JTAG and Chip-Off Data Analysis and Testing

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CFTT at NIST

 Provides method of assurance that tools used in computer-related crime investigations produce valid results.

• Benefits:

 Users make informed choices about acquiring/using computer forensic tools

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- Interested parties understand the tools capabilities
- Toolmakers improve their tools

JTAG Overview

✓ Support admissibility in court

Joint
Test
Action
Group

- ✓ Test PCBs
- ✓ IEE standard

2 Methods:

- ✓ Solder
- ✓ Solderless

✓ It can't be applied on ALL devices

JTAG

- Bypasses pss/gesture swipes
- ✓ Data dumps:Windows & Android✓ Damaged devices

Test Access Port:

- ✓ Size
- ✓ Location
- ✓ Shapes
- ✓ Quantity

Requirements:

- ✓ Memory
- ✓ Power
- **✓ TAPs**
- Processor

Chip-Off Overview

✓ Support admissibility in court

Destructive method

Chip-Off

✓ Conducted by Fort Worth Texas Police Dept and VTO labs

✓ It can't be applied on ALL devices

✓ Physically removing memory chip from PCB

JTAG and Chip-Off side by side

Some Advantages	JTAG	Chip-Off
*Byte-for-byte memory extraction	Yes	Yes
Destructive process	No	Yes
Require specific data cables for each make/model	No	No
Recover PIN-codes, pass-phrases, gesture swipes	Yes	Yes
Bypass phones with locked/disabled USB data ports	Yes	Yes
Data recovery from damaged mobile devices (liquid, thermal, structural)	Yes	Yes



- Import Binaries
- Data parsed –analysis tools
- Data compared to known data set









RESULTS

Mobile Forensic Tools

Analysis Tools

Traditional Tools



- Disk Imaging
 - String Search
 - Import and Parse

JTAG Binaries

Mobile Forensics Tools



- Phones
- Tablets
- Import and Parse JTAG Binaries

Data Analysis

- 9 tools used
- 10 devices

Results - Analysis Tools

Differences between analysis tools types?

Differences	Traditional Tools	Mobile Forensics Tools
Presentation of Data	Presents the data in file explorer view format	Presents and categorizes the data better

^{*} User data doesn't change *

Results – JTAG Technique

- Analysis tools anomalies for JTAG:
 - Social Media data:
 - Facebook, Pinterest, SnapChat were partially or not reported – mostly Facebook/most tools
 - Stand-alone files
 - graphic, video, audio not reported for some devices – an analysis tool

Results – JTAG Technique Cont.

- Analysis tools anomalies for JTAG:
 - GPS:
 - Coordinates or address not reported for some devices – some tools

Results - Chip-Off Technique

- Analysis tools anomalies for Chip-Off:
 - Social Media data:
 - Facebook, Pinterest, SnapChat were partially or not reported – mostly Facebook/most tools
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Results - Chip-Off Technique Cont.

- Analysis tools anomalies for Chip-Off:
 - GPS:
 - coordinates or address not reported for some devices – most tools

Conclusions

- JTAG vs Chip-Off
 - both techniques were consistent across the board
- Analysis Tools Types
 - data presentation varies

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