Big Game Phishing

Are You Prepared?

FISSEA 2008

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Intrepidus Group

- Information security consultancy
- Former Foundstone, McAfee, Symantec, Air Force, Lucent and EDS engineers
- Offices in NYC and Chantilly, VA
- Regular speakers at Black Hat, DefCon, OWASP, HITB, ISSA, and MISTI events
- Faculty at Carnegie Mellon University

Phishing – Passé Definition

(fish´ing) (n.) The act of sending an e-mail

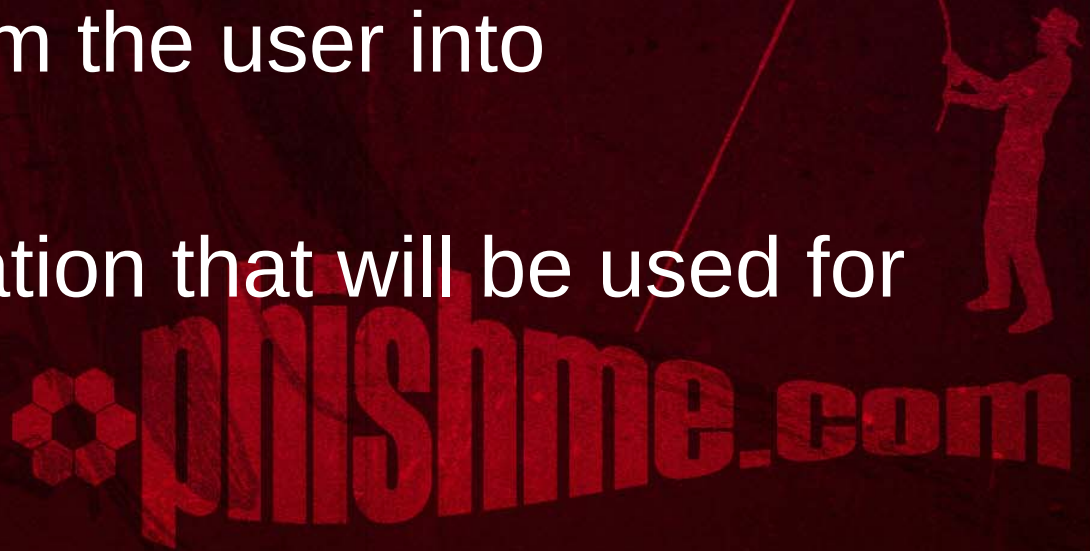
to a user falsely claiming to be an

established legitimate enterprise in an

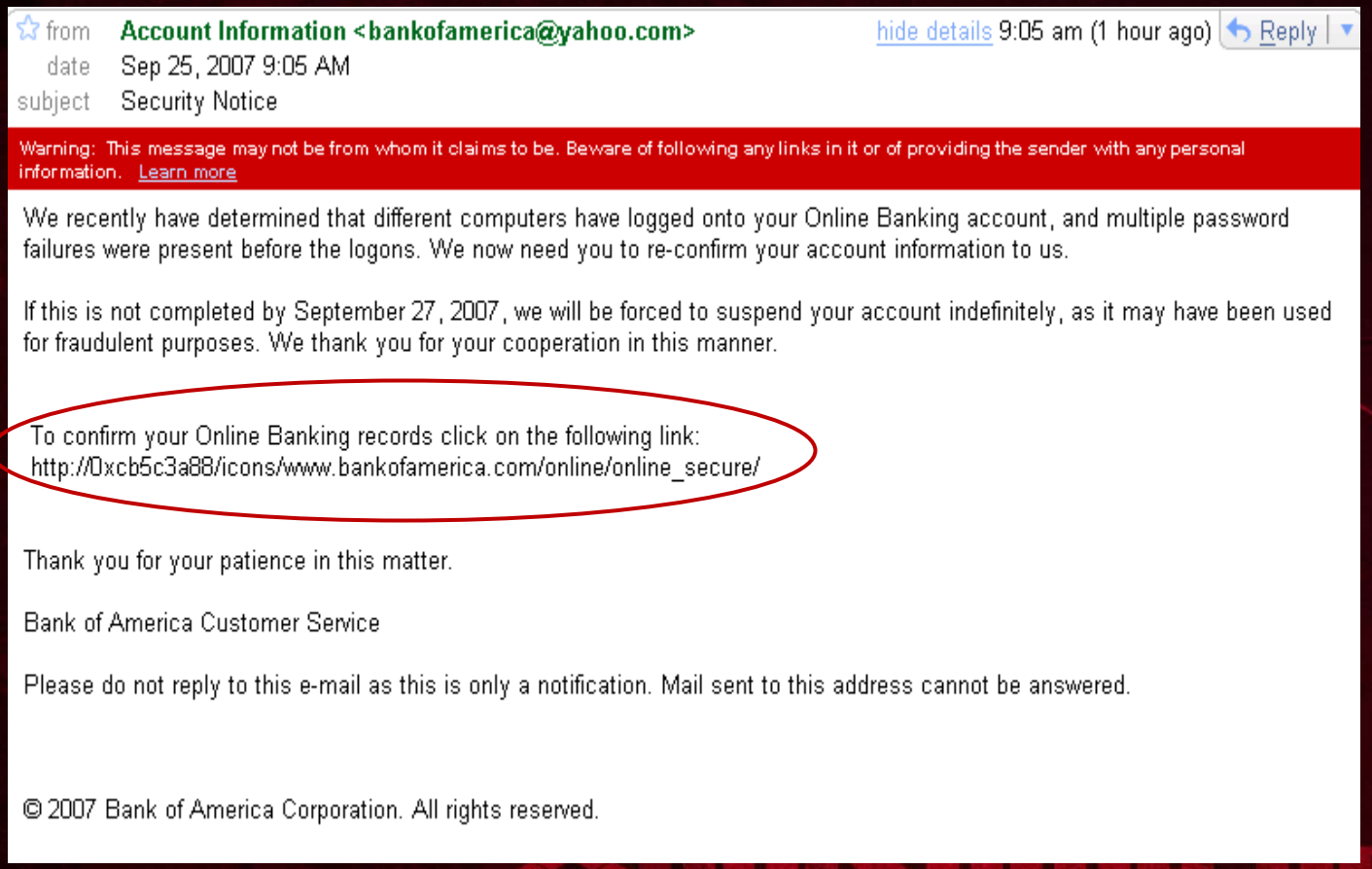
attempt to scam the user into surrendering

private information that will be used for

identity theft.



Example banking “phish”



from **Account Information <bankofamerica@yahoo.com>** hide details 9:05 am (1 hour ago) Reply

date Sep 25, 2007 9:05 AM

subject Security Notice

Warning: This message may not be from whom it claims to be. Beware of following any links in it or of providing the sender with any personal information. Learn more

We recently have determined that different computers have logged onto your Online Banking account, and multiple password failures were present before the logons. We now need you to re-confirm your account information to us.

If this is not completed by September 27, 2007, we will be forced to suspend your account indefinitely, as it may have been used for fraudulent purposes. We thank you for your cooperation in this manner.

To confirm your Online Banking records click on the following link:
http://0xcb5c3a88/icons/www.bankofamerica.com/online/online_secure/

Thank you for your patience in this matter.

Bank of America Customer Service

Please do not reply to this e-mail as this is only a notification. Mail sent to this address cannot be answered.

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Another example

Dear Citibank Member,

This email was sent by the Citibank server to verify your e-mail address. You must complete this process by clicking on the link below and entering in the small window your Citibank ATM/Debit Card number and PIN that you use on ATM.
This is done for your protection -t- becaurse some of our members no longer have access to their email addresses and we must verify it.

To verify your e-mail address and access your bank account, click on the link below. If nothing happens when you click on the link (or if you use AOL)K, copy and paste the link into the address bar of your web browser.

http://www.citibank.com:ac=piUq3027qcHw003nfuJ2@sd96V.pIsEm.NeT/3/?3X6CMW2I2uPOVQW

y----------

Thank you for using Citibank!

C----------

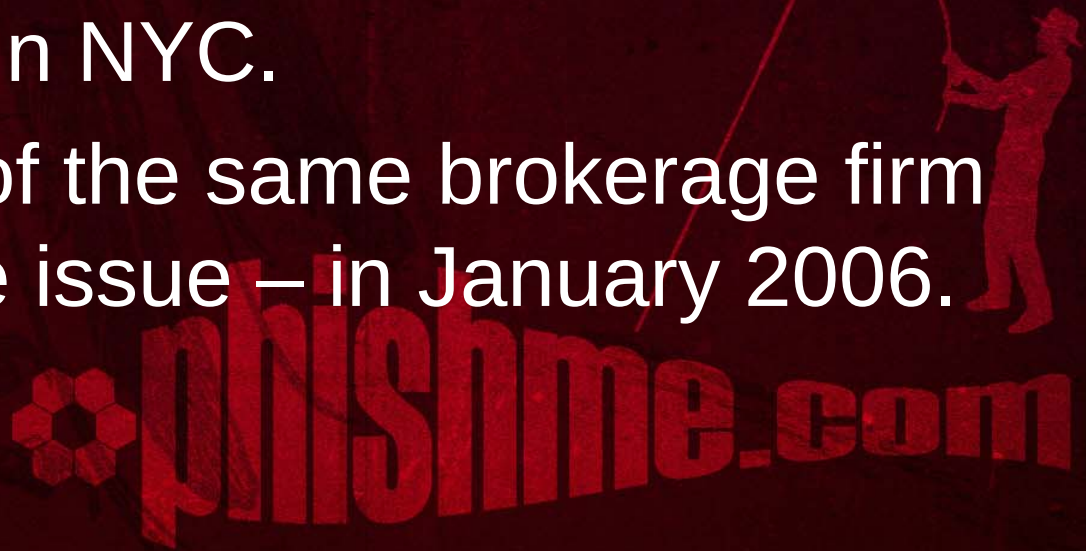
Phishing – New Definition

(fish´ing) (n.) The act of electronically luring a user into surrendering private information that will be used for identity theft **or conducting an act that will compromise the victim's computer system.**

A Report From The Trenches

Symptoms

- “I see a trade executed from my account …10000 shares of a company I haven’t even heard about, were purchased on January 17 (2006) @ 2 pm from my account!” – a client of a well-established brokerage firm in NYC.
- 7 other clients of the same brokerage firm report the same issue – in January 2006.



Investigation

- Was the brokerage firm hacked?
- Was it the end user who was hacked?
- We had dates and times of the trade executions as a clue.

Investigation

- Our team began reviewing the brokerage firm's online trading application for clues
  - Network logs
  - Web server logs
  - Security mechanisms of the application
- We asked to duplicate the victim's hard drive and review it for indicators of compromise.

Web Server Logs

- Requested IIS logs for January 17, 2006 from all the (load balanced) servers.
- Combined the log files into one common repository = 1 GB
- Microsoft's Log Parser to the rescue

Microsoft LogParser

Parsed out all requests to execute.asp using Microsoft Log Parser:

```
LogParser -o:csv "select * INTO
  execute.csv from *.log where
  cs-uri-stem like
  '/execute.asp%'"
```

Can You Find The Smoking Gun?

#Fields:time	c-ip	cs-method	cs-uri-stem	cs-uri-query	Status
1:03:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:04:35	172.16.54.33	POST	/execute.asp	sessionid=3840943093874b3484c3839de9340494	200
1:08:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:10:19	172.16.87.231	POST	/execute.asp	sessionid=298230e0393bc09849d839209883993	200
1:13:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:18:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:19:20	172.16.121.3	POST	/execute.asp	sessionid=676db87873ab0393898de0398348c89	200
1:21:43	172.16.41.53	POST	/execute.asp	sessionid=3840943093874b3484c3839de9340494	200
1:23:16	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:28:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
.	.	.	.	.	.
.	.	.	.	.	.

Next Step

Parsed out all requests with the suspicious sessionid

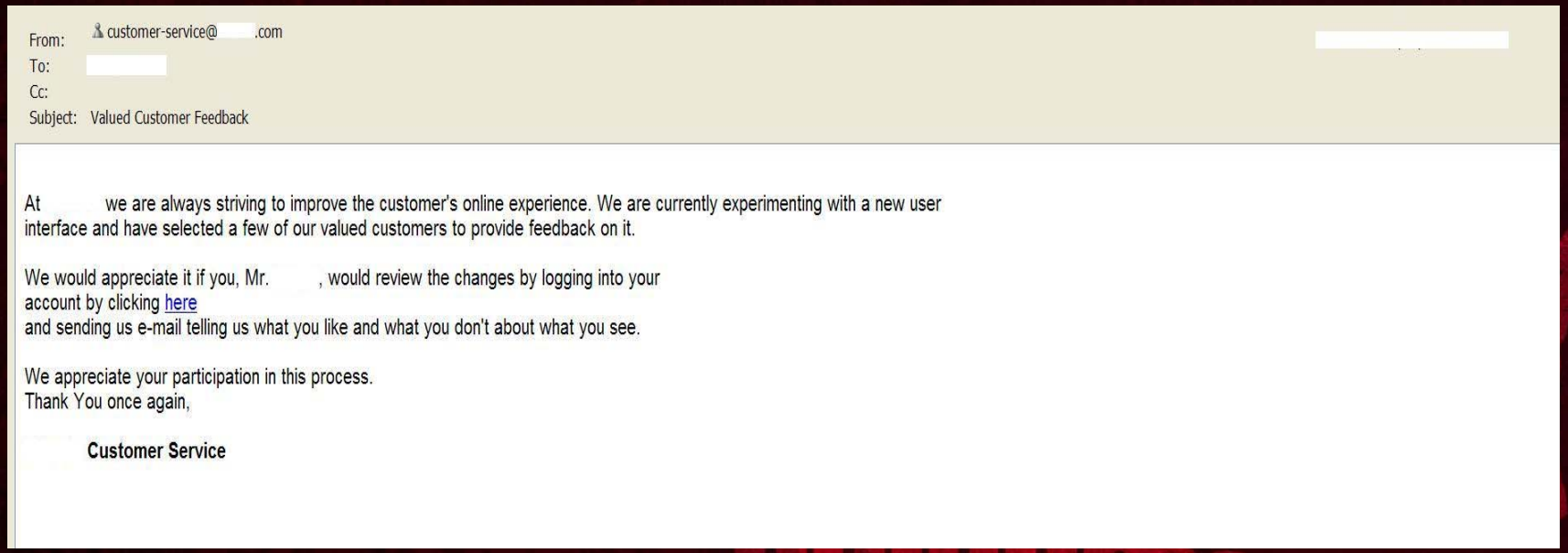
```
LogParser -o:csv "select * INTO
  sessionid.csv from *.log where
  cs-uri-query like
  '%90198e1525e4b03797f833ff4320af39'
  "
```

Can You Find The Smoking Gun?

#Fields:time	c-ip	cs-method	cs-uri-stem	cs-uri-query	Status
1:18:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:23:16	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
1:28:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
.	.	.	.	.	.
.	.	.	.	.	.
13:53:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
13:58:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
14:03:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
14:07:23	172.16.14.166	POST	/login.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
14:07:54	172.16.14.166	POST	/account.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
14:08:15	172.16.22.33	POST	/execute.asp	sessionid=90198e1525e4b03797f833ff4320af39	200
14:10:09	172.16.22.33	POST	/confirm.asp	sessionid=90198e1525e4b03797f833ff4320af39	200

Phishing?

- No indications of key logging trojans, malware, viruses, etc. were found on the victim's computer.
- Look what we found in the archived .pst file:



From: customer-service@ .com
To:
Cc:
Subject: Valued Customer Feedback

At we are always striving to improve the customer's online experience. We are currently experimenting with a new user interface and have selected a few of our valued customers to provide feedback on it.

We would appreciate it if you, Mr. , would review the changes by logging into your account by clicking here
and sending us e-mail telling us what you like and what you don't about what you see.

We appreciate your participation in this process.
Thank You once again,

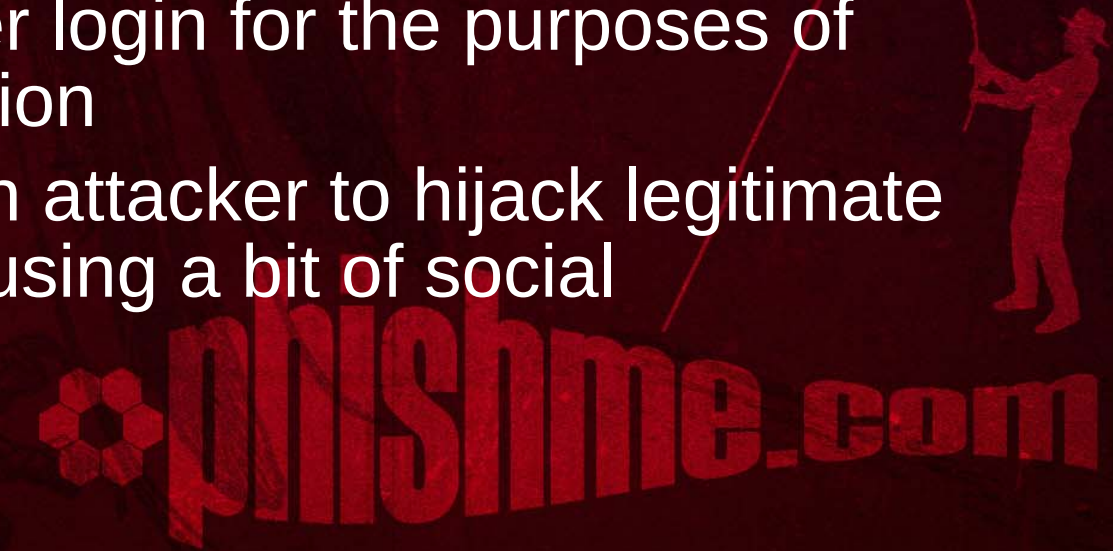
Customer Service

URL: https://www.xyzbrokerage.com/login.asp?sessionid=90198e1525e4b03797f833ff4320af39

Session Fixation

The application was confirmed to be vulnerable to session fixation:

- A session id was issued before login
- The same session id was used by the application after login for the purposes of user authorization
- This allowed an attacker to hijack legitimate user sessions using a bit of social engineering



A Report From The Trenches

Symptoms

- On April 3, 2007
- Windows Security Event ID: 624 on Domain Controller

```
New Account Name: aelitasrvss
Caller User Name: SYSTEM
Privileges: administrator
```

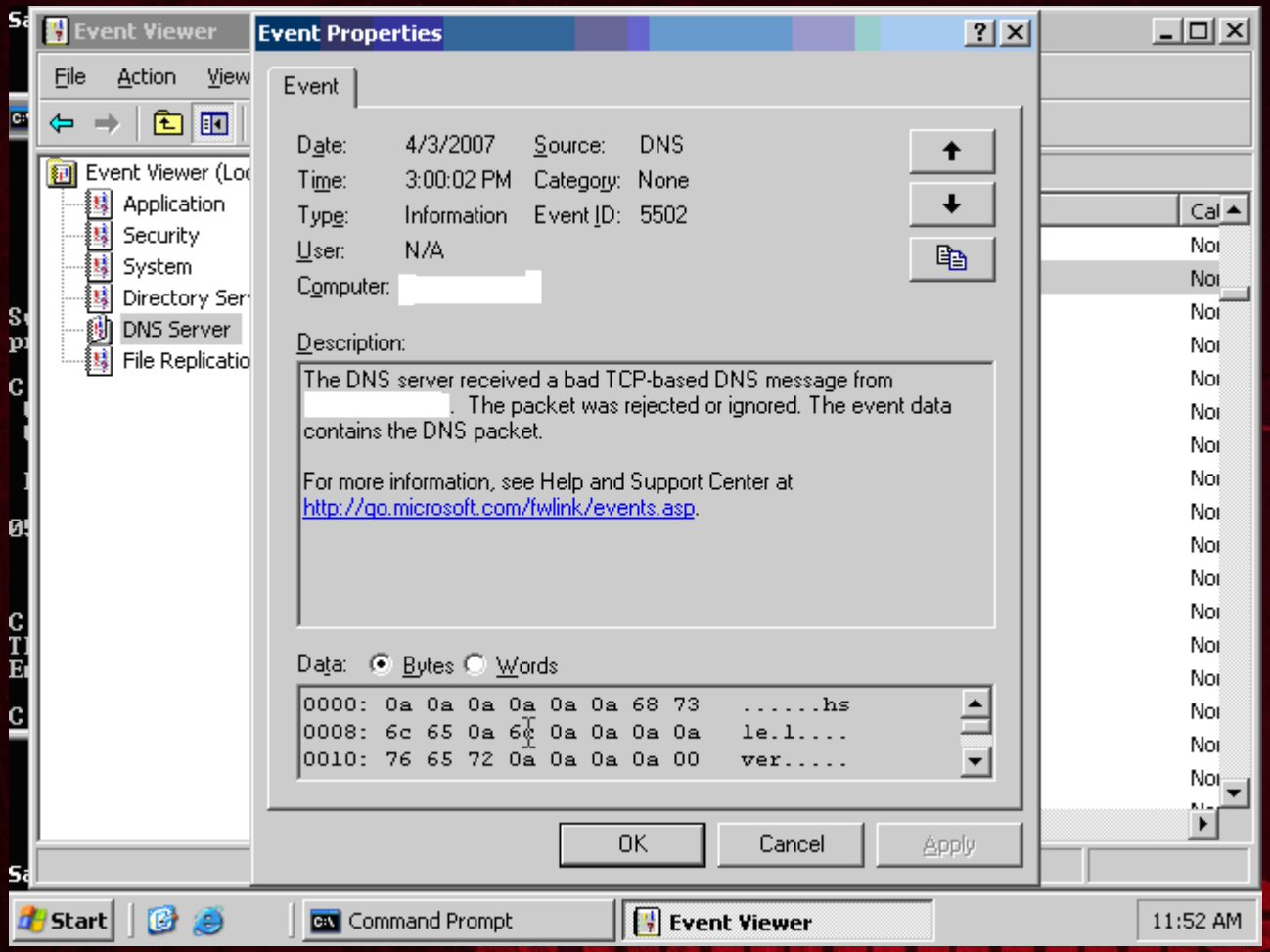
Preliminary Investigation

- Windows Security Event Log ID: 540 with a time stamp of (T+3) hours
- Username: `ABCDOMAIN \ ABCADMIN`
- Logon Type: 3 indicated Network Logon
- Source Network Address indicated that the logon originated from a workstation (`\\RIVER`) in the most guarded part of the network

Investigating the DC

- How did the attacker break in to the DC?
  - No traces of password guessing
  - DC was up to date on patches…or at least MBSA so reported
- How did the attacker run commands as SYSTEM?
- How did the attacker use an existing domain administrator account – ABCADMIN?

That's How the DC fell...



And what about ABCADMIN?

- This administrative account had a “strong” password
- The issue was it was hard to guess, but easy to crack

  http://blog.phishme.com/2007/06/windows-passwords-guess-ability-vs-crack-ability/
- Using a combination of rainbow tables (ophcrack) and a password cracker (john) the password cracked in under 5 minutes!

Honing In On RIVER

Live Response

- `Smart Card Manager` service associated with `ipripsvc.dll`
- An analysis of the DLL indicated that it was similar to Backdoor.Ripgof.B
- No spurious processes

How did the attacker Own the Workstation

- The workstation wasn't Internet routable
- Did the user do something to facilitate the attack?
- Time to focus on user activity
  - Web browser history and cache
  - User's email inbox

Reviewing User Activity

- Browser History
  - Request to `/images/singup.exe` from a site in Taiwan on 3/27/2007
- Email Archives
  - Email from the organization's HR department on 3/27/2007 with an attachment called Healthcare_Update.chm

Healthcare_Update.chm

- **C**ompiled **H**T**M**L
- Contained a link to /images/singup.exe
- Eureka!

Conventional Countermeasures

User Awareness Campaigns

- Poster Campaigns
- Brown Bag Sessions

Reactive Technologies

- Email Filtering Software
- Cousin Domain Monitors
- Site Takedown Services

Mock Phishing Exercises

- **Recommended by SANS Top 20 (2007)**

  "The most promising method of stopping spear phishing is continuous periodic awareness training for all users; this may even involve mock phishing attempts to test awareness "

- **CMU study finds them to be the most effective user training mechanism**

  "..users learned more effectively when the training materials were presented after they fell for the phishing attack (embedded) than when the training materials were sent by email (non-embedded)…"

- 10,000 employees “phished”
- First run…
  - 75% of employees opened the email
  - 17% followed the link
  - 15% entered data
- Second Run …
  - Only 8% even opened the email

Source: Wall Street Journal

- 500 Cadets “phished”
- 80% fell prey
- Mock Phishing Exercises run Quarterly

Source: Wall Street Journal

Intrepidus Group Client

- 24,000 employees
- 3 times in a 12 month period
- Significant Improvement

Thank You