
Infogressive, Inc.

# VULNERABILITY MANAGEMENT:
## A DEFENSE-IN-DEPTH APPROACH

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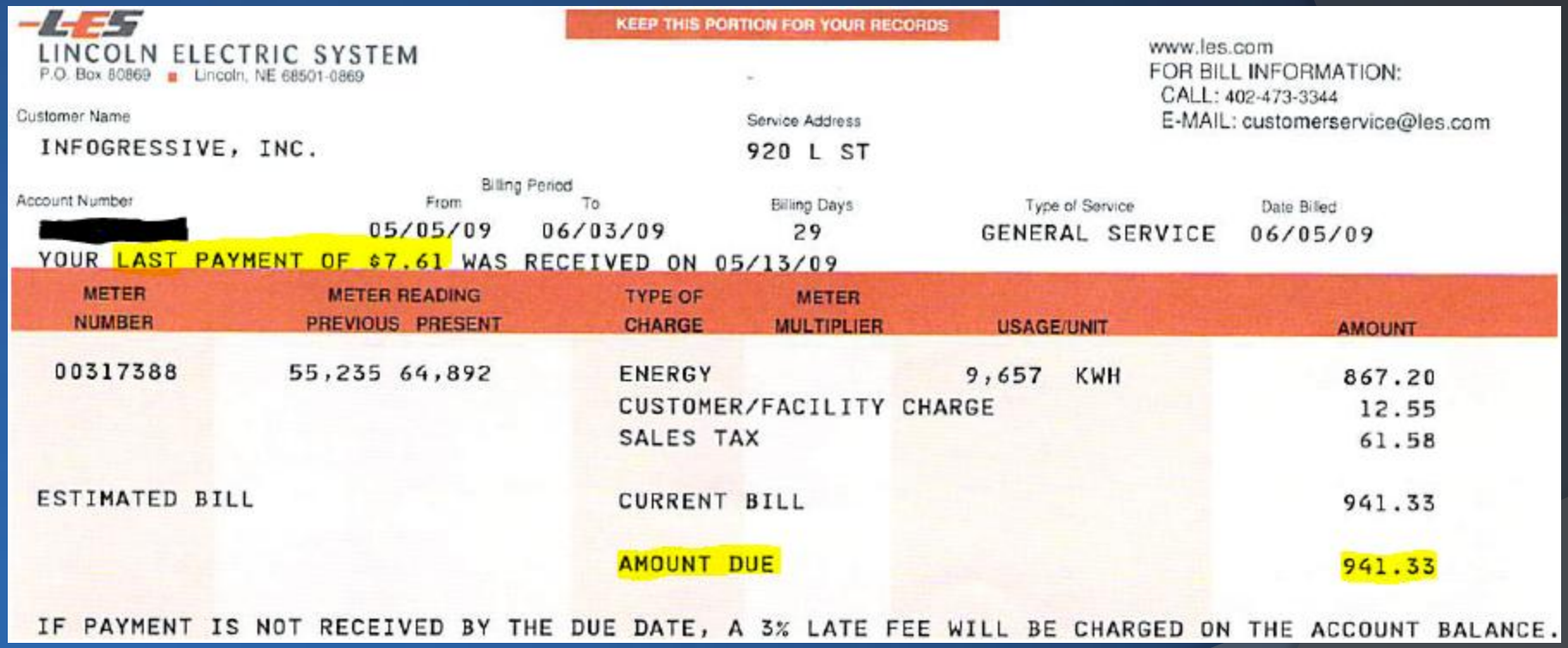
# COMPUTERS MAKE MISTAKES?



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| Account Number | Billing Period From | To | Billing Days | Type of Service | Date Billed |
|---|---|---|---|---|---|
| [redacted] | 05/05/09 | 06/03/09 | 29 | GENERAL SERVICE | 06/05/09 |

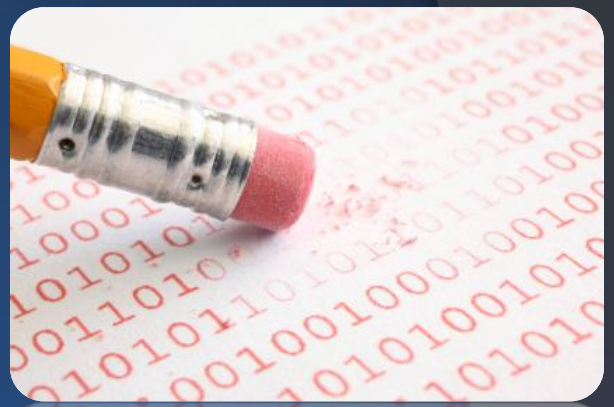
YOUR LAST PAYMENT OF $7.61 WAS RECEIVED ON 05/13/09

| METER NUMBER | METER READING PREVIOUS | PRESENT | TYPE OF CHARGE | METER MULTIPLIER | USAGE/UNIT | AMOUNT |
|---|---|---|---|---|---|---|
| 00317388 | 55,235 | 64,892 | ENERGY | | 9,657 KWH | 867.20 |
| | | | CUSTOMER/FACILITY CHARGE | | | 12.55 |
| | | | SALES TAX | | | 61.58 |
| ESTIMATED BILL | | | CURRENT BILL | | | 941.33 |
| | | | AMOUNT DUE | | | 941.33 |

IF PAYMENT IS NOT RECEIVED BY THE DUE DATE, A 3% LATE FEE WILL BE CHARGED ON THE ACCOUNT BALANCE.

# ERASING SOME MYTHS

- Internal vs. External
- In Signatures We Trust
- Defend, Defend…Pray
- Microsoft Problem?
- Damn the Insiders?
- We’re not a Target



# INTERNAL VS. EXTERNAL

## M&MS AREN'T GOOD.

- DMZs, well patched and defended
- Where is the E-mail and Internet access
- We can't just rebuild workstations
- In 2008, 95% of attacks were client-side 5% were server-side*
- Connected to the Internet vs. not.

*Source: Symantec Global Internet Security Threat Report

# IN SIGNATURES WE TRUST

## SIGNATURES = TOO LATE.

- A/V Don't set it and forget it
- A/V Perimeter and host-based
- Different vendors a good thing
- Good guys will NEVER catch up
- 2008 number of new malicious code signatures increased by 265% over 2007*

- Don't depend on anything with signatures.

<Demonstration>

*Source: Symantec Global Internet Security Threat Report

# DEFEND, DEFEND…PRAY

## WE ALL LOSE……EVENTUALLY.

- You've hardened your systems
- You've built many layers of defense
- You can't control everything, particularly users
- Months before big orgs become aware, why?
- Watch logs, learn about File Integrity

# MICROSOFT PROBLEM?

## 2008 TOP 10 RISKS

1. Browser Vulnerabilities
2. Rogue Anti-Virus/Social Engineering
3. SQL Injection
4. Malicious Web 2.0 Components
5. Adobe Flash
6. DNS Cache Poisoning/DNS Zone File Hijacking
7. Active X Vulnerabilities
8. RealPlayer Vulnerabilities
9. Apple QuickTime Vulnerabilities
10. Adobe Acrobat Reader PDF Vulnerabilities

Source - WebSense Security Labs


Note: 2/10 involve services in DMZ, 8/10 client-side

# DAMN THE INSIDERS?

## 2008 Attack Statistics

74% External Sources
20% Insiders
32% Business Partners
39% Multiple Parties

Source: 2009 Verizon Data Breach Investigations Report

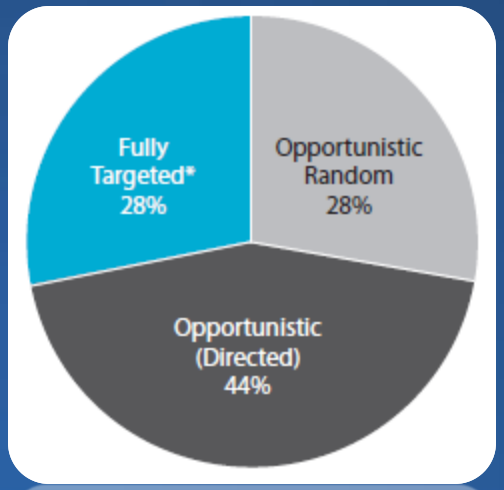
# EXTERNAL WHERE?

## 2008 Attack Statistics

| 2008 Rank | 2007 Rank | Country | 2008 Overall Percentage | 2007 Overall Percentage | Malicious Code Rank | Spam Zombies Rank | Phishing Websites Host Rank | Bot Rank | Attack Origin Rank |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | United States | 23% | 26% | 1 | 3 | 1 | 2 | 1 |
| 2 | 2 | China | 9% | 11% | 2 | 4 | 6 | 1 | 2 |
| 3 | 3 | Germany | 6% | 7% | 12 | 2 | 2 | 4 | 4 |
| 4 | 4 | United Kingdom | 5% | 4% | 4 | 10 | 5 | 9 | 3 |
| 5 | 8 | Brazil | 4% | 3% | 16 | 1 | 16 | 5 | 9 |
| 6 | 6 | Spain | 4% | 3% | 10 | 8 | 13 | 3 | 6 |
| 7 | 7 | Italy | 3% | 3% | 11 | 6 | 14 | 6 | 8 |
| 8 | 5 | France | 3% | 4% | 8 | 14 | 9 | 10 | 5 |
| 9 | 15 | Turkey | 3% | 2% | 15 | 5 | 24 | 8 | 12 |
| 10 | 12 | Poland | 3% | 2% | 23 | 9 | 8 | 7 | 17 |

**Table 2. Malicious activity by country**
*Source: Symantec*

# "WE'RE NOT A TARGET"




Source: Verizon Business Report

Random Opportunistic: Attacker(s) identified the victim while searching randomly or widely for weaknesses and then exploited the weakness.

Directed Opportunistic: Although the victim was specifically selected, it was because they were known to have a particular weakness that the attacker(s) could exploit.

Fully Targeted: The victim was first chosen as the target and then the attacker(s) determined a way to exploit them.

# STATISTICS, BLAH BLAH

## WHAT'S THE POINT?

- Include workstations in your processes and priorities
- Drop non-U.S. inbound traffic at the perimeter
  - 77% of malicious traffic dropped, ONE firewall rule
  - Extra CPU/Memory/Bandwidth for the good guys
- Don't lose track of insiders, limit access
- Restrict Internet access, including IT
- Business partners and remote workers on the rise (VPN)

  "The number of Americans working at home at least one day a month will rise from 28 million to 100 million by 2010." -WorldatWork

# THE PARADIGM SHIFT

- Client-side attacks are the most common attack vector.
- Treat workstations like servers if they have access to sensitive data
- With this shift, managing vulnerabilities becomes a larger operational problem
  - Requires more resources
  - More organized effort
  - More teamwork

# WARNING: BORING DEFINITION

Vulnerability Management:

The process of finding and fixing mistakes in software and configuration errors.

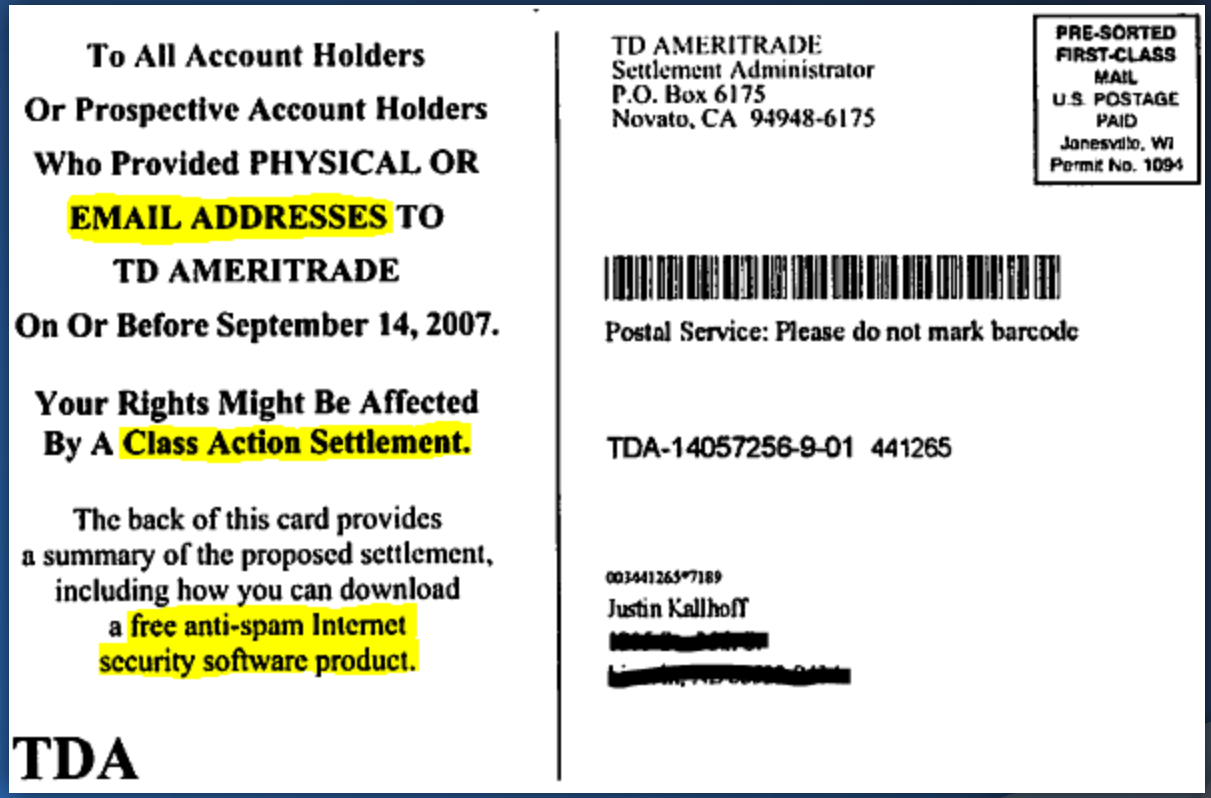
The standard assumption by computer scientists is 5 to 20 bugs in every thousand lines of software code.

# WHY DO I CARE?

The Risks:

- Money
- Reputation
- Customers
- Compliance
- Productivity and Time

# JUST CC#S, SSNS AND PII?



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Justin Kallhoff
[redacted]

# AVOID INFORMATION OVERLOAD

Scenario: You've just completed vulnerability scanning on your environment. You have 29,856 high severity vulnerabilities.

Question: Where the heck do you start?

Answer:
Vulnerability Management

# VULNERABILITY MANAGEMENT

## A PROCESS, NOT A TOOL

- Asset Discovery
- Risk Analysis
- Scanning
- Prioritize
- Assign
- Remediate
- Report
- Repeat

# ASSET DISCOVERY

- Quickly Identify Rogue Hosts/Services
- Network Awareness
- Network Inventory

# RISK ANALYSIS

If this host were to be compromised, what impact would it have on my business?

- Business Impact
  - Revenue Generation
  - Operational Impact
  - Reputation
  - Compliance

**Business Risk**

| Security Risk | Business Impact | | | | |
|---|---|---|---|---|---|
| Title: | Critical | High | Medium | Minor | Low |
| **5** | 100 | 64 | 36 | 16 | 9 |
| **4** | 64 | 36 | 16 | 9 | 4 |
| **3** | 36 | 16 | 9 | 4 | 2 |
| **2** | 16 | 9 | 4 | 2 | 1 |
| **1** | 9 | 4 | 2 | 1 | 1 |

# SCANNING AND ASSESSMENT

- Operating System/Resident Apps
- Network Services
- Web App Scans
- Policy Compliance Scans
- Authenticated Scanning!

# PRIORITIZE DISCOVERED VULNERABILITIES

Not always an obvious order of priority

Variables to Consider:

- Vulnerability Severity Level
- Risk Analysis Results
- Ease of Remediation/Automation

# ASSIGN & TRACK

- Assign vulnerabilities to individuals or groups responsible for the affected system(s).
- Track to ensure that the applied fix has resolved the vulnerability.
- Monitor to ensure the vulnerability does not return

# REMEDIATION
## THE HARD PART

- System hardening will reduce quantity
- Imaging reduces diversity and complexity
- Don’t allow users to install software
- If you fear breaking systems, create a test environment
- Manual remediation not an option for most organizations
  - Patch Management – Developing market, automate!

# REPORTING

- Demonstrate Progress
- Justify additional human resources
- Justify additional budget
- Compliance/Auditors
- Which boxes are running X or are vulnerable to Y exploit?

# REPEAT

FACT: There were ~150 Updates to Qualys' Vulnerability Database on 6/14-6/15 alone.

The vulnerability landscape changes daily. VM is a process that requires constant awareness.

Scheduled, automated, and regular scans

If scans break things, fix those problems.

Setting a goal of having all vulnerabilities eliminated at any given time is unattainable for most organizations.

So what do we do then to prevent compromise?

# DEFENSE IN DEPTH

| Easy and/or Low Cost | Moderate | High Cost and/or Difficult |
| --- | --- | --- |
| Hardening | Firewall +Egress | Physical |
| Patching | A/V Host/Perimeter | File Integrity |
| Audit Logs | Wireless | Penetration Testing |
| Centralized Logging | Education | NAC |
| Encryption | Vulnerability Mgmt | WAF |
| Fault Monitoring | | IPS |
| Trending | | Web Security |
| VPN | | |
| Proxy | | |
| Segmentation | | |
| Policy | | |

# EXECUTIVES:

Do they understand?
Answer: Nope.
Do they care?
Answer: Nope, until you get pwned.
Is it their fault?
Answer: Nope, it's yours.

Getting buy-in from the top is vital.
- Restrict access to the web
- Resource allocation to VM
- Pen tests can illustrate reality
- If you can't get buy-in, call me, I will.

# HOW TO DEPLOY MALWARE

## THE WEB 2.0 SHIFT

Step 1: Create a big FREE online network of humans
Step 2: Create a model of complete anonymous trust
Step 3: Allow anyone to post content anywhere
Step 4: Allow anyone to create and distribute applications
Step 5: Allow external advertising sources
Step 6: Name it Facebook, MySpace, Linkedin, or Twitter

HINT: Block all of them. You will get whine, be prepared with statistics and examples.

# TIGHT BUDGET?

Solutions:

1. Vulnerability Scanning (OpenVAS)
2. File Integrity Monitoring (Osiris)
3. Central Logging and Correlation (Splunk/SyslogNG)
4. Patching (WSUS,  Purgos)
5. VPN (OpenVPN)
6. Proxy (Squid)
7. Disk Imaging/Standardization (FOG)

Best Practices:

1. Egress (outbound) Firewall Rules
   - Not just about blocking your people
2. Servers NO Internet access
3. Hardening (NIST and Microsoft Templates)
4. Workstations ONLY 80, 443
5. Block executable content Web & Mail
6. Host File

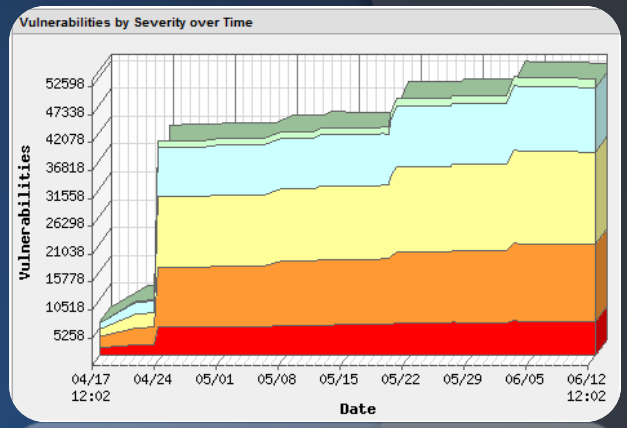
# COMMERCIAL SOLUTIONS ARE AFFORDABLE (SMB INCLUDED)

"Enterprises that implement a vulnerability management process will experience 90% fewer success attacks…" Source: Gartner

- Buffet
  - Entry Level Pricing ~$3,000/year
  - Unlimited scanning
  - 32 Internal, 4 External
- Ala Carte
  - Pay Per Scans
  - Approx. $20 per IP
  - Schedule Monthly, Quarterly, as often as possible

# TELL ME WHAT TO LOOK FOR!

- Authenticated scanning!
- Automation
- Rate and categorize risks
- Remediation tracking & ticketing
- Frequent updates
- Compliance
- Reporting, trending, historical




The Bottom Line:

Find, Confirm, Prioritize, Remediate, Rinse and Repeat

# MARKET FRESH

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criston

Lumension®
IT Secured. Success Optimized.™

SAINT®

Source: Gartner (May 2008)

# PATCH MANAGEMENT SOLUTIONS


- BigFix


- Shavlik NetChk


- IBM Tivoli


- Altiris and Hercules


- Patch Authority/Desktop Authority


- Microsoft's SCCM


- Lumension (Patchlink)

# MISSING SOMETHING?

## MAJOR AREA OF VULNERABILITY NOT DISCUSSED?

HINT:

HUMANS! Security awareness training please!


Infogressive, Inc.