Anti-Forensics

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Outline

- What is Anti-forensics
- Anti-forensic Techniques
  - Overwrite or Destroy Data
  - Hiding Data
  - Memory Injection and Userland Execve
  - Syscall Proxying
  - Attacking the Investigator
- Countermeasures for Anti-Forensics

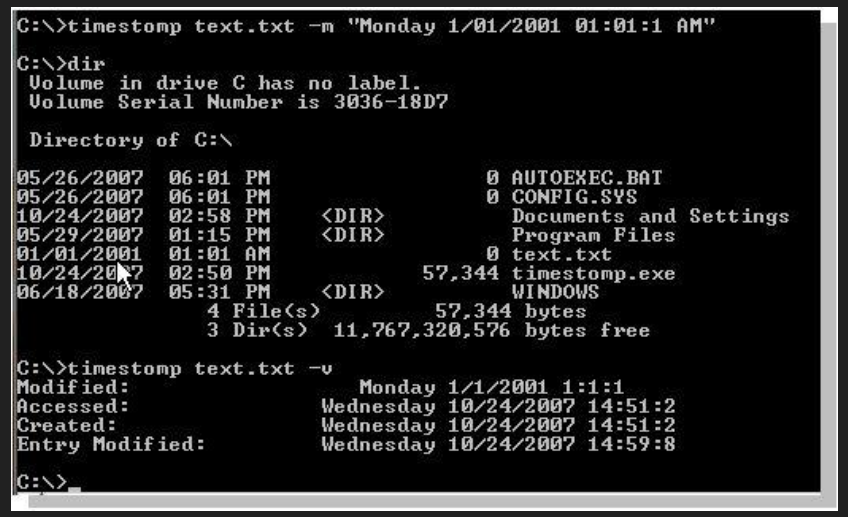
What is Anti-forensics

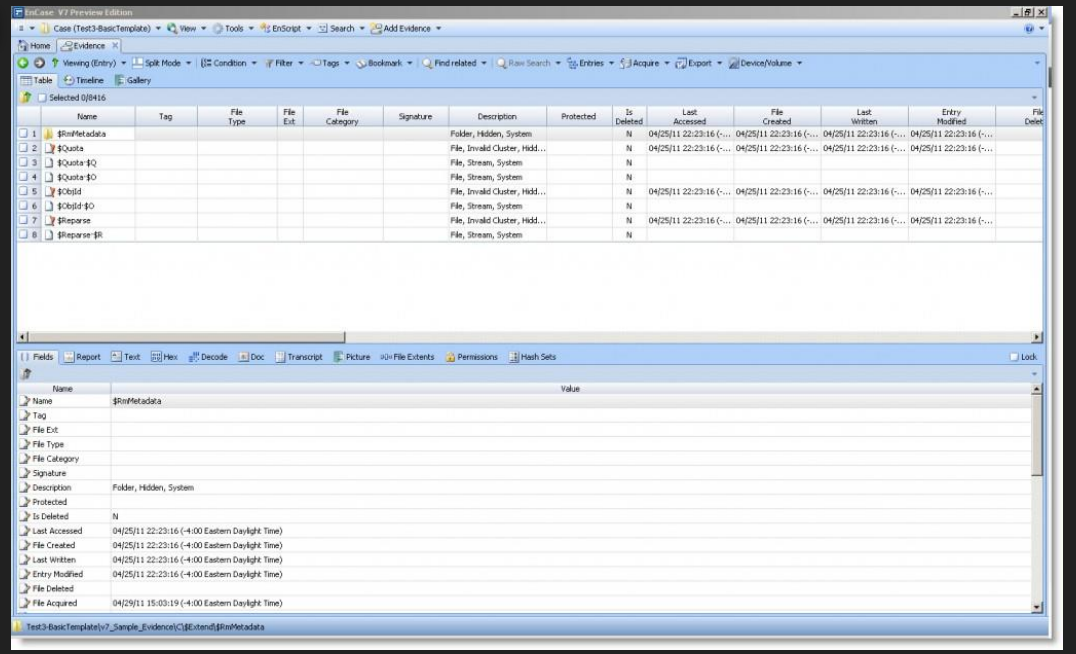
- Tools and techniques that frustrate forensic tools, investigations and investigators.
- Goals of Anti-Forensics:
  - Avoiding detection
  - Disrupting information collection
  - Increasing the examiner's time

Anti-Forensic techniques

Overwrite and Destroy data : Eliminate data or metadata

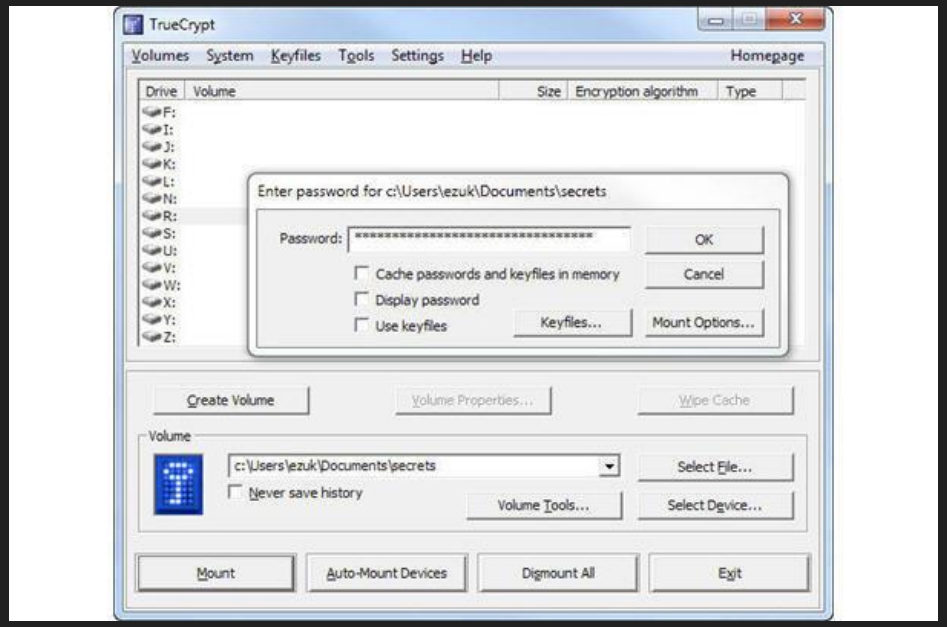
- Disk sanitizers, Microsoft Word metadata "washers," timestamp eliminators.
- MACE (Modified, Accessed, Changed, Entry Modified)

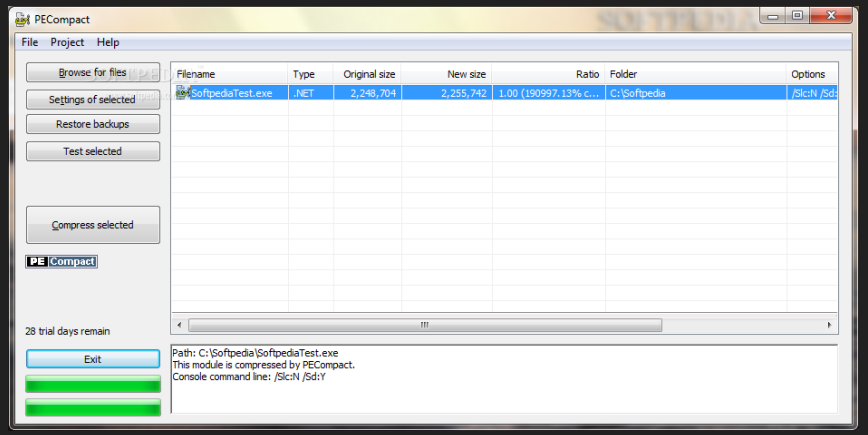




Anti-Forensic techniques

- **Hiding Data :** cryptography or steganography
  - Cryptographic File Systems (EFS, TrueCrypt)
  - Encrypted Network Protocols (SSL, SSH, Onion Routing)
  - Program Packers (PECompact, Burneye) & Rootkits
  - Steganography





Anti-Forensic techniques

- **Slacker**: Hides data in slack space
- **FragFS**: Hides in NTFS Master File Table
- **RuneFS**: Stores data in "bad blocks"
- **KY FS**: Stores data in directories
- **Data Mule FS:** Stores in inode reserved space

```
C:\>slacker.exe

Hiding a file in slack space:
-----------------------------
slacker.exe -s <file> <path> <levels> <metadata> [password] [-dxi] [-n|-k|-f <xorfile>]
-s                      store a file in slack space
<file>                  file to be hidden
<path>                  root directory in which to search for slack space
<levels>                depth of subdirectories to search for slack space
<metadata>              file containing slack space tracking information
[password]              passphrase used to encrypt the metadata file
-dxi                    dumb, random, or intelligent slack space selection
-nkf                    none, random key, or file based data obfusaction
<xorfile>               the file whose contents will be used as the xor key


Restoring a file from slack space:
----------------------------------
slacker.exe -r <metadata> [password] [-o outfile]

-r                      restore a file from slack space
<metadata>              file containing slack space tracking information
[password]              passphrase used to decrypt the metadata file
[-o outfile]            output file, else original location is used, no clobber
```

Anti-Forensic techniques

Memory Injection and Userland Execve: Running a program without Os intervention for loading the code.

- Buffer overflow

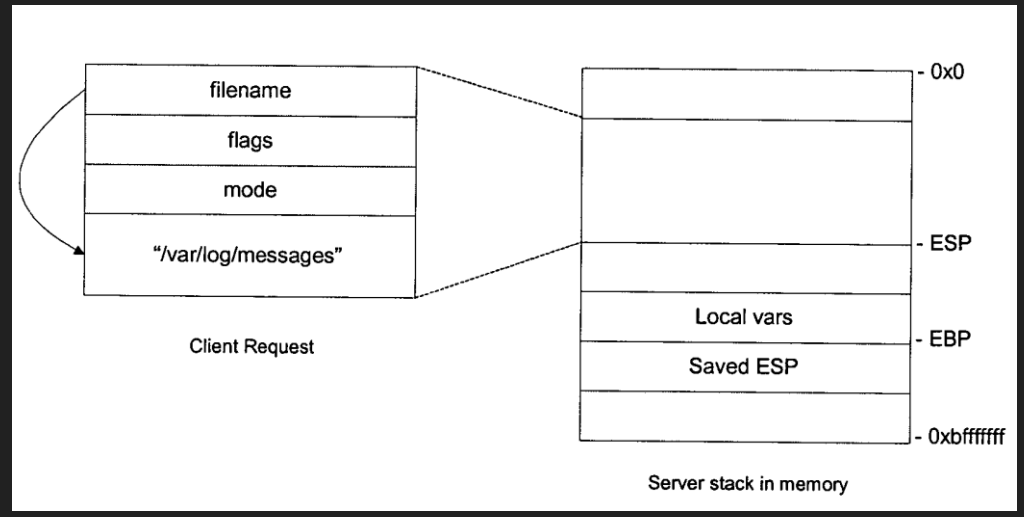
Userland Execve:

- Runs program without using execve()
- Bypasses logging and access control
- Works with code from disk or read from network

Anti-Forensic techniques

Syscall Proxying: (RMI)

- Program runs on one computer, syscalls executed on another.
- Program not available for analysis
- May generate a lot of network traffic
- Developed by Core Security; used in Impact



Anti-Forensic techniques

Attackers have long made use of anonymous e-mail accounts.

Today these accounts are far more powerful.

- Yahoo and Gmail both have 2GB of storage
- APIs allow this storage to be used as if it were a file system.

Amazon's Elastic Compute Cloud (EC2) and Simple Storage Service (S3) provide high-capability, little-patrolled services to anyone with a credit card

- EC2: 10 ¢/CPU hour (Xen-based virtual machines)
- S3: 10 ¢/GB-Month

Anti-Forensic techniques

- Attacking the Investigator
  - Ability to run code on the forensic appliance
  - Erase collected evidence
  - Break the investigative software
  - Leak information about the analyst or the investigation
  - Implicate the investigator

Thank you…