Bad Cocktail

Spear Phishing + Application Hacks

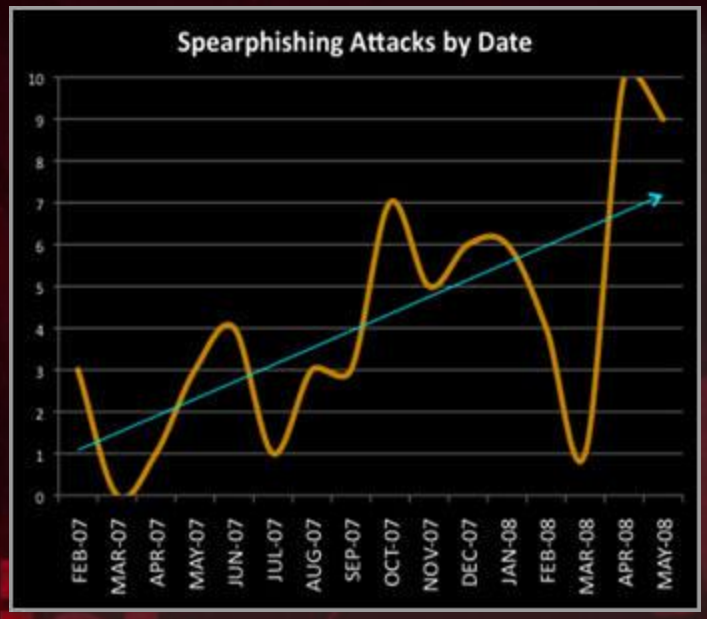
OWASP Chicago

August 2008


LIVE
FAY FLOODS
NEW FOX POLLS
AGE RAGE
08·21·08
NATIONAL HEADLINES
POLICE: BOMB SUSPEC
READY TO WAGE 'WAR'
CALIF.
AMERICA'S
ELECTION HQ
NEW WASHINGTON LAW
PITS SAME PARTY
CANDIDATES AGAINST
EACH OTHER
ENTERTAINMENT
MAGAZINE: DAVID
BECKHAM HAS BEST A
IN HOLLYWOOD
FOX NEWS channel
MIKE WALKER
INTREPIDUS GROUP
LIVE Desk
IGATORS CONCLUDE FIRE CAUSED WORLD
NAS 2,374.62
Panasonic

Spear Phishing Is A Problem

- > 15,000 corporate victims in 15 months
- Victim Losses have exceeded $100,000
- Recent Victims
  - Salesforce.com
  - Critical infrastructure at large energy company

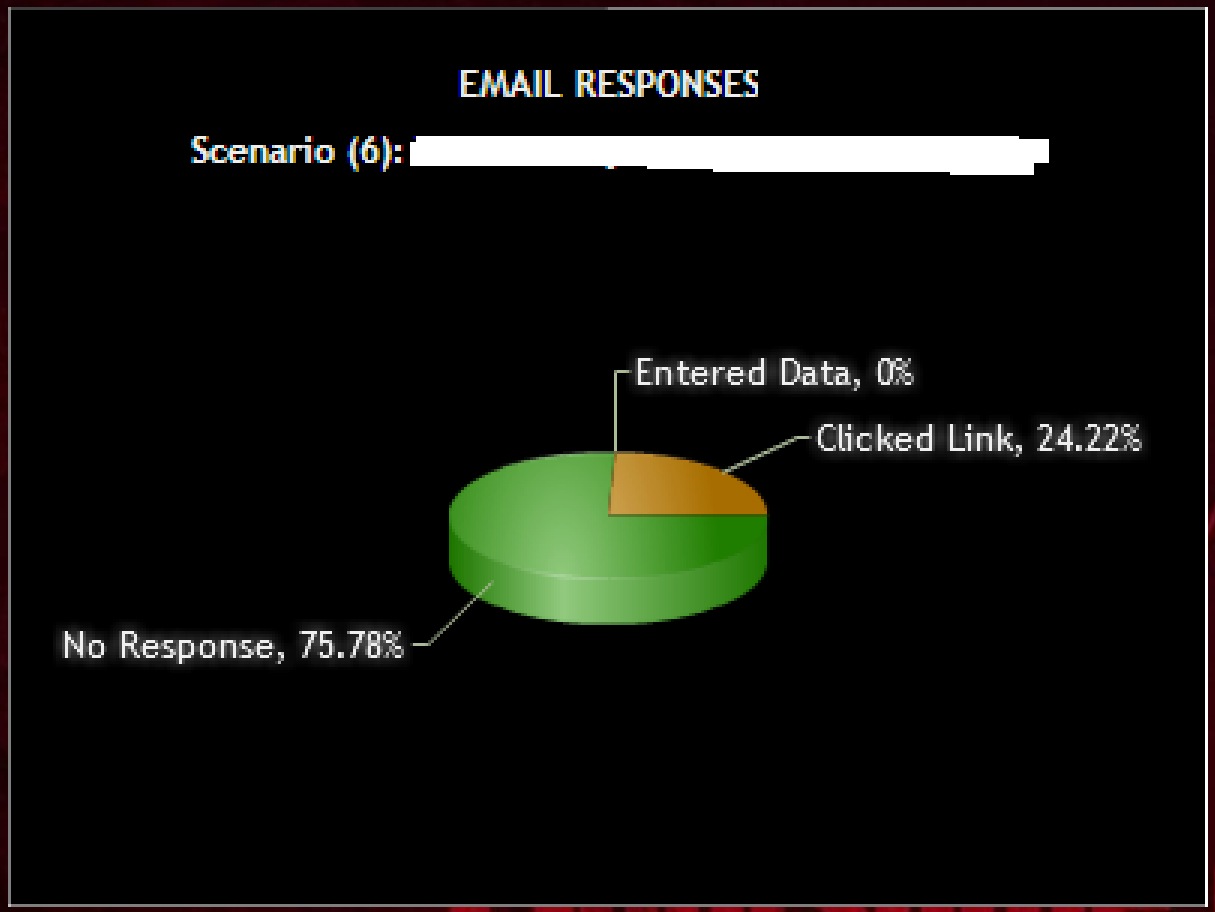


Sources: iDefense Labs, Washington Post

Why Does Spear Phishing Succeed?

- People are “click happy”
- Phishing attacks have gotten more sophisticated – use of legitimate sites with application security flaws
- Reactive Anti-Phishing technologies aren’t good enough….may never be!

People Are “Click Happy”



How To Use Legitimate Sites

Take advantage of:

- Cross Site Scripting
- Insecure URL redirection
- Session Fixation
- Insecure ActiveX Controls

The XSS Phishing Mail

- More realistic phishing attack because it uses the actual site (often even over HTTPS)

- XSS Tricks
  - Expect HEX encoding of attack parameters
    - “<script>” = “%3C%73%63%72%69%70%74%3E”
  - Short attack parameter that links to a remote “.js” file for more javascript or an “iframe” tag that loads remote HTML form

XSS Emails in the Real World

CHARTER ONE BANK

Dear valued **Charter® One** member,

Due to concerns, for the safety and integrity of the online bankin
message.

It has come to our attention that your **Charter® One** account in
continuing commitment to protect your account and to reduce th
please take 5-10 minutes out of your online experience and renew
problems with the online service. However, failure to confirm you

Once you have confirmed your account records your internet ba
continue as normal.

To confirm your bank account records please click here.

Note:
This e-mail was sent on behalf of the online banking community, if you do not
this message does not apply to you and you may ignore this message.

- Charter One Bank (Citizens Financial Group)
  - March 2005

https://www.charterone.com/pf/?ygtkt=%61%53%33%87%64%38%80%87%76%23%66%59%44%95%16%28%88%12%19%85%91%20...

Cross Site Scripting Not Dead Yet

Citibank's critical cross-site scripting vulnerabilities
Written by Dimitris Pagkalos
Saturday, 16 August 2008

DaiMon and mox have discovered two critical XSS flaws on Citibank's website.

read more...

Justin.tv non-malicious cross-site scripting worm
Written by Dimitris Pagkalos
Tuesday, 8 July 2008

x2Fusion from TheDefaced.org security team, recently contacted us in regards to a serious XSS vulnerability on the popular lifecasting website Justin.tv.

read more...

ICANN and IANA domains hijacked by Turkish crackers
Written by Marcelo "Vympel" Almeida and Kevin Fernandez
Thursday, 26 June 2008

The ICANN and IANA websites were defaced earlier today by a Turkish group called "NetDevilz". ICANN is responsible for the global coordination of the Internet's system of unique identifiers. These include domain names, as well as the addresses used in a variety of Internet protocols.

read more...

HSBC web sites are open to critical XSS attacks. Warning to customers!
Written by Dimitris Pagkalos
Saturday, 21 June 2008

URL redirection

- Used to mask where the link is really taking you

- Often comes in one of two ways
  - 3rd party trust (known vendor, popular search site)
  - Or misconfiguration on your site

URL 3rd Party Redirection

- Because search engines never lie… right?
  - http://www.google.com/url?q=http://68.207.70.141/signin.ebay.com/Members_Log-in.htm
  - http://world.altavista.com/urltrurl?url=http%3A%2F%2Fworld2altavista.com%2FSearch
- Often used for tracking Ad clicks, many sites will have a way to redirect based off a URL sent in

Homegrown Redirection

- Be careful about how your own redirects are coded

- http://site.com/?location=us may become http://site.com/?location=http://evil.com
- Again HEX encoding tricks can be used
  - “evil.com” = “%65%76%69%6C%2E%63%6F%6D”

Don’t forget Flash

- Flash Objects can perform their own redirects.
- “eBay Flash-redirect scam”
  - Reported in Aug 2007
  - Attacker creates legitimate auction page but places malicious flash “SWF” file in description
  - When another eBay user views their page, they are redirected to a cloned malicious site which ask them to login

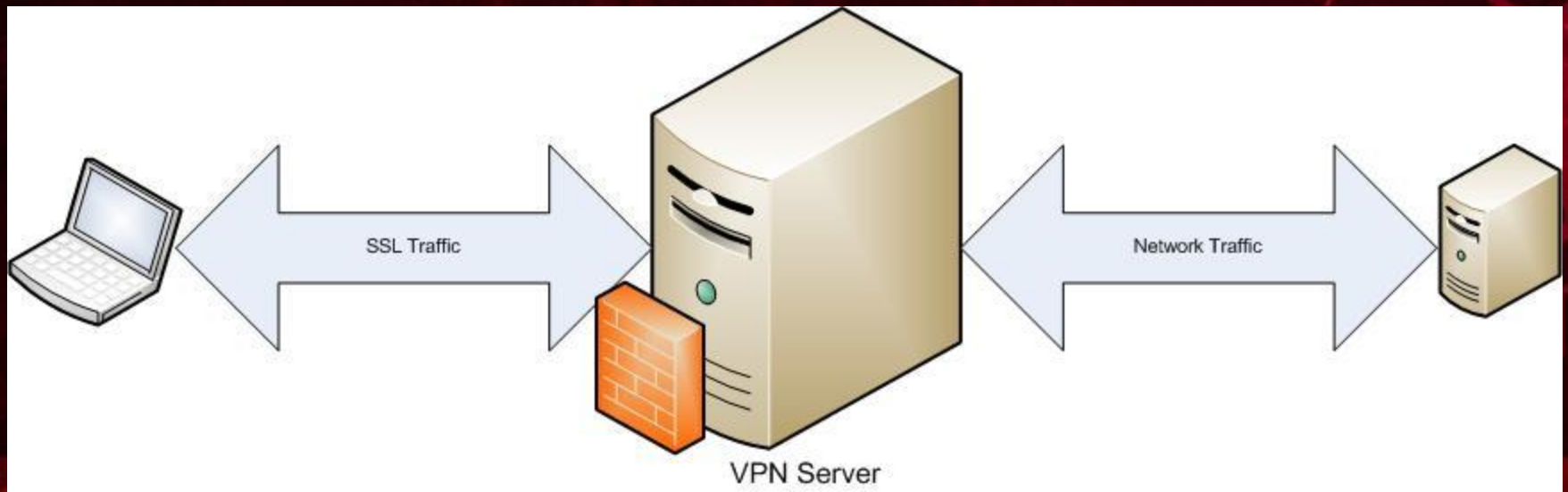
Would you notice a redirect?

- Since you just clicked on a legitimate link, you may expect the page to reload

Insider Phishing Attack

- Some SSL VPNs can be used by an attacker to form believable “internal” phishing sites
- A legitamte link to the mail server maybe:

```
https://sslvpn.yourcompany.com/cgibin/nph/http%3A%2F%2F192.168.151.100/exchange/
```

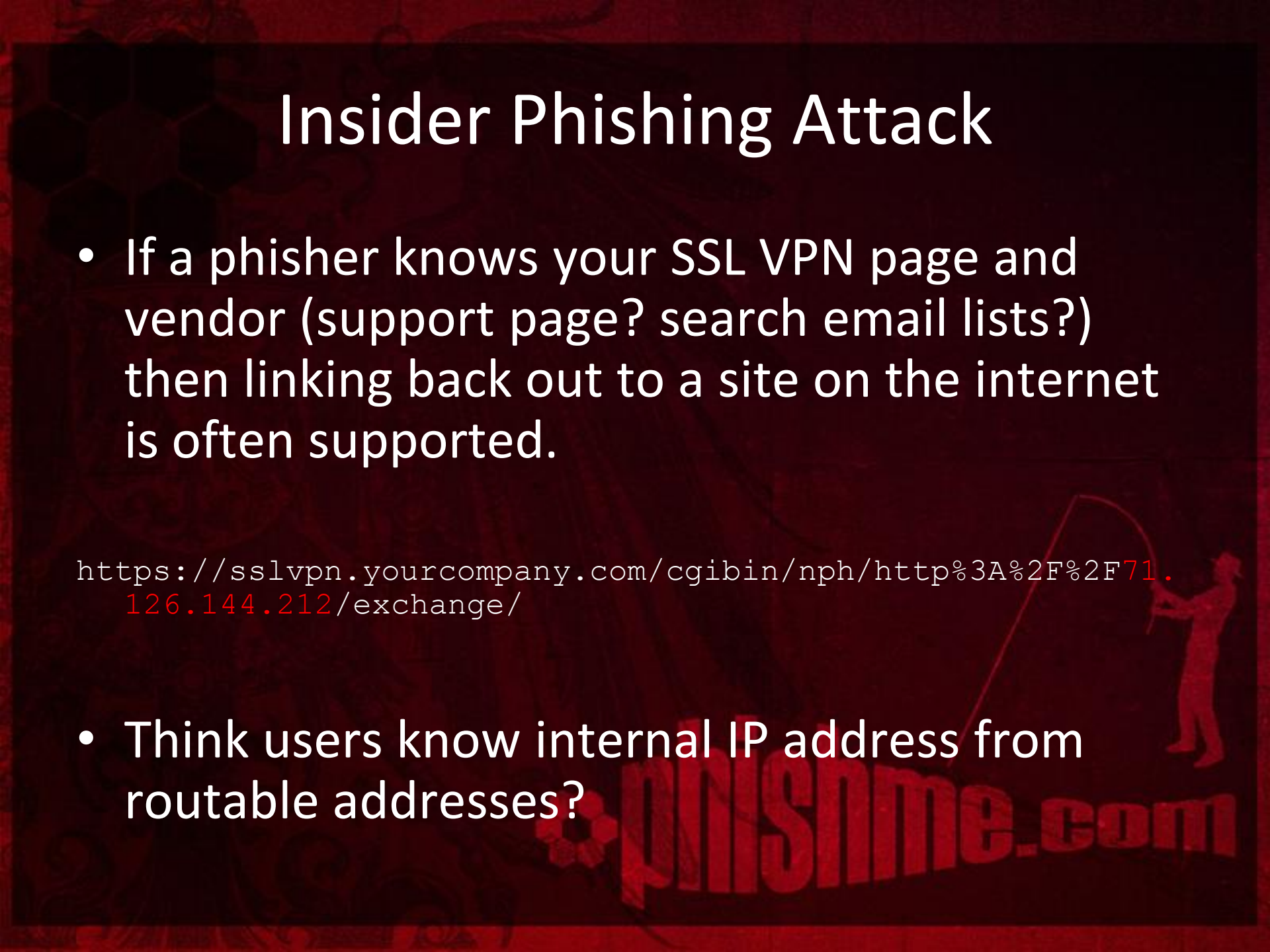


Insider Phishing Attack

- If a phisher knows your SSL VPN page and vendor (support page? search email lists?) then linking back out to a site on the internet is often supported.

```
https://sslvpn.yourcompany.com/cgibin/nph/http%3A%2F%2F71.
   126.144.212/exchange/
```

- Think users know internal IP address from routable addresses?



Next Level: CSRF->DNS->Phish

- This attack as been described at “drive-by pharming” and seen in the wild in Jan 2008 targeting Mexican banking sites
- Complex Attack in 3 Steps
  - 1) Use a CSRF attack against home router to reconfigure DNS settings

```
https://192.168.1.1/apply.cgi?submit_button=Sub
mit&action=Apply&block_wan=1&block_loopbacks=0&
dns1=6.6.6.6
```

Next Level: CSRF->DNS->Phish

- Complex Attack in 3 Steps (continued
  - 2) Attacker hosts DNS server at “6.6.6.6” and returns malicious DNS responses for known banking sites.
  - 3) Malicious response point to fake cloned site. The URL matches the legitimate site, however DNS gave out the wrong IP address

- Attacker can just wait for victim to surf to their trusted site, or send an email with a real link

Drive-By Pharming

- Sneaky, but difficult to execute
  - Must trick users into visiting site hosting CSRF attack
  - Victim's router IP must be know, must be vulnerable to CSRF, often must be logged in
  - HTTPS request will trigger invalid certificate responses

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

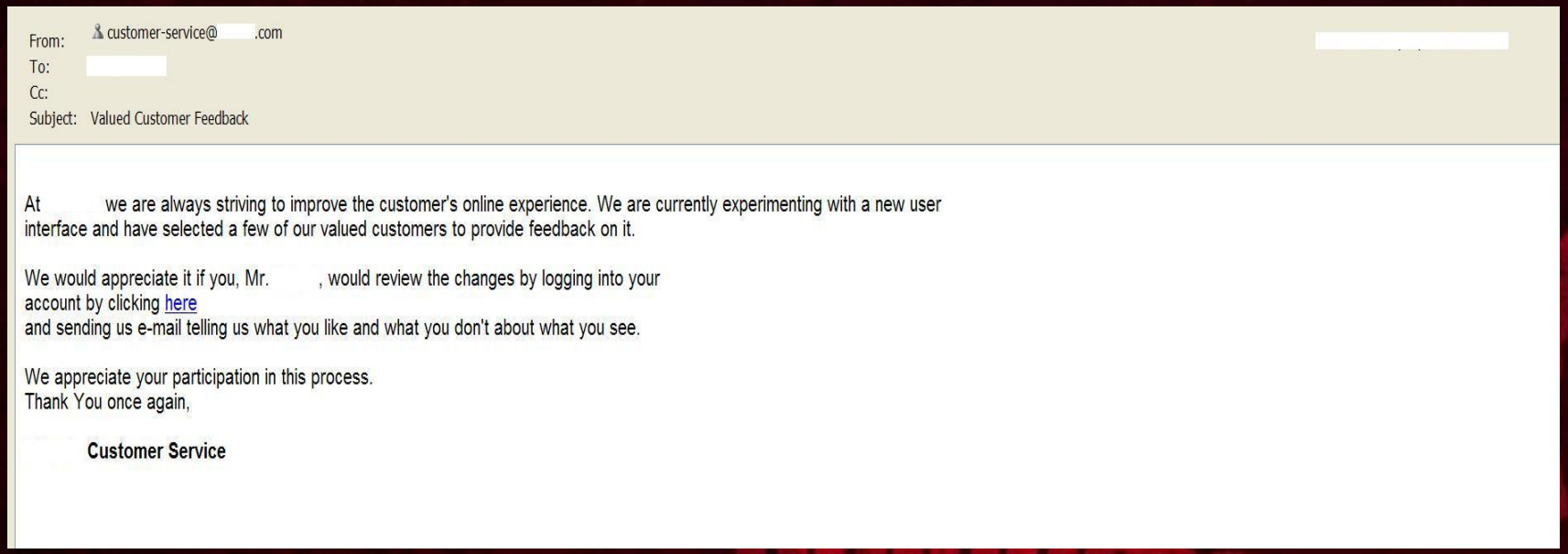
```
LogParser -o:csv "select * INTO
  sessionid.csv from *.log where
  cs-uri-query like
  '%90198e1525e4b03797f833ff4320af39'
  "
```

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.

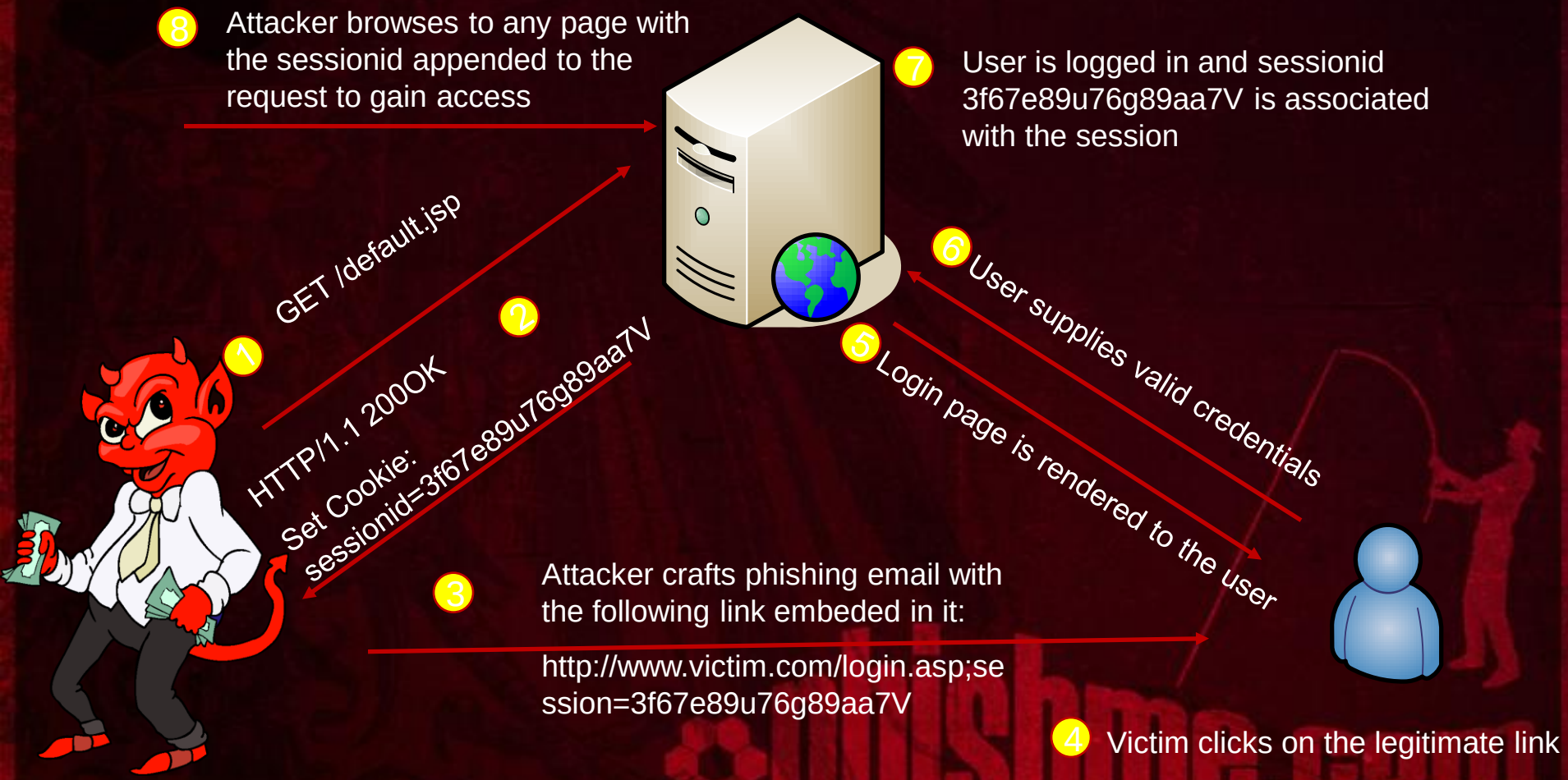
We would appreciate it if you, Mr. , would review the changes by logging into your account by clicking here
and sending us e-mail telling us what you like and what you don't about what you see.

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

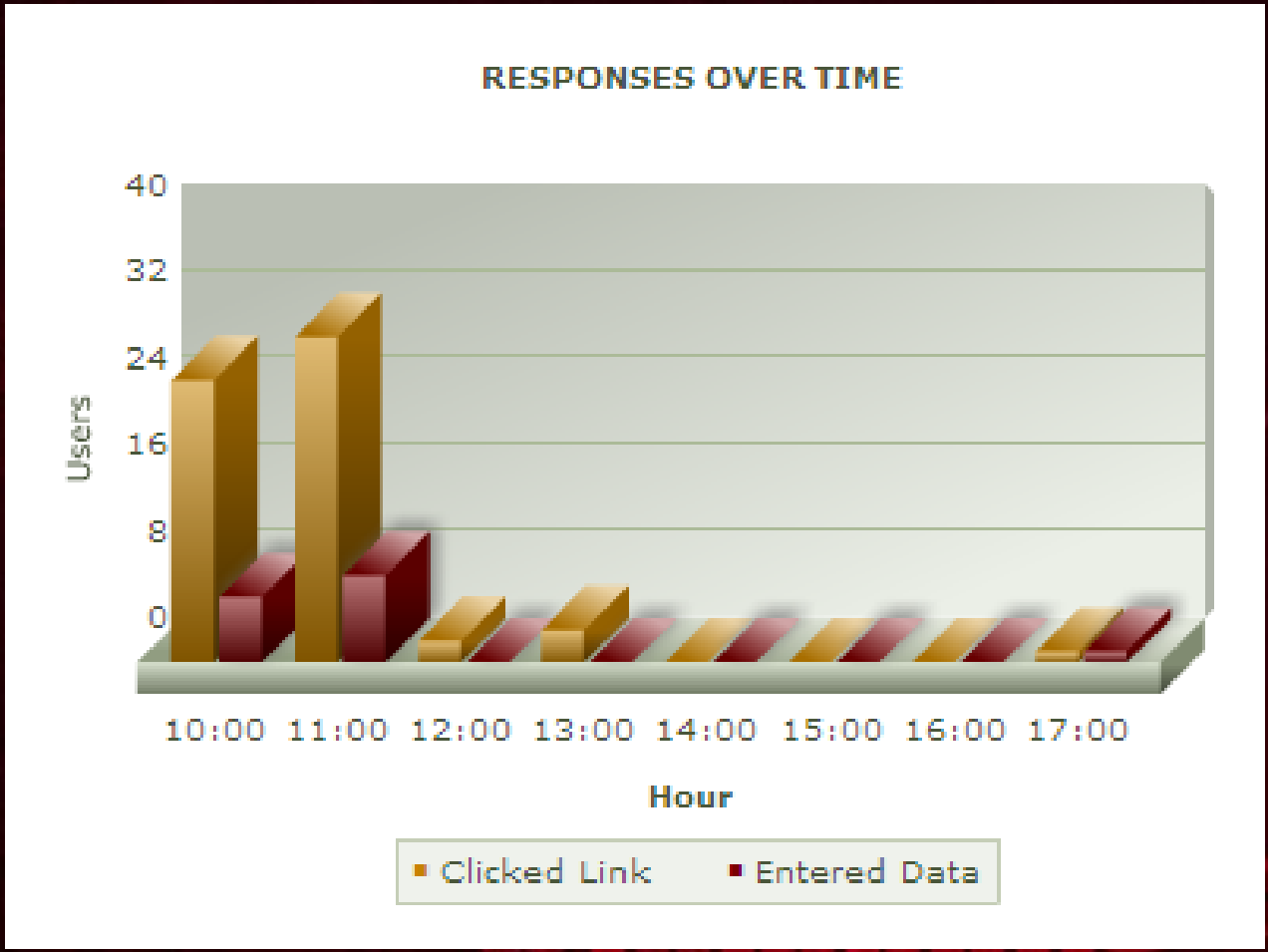
Customer Service

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

Session Fixation



Why Reactive Technologies Fail…



Thank You

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