Web Forensics

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Agenda

- Digital Forensics
- Evidence
- Web Forensics
- Network Forensics
- Operating System Forensics
- Client Side Forensics
- Server Side Forensics
- Demo
- Forensics Readiness

Digital Forensics

- What is Digital Forensics?
  - Incident response
  - Computer Forensic Investigations
  - Forensic preparedness
  - Secure Data Recovery

Goal: Obtain Good Evidence

- Evidence
  - Human Testimony
  - Environmental
  - Network Traffic
  - Network Devices
  - Host
    - Operating Systems
    - Databases
    - Applications
  - Peripherals
  - External Storage
  - Mobile Devices
  - ... ANYTHING !!!

Web Forensics

- Why Web Forensics?
  - Child Pornography
  - CC Fraud
  - Identity Theft
  - Industrial Espionage
  - Casual Hacks
  - ...
- Web Attacks:
  - Clients:
    - Perimeter Penetration
    - CC Fraud / Identity Theft
  - Web Servers:
    - Access critical information (e.g. customer databases)
    - Trojanize software

Web Forensics

- Players
  - Common
    - Network Traffic
    - Operating Systems
  - Client Side
    - Web Browsers
  - Server Side
    - Web Servers
    - Application Servers
    - Database Servers

Network Forensics

- Phases
  - Deployment
    - May integrate with NIDS
  - Traffic Capture
  - Traffic Analysis
- Challenges:
  - Encryption (HTTPS)
  - High Traffic Load

Operating System Forensics

- Operating Systems
  - Windows, UNIX, ...
- Analysis
  - Files, Directories & Filesystems
    - Timestamps, permissions
    - Additions, changes, removals
  - Memory & Swap
  - Processes
  - Services
  - Network Connections
  - Logs

Operating System Forensics - Tools

- Dozens
  - Lots of tools, both commercial and open source
  - Open Source Favorite Suites (more UNIX-oriented)
    - Helix Bootable CD
  - Commercial Favorite Suites (more Windows-oriented)
    - EnCase
    - FTK
  - Check:

    http://www.jessland.net/Forensics/Software.php

Client Side Forensics

- Goals
  - Determine if a user has been involved in a crime
  - Determine if a user has been victim of a crime
- How
  - Tie a person to a system at a particular point of the time
- Analysis
  - Operating System
  - Web Browser

Client Side Forensics: The Web Browser

- Electronic Evidence
  - Email
  - Visited Pages
  - Internet Searches
- Web Browsers
  - Internet Explorer
  - Firefox/Mozilla/Netscape
  - Others:
    - Safari
    - Opera
    - Konqueror
    - Galeon
    - links/lynx

Web Browser Forensics: Internet Explorer

- Most commonly used Browser
- Characteristics:
  - Stores user's Internet activity under his Windows Profile
    - Cached Information
      - C:\Documents and Settings\john\Local Settings\Temporary Internet Files\Content.IE5\
    - History
      - C:\Documents and Settings\john\Local Settings\History\History.IE5\
    - Cookies
      - C:\Documents and Settings\john\Cookies\
    - File
      - Index.dat

Web Browser Forensics: Tools

- Pasco
  - Parses IE index.dat files
- Web Historian
  - Allows to review user's browsing history.
- Cache View
  - Allows to view user's web cache.
- IE History View
  - Allows to review user's browsing history.
- FTK, Encase
  - General Purpose Forensics Suites

Server Side Forensics

- Components:
  - Web Servers
  - Application Servers
  - Database Servers

Server Side Forensics

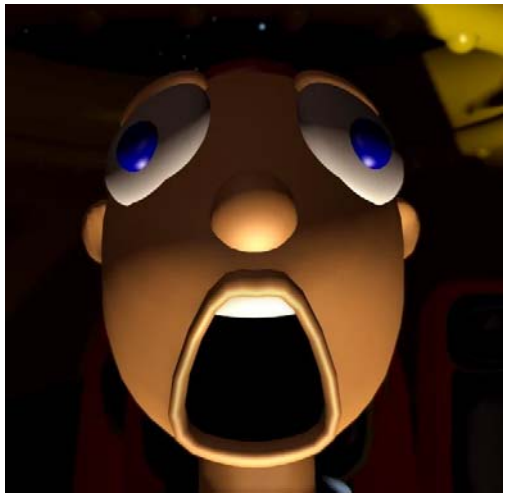
- The Web & Applicaton Servers
  - Heavily based on log analysis
  - Strategies
    - Increase verbosity of Logs
    - Log remotely
    - Log securely
  - Log analysis tools for identification
  - Keep your logs safe! Know your logs!
- The Dabase Backend
  - Transaction Log based.
  - Challenges:
    - Database Rootkits

Other Player's Forensics

- Other players:
  - Network Devices
  - Firewalls
  - IDSs
  - Proxies
- In the end:
  - Operating System Forensics
  - Log Analysis
  - Network Traffic Analysis

The Incident

I'VE BEEN HACKED !!!



Now What???

The Response

Seizure

Preliminary Analysis

Investigation

Analysis

A wider view: Incident Response

The 6-Step IR Process

Preparation

Identification

Containment

Eradication

Recovery

Follow-up

Demo

Web Server Compromise

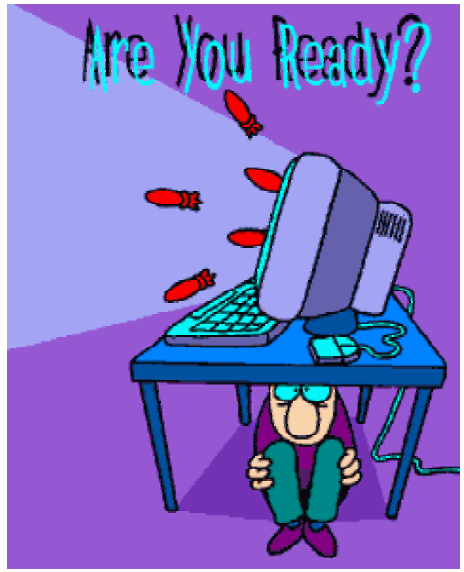
&

Forensics Analysis

Real Life Problems

- Lack of training
- Poor Evidence
- Time consuming process
- Lack of logging & tracking capabilities
- Lack of containment capabilities
- Lack of appropriate Forensics environment

Preparation: Forensics Readiness



Are you Ready?

No system or network is secure enough:

Plan for the Worst, Hope for the Best!!!

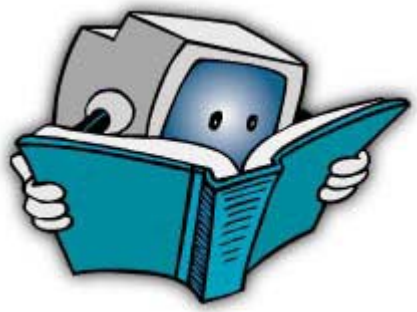
Forensics Readiness is the "art" of

Maximizing an Environment's Ability to Collect Credible Digital Evidence

The End

If You Have an Incident

Ask for Professional Help!!



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http://www.jessland.net/Docs.php

More information:

http://www.jessland.net/KB/Forensics/

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