

# Forensic Analysis

## The Treachery of Images

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# Gangster Story

- ▶ The Italian gangster and forensic analysis...

# Gangster Story

- ▶ Moral of the story : "learning forensic analysis is useful even for gangster".
- ▶ Forensic Analysis can help to discover any media sanitization defect.

# A story from the other side...

## Nagra SNST Recorder (gathered by Matt Blaze)



- ▶ An audio recorder (including a tape) purchased via eBay.
- ▶ But the tape contains an evidence recording of a confidential informant.
- ▶ [http://www.crypto.com/blog/watching\\_the\\_watchers\\_via\\_ebay/](http://www.crypto.com/blog/watching_the_watchers_via_ebay/).

# Forensic Analysis - Theory

- ▶ Broad definition of (computer) forensic analysis : *"Forensic analysis involves the preservation, identification, extraction, documentation and interpretation of computer data"*
- ▶ *To reach those goals, the forensic specialists follow clear and well-defined methodologies. Flexibility is highly required when encountering the unusual.*

# Forensic Analysis - Theory - Methodology

- ▶ Acquire the evidence without altering or modifying the original source.
- ▶ Authenticate that you gathered the evidence in a proper way.
- ▶ Analyze the non-original collected data without modifying it.

# Forensic Analysis - Theory - Methodology

- ▶ Act always in ways that you can easily explain to a court.
- ▶ Think twice before doing any action on the collected data.
- ▶ Take notes of everything not only the action taken but also any discoveries.



# Forensic Analysis - Theory - The Order of Volatility (OOV)

The expected life of data :

Type of Data	Life Span
Registers or cache	Nanoseconds
Main Memory	Ten Nanoseconds
Network State	Milliseconds
Running Processes	Seconds
Disk	Minutes
Backup Medias	Years
CD-ROMS or printouts	Tens of years

Sometimes a small process trace can explain more than 50 gigabytes of a single backup...

# Forensic Analysis - Theory - Layer(s)

- ▶ A computer system is a machine playing with the "treachery of images".
- ▶ An operation is often using one or more abstraction to be completed.
- ▶ The top-down approach of information from high-meaning to low-meaning is critical for forensic analysis.
- ▶ Computers become more and more mature but become less predictable at the row level.

# Forensic Analysis - Theory - Layer(s) - The File System case

The file system is a great source of forensic information but :

- ▶ Forensic data must captured at the right layer. (e.g. using the tool of the file system is useful but not enough)
- ▶ Be prepare to collect partial information.
- ▶ File system analysis is often the next step after a detection. (e.g. from the network)
- ▶ File system analysis can be time consuming.

# Forensic Analysis - General Practice

- ▶ First rule : Stay calm.
- ▶ Second rule : Limit risk but keep OOV in mind.
- ▶ Third rule : Never work on real data.

# Forensic Analysis and Incident Response

- ▶ (Prevention)
- ▶ Detection
- ▶ Analysis
- ▶ Containment
- ▶ Investigation
- ▶ Eradication
- ▶ Postmortem

# Forensic Analysis and Training

- ▶ The best way to be prepared for doing forensic analysis. It's to do it regularly.
- ▶ Participate to the reverse challenge of the honeynet project.
- ▶ Collect old filesystem and try to understand the last actions executed on the system.
- ▶ Prepare your legal staff to forensic analysis.

# Bibliography

- ▶ Forensic Discovery, Dan Farmer, Wietse Venema, Addison Wesley  $\omega$
- ▶ Incident Response, Kenneth R. Van Wyk, O'Reilly
- ▶ Computer Forensics, Incident Response Essentials, Warren G. Kruse, Addison Wesley
- ▶ File System Forensic Analysis, Brian Carrier, Addison Wesley
- ▶ Mechanisms, New Media and the Forensic Imagination, Matthew G. Kirschenbaum, The MIT press  $\omega$

# Use case 1

- ▶ You have a public web server, hosted in a datacenter, that has been compromised (the main page has been defaced).
- ▶ The public web server also contains private information from the customer (mainly login and password).
- ▶ What should I do ?



## Use case 2

- ▶ A laptop from a potential hostile employee has been given to you for analysis.
- ▶ What should I do ?

## Use case 3

- ▶ You discovered a enterprise server with a proprietary software installed and doing unusual network connection to Internet.
- ▶ How forensic analysis could help me ?

## Use case 4

- ▶ An employee gave you a flashcard where he would like to recover documents deleted ?
- ▶ How you would proceed ?

# Q and A

- ▶ Thanks for listening.
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