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# DEF CON 19

## Malware Freakshow 3: They're pwning er'body out there!

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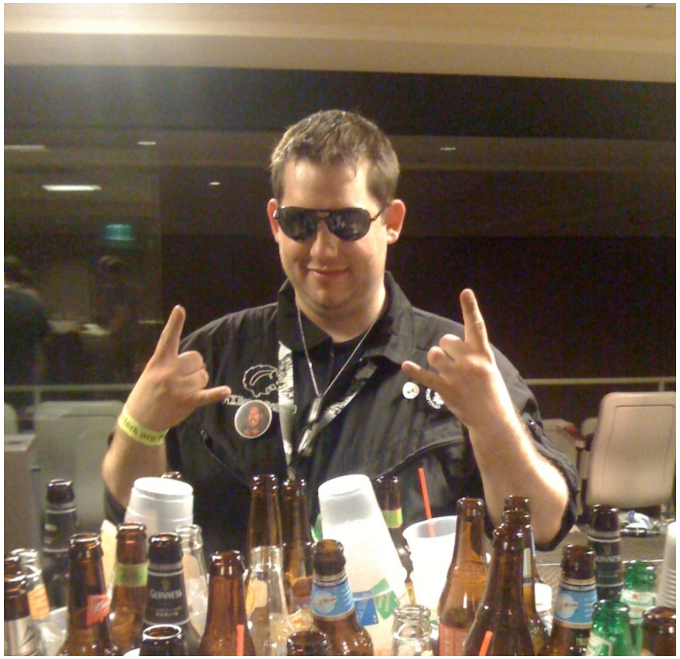
# Agenda

- Introduction
- Evolution of Malware
- Sample Analysis + Victim + Demo
  - Sample SL2010-161 – Kameo (Grocery Store)
  - Sample SL2011-014 – Memory Dumper (Bar)
  - Sample SL2011-026 – Webcheck.dll (Work)
  - Sample SL2011-039 – Android Malware (Phone)
- Conclusions

# Inspiration – "System Intruder"



**"Well… There's malware on the interwebs. They're pwning all your systems, snatching your data up. So hide your cards, hide your docs, and hide your phone, 'cause they're pwning er'body out there!" – Zero Cool**

# Introduction – Who are these guys?

**Nicholas J. Percoco (@c7five)**

- Head of SpiderLabs at Trustwave
- Started my InfoSec career in the 90s
- 4th DEF CON talk (2 more this weekend – Droid & SSL)
- Primary author of Trustwave's Global Security Report

**Jibran Ilyas (@jibranilyas)**

- Senior Forensic Investigator, Spiderlabs at Trustwave
- 9 Years of InfoSec Experience
- Speaker at several Global Security Conferences like Black Hat, DEF CON, SecTor, Source Barcelona, etc.
- Masters degree from Northwestern University

# Introduction – Why give a “Freakshow”?

**Exploits are commodities.**

**Malware fuels the business of crime*.**

***“They're pwning er'body out there!”**

# Introduction – What’s this about?

**This the 3rd Iteration of this Talk**

- 2009 – KeyLogger, MemDumper, Video Poker, Sniffer
- 2010 – MemDumper, Logon Credentials Stealer, Sniffer, Client-Side (PDF Malware)

**New Targets This Year -> YOU**

- Your Grocery Store
- Your Favorite Bar
- Your Work
- Your Smart Phone

# Evolution of Malware - 2009

- Sloppy malware developers
- Just “testing the waters”
- No covert file system placement
- Noisy output files
- Easily detected using “Task Manager”

# Evolution of Malware - 2010

- Started to use "tricky" names for executable
- Located in "system" folders
- Output still mainly in plain-text and written to disk
- Advanced tools can easily detect them
- Automated exfiltration in certain instances

# Evolution of Malware - 2011

- Malware developers have grown up
- Completely subverting process analysis tools
- Many instances of ZERO data storage
- When data is stored it is ENCRYPTED
- More efficient methods resulting in small footprint
- Automation is “everywhere they want to be”

# Evolution of Malware – Network Sniffers

| Year | Notables |
|---|---|
| 2009 | • Obvious filenames<br>• Output was plain text (.cap extension)<br>• Attacker's FTP credentials in executable |
| 2010 | • Filenames matched Windows system files<br>• Output compress and password protected<br>• Nightly auto-exfiltration functionality appeared |
| 2011 | • No output on disk<br>• Malware utilizes buffers (one to sniff, one to export)<br>• Real-time data exfiltration<br>• Encryption/Encoding of output data |

# Evolution of Malware – Memory Dumper

| Year | Notables |
|---|---|
| **2009** | • Malware kit required 3 executable files<br>• No anti-forensics capabilities<br>• Plain text output in "system" folders |
| **2010** | • Single executable<br>• Kernel rootkit<br>• Plain text output in "system folders" |
| **2011** | • Return of 3 executable files, but output file:<br>  • Time stomped after each update<br>  • Encrypted |

# Evolution of Malware – Advanced Techniques

**Malware Landscape Today**

- **Anti-forensic features** are built into malware.
- Stolen **data is stored encrypted** and encryption algorithms are getting advanced.
- **Automated Exfiltration** features are built in so attackers don't have to keep coming back to get the data.
- Data commonly being **exported on port 80** which is usually allowed for outbound access in most organizations.
- **Time stomping** is common.
- **Malware is a DLL** - injected into critical processes

# Sample SL2010-161 – Kameo

| | | |
|---|---|---|
| Vitals | **Code Name:** | **Best Supporting Actor** |
| | Filename: | Kameo.exe |
| | File Type: | PE 32-bit |
| | Target Platform: | Windows |
| Key Features | - Malware has minimal file and registry activity.<br>- Malware sniffs magnetic stripe data of credit cards and puts it in a buffer XYZ.<br>- In a separate thread, malware sends the data in buffer XYZ to hacker server via port 80.<br>- Exported data is encoded to defeat monitoring tools<br>- There is no storage of intercepted data on disk at anytime. | |
| Victim | **Your Grocery Store** | |

# Sample SL2010-161 – Kameo

Demo Demo Demo!

# Sample SL2011-014 – Memory Dumper

| | | |
|---|---|---|
| **Vitals** | **Code Name:** | **Son of Brain Drain** |
| | Filename: | Winboot.exe |
| | File Type: | PE 32-bit |
| | Target Platform: | Windows |
| **Key Features** | • Malware is installed as Windows service.<br>• Winboot.exe invokes two other processes: One dumps memory of processes, other parses data.<br>• Malware executables are time stomped to OS Install time.<br>• Output file is time stomped despite regular read/ writes.<br>• Output file is encrypted. | |
| Victim | **Your Favorite Bar** | |

# Sample SL2011-014 – Memory Dumper

**Demo Please!**

# Sample SL2011-026 – Webcheck.dll

| | | |
|---|---|---|
| **Vitals** | **Code Name:** | **Napoleon's Victory** |
| | Filename: | Webcheck.dll |
| | File Type: | Win32 DLL |
| | Target Platform: | Windows |
| **Key Features** | • 10KB DLL gets injected into explorer.exe<br>• Malware is packed so strings can’t be read.<br>• Monitors a specific process and records data processed by it in a hidden and encrypted file.<br>• At 2am, data is FTP’ed to attacker’s server.<br>• Outgoing file is encrypted has extension of zip file but is not actually a zip file. | |
| **Victim** | **Your Work** | |

# Sample SL2011-026 – Webcheck.dll

# This Sh*t is Live (Demo)

# Sample SL2011-039 – Android Malware

| | | |
|---|---|---|
| **Vitals** | **Code Name:** | **ZiTFO (aka Zitmo)** |
| | Filename: | zitmo.apk |
| | File Type: | Android Package |
| | Target Platform: | Android |
| **Key Features** | | • Registers an intent filter looking for SMS_RECEIVED events<br>• Sets this filter with a priority of 1000 (highest)<br>• Prevents everything else from seeing SMS messages<br>• Send the content of the message to the attacker's website<br>• It does NOT do any form of content analysis<br>    • Attackers are likely collecting a lot junk texts<br>• It ironically appears on the phone as a package by Trusteer called "Rapport" which is used by banks to specifically prevent this type of SMS interception attack |
| **Victim** | | **You** |

# Sample SL2011-039 – Android Malware

Oh No3s!

(Android Demo)

# Conclusions

## Windows Malware is All Grown Up

- We have seen the same type of malware advance over the last three years.

## Mobile Malware is Just Taking it First Steps

- This is a new, but interesting area where we will likely see the most growth.
- Attacks are PLENTY of targets

## Where will be next year?

- Predictions:
  - iOS/Android Malware w/ Advanced Features
  - Mobile DDoS and Spam Bots
  - Malware Focused on Stealing Corporate Credentials

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**Zero Cool**

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