantly less disk space
  - Cons: No data about the file system or non-matching files is saved. Not all file metadata is preserved.

- VHD mode
  - Pros: Can be used to make a full copy of the drive. Has metadata about all files, which enables for more post-processing analytics (such as prioritization).
  - Cons: Typically much slower and uses more disk space. Can also be more confusing in Autopsy since files that were not copied will appear in the tree

Saving

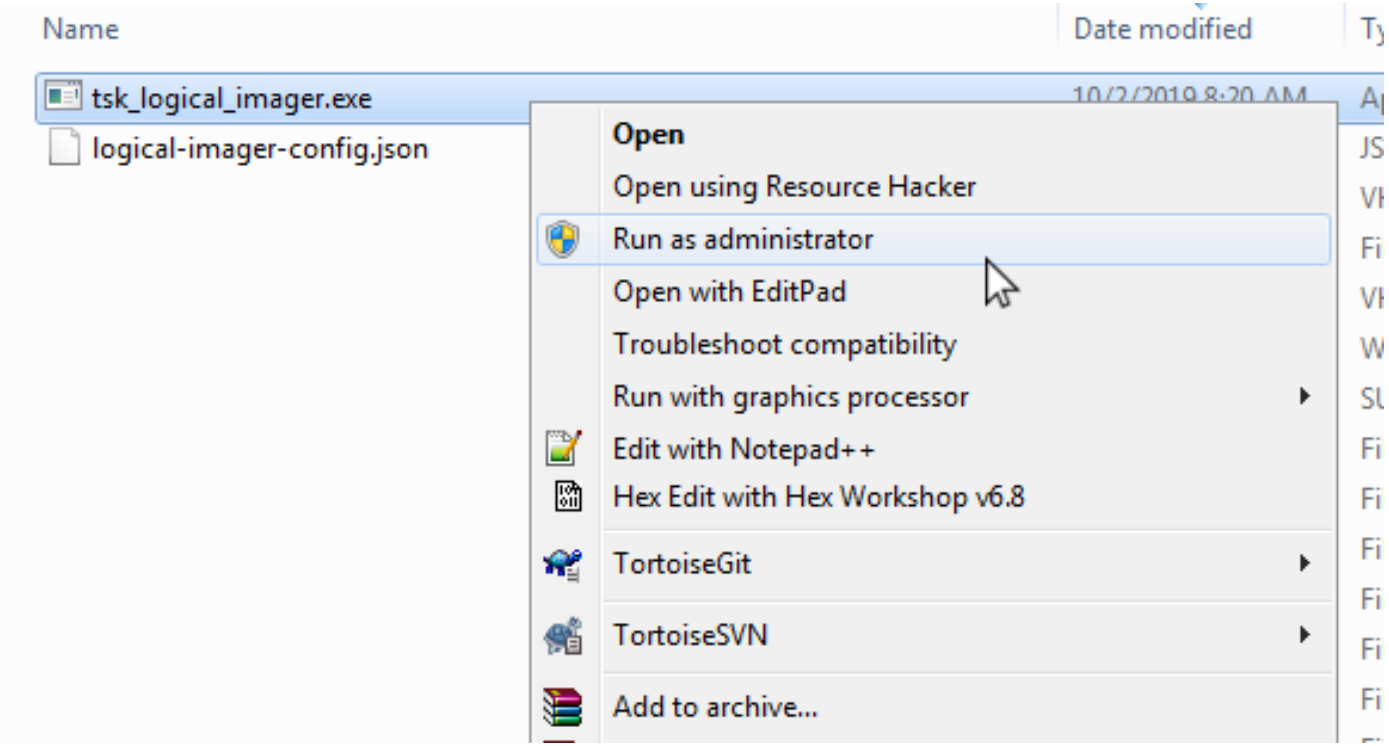
- Executable:
  - tsk_logical_imager.exe
- Configuration file:
  - logical_imager_config.json (default)



Running Logical Imager

Launching Logical Imager

- Insert the drive you configured into the target computer
- Right-click to run tsk_logical_imager.exe as Administrator
- You can also run from an elevated command prompt



What Will Happen

- All “Physical Drives” will be analyzed to identify file systems.
- If a drive is encrypted, then “Logical Drives” (such as \\.\C:) will be used.
- For each file system:
  - Searches will be conducted for full path-based rules
  - Registry hives will be searched for and processed to identify users
  - All files will be scanned and evaluated against attribute-based rules

Launching Logical Imager

Analyzing drive 2 of 2

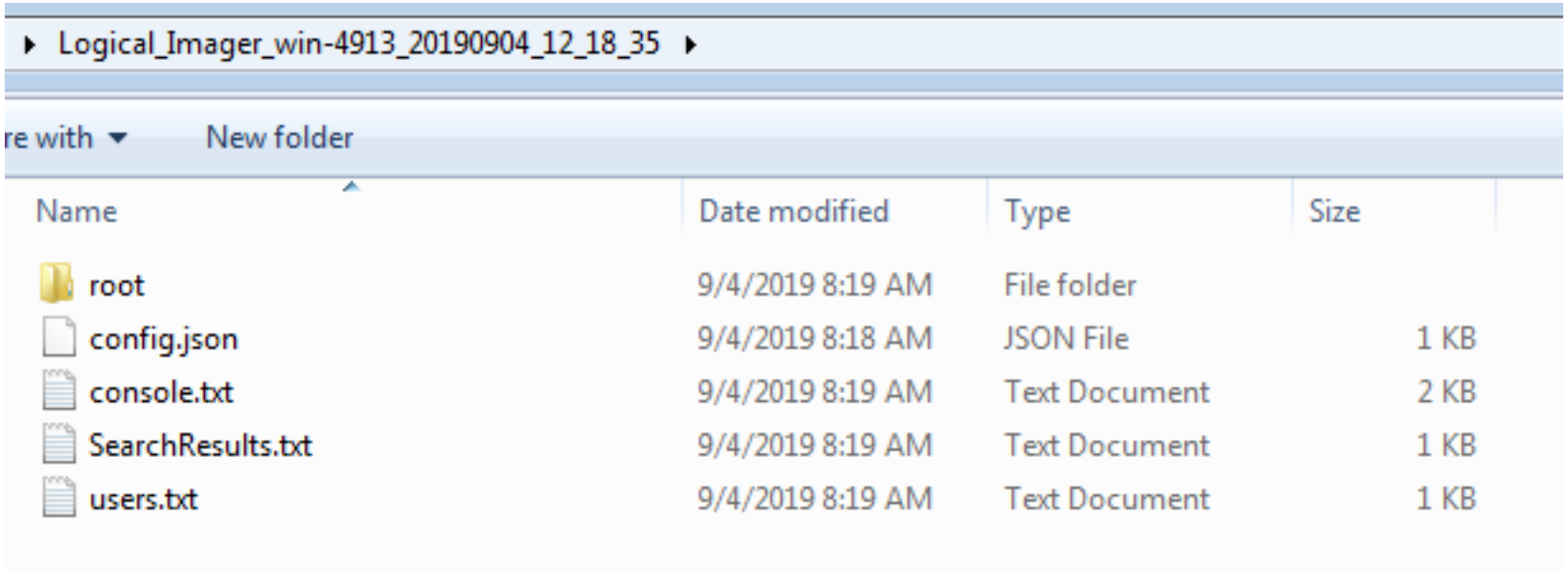
```
Using default configuration file logical-imager-config.json
Created directory Logical_Imager_win-4913_20190702_13_10_20
Analyzing drive 1 of 2 (PhysicalDrive0)
PhysicalDrive0 - Searching for full path files
PhysicalDrive0 - Searching for registry
PhysicalDrive0 - Searching for files by attribute
Alert for no-set-name:Users/User1/Downloads/empty.zip
Analyzing drive 2 of 2 (PhysicalDrive1)
Skipping drive PhysicalDrive1 because tsk_logical_imager.exe exists at the root
directory.

Press any key to exit
```

Viewing Results

Output Folders

- The results will be in a folder next to the logical imager executable
- Non-VHD runs will contain all exported files under the “root” folder
- VHD runs will contain one or more .vhd images instead of the “root” folder



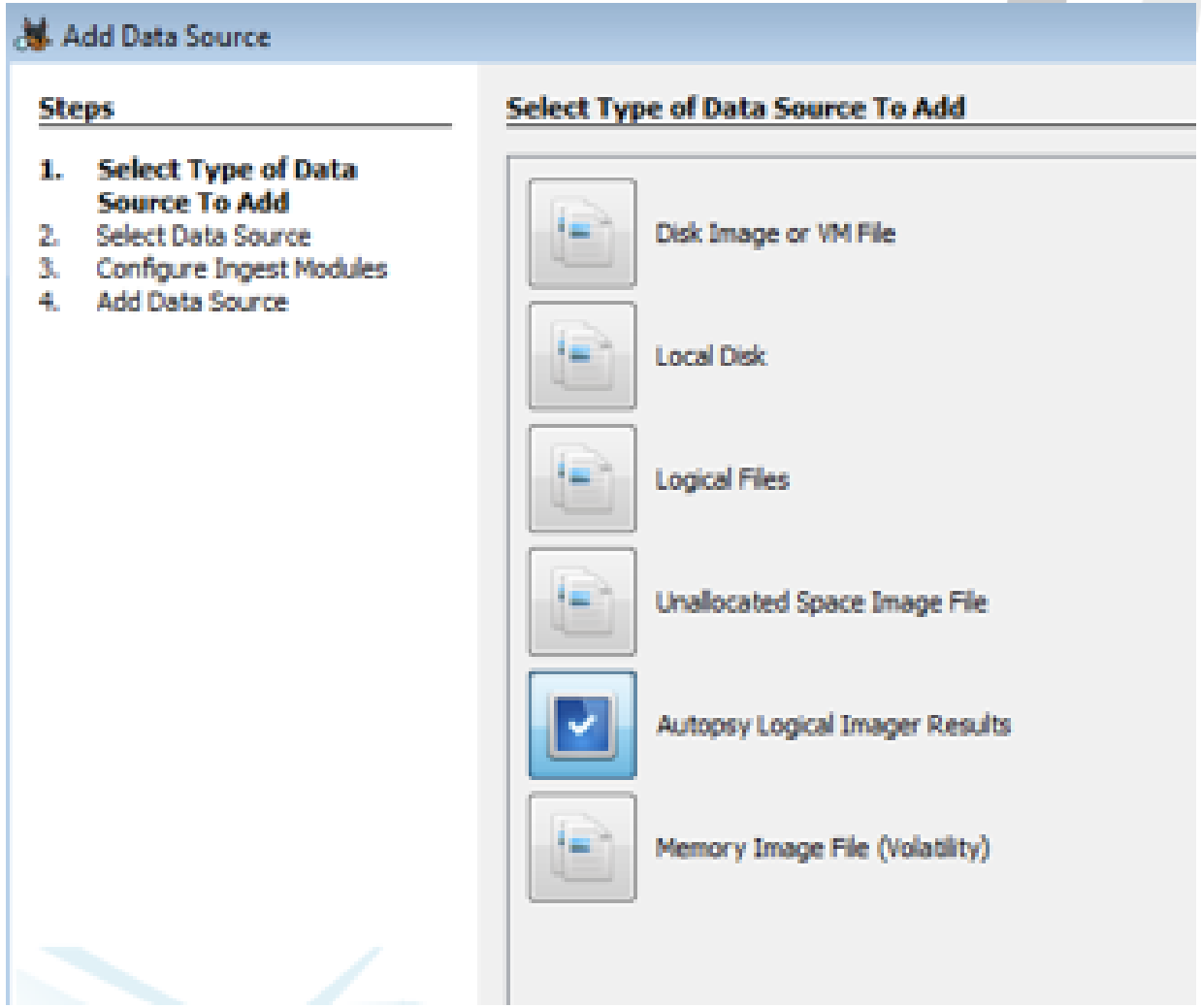
Users.txt

- Contains user information from the registry

	A	B	C	D	E	F	G	H
1	LOCAL USER ACCOUNTS ONLY							
2								
3	UserName	FullName	UserDomain	HomeDir	AccountType	AdminPriv	DateCreated	LastLoginDate
4	Administrator		local		Regular	Yes	2016-06-06T03:55:48.000000000Z	2016-04-24T14:54:42.0
5	Guest		local		Limited	No	2016-06-06T03:55:48.000000000Z	Unknown
6	DefaultAccount		local		Regular	No	2016-06-06T03:55:48.000000000Z	Unknown
7	WDAGUtilityAccount		local		Regular	No	2017-12-05T23:15:19.000000000Z	Unknown
8	User1		local		Regular	Yes	2016-06-05T12:59:52.000000000Z	2019-08-07T19:37:18.0
9								
10								
11								
12								

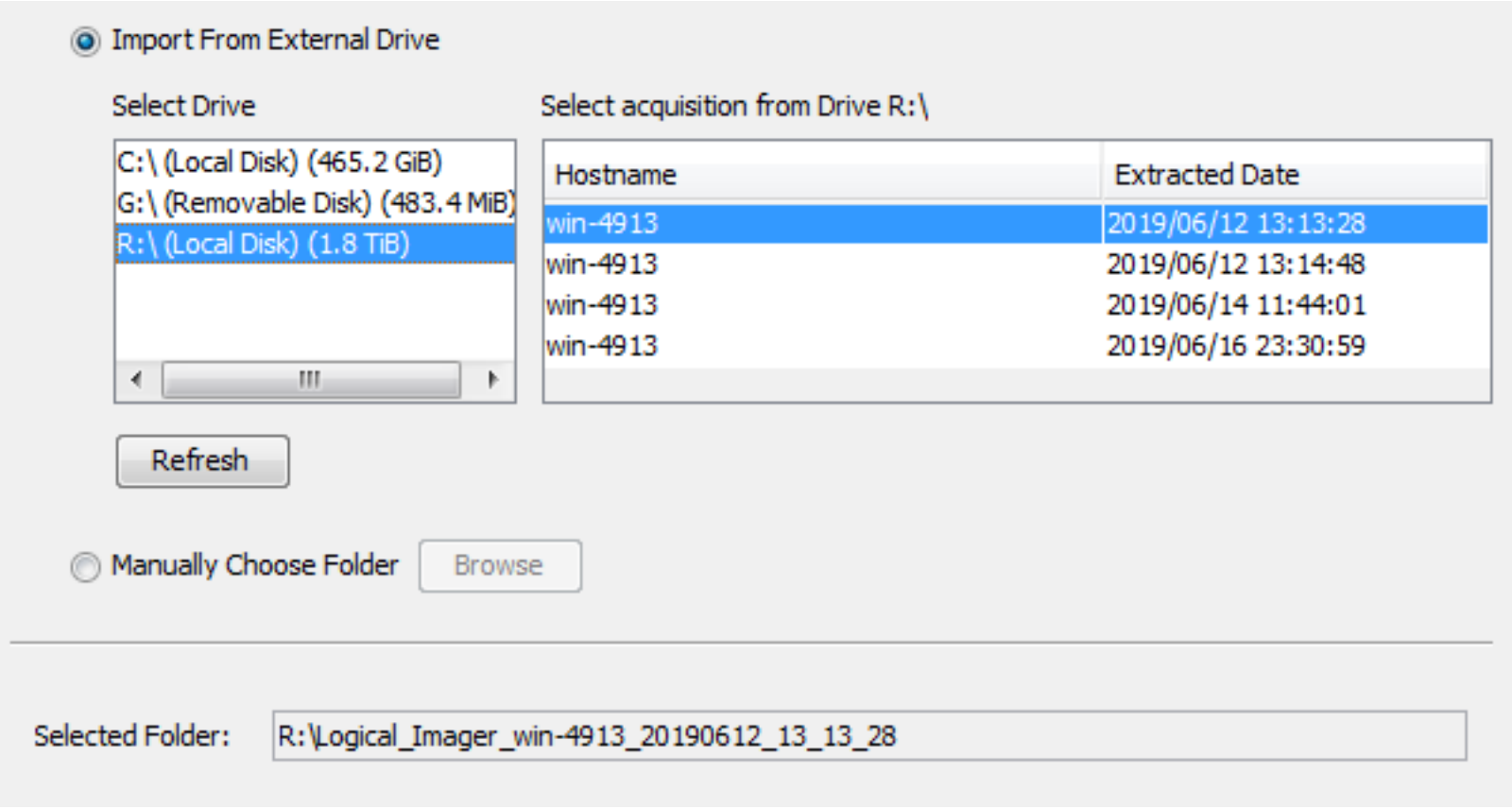
Viewing in Autopsy

- Use the “Autopsy Logical Imager Results” option to add your results to Autopsy.



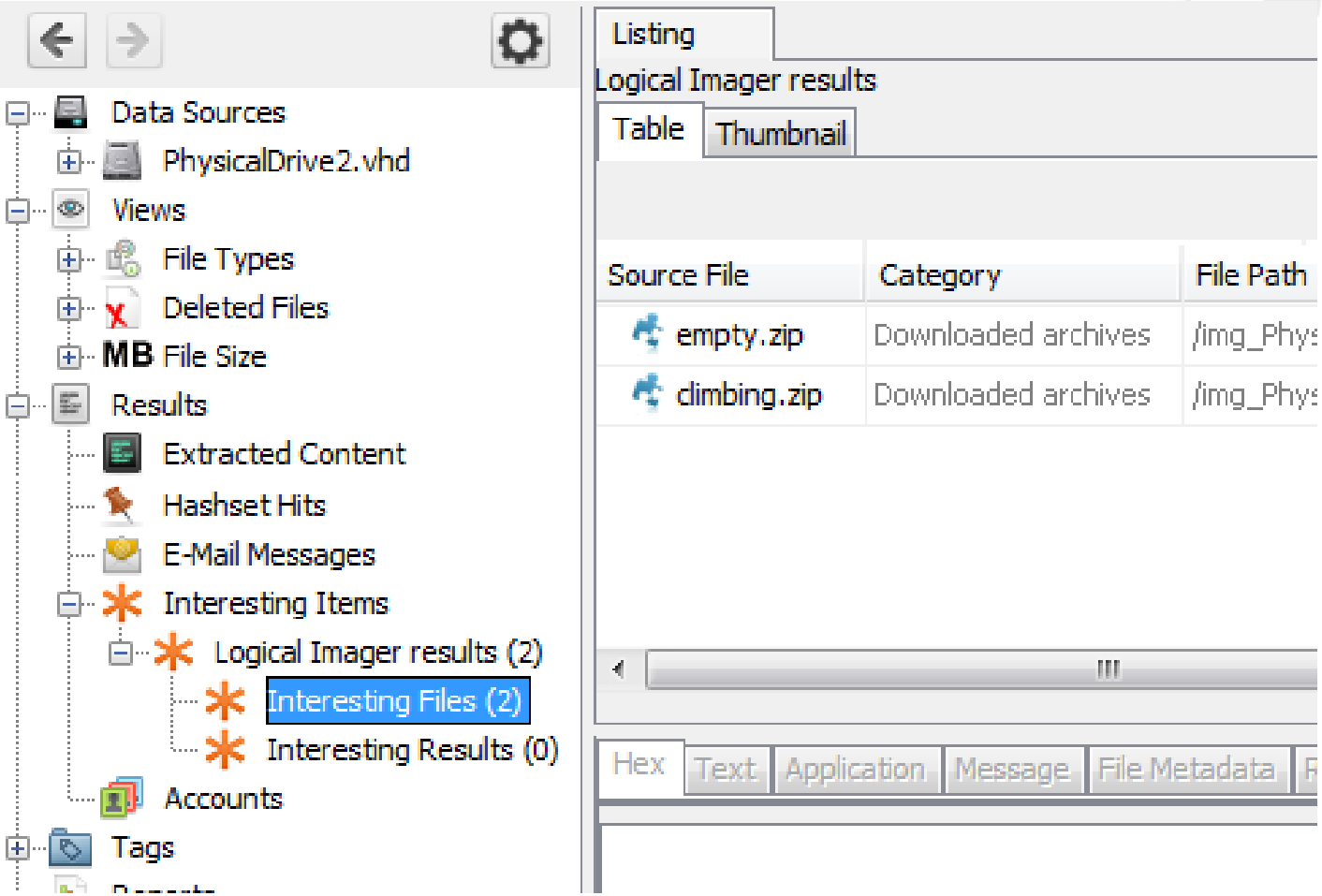
Viewing in Autopsy

- Select the logical imager drive and acquisition from the top, or manually browse to the folder.



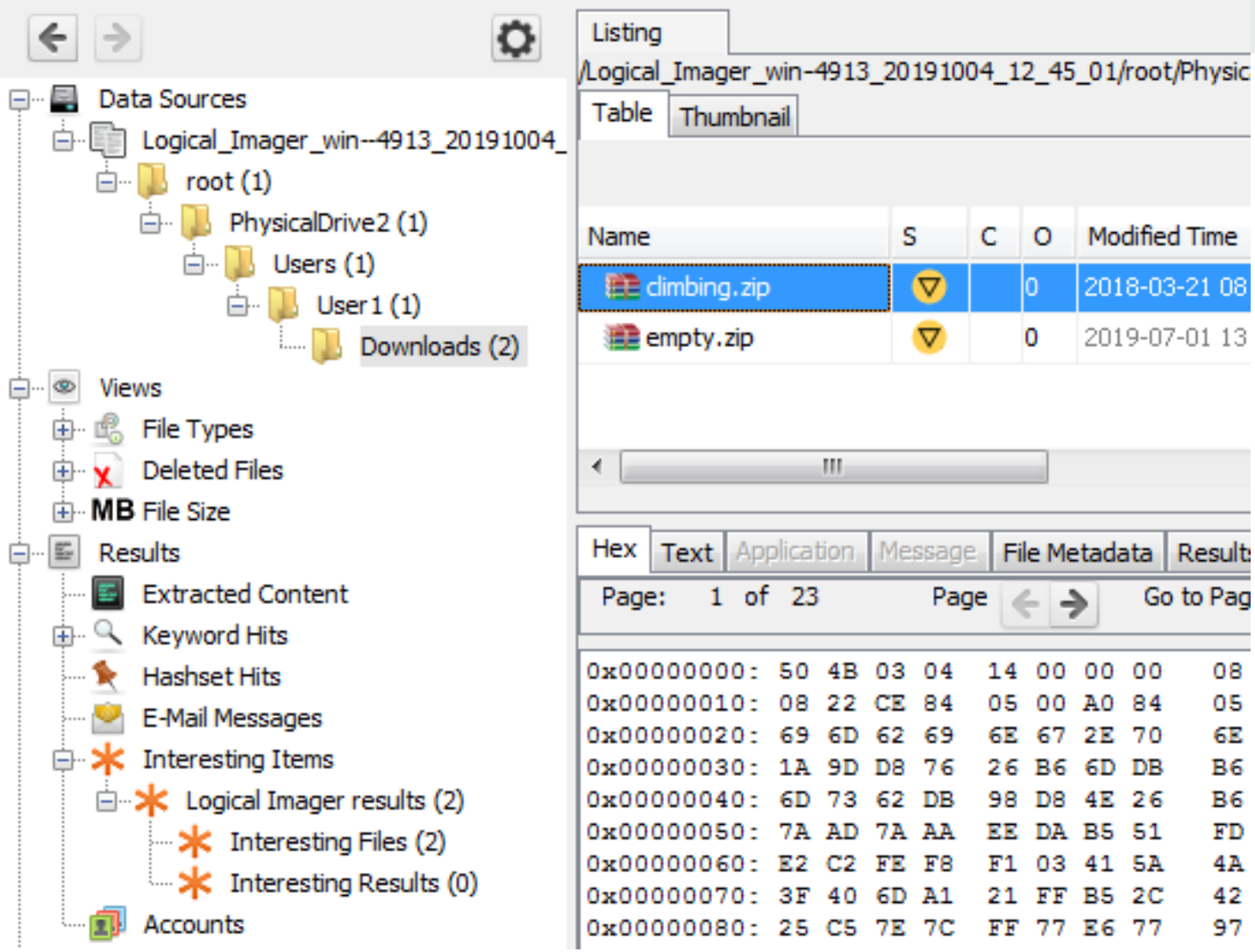
Interesting Items

- Interesting Item results are created for each matching file.
- Double click on a result (or right-click and select “View Source File in Directory”) to move to the file’s location in the Data Sources section of the tree.



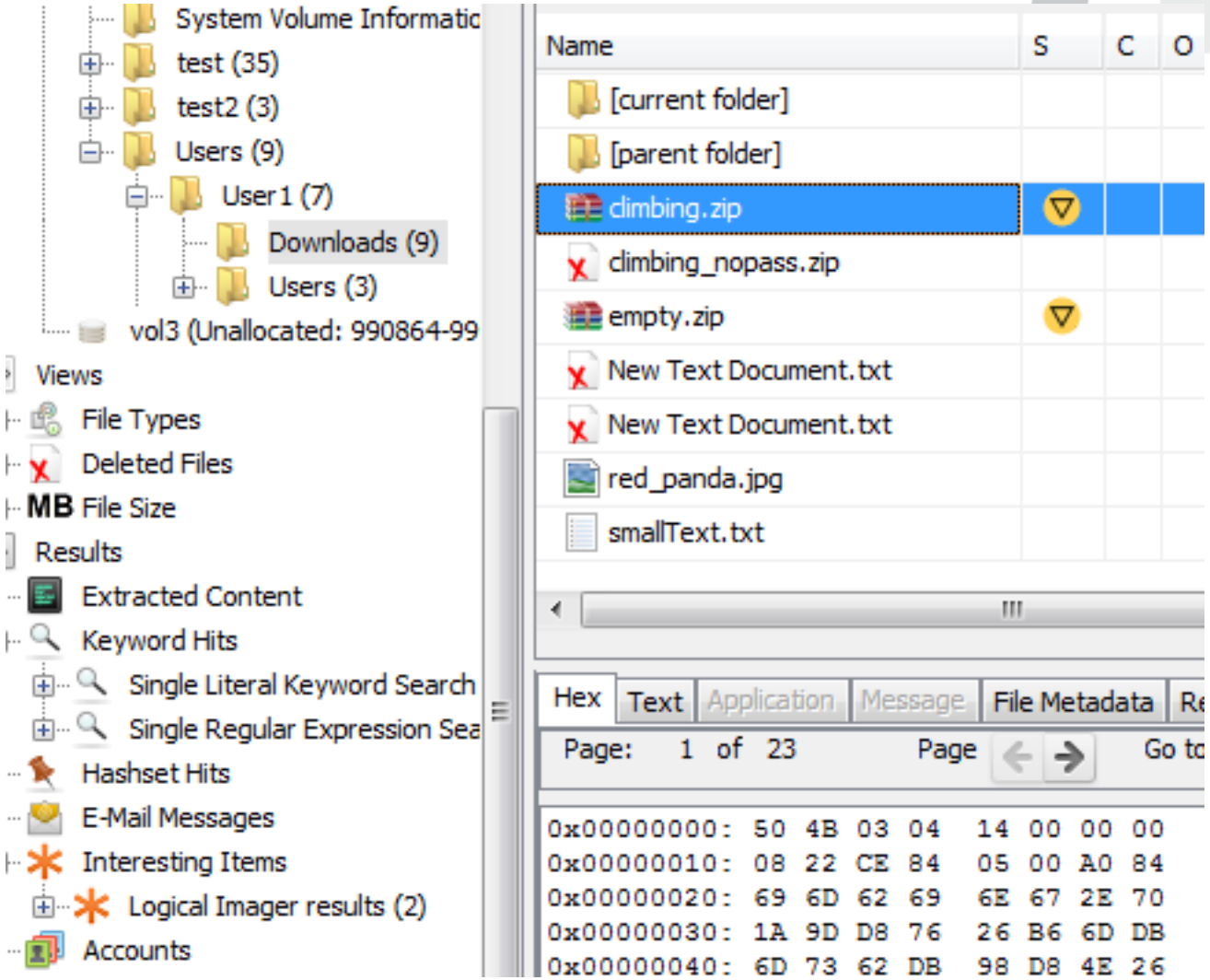
Non-VHD Mode

- Files appear in their original folders.
- All files will be complete.
- No non-matching files or folders that do not contain extracted files will be present.



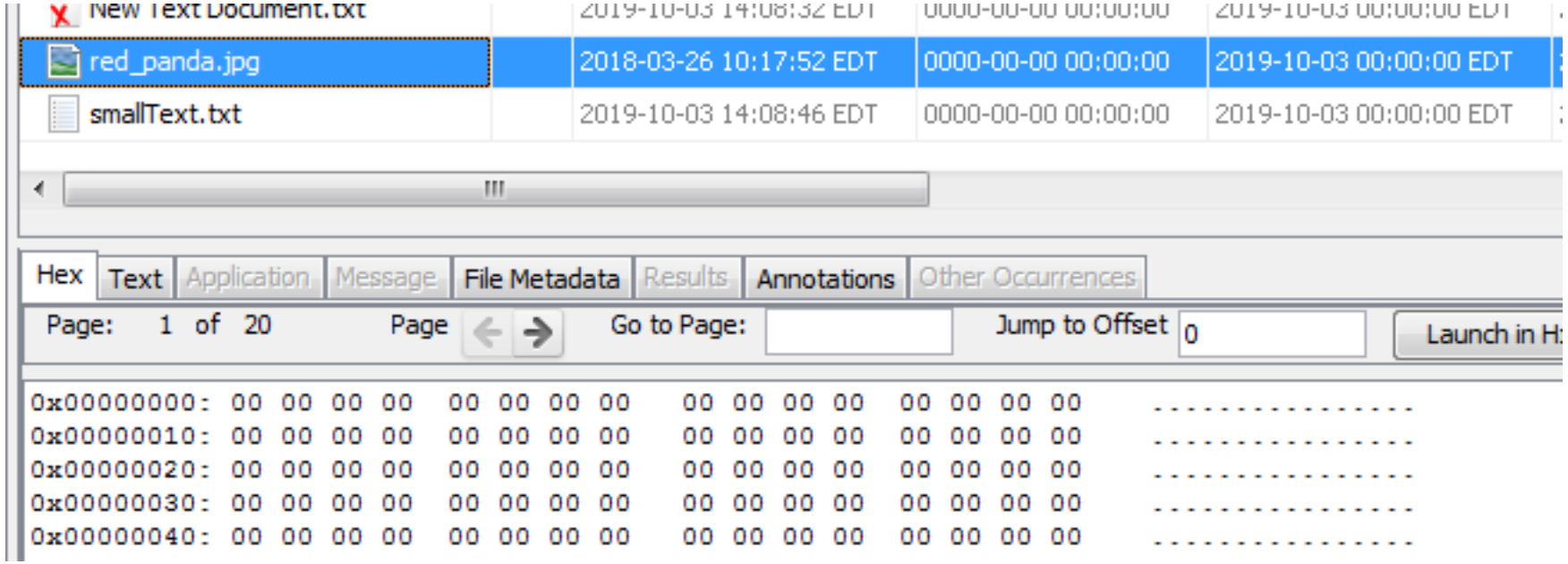
VHD Mode – Extracted File

- Files appear in their original folders.
- Extracted files will be complete.
- Non-matching files and folders that do not contain extracted files will be present.



VHD Mode – Non-extracted File

- Files that were not extracted will generally not contain data.
- The timestamps will be present.



- It’s best to use the Interesting File results to navigate to the extracted files

Demo