



# Internet Activity Analysis



Cybercrime Lab  
U.S. Department of Justice  
Computer Crime and intellectual Property Section



# Internet Activity Analysis

## Agenda

- How does web surfing works
- Where to Find Evidence of Web Surfing Activity
- Internet Activity Analysis and Tools needed.
  - User computer
  - Web server
  - Internet Service Provider (ISP)





# How does web surfing work

Visit [www.barbadospolice.gov.bb](http://www.barbadospolice.gov.bb)

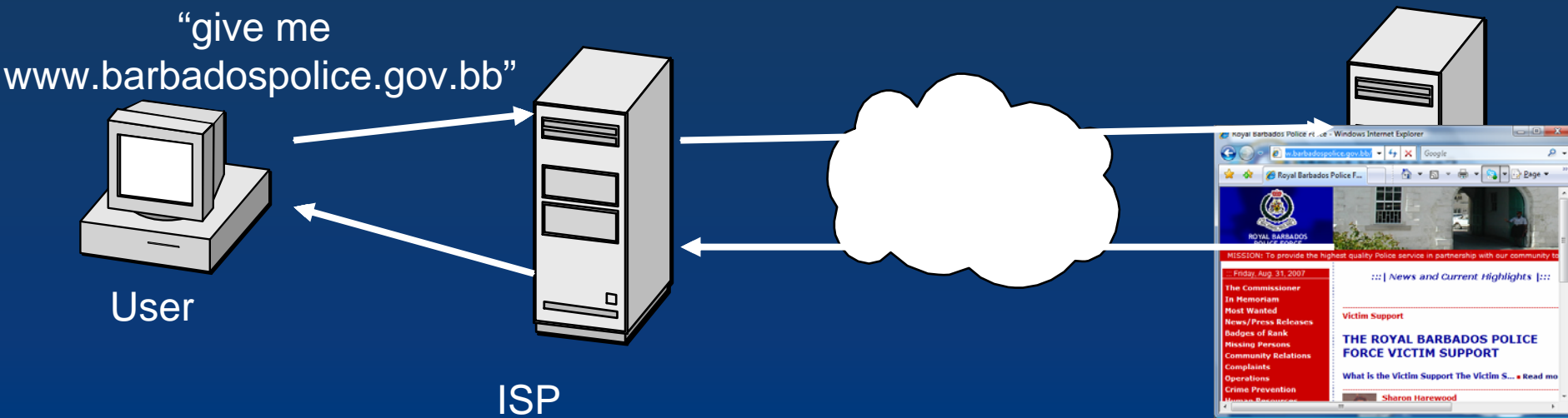




# How does web surfing work

## What Happens

- Our browser sends a request to the web server
- The web server sends files that makes up the webpage to our computer





# Where to Find Web Surfing Evidence

- User Computer:
  - Temporary Internet Files, index.dat, cookies, favorites, html pages and images in un-allocated space.
  - C:\Documents and Settings\<user>\Local Settings\History
  - Files from web sites, ftp programs and logs
- Web Server:
  - Site Content, Access logs, Error Logs, FTP Logs
  - Log Reporting Tools: Ana-log, web-analyzer, etc.
- Intermediate Sites (ISP)
  - Firewall logs, Anti-virus server logs, spam filter logs, web filtering logs (Web Sense)

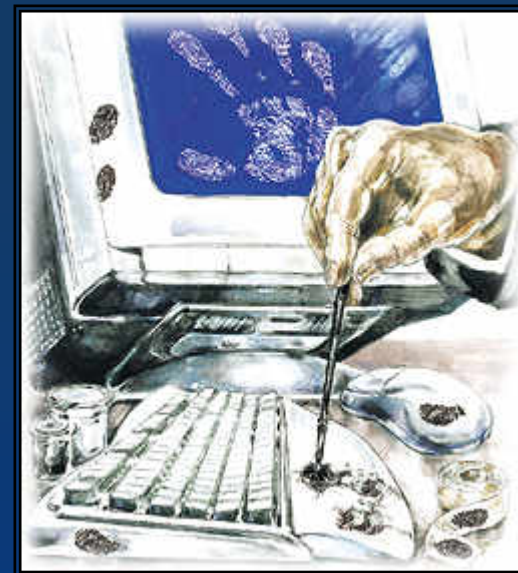




# Evidence on User Computer

## Evidence on user computer

- Temporary Internet Cache
- History
- Index.dat
- Cookies
- Registry





# Temporary Internet Cache

C:\documents and settings\username\Local Settings\Temporary Internet Files

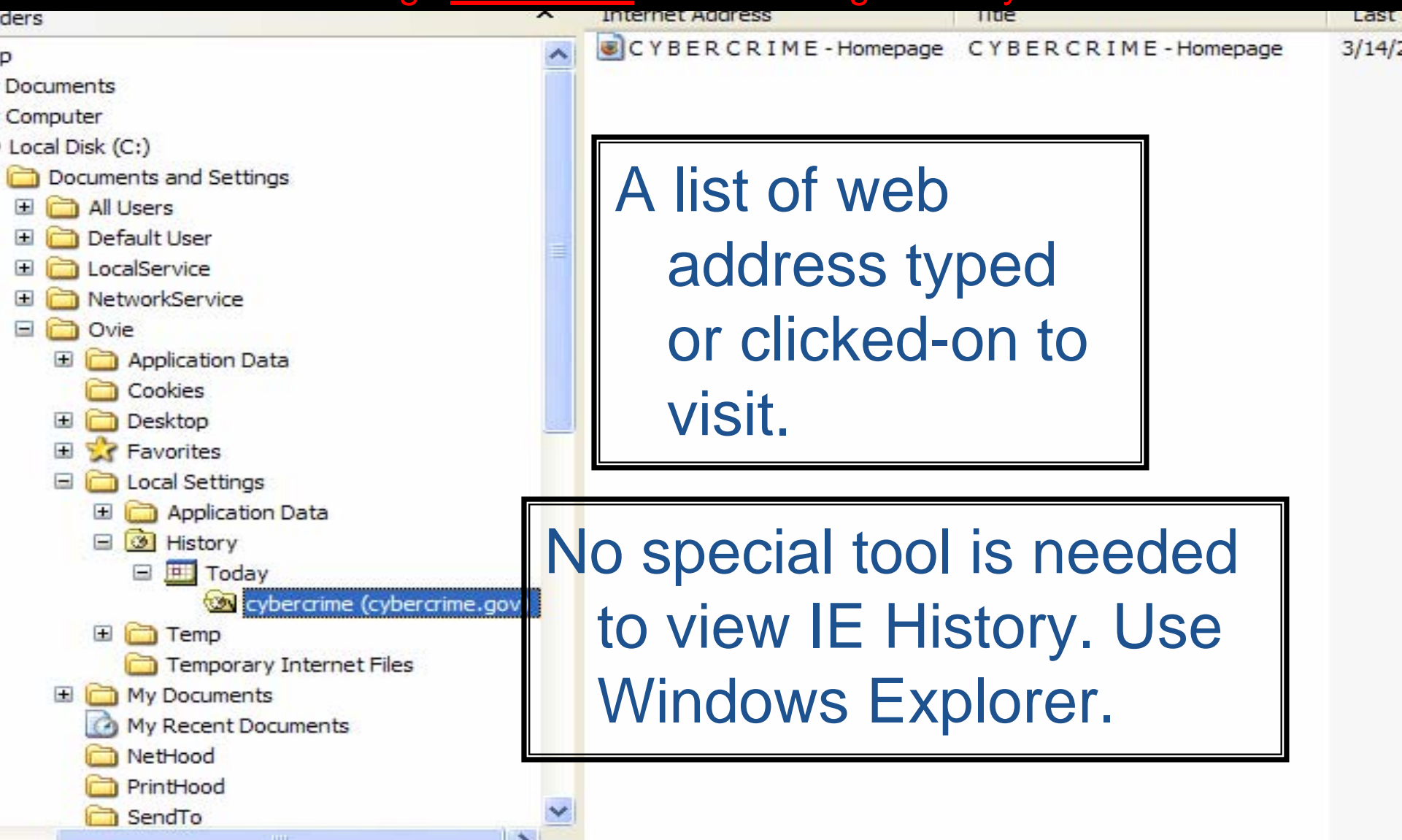
Name	Internet Address	Type	Size	Expires	Last Accessed	Last Checked
cybercrime.gov/	http://cybercrime.gov/	HTM File	12 KB	None	3/14/2006 1:21 PM	3/14/2006
cyberIndex.css	http://cybercrime.gov/cyberStyles/cyb...	Cascading St...	2 KB	None	3/14/2006 1:21 PM	3/14/2006
bar9.gif	http://cybercrime.gov/image/bar9.gif	GIF Image	33 KB	None	3/14/2006 1:21 PM	3/14/2006
				None	3/14/2006 1:21 PM	3/14/2006
				None	3/14/2006 1:21 PM	3/14/2006
				None	3/14/2006 1:21 PM	3/14/2006

Files from web server are saved on local drive to avoid the need of downloading until the web page is updated.

No special tool is needed to view Temporary Internet Cache. Use Windows Explorer.

# IE History

C:\documents and settings\username\Local Settings\History



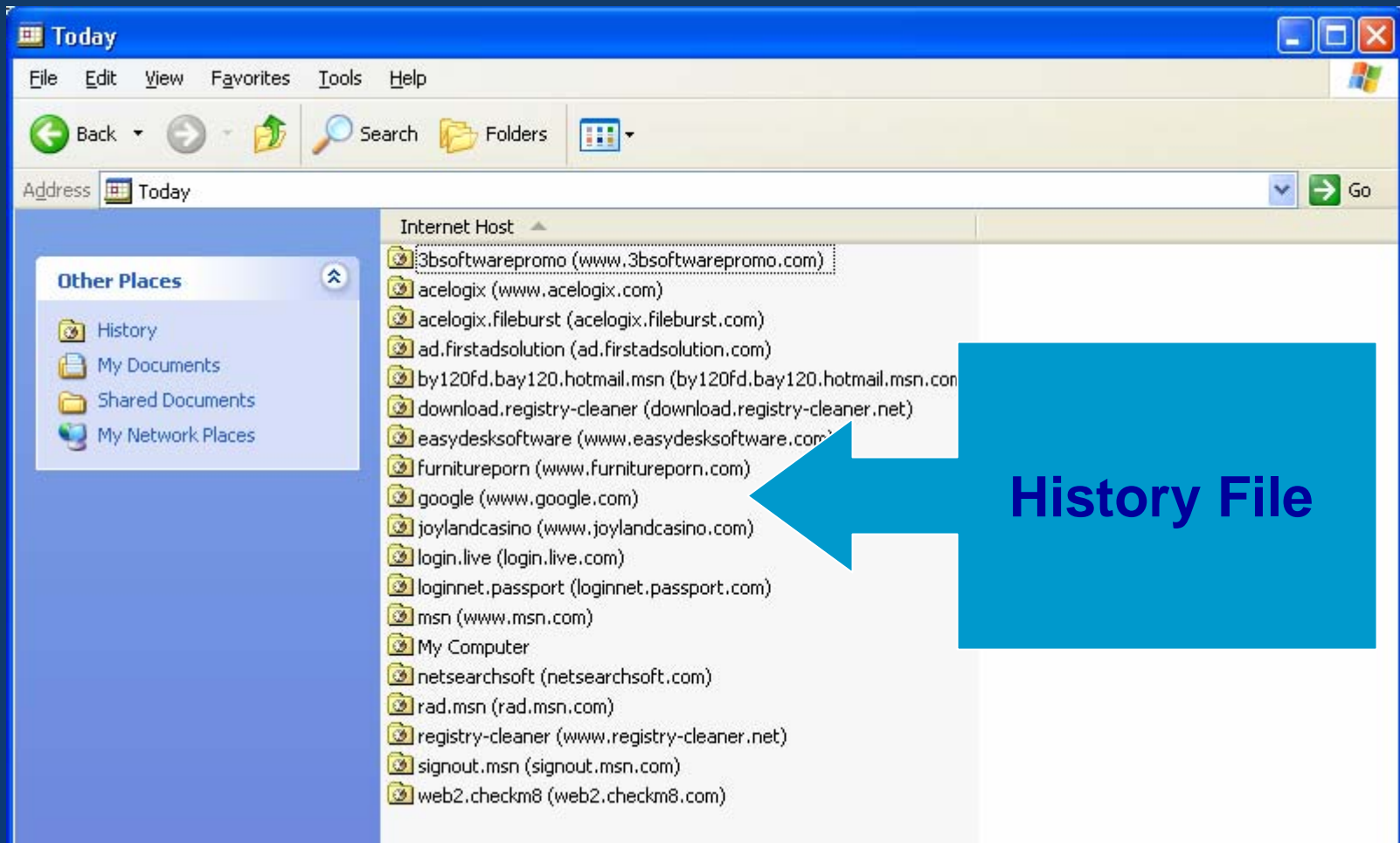
A list of web address typed or clicked-on to visit.

No special tool is needed to view IE History. Use Windows Explorer.





# IE History





# History

A screenshot of an Internet Explorer browser window. The address bar shows "Today". The left sidebar displays "Other Places" with a list of folders: History, My Documents, Shared Documents, and My Network Places. The main content area shows a list of internet shortcuts. A "Google Properties" dialog box is open, displaying the "General" tab. The dialog box shows the icon for Google, the type "Internet Shortcut", the internet address "http://www.google.com", the last visited date "9/4/2007 6:59 PM", and the number of times visited "596". A blue arrow points from a text box on the right to the "Last Visited" and "Times Visited" fields in the dialog box.

Today

File Edit View Favorites Tools Help

Back Forward Stop Search Folders

Address Today

Other Places

- History
- My Documents
- Shared Documents
- My Network Places

Internet shortcuts

Google Properties

General

Google

Type: Internet Shortcut

Internet Address: <http://www.google.com>

Last Visited: 9/4/2007 6:59 PM

Times Visited: 596

OK Cancel

web2.checkm8 (web2.checkm8.com)

History of Pages Viewed & Times



# Evidence on User Computer

## Index.dat

- Contain a log all files makes up all the web pages visited.
- Needs special tools to decode this file.
  - IE history viewer
  - Net Analysis
- Reside in Folder “Documents and Settings\<User>\Local settings\Temporary Internet Files\Content.IE5” for Internet Explorer, Windows XP





# Evidence on User Computer

## Analyzing Index.dat

- Special tool is needed to view Index.dat file.



Paraben Net Analysis  
[www.logon-int.com](http://www.logon-int.com)



# Analyzing Index.dat Using IEhistory Viewer

IEHistoryView: c:\documents and settings\Administrator\Local Settings\History

File Edit View Help

URL Hits Modified Date Expiration Date

about:Home 2006 12:59:01 AM N/A

**Select User Profile**

User Profile:

- Administrator
- CCIPS
- Default User
- LocalService
- NetworkService
- Olvie

1 item(s)





# Analyzing Index.dat Using IEhistory Viewer

IEHistoryView: C:\Documents and Settings\CCIPS\Local Settings\History

File Edit View Help

URL	Hits	Modified Date	Expiration Date	User Name
<input type="checkbox"/> http://cyberspeak.libsyn.com/index.php?post_id=155453&comments=on	11	11/27/2006 9:05:19 PM	12/23/2006 9:05:20 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com/index.php?post_id=155453&comments=on	10	11/27/2006 9:05:19 PM	12/23/2006 9:05:20 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com/rss	5	11/27/2006 9:05:19 PM	12/23/2006 9:05:20 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com	10	11/27/2006 9:05:16 PM	12/23/2006 9:05:18 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com/index.php?post_id=153162&comments=on	11	11/27/2006 9:03:59 PM	12/23/2006 9:04:00 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com/rss	2	11/27/2006 9:03:58 PM	12/23/2006 9:04:00 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com/index.php?post_id=153162&comments=on	2	11/27/2006 9:03:58 PM	12/23/2006 9:04:00 PM	CCIPS
<input type="checkbox"/> http://cyberspeak.libsyn.com	7	11/27/2006 9:03:54 PM	12/23/2006 9:03:56 PM	CCIPS
<input type="checkbox"/> http://www.cybercrime.gov	7	11/27/2006 9:03:43 PM	12/23/2006 9:03:44 PM	CCIPS
<input type="checkbox"/> http://news.com.com/2547-1_3-0-20.xml	1	11/27/2006 9:03:29 PM	12/23/2006 9:03:30 PM	CCIPS
<input type="checkbox"/> http://search.live.com/results.aspx?q=www.news.cnet.com&src=IE-Address	7	11/27/2006 9:03:15 PM	12/23/2006 9:03:16 PM	CCIPS
<input type="checkbox"/> http://search.live.com/results.aspx?q=www.news.cnet.com&format=rss	1	11/27/2006 9:03:14 PM	12/23/2006 9:03:16 PM	CCIPS
<input type="checkbox"/> http://local.live.com/i/spacer.gif	1	11/27/2006 9:00:14 PM	12/23/2006 8:53:06 PM	CCIPS
<input type="checkbox"/> http://local.live.com/favicon.ico	3	11/27/2006 8:59:57 PM	12/23/2006 8:52:48 PM	CCIPS
<input type="checkbox"/> http://local.live.com	1	11/27/2006 8:59:56 PM	12/23/2006 8:52:48 PM	CCIPS
<input type="checkbox"/> https://lms.digitalthink.com/lms/com/digitalthink/lms/tk/jspDriver/lms_driver.jsp;LMSJSESSIONID=Fq42...	22	11/27/2006 8:59:47 PM	12/23/2006 8:52:38 PM	CCIPS
<input type="checkbox"/> file:///C:/Documents%20and%20Settings/CCIPS/Desktop/Internet%20Analysis.ppt	1	11/27/2006 8:56:16 PM	12/23/2006 8:56:18 PM	CCIPS
<input type="checkbox"/> file:///C:/Documents%20and%20Settings/CCIPS/Desktop/iehv_lng.ini	1	11/27/2006 8:34:46 PM	12/23/2006 8:34:48 PM	CCIPS
<input type="checkbox"/> file:///C:/Documents%20and%20Settings/CCIPS/Desktop/iehv_spanish.zip	1	11/27/2006 8:34:02 PM	12/23/2006 8:34:04 PM	CCIPS
<input type="checkbox"/> file:///C:/Documents%20and%20Settings/CCIPS/Desktop/Info%20Tools/iehv_lng.txt	2	11/27/2006 8:31:13 PM	12/23/2006 8:24:04 PM	CCIPS

677 item(s)

[illegible]

935762.5.1??PID=3232842&...	http://b.global.msads.net/ads/8707/
search?hl=en&q=Furniture+P...	http://www.google.com/search?hl=en&q=Furniture+P...
banner20.gif	http://www.furnitureporn.com/bann
chairie01.html	http://www.furnitureporn.com/chair
ca8.jpg	http://www.vgg.com/furnitureporn/
chairie02.html	http://www.furnitureporn.com/chair





# Returns to Surfing Furniture Porn



# Temporary Internet Files

View Favorites Tools Help



C:\documents and settings\username\Local Settings\Temporary Internet Files

X		Name	Internet Address
+ All Users		Cookie:ovie@2...	Cookie:ovie@2o7.net/
+ Default User			@adknowledge.com
+ LocalService			@advance.net/
+ NetworkService			@as-us.falkag.net/
- Ovie			@atdmt.com/
+ Application			@blockbuster.com/
+ Cookies			@bluestreak.com/
+ Desktop		Cookie:ovie@b...	Cookie:ovie@burstnet.com/
+ Favorites		Cookie:ovie@c...	Cookie:ovie@crucialsecurity.co
- Local S			ovie@doubledclick.net/
+ Ap			ovie@expedia.com/
+ His			ovie@google.com/
+ Te			ovie@google.fr/
+ Te			ovie@img.wmp10.elsitic
+ My Do			ovie@live.com/
+ My Re			ovie@live365.com/
+ NetHo			ovie@m.webtrends.com
+ ...			ovie@mediaplay.com/

File resides on the client computer for information a web server wants to track.

Special tool is needed to decode and view cookie files. However, some information is in clear text.



# IECookiesView

## Cookie Properties

Key:

VE\_StatePersistent

VE\_StatePersistent

SaveLocation=false&SaveSearches2=false&SaveScratchpad=true&DirectionUnit=m  
i&AnimatedMovementsEnabled=true&ClientPageSize=10&DontAskWiFiLocator=fals  
e&sp=Point.qggzz58kdqsm\_1301%20New%20York%20Ave%20NW%2c%20Washin  
gton%2c%20DC%2020005-4701%2c%20United%20States\_

msn.com

IP Address:

Sub-Values:

Key	Value
DirectionUnit	mi
AnimatedMoveme...	true
ClientPageSize	10
DontAskWiFiLoc...	false
sp	Point.qggzz58kdqsm_1301%20New%20York%20Ave%20NW%

Close

47 Cookie Files,

# Registry

File Edit View Favorites Help

- + File Manager
- FTP
- GDIPlus
- + IMEJP
- + IMEMIP
- + Installer
- + Internet Account Manager
- Internet Connection Wizard
- Internet Explorer
  - + Default HTML Editor
  - + Default MHTML Editor
  - + Desktop
    - Document Windows
    - Download
  - + Explorer Bars
  - + Extensions
  - Help\_Menu\_URLs
  - + IntelliForms
  - + International
  - Main
  - + Media
  - + MenuExt
  - + New Windows
  - SearchUrl
  - + Security
  - Services
  - Settings
  - + Toolbar
  - TypedURLs**
  - URI SearchHooks

Name	Type	Data
(Default)	REG_SZ	(value not set)
url1	REG_SZ	http://www.hidemyass.com/
url2	REG_SZ	http://google.com/
url3	REG_SZ	http://www.cybercrime.gov/

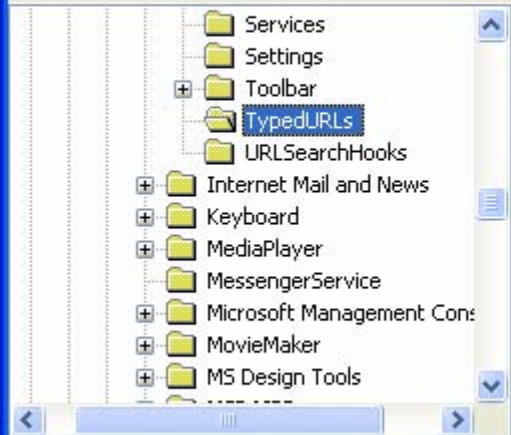


# Registry

- Human Typed URL's

## Registry Editor

File Edit View Favorites Help



My Computer\HKEY\_CURRENT\_USER\Software\Microsoft\Internet Explorer\TypedURLs

Name	Type	Data
(Default)	REG_SZ	(value not set)
url1	REG_SZ	http://www.furnitureporn.com/
url2	REG_SZ	http://hotmail.com/
url3	REG_SZ	http://google.com/
url4	REG_SZ	http://www.windowsupdate.com/
url5	REG_SZ	http://www.microsoft.com/isapi/redir.dll

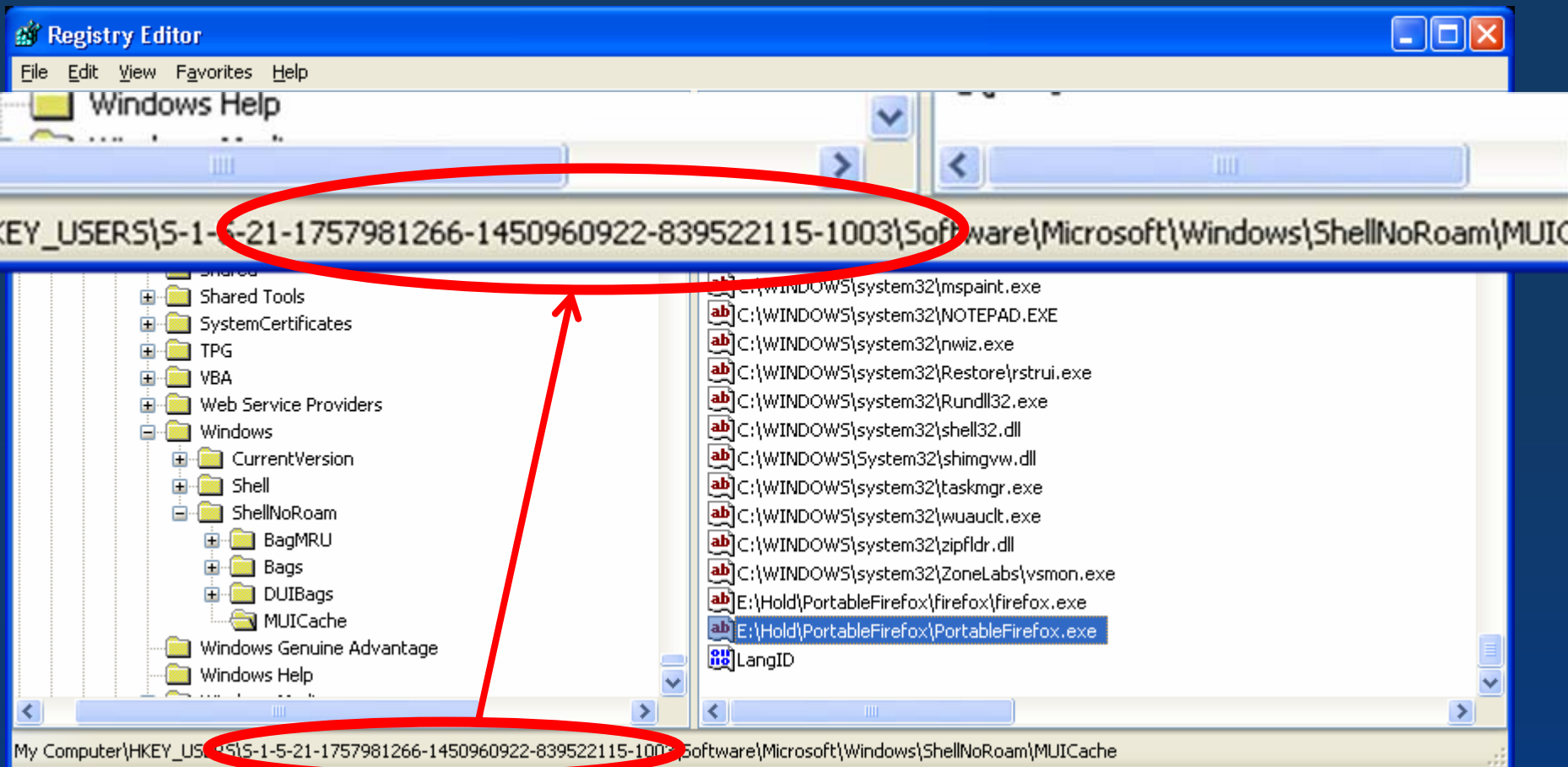
Read 

Microsoft\Internet Explorer\TypedURLs



# Registry

- Also tracked by User Security Identifier (SID)







# Why do we care about user's computer?

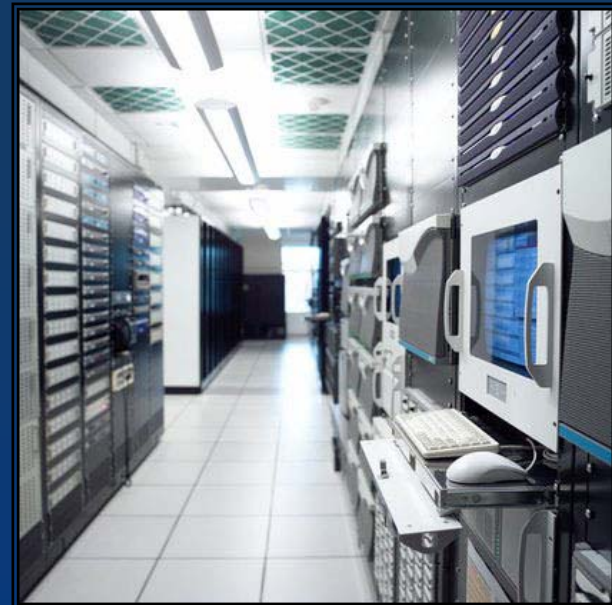
- Can be seized for evidence
- Can be used as an undercover investigation tool





# Evidence: Web Server

- Web access logs.
- The illegal contents web server provides to Internet users.





# Evidence: Web Server

**Sample Web Server Logs: each entry represents a request to the sever**

199.202.74.125 - - [25/Apr/2006:09:16:23:48 -0500] "GET /index.html /HTTP/1.0" 200 6248 "http://www.catsrus.com/links.htm"  
"Mozilla/4.0+(compatible;+MSIE+5.5;+Windows+98;+Win+9x+4.90)"

199.202.74.125 - - [25/Apr/2006:09:16:24:01 -0500] "GET /wordpress/seduction.jpg /HTTP/1.0" 200 47178  
"http://www.google.com/search?hl=en&q=kitty+porn"  
"Mozilla/4.0+(compatible;+MSIE+5.5;+Windows+98;+Win+9x+4.90)"

IP of requesting computer

Request (file requested)

Date/time of request (as seen by web server)

Bytes transferred

Referrer URL (the referring page)

User Agent (browser, operating system)



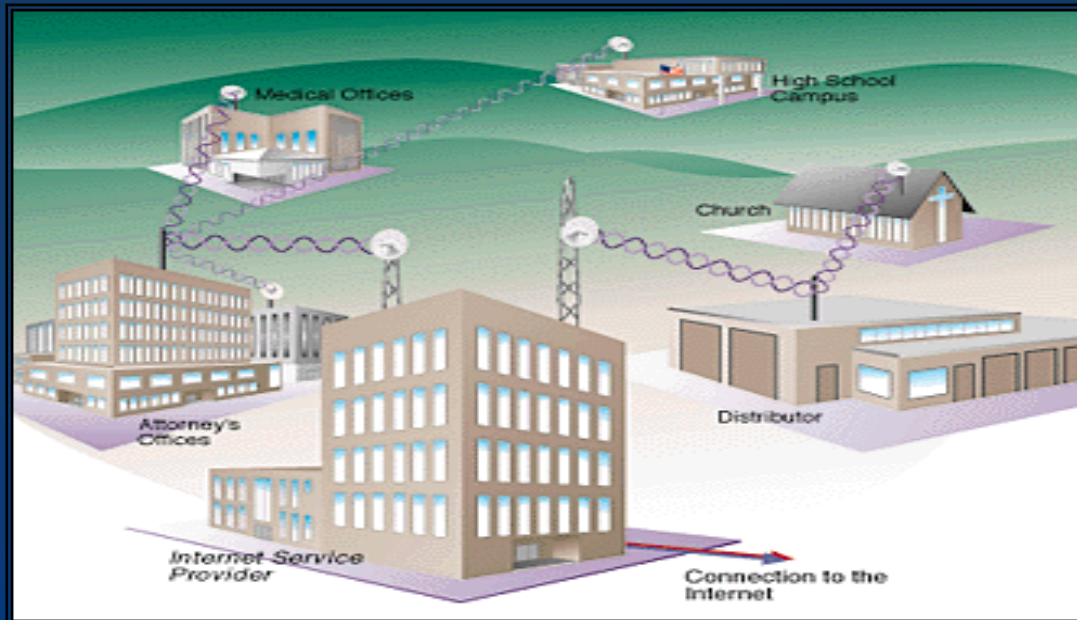
# Why do we care about web servers?

- Criminals using a web server will obtain information about the undercover computer
- If law enforcement can run the web server, we can obtain this information about targets



# Evidence: ISP

- ISP can provide LE account information to full content of a user's activity







# Evidence: ISP

- Sample response to pen-trap order

	A	B	C	D	E	F	G	H	I
1	TCP	Node1 Name	Node1 Bytes Sent	Node2 Name	Node2 Bytes Sent	Start Time	Stop Time	Total Bytes	Duration (secs.)
2	TCP	109.211.87.22	52	197.239.153.148	72	12/9/2005 5:17	12/9/2005 5:17	124	0
3	TCP	109.211.87.22	49	21.160.166.14	74	12/9/2005 5:17	12/9/2005 5:17	123	2
4	TCP	109.211.87.22	44	101.91.157.13	103	12/9/2005 5:17	12/9/2005 5:17	147	0
5	TCP	109.211.87.22	59	21.160.166.14	83	12/9/2005 5:17	12/9/2005 5:17	142	1
6	TCP	109.211.87.22	2273	115.198.117.225	417	12/9/2005 5:17	12/9/2005 5:17	2690	0
7	TCP	109.211.87.22	2257	115.198.117.225	3457	12/9/2005 5:17	12/9/2005 5:17	5714	0
8	TCP	109.211.87.22	48	102.110.252.202	77	12/9/2005 5:17	12/9/2005 5:17	125	0
9	TCP	109.211.87.22	54	249.142.242.201	199	12/9/2005 5:16	12/9/2005 5:17	253	0
10	TCP	109.211.87.22	423	71.54.97.105	1176	12/9/2005 5:16	12/9/2005 5:16	1599	0
11	TCP	109.211.87.22	49	2.135.238.65	81	12/9/2005 5:16	12/9/2005 5:16	130	0
12	TCP	254.84.58.65	0	109.211.87.22	0	12/9/2005 5:15	12/9/2005 5:15	0	8
13	TCP	109.211.87.22	9541	119.202.55.44	18344	12/9/2005 5:11	12/9/2005 5:18	27885	382
14	TCP	109.211.87.22	6	169.192.178.164	0	12/9/2005 5:11	12/9/2005 5:16	6	300
15	TCP	109.211.87.22	24	189.130.109.116	120	12/9/2005 5:11	12/9/2005 5:17	144	360
16	TCP	109.211.87.22	24	176.31.58.35	120	12/9/2005 5:11	12/9/2005 5:17	144	360
17	TCP	231.196.103.72	114	109.211.87.22	6	12/9/2005 5:11	12/9/2005 5:18	120	419
18	TCP	82.177.26.187	2711	109.211.87.22	296	12/9/2005 5:01	12/9/2005 5:18	3007	1028



# Evidence: ISP

## Sample of Full Content Monitoring / Capturing

No. -	Time	Source	Destination	Protocol	Info
1	0.000000	172.16.205.161	212.24.243.2	HTTP	GET http://www.myspace.com/ HTTP/1.1
2	0.349072	212.24.243.2	172.16.205.161	TCP	http > 1392 [ACK] Seq=0 Ack=435 win=65535 Len=0
3	1.027083	212.24.243.2	172.16.205.161	HTTP	[TCP Previous segment lost] Continuation or non-HTTP traffic
4	1.027143	172.16.205.161	212.24.243.2	TCP	1392 > http [ACK] Seq=435 Ack=0 win=17040 Len=0
5	1.045529	212.24.243.2	172.16.205.161	HTTP	[TCP Retransmission] HTTP/1.0 200 OK (text/html)
6	1.046004	172.16.205.161	212.24.243.2	TCP	1392 > http [ACK] Seq=435 Ack=2823 win=14217 Len=0
7	1.046308	172.16.205.161	212.24.243.2	TCP	[TCP window Update] 1392 > http [ACK] Seq=435 Ack=2823 win=17040 Len=0
8	1.052130	212.24.243.2	172.16.205.161	HTTP	Continuation or non-HTTP traffic
9	1.052269	172.16.205.161	212.24.243.2	TCP	1392 > http [ACK] Seq=435 Ack=3825 win=16039 Len=0
10	1.053099	172.16.205.161	212.24.243.2	TCP	1392 > http [FIN, ACK] Seq=435 Ack=3825 win=16039 Len=0
11	1.072755	172.16.205.161	212.24.243.2	HTTP	GET http://x.myspace.com/js/myspace.js HTTP/1.1
12	1.279441	212.24.243.2	172.16.205.161	TCP	[TCP Zerowindow] http > 1392 [ACK] Seq=3825 Ack=436 win=0 Len=0
13	1.364067	212.24.243.2	172.16.205.161	HTTP	[TCP Previous segment lost] Continuation or non-HTTP traffic
14	1.364119	172.16.205.161	212.24.243.2	TCP	1393 > http [ACK] Seq=382 Ack=0 win=17040 Len=0
15	1.365754	212.24.243.2	172.16.205.161	TCP	[TCP Retransmission] [TCP segment of a reassembled PDU]
16	1.366213	172.16.205.161	212.24.243.2	TCP	1393 > http [ACK] Seq=382 Ack=2840 win=14200 Len=0
17	1.366451	172.16.205.161	212.24.243.2	TCP	[TCP window Update] 1393 > http [ACK] Seq=382 Ack=2840 win=17040 Len=0
18	1.373631	212.24.243.2	172.16.205.161	HTTP	Continuation or non-HTTP traffic

Frame 1 (489 bytes on wire, 489 bytes captured)

Ethernet II, Src: IntelCor\_2e:46:08 (00:13:ce:2e:46:08), Dst: LannerE1\_06:c2:4c (00:90:0b:06:c2:4c)

Internet Protocol, Src: 172.16.205.161 (172.16.205.161), Dst: 212.24.243.2 (212.24.243.2)

Transmission Control Protocol, Src Port: 1392 (1392), Dst Port: http (80), Seq: 0, Ack: 0, Len: 435

Hypertext Transfer Protocol

GET http://www.myspace.com/ HTTP/1.1\r\n

Request Method: GET

Request URI: http://www.myspace.com/

Request Version: HTTP/1.1

Host: www.myspace.com\r\n

User-Agent: Mozilla/5.0 (windows; U; windows NT 5.1; en-US; rv:1.8.0.1) Gecko/20060111 Firefox/1.5.0.1\r\n

```
0030 42 90 1b 25 00 00 47 45 54 20 68 74 74 70 3a 2f B...GE T http:/
0040 2f 77 77 77 2e 6d 79 73 70 61 63 65 2e 63 6f 6d /www.mys pace.com
0050 2f 20 48 54 54 50 2f 31 2e 31 0d 0a 48 6f 73 74 / HTTP/1 .1..Host
0060 3a 20 77 77 77 2e 6d 79 73 70 61 63 65 2e 63 6f : www.my space.co
0070 6d 0d 0a 55 73 65 72 2d 41 67 65 6e 74 3a 20 4d m..User- Agent: M
0080 6f 7a 69 6c 6c 61 2f 35 2e 30 20 28 57 69 6e 64 ozilla/5 .0 (wind
0090 6f 77 73 3b 20 55 3b 20 57 69 6e 64 6f 77 73 20 ows; U; windows
00a0 4e 54 20 35 2e 31 3b 20 65 6e 2d 55 53 3b 20 72 NT 5.1; en-US; r
00b0 76 3a 31 2e 38 2e 30 2e 31 29 20 47 65 63 6b 6f v:1.8.0. 1) Gecko
```



# Questions



Cybercrime Lab  
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