Exploring Three Modern Threat Vectors
Malicious Insiders, Industrialized Hacking and APTs

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AGENDA

- Insider Threats
- Industrialized Hacking
- Advanced Persistent Threats

Why do you rob banks?

NOW → Money AND Politics

THEN → Curiosity AND Excitement

Willie "The Actor" Sutton
(1901–1980)

Revenue, Penalties, National Security

Economic

Regulatory

Defense

Sharing: Education, Awareness, Perspectives

Not a
Product Pitch

Not a
Company Pitch

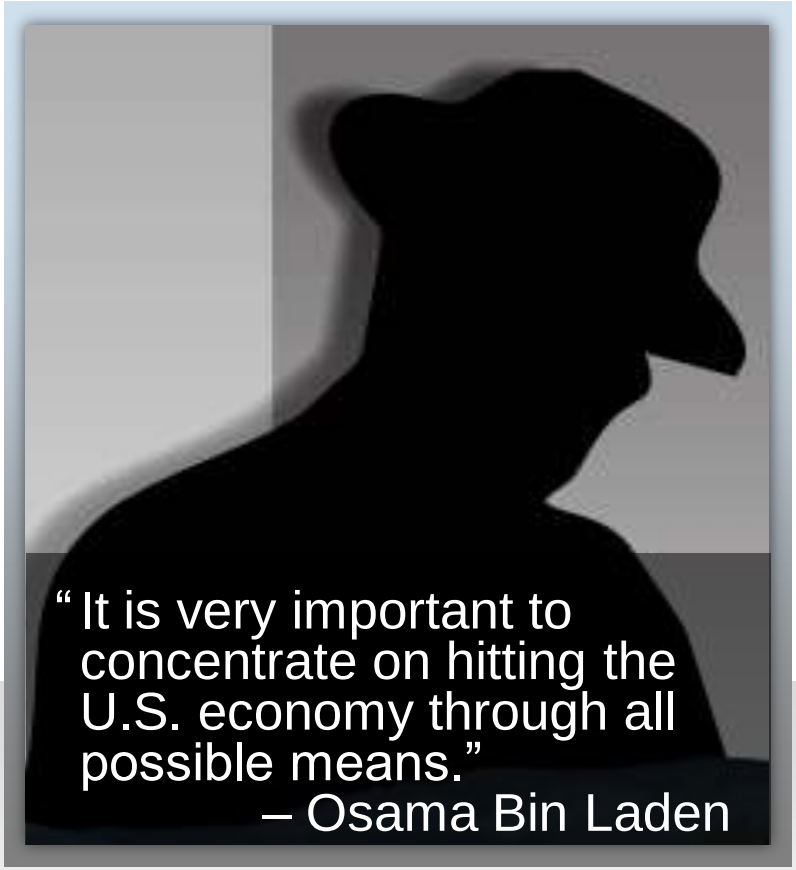
Insiders

Low-tech Trumps Hi-tech

Anything done unintentionally can also be done intentionally – with greater impact

Trust & Access

Who Are They



Why hack when you can recruit…

…or plant?

Insiders Convicted of Espionage

Aldrich H. Ames – began working for the **CIA** in 1962. He is currently serving life without parole.

Robert P. Hansen – began working for the **FBI** in 1976. He is now serving life without parole.

Ronald W. Pelton – began working for the **NSA** in the early 1960s. He is serving three consecutive life sentences.

Espionage Motivations

69% Money is the primary motivator

56% Money is the only motivator

27% Disgruntlement or revenge

22% Ideology

17% Desire to please

12% Excitement

05% Coerced

04% Importance

Espionage Dollars

More than 50% < $100k

11% received < $1,000

17% received $1,000 to $9,999

26% received $10,000 to $99,999

12% received $100,000 to $999,999

04% received > $1,000,000

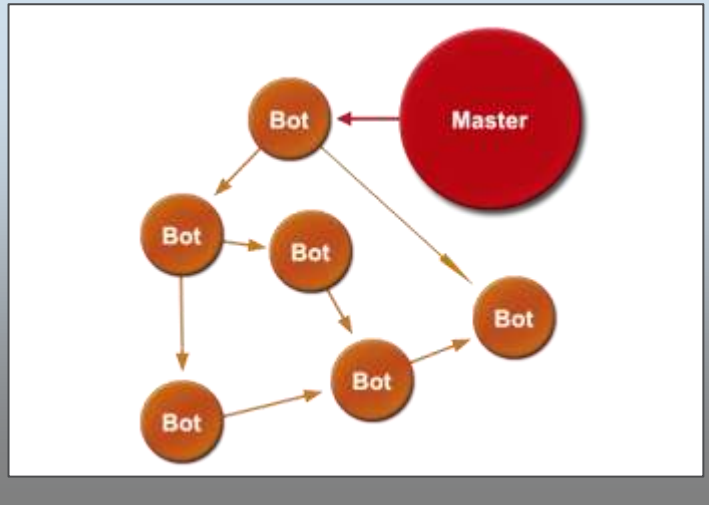
Johnny Depp's Character, Agent Sands in the movie ***Once Upon a Time in Mexico***

"I couldn't find a briefcase small enough for 10,000 dollars in cash…so I put it in this lunchbox."

Industrial Revolution

19th century
Mass Production

Automation,
Efficiency, Scalability



Old School

1997 EarthLink & AOL

2002 eBay

2003 Amazon,
Banks, ISPs (Grammar)

Middle School

2007 –ish

Organized & Improved

- Tools
- Services
- Communities
- More underground
- Less sharing with public
- Drive-by-downloads
- Steal contacts & propagate
- Social engineering
- Candy drops

New School

“If crime didn’t pay there’d be no crime.” – G. Gordon Liddy

350,000+ Apps

100,000+ Apps

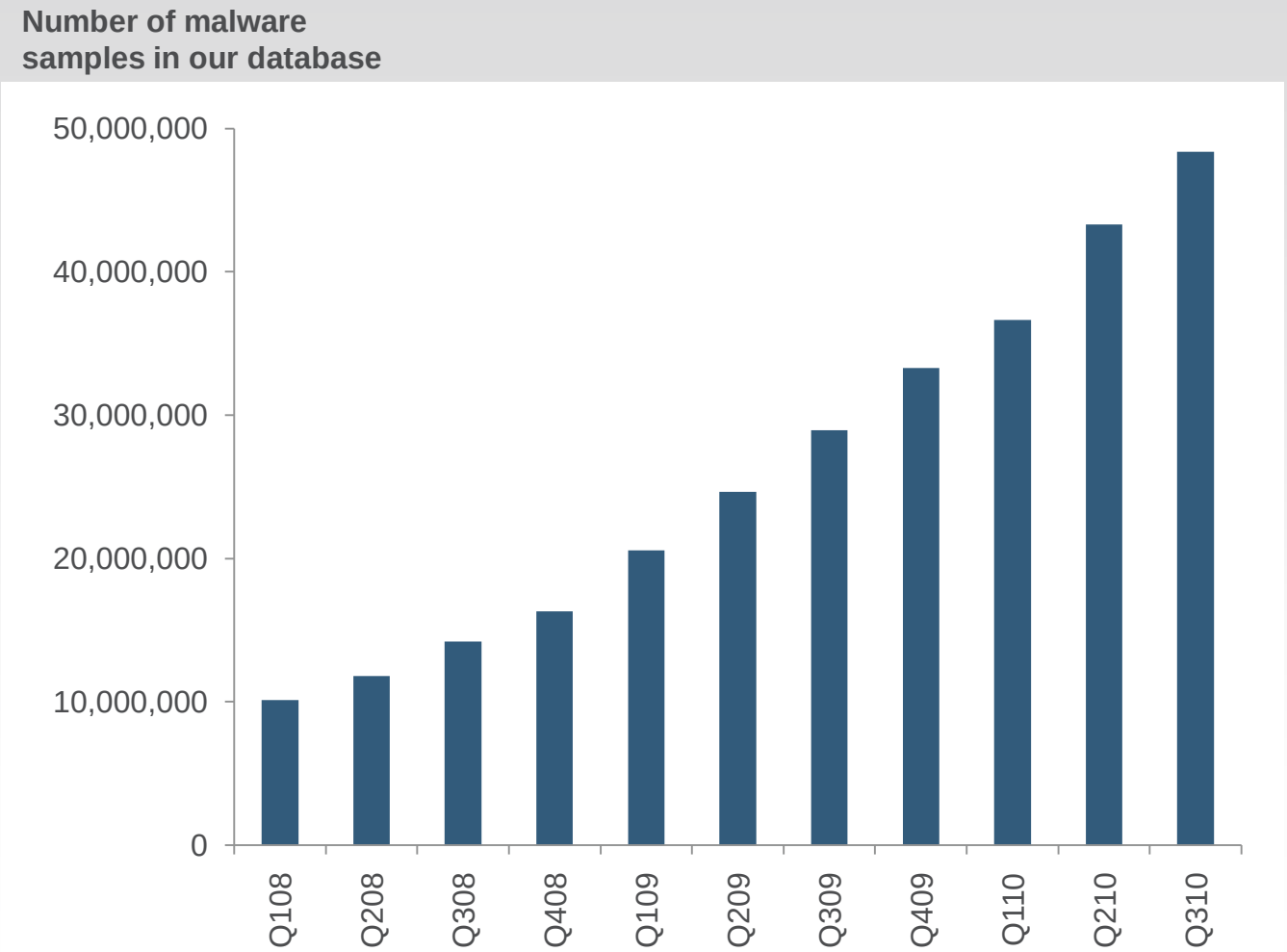
Google Chrome OS

McAfee

If Facebook Was a Country…

Rank	Country	Population	Date of Estimate
1	China	1,340,110,000	October 18th 2010
2	India	1,189,030,000	October 18th 2010
3	Facebook	500,000,000	October 18th 2010
4	USA	310,504,000	October 18th 2010
5	Indonesia	237,556,363	October 18th 2010
6	Brazil	193,670,000	October 18th 2010

Malware Continues to Be the Biggest Threat to Enterprises and Consumers

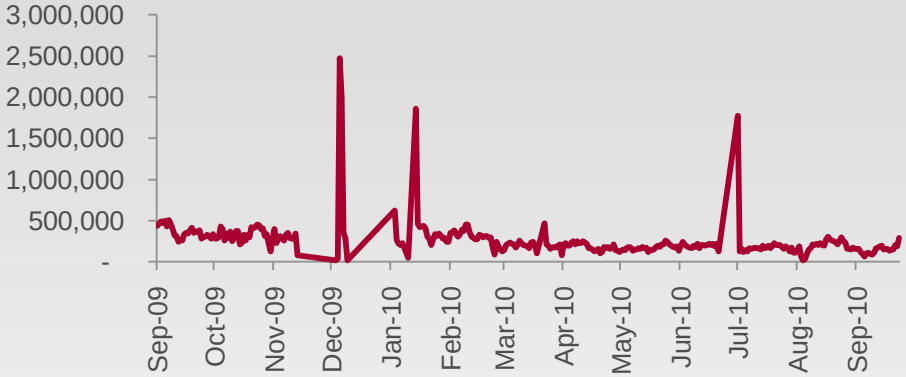


New pieces of malware per day:

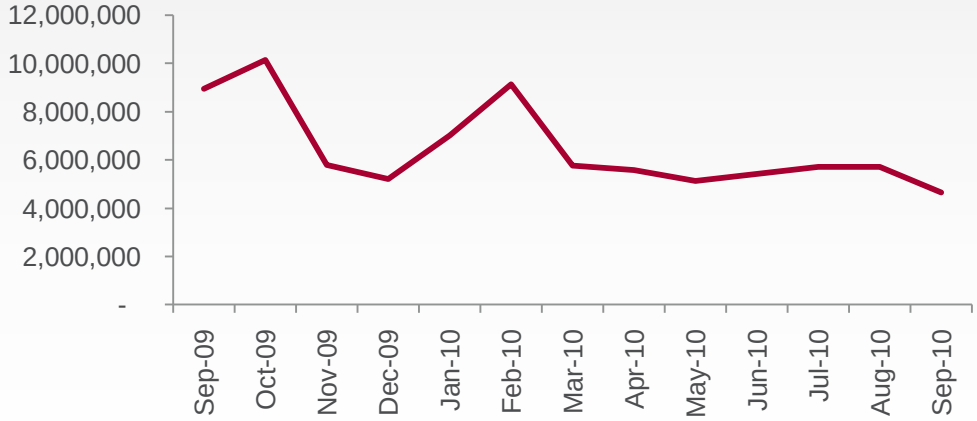
2007: 16,000
2008: 29,000
2009: 46,000
2010 so far: 60,000

Botnet Infections Held Steady

Overall Botnet Infections Per Day



Overall Botnet Infections Per Month



We have seen new botnet infections hold steady at around six million per month.

Carbon Footprint of Spam

- Over 62 trillion email spam messages a year
- 33 billion kilo-watt-hours per year (2.4 million homes in the U.S.)
- Greenhouse gases equivalent to 3.1 million passenger cars

Botnets By The Numbers

amazon.com

- Number of Systems: 160,000
- Number of CPUs: 320,000
- Bandwidth: 500 Gbps

Google™

- Number of Systems: 500,000
- Number of CPUs: 1,000,000
- Bandwidth: 1,500 Gbps

- Number of Systems: 6,400,000
- Number of CPUs: 18,000,000+
- Bandwidth: 28 Terabits
- Facilities: 230 Countries

Research and Destroy

- Virtual machine Detection
- Line-by-line debugger detection
- Re-writes host file
- Multi-packed, one time, encrypted
- Rootkits
- Fuzzing
- Reverse Engineering
- Code Auditing

Industrialized Hacking Maturity Model

Hacking Is a Profitable Industry

- Researching Vulnerabilities
- Developing Exploits
- Growing Botnets
- Exploiting Targets
- Consuming

Roles

- Direct Value—i.e. IP, PII, CCN
- Command & Control
- Malware Distribution
- Phishing & spam
- DDoS
- Blackhat SEO

Optimization

- Growing Botnets and Exploiting Vulnerabilities
- Selecting Targets via Search Engines
- Templates & Kits
- Centralized Management
- Service Model

Automation

It's not fair and it's not personal; it's just business

Cyber Criminal Family

More than a Decade of Experience, Relationships and Trust Groups

- Carders
- Hackers
  - Targeted intrusion for harvesting data, develop exploits and toolkits, decryption services, anonymity services, consulting
- Spammers
- Bot herders
- Money Launders
- Renegade Hosters
- Malware developers
- Document forgers
- Specialized hardware providers
- Back office services—FW, AV, Test Beds

Black Hat SEO

2010's Most Dangerous Internet Searches

60% of Popular Google Searches Yield Malicious Sites in First 100 Results

Cameron Diaz

Julia Roberts

Jessica Biel

Gisele Bündchen

Pricing

CVV2 $1

- Card Number
- Expiration Date
- Cardholder Name
- Address
- CVV2 Security Code

Full (Wallet) $10

- CVV2
- Date of Birth
- Mother's Maiden Name
- Social Security Number
- Place of Birth

Source: Secret Service

Zeus: An Abbreviated Love Story

aka: Zbot, PRG, Wsnpoem, Gorhax and Kneber

- Discovered July 2007—More recent versions with over 150 variants
- Doesn't self propagate—requires spam, phishing, drive-by downloads
- C&C 196 countries; 2,400 companies impacted, 3.6M PCs in U.S. alone

- Targeted: email accounts, social networking sites and banking
- Control, steal credentials, transfer funds
- Man in the Browser

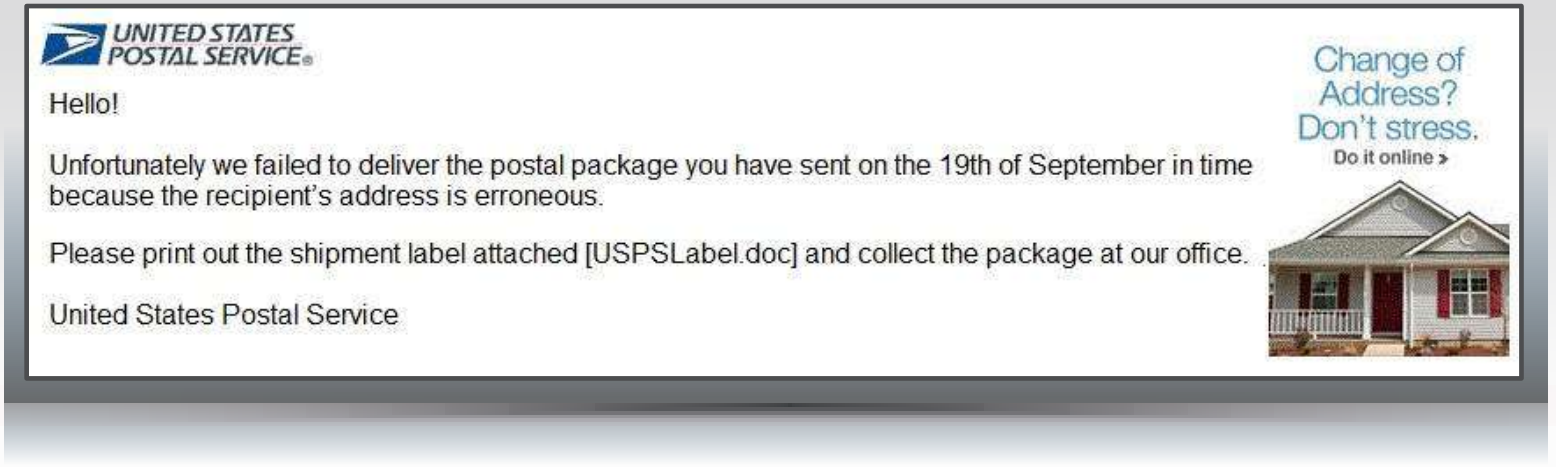
- Kit: $700-$4,000 USD plus add-ons & plug-ins $500-$10,000 USD
- Binary generator to evade detection
- Copy protection and license keys

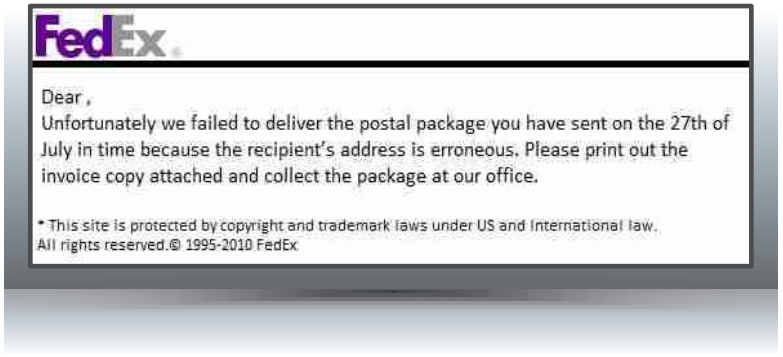
- Money mules in U.S. recruited and paid on commission
- Create bank accounts using fake documents and phony names
- Wire fund to Eastern Europe or smuggle cash

- Stole around $70M USD
- 100+ arrested across U.S., U.K., & Ukraine 2010
- Charges of bank fraud & money laundering

Zeus: Graphical spam

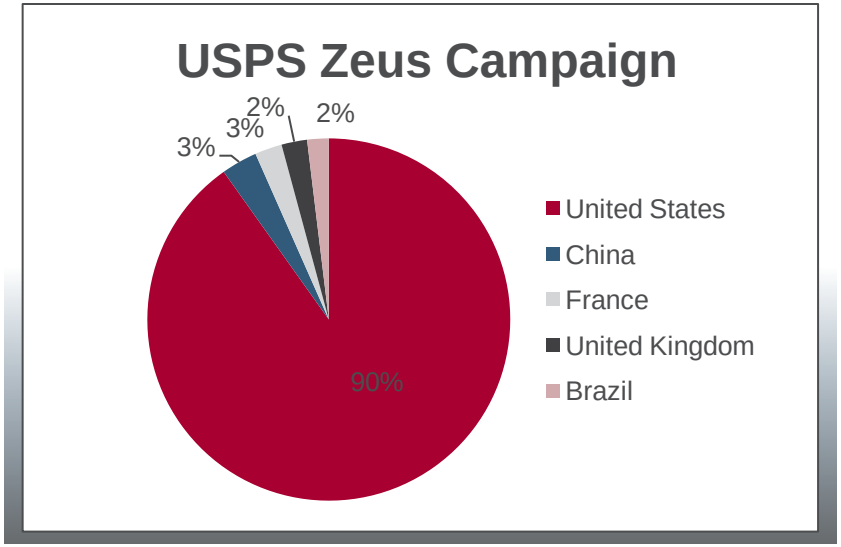
eFax | FedEx | IRS | Social Security Administration | USPS | Western Union

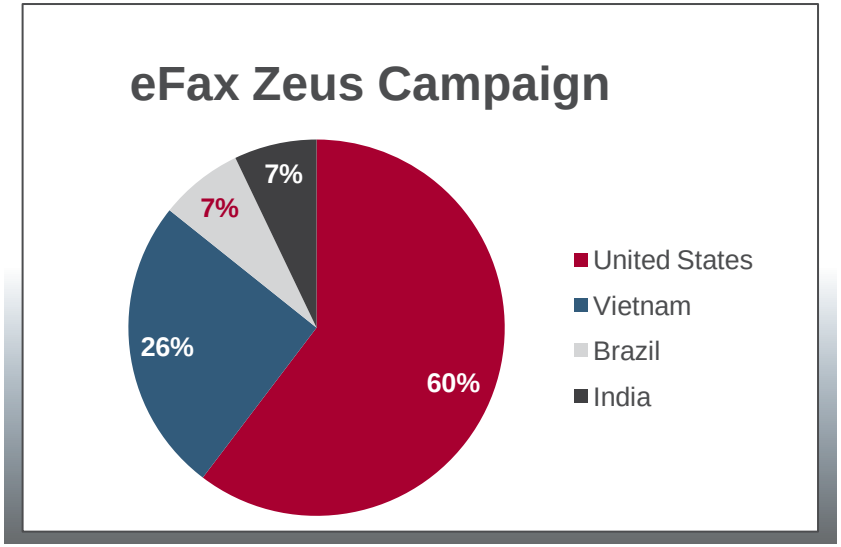


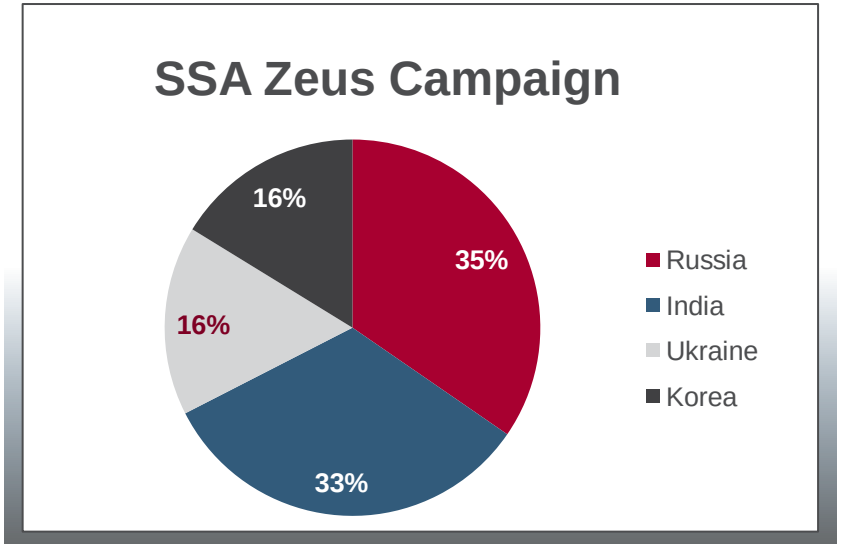


Zeus: Spam Campaigns Q3/2010

Who sends the most Zeus spam?







Zeus: Going Mobile (Zitmo)

SMS: Common, Cheap Two-factor Authentication for Financial Institutions

1. User logs on the banking site
2. Starts a money transfer
3. Bank asks for additional code
4. Code is sent to user's phone via text message (SMS)
5. User enters the code to validate the transaction

Remember Zeus Has Full Access to the Victim's Computer

1. Inject additional fields into an online banking webpage asking for the user's phone number and model
2. Zeus then sends that user's phone a link to download a "security add-on" (currently works on BlackBerry and Symbian-based phones)
3. The code is malware that intercepts/forwards SMS messages
4. Full operational capabilities on the account

The Countermeasures

- Reputation
- Reduce complexity
- Wolverines not mosquitoes
- Damn the whales—save the plankton
- Anti-social engineering

"The Internet is the first thing that humanity has built that humanity doesn't understand, the largest experiment in anarchy that we have ever had."

Eric E. Schmidt, Chairman of the Board and CEO Google

APT

Industrialized Hacking

APT

Advanced: Custom exploits and other mature tools
Persistent: Not a crime of opportunity—on a mission
Threat: They have money and they are motivated

APT Maturity Model

Actors

- Nation-States
- Insiders & Ex-employees
- Unscrupulous Competitors
- Terrorist/Activist/ Criminal Organizations

Motives

- Political
- Economic

Targets

- Large corporations
- Critical infrastructure
- Governments
- Academic & Media

Goals

- Stealth intrusion, backdoors
- Sensitive data, Monitoring, Sabotage
- Leave no traces

Operation Aurora in 12 Steps

- Zero-day vulnerability was discovered
  - Microsoft IE DOM Operation Memory Corruption Vulnerability (CVE 2010-0249)
- Malware written (~July 2009)
- Targets acquired (Google, others) mostly in China/Taiwan
- Users received web link via social engineering attack from trusted source
- Users clicked on web link
- Web page had obfuscated Javascript which included shellcode to exploit 0-day vulnerability
- Exploit downloaded additional shellcode from servers (predominantly in TW) disguised as an image (ad.jpg), decrypted it, and executed it—spawning numerous other files (a.exe, b.exe, etc) that were executed, including backdoors (rasmon.dll, securmon.dll, etc.)

Operation Aurora in 12 Steps

- The backdoor phoned home to C&C servers (predominantly in TW) over TCP 443 (non-SSL protocol)
- Attackers then had direct channel into the inside of the corporate networks

Persistent

- Once inside, attackers targeted administrators and cracked SAMs on local/domain controllers
- Attackers targeted repositories of intellectual property and installed additional backdoors
- Attackers pushed the files through traditional means (FTP/HTTP, etc.) back to their own servers

Threat

APT Type: Information Warfare

Using information to achieve a national objective

- Howard Schmitt—Cyber Security Coordinator (No)
- Firm Booz Allen (Yes)
- Over 100 nations have information warfare capabilities (according to FBI ‘08)
- Congress initiated a bill for $16B to combat cyber attacks
- October 2009 Department of Homeland Security said it would hire 1,000 security experts

Not just states; non-state entities can be leveraged

Not a Super Power—Not a Problem

December 2008: Attacks by Mugabe Gov. in Zimbabwe

December 2008: Israeli Defense Forces and Hamas

January 2009: A DDoS attack on several Kyrgyzstan's

June 2009: Iranian government sites attacked

June 2009: President of Tatarstan has websites attacked

July 2009: Attacks on S. Korean sites

Technology Shifts Advantage

Technology becomes an equalizer…again

Inexpensive Anonymous	Simple Excellent Range
State & Non-state Participants	Espionage Propaganda Attack

“God made man, but Samuel Colt made them equal.”

RU

- Estonia—May 2007: Three weeks of cyber attacks following the removal of a bronze soldier
- Russian mafia and Russian sympathizers in Latvia, Ukraine, and the US (80,000 IP address sources)

- Georgia - August 2008: Kinetic + Non-kinetic attacks where radio station towers were being shot by tanks, as DDoS was taking out online capabilities

- Others attacks
  - 2007 Lithuania, Ukraine
  - 2009 Kyrgyzstan

Patriotic DDoS

April 2008
- **CNN reports on Tibet**

- **5,000 Chinese forums recruit "patriots" antiCNN.exe**

- **CNN blocks traffic from .CN**
- **Double win**

The Countermeasures

- Discover
- Connect
- Assume
- Risk Awareness
- Partnerships

"The best poker players walk a tightrope between their business sense and their passion. As professionals, they seek out the most profitable opportunities and control as many factors as possible to create a positive result. As gamblers, they want the risk and excitement of something important on the line with the outcome in the balance."

—Michael Craig Full Tilt Poker Blog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