File Carving using Foremost

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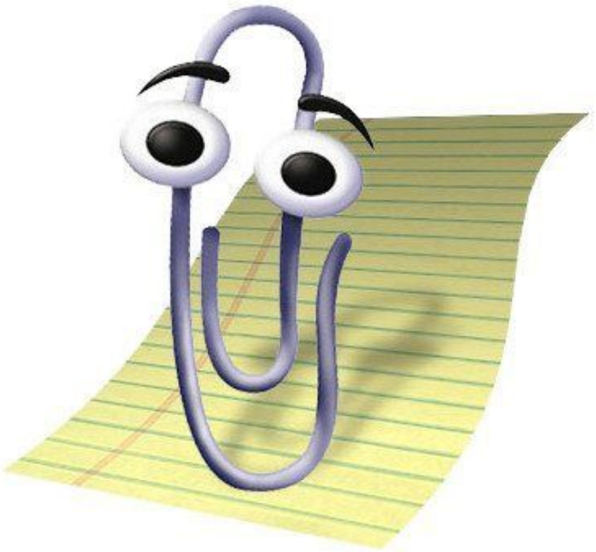
What is File Carving?

- Process to recover deleted or fragmented files
- Recovery technique
  - Contents and structures > file system structures
- Commonly used in digital forensics
  - Best for cybercrimes
    - *Collecting and restoring evidence*
    - *Recovering corrupt or missing files*

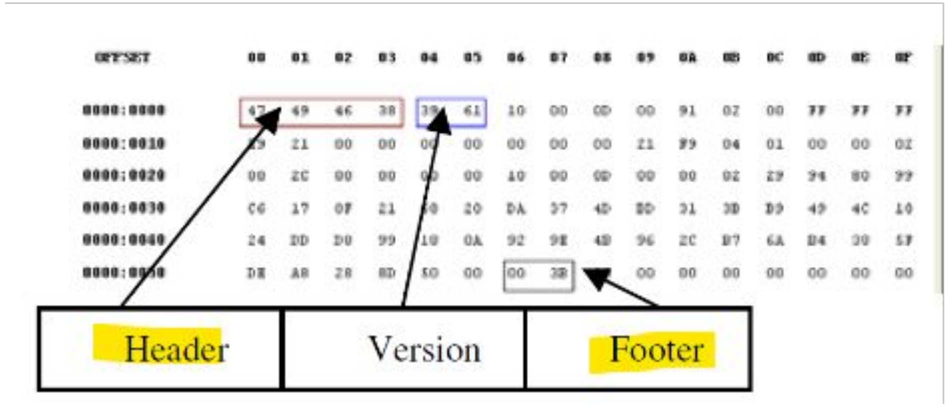
Common Techniques

- Header-Based Carving
- File Structure Based Carving
- Content Based Carving



Header-Based Carving

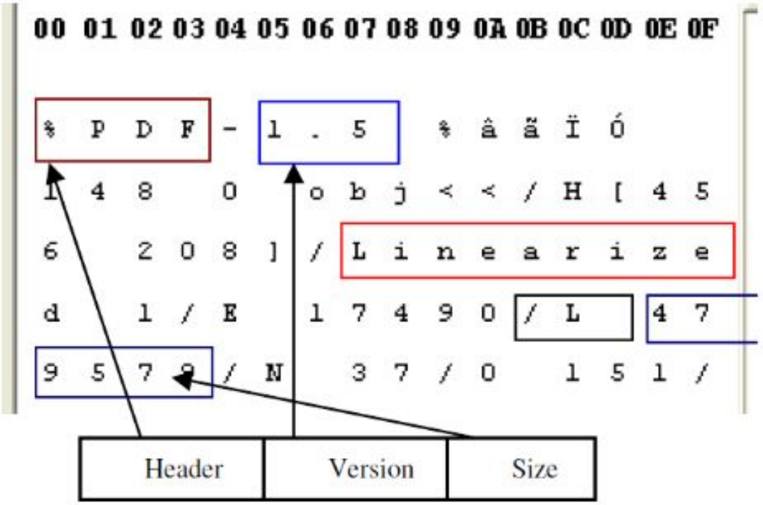
- Header
  - First few bytes of data
- Footer
  - Last few bytes of data



```
OFFSET      00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

0000:0000   47 49 46 38 39 61 10 00 0D 00 91 02 00 FF FF FF
0000:0010   F9 21 00 00 00 00 00 00 00 21 F9 04 01 00 00 02
0000:0020   00 2C 00 00 00 00 10 00 0D 00 00 02 2F 94 8F 99
0000:0030   C6 17 0F 21 50 20 DA 37 4D BD 31 3B D9 49 4C 10
0000:0040   24 DD D0 99 10 0A 92 9E 4B 96 2C B7 6A D4 30 5F
0000:0050   DE A8 28 8D 50 00 00 3B       00 00 00 00 00 00 00
```

- Header-footer based carving
- Header-maximum size carving
  - *If there is no footer, then a maximum file size is used*



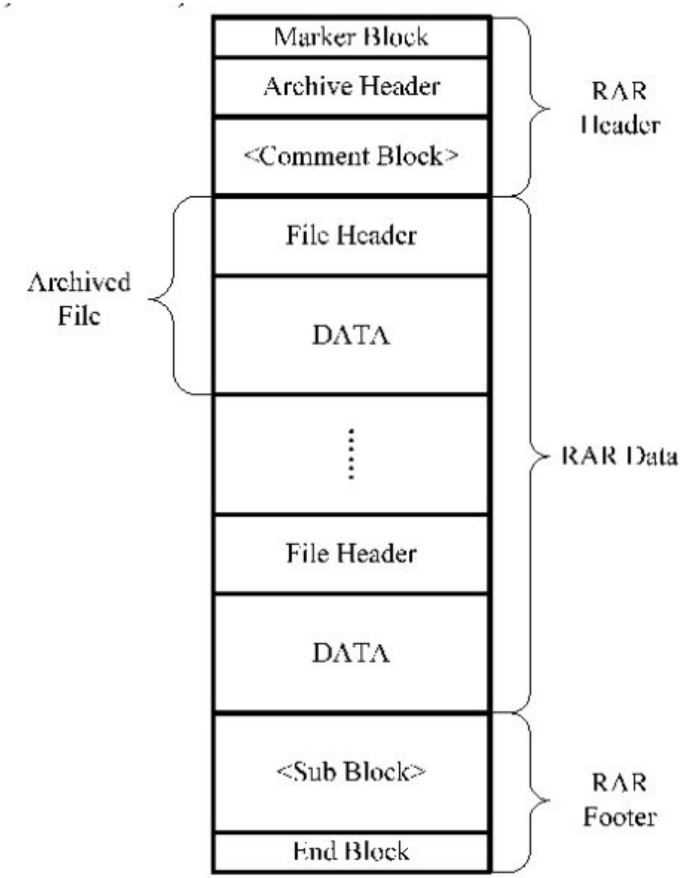
```
00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

%  P  D  F  -  1  .  5     %  â  ã  Ï  Ó
1  4  8     0     o  b  j  <  <  /  H  [  4  5
6     2  0  8  ]  /  L  i  n  e  a  r  i  z  e
d     1  /  E     1  7  4  9  0  /  L     4  7
9  5  7  9  /  N     3  7  /  0     1  5  1  /
```

HTTPS://WWW.INSTITUTOPOINCARE.COM.BR/SITE/INDEX.PHP?OPTION=COM_CONTENT&VIEW=ARTICLE&ID=30:DATACARVING&CATID=8&ITEMID=126

File Structure Based Carving

- Internal layout of a file must be known
- Basic Elements
  - Header
  - Footer
  - Identifier strings
  - Size information



HTTPS://WWW.SEMANTICSCHOLAR.ORG/PAPER/AN-AUTOMATIC-CARVING-METHOD-FOR-RAR-FILE-BASED-ON-WEI-ZHENG/4C614E87D3CF4C09EB698B8D5E0346134B143FCF

Content Based Carving

- Identification of files
- Headers, footers, or known file signatures are optional
- Characteristics
  - Character count
  - Text/Language Recognition
  - Information Entropy

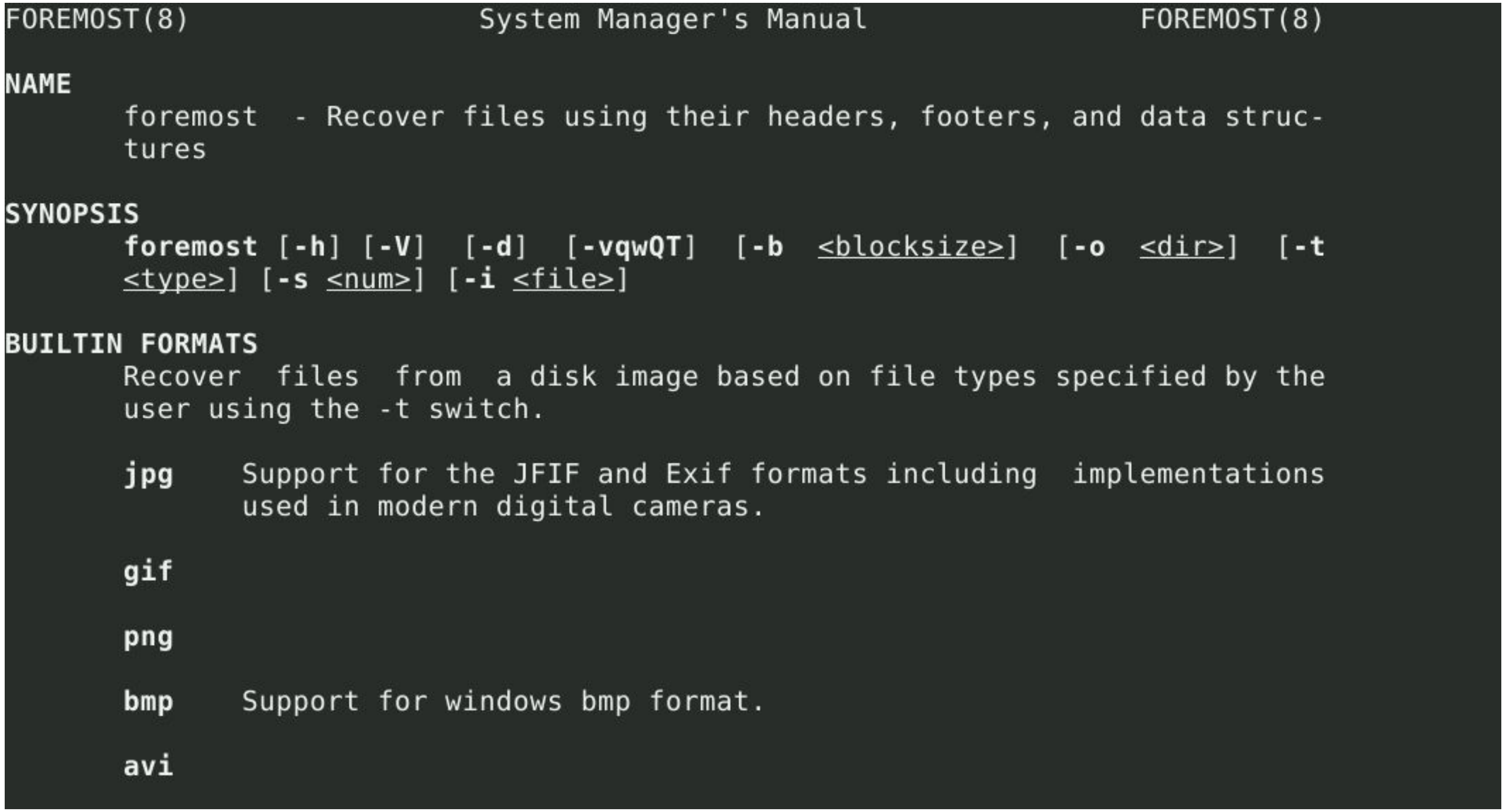
File Carving vs Data Carving

- File Carving
  - Specific in identifying and extracting known file types
- Data Carving
  - Broader approach for recreating deleted raw data

Foremost

- A Kali Linux tool used to recover files on their headers, footers, and internal data structures of a bit-stream image file of a drive or directly on a drive
- Designed for:
  - Digital forensics
  - Security auditing
  - Penetration testing
- Demonstration: using Foremost on a bit-stream image of a USB

Demo



```
FOREMOST(8)                System Manager's Manual               FOREMOST(8)

NAME
       foremost  - Recover files using their headers, footers, and data struc-
       tures

SYNOPSIS
       foremost [-h] [-V]  [-d]  [-vqwQT]  [-b  <blocksize>]  [-o  <dir>]  [-t
       <type>] [-s <num>] [-i <file>]

BUILTIN FORMATS
       Recover  files  from  a disk image based on file types specified by the
       user using the -t switch.

       jpg    Support for the JFIF and Exif formats including  implementations
              used in modern digital cameras.

       gif

       png

       bmp    Support for windows bmp format.

       avi
```

Summary

- File Carving
- Common Techniques
  - Header-Based File Carving
  - File Structure Based File Carving
  - Content Based Carving
- File Carving vs Data Carving
- Foremost
  - Demo

Thank you!

Any questions?