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DEFCON 18
Malware Freakshow 2

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About Us

Nicholas J. Percoco / Senior Vice President at Trustwave

- 15 Years in InfoSec / BS in Computer Science
- Built and Leads the SpiderLabs team at Trustwave
- Interests:
  - Targeted Malware, Attack Prevention, Mobile Devices
    - Business / Social Impact Standpoint

Jibran Ilyas / Senior Security Consultant at Trustwave

- 8 Years in InfoSec / Masters in Infotech Management from Northwestern University
- Interests:
  - Antiforensics, Artifact Analysis, Real time Defense

Introduction

We had a busy year!!

- Over 200 incidents in 24 different countries
- Hundreds of Samples to pick from
- We picked the most interesting for you

New Targets This Year

- Sports Bar in Miami
- Online Adult Toy Store
- International VoIP Provider
- US Defense Contractor

Malware Developers were busy updating/improving their code

- Many improvements to avoid detection
- Maybe they saw our Freakshow last year ☺

What's a Malware Freakshow?

We have access to breached environments

- Many of these environments contain valuable data
- Smash and Grab is old school
- Attackers spend average of 156 before getting caught
- With time, comes exploration and development
- Custom and Targeted Malware is the Norm, not the exception
- Gather and perform analysis on each piece of Malware
  - **A Malware Freakshow demos samples to the security community**
  - **Benefit: Learn the sophistication of the current threats**
  - **Goal: Rethink the way we alert and defend!!!**

Anatomy of a Successful Malware Attack

Malware development takes a methodical approach

- Step 1: Identifying the Target
- Step 2: Developing the Malware
- Step 3: Infiltrating the Victim
- Step 4: Finding the Data
- Step 5: Getting the Loot Out
- Step 6: Covering Tracks and Obfuscation (optional)

Before we discuss the samples, we'll cover this process.

Anatomy – Step 1: Identifying the Target

Target the Data that will lead to the Money

- Credit Card Data
  - Exists in plain text in many type of environments
  - Cash is just 4 hops away

    [Track Data]->[Fake Card]->[Fraud]->[Sale of Good]->[Cash]

- ATM/Debit Card Data
  - Limited to only ATM Networks and places accepting debit
  - Need PIN as well
  - Cash is just 3 hops away

    [Track Data+PIN]->[Fake Card]->[ATM Machine]->[Cash]

Anatomy – Step 2: Developing the Malware

Depends on the Target System, but focus on the Big Three

- Keystroke Logger
- Network Sniffer
- Memory Dumper

Design Considerations

- Naming Convention
  - blabla.exe – not the best name choice
  - svchost.exe – much better ☺
- Functionality
  - Slow and Steady wins the race
- Persistency and Data Storage

Anatomy – Step 3: Infiltrating the Victim

Three basic methods of planting your malware:

- **The Physical Way**
  - "Hi, I'm Ryan Jones. Look over there. Owned"
- **The Easy Way**
  - "Nice to meet you *RDP* & your friend *default password*"
- **The Über Way**
  - "Silent But Deadly"

Anatomy – Step 4: Finding the Data

The Software Holds the "Secrets"

- **Task Manager**
  - Busy Processes == Data Processing
- **Process's Folders**
  - Temp Files == Sensitive Data
- **Configuration Files**
  - Debug Set to ON == Shields Down
- **The Wire**
  - Local Network Traffic == Clear Text

Anatomy – Step 5: Getting the Loot Out

Keep It Simple Stupid

- **Little to no egress filtering, doesn't mean use TCP 6667**
- **Don't Reinvent to Wheel**
  - FTP
  - HTTP
  - HTTPS
  - RDP
- **IT/Security Professional Look for Freaks**
  - Traffic on high ports == suspicious

Anatomy – Step 6: Covering Tracks and Obfuscation

Don't Be Clumsy

- *Test Malware First!*
  - Crashing Systems = Sorta Bad
  - Filling Up Disk Space = Real Bad
  - Shells Popping Up = Very Bad
  - Stealing Mouse Focus = Just Stupid

Mess with the Cops

- MAC times to match system install dates
- Obfuscate Output file; even just slightly
- Pack the Malware
- Randomize Events
- Rootkits

Sample SL2009-127 – Memory Rootkit Malware

Vitals	**Code Name:**	Capt. Brain Drain
	Filename:	ram32.sys
	File Type:	PE 32-bit, Kernel Driver
	Target Platform:	Windows
Key Features	• Installs malware as a rootkit to stay hidden from process list • Checks all running processes in kernel for track data • Output dumped to file w/ "HIDDEN" and "SYSTEM" attributes • Character substitution in output file to avoid detection • At set time daily, malware archives data and flushes the data from output file to avoid duplication of stolen data	
Victim	**Sports Bar in Miami** • An elite location that attracts celebrities • IT operations outsourced to Third Party • Owner throws away security and compliance notices as monthly IT expenses "give him a headache". • Back Office server is also a backup DVR server	

Sample SL2009-127 – Memory Rootkit Malware

It's Demo Time!

Sample SL2010-018 – Windows Credential Stealer

Vitals	**Code Name:**	Don't Call Me Gina
	Filename:	fsgina.dll
	File Type:	Win32 Dynamic Link Library
	Target Platform:	Windows
Key Features	• Loads with Winlogon.exe process • Changes Windows Authentication screen to a "Domain login" screen. • Stores stolen credentials in ASCII file on system • Only stores successful logins • Attempts exporting logins via SMTP to an email address.	
Victim	**Online Adult Toy Store** • A 100 person company on the West Coast of USA. • Outsourced website development in year 2008 to an overseas development firm to cut costs. • Admin page allows uploads of files • Third Party IT firm not fluent in English	

Sample SL2010-018 – Windows Credential Stealer

Another Demo!

Sample SL2009-143 – Network Sniffer Rootkit

Vitals	**Code Name:**	Clandestine Transit Authority
	Filename:	winsrv32.exe
	File Type:	PE 32-bit
	Target Platform:	Windows
Key Features	• PE Executable has components of malware embedded inside it - Ngrep, RAR tool and Config file • Uses rootkit to hide malware from Task Manager • Ngrep options contains Track Data regular expression • At the end of the day, it RARs and password protects the temporary output file and creates new file for next day. • Exports compressed and password protected data to FTP server set in the config file	
Victim	**International VOIP Provider** • Seven person company • Hosting Company was in barn; was home to 20 farm cats • Used publicly available payment application for credit cards	

Sample SL2009-143 – Network Sniffer Rootkit

Demo #3!

Sample SL2010-007 – Client-Side PDF Attack

Vitals	**Code Name:**	**Dwight's Duper**
	Filename:	Announcement.pdf
	File Type:	Portable Document Format
	Target Platform:	Windows
Key Features	• The attack is customized for victims with enticing email • Malware attached in email looks like a normal PDF file • PDF contains shell code which executes upon PDF launch • Shell code calls a batch file which steals all *.docx, xlsx, pptx and txt files from user's My Documents folder • Stolen files are compressed, password protected and sent to FTP over TCP port 443	
Victim	**US Defense Contractor** • Provides analytics service to US Military • Egress filtering set to only allow TCP ports 80 and 443 • No inbound access allowed from the Internet without VPN	

Sample SL2010-007 – Client-Side PDF Attack

Last One!

Conclusions (What we learned in the past year)

Customization of Malware

- One size fits all is not the mantra of attackers today

Slow and Steady wins the race

- Malware writers are not in for quick and dirty hacks. Since data is stolen in transit, persistency is the key.

AntiForensics

- Detection is not easy for these new age malware. MAC times are modified; random events configured and protection from detection built in.

Automation

- Attackers adding layers to malware to automate tasks so that they don't have to come in to the system and risk detection.

Not Slowing Down

- Since Malware Freakshow last year here at Defcon, the techniques have improved significantly.

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