

# Tracking on the Web

***CS 161: Computer Security***

**Prof. Raluca Ada Popa**

**February 19, 2016**

# Announcements

- Wednesday, Feb 24
  - 8-9:30pm (in 155 Dwinelle)
  - One cheat sheet, double sided, hand written
  - Covers material up to Monday
- Review session on Wed in lecture
  - Sample example questions, review material before
- Homework 2 (due Feb 22)

What does a site learn about  
you when you visit them?

Discuss with your neighbor

# The sites you visit learn:

- The **URLs** you're interested in
  - Google/Bing also learns *what you're searching for*
- Your **IP address**
  - Thus, your service provider & geo-location
  - Can often link you to other activity including at other sites
- Your browser's capabilities, which OS you run, which language you prefer
- Which URL you looked at that took you there
  - Via the HTTP "**Referer**" header

**They also learn cookies!**

**They also learn cookies**

Why is that harmful?

# Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▶ accounts.google.com	
▶ auth.berkeley.edu	
▶ cnn.com	
▶ facebook.com	
▶ google.com	
▶ markets.on.nytimes.com	
▶ nytimes.com	
▶ us.cnn.com	
▶ wt.o.nytimes.com	

Name: <no cookie selected>

Content: <no cookie selected>

Host: <no cookie selected>

Path: <no cookie selected>

Send For: <no cookie selected>

Expires: <no cookie selected>

Remove Cookies

Remove All Cookies

Let's remove all of our cookies

# Cookies

Search:



The following cookies are stored on your computer:

Site	Cookie Name
<div style="border: 2px solid orange; padding: 10px; display: inline-block;">Cool, no web site is tracking us ...</div>	

Name: <no cookie selected>

Content: <no cookie selected>

Host: <no cookie selected>

Path: <no cookie selected>

Send For: <no cookie selected>

Expires: <no cookie selected>

Remove Cookies

Remove All Cookies

- private browsing
- private browsing on ipad
- private browsing on chrome
- private browsing safari ipad
- private browsing safari
- private browsing android
- private browsing internet e...
- private browsing firefox an...
- private browsing mode chr...
- private browsing firefox m...

private browsing firefox mobile



Google

Search



You're the director. Mobile is the star. Enter [Firefox Flicks](#), our global video contest about the power of mobile.

We do a search on "private browsing"





private browsing



Sign in

**Web**[Images](#)[Maps](#)[Shopping](#)[Applications](#)[More](#)[Search tools](#)

About 30,800,000 results (0.15 seconds)

[Private Browsing - Browse the web without saving information about ...](#)[support.mozilla.org/.../private-browsing-browse-web-without-saving-inf...](#)

When using a shared computer, **Private Browsing** is great for viewing websites without saving stuff like cookies, temp files and a history of the pages you visit.

[Firefox 20 Launches With Improved Private Browsing, New ...](#)[techcrunch.com/.../firefox-20-launches-with-per-tab-private-bro...](#)

by Frederic Lardinois - in 18,052 Google+ circles

Apr 2, 2013 – Firefox 20 is now available for download. The emphasis of today's release is on Firefox's **private browsing** mode, which now allows Firefox ...

[Privacy mode - Wikipedia, the free encyclopedia](#)[en.wikipedia.org/wiki/Privacy\\_mode](#)

Internet Explorer 8 in InPrivate mode. Google Chrome in Incognito mode. Privacy mode or "**private browsing**", sometimes informally referred to as "porn mode", ...

[Firefox 20 improves private browsing, fixes three critical flaws | ZDNet](#)[www.zdnet.com/firefox-20-improves-private-browsing-fixes-three-critic...](#)

Apr 3, 2013 – Mozilla has released the latest version of its Firefox web browser which features new enhancement to **private browsing** and fixes a number of ...

[Private Browsing - Web Browsers - About.com](#)[browsers.about.com](#) › ... › [Web Browsers](#) › [Web Browser Glossary](#) › [FAQs](#)

The methods for activating **private browsing** mode differ across browsers, operating systems, and device types. These step-by-step tutorials teach you how to ...

# Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID

Name: NID

Content: 67=wM7cm7WZI9DNm0B4IMS8Vu1K3Ngl

Domain: .google.com

Path: /

Send For: Any type of connection

Expires: October 28, 2014 at 2:11:10 PM

[Remove Cookie](#)

[Remove All Cookies](#)

Google has stored a couple of cookies on our system

# Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID

Name: NID

Content: 67=wM7cm7WZI9DNm0B4IMS8Vu1K3NgLr0SIUZt2RkVeQw\_zbA

Domain: .google.com

Path: /

Send For: Any type of connection

Expires: October 28, 2014 at 2:11:10 PM

[Remove Cookie](#)

[Remove All Cookies](#)

Goodness knows what info they decided to put in the cookie

## Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID

Name: NID

Content: 67=wM7cm7WZI9DNm0B4IMS8Vu1K3NgLr0SIUZt2RkVeQw\_zbA

Domain: .google.com

Path: /

Send For: Any type of connection

Expires: October 28, **But it lasts for months ...**

Remove Cookie

Remove All Cookies

# Private browsing

You can turn on a mode called [private browsing](#) on your browser

What is this?

Does it protect you against tracking?

private browsing



Sign in

[Web](#) [Images](#) [Maps](#) [Shopping](#) [Applications](#) [More](#) [Search tools](#)

About 30,800,000 results (0.15 seconds)

[Private Browsing - Browse the web without saving information about ...](#)[support.mozilla.org/.../private-browsing-browse-web-without-saving-inf...](#)

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The methods for activating **private browsing** mode differ across browsers, operating systems, and device types. These step-by-step tutorials teach you how to ...

We click on the top result

# mozilla support

Search Mozilla Support

Products & Services

Hot Topics

Mo

tion Box



# Firefox

Mac OS X

Firefox 20

Note that this mode is privacy from your family, not from web sites!

EDITING TOOLS

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## Private Browsing - Browse the web without saving information about the sites you visit

As you browse the web, Firefox remembers lots of information for you: sites you've visited, files you've downloaded, and more. There may be times, however, when you don't want other users on your computer to see this information, such as when shopping for a birthday present.

**Private Browsing allows you to browse the Internet without saving any information about which sites and pages you've visited.** This article explains what information is not saved when in Private Browsing and gives you step-by-step instructions for using it.

**Warning:** Private Browsing doesn't make you anonymous on the Internet. Your Internet service provider, employer, or the sites themselves can still track what pages you visit. Private Browsing also doesn't protect you from [keyloggers](#) or [spyware](#) that may be

# Private browsing

“Private Browsing allows you to browse the Internet without saving any information about which sites and pages you’ve visited.” 

- deletes history of URL visits, passwords, cookies too
- Private Browsing maintains cookies for as long as the private browsing window is open. Once you quit the browser, it gets deleted
  - **So still tracked for a good while!**



# Cookies

Search:



The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID
▼ support.mozilla.org	
support.mozilla.org	__utma
support.mozilla.org	__utmb
support.mozilla.org	__utmc
support.mozilla.org	__utmz
▼ youtube.com	
youtube.com	VISITOR_INFO1_LIVE
youtube.com	YSC
youtube.com	PREF

Name: \_\_utma

Content: 62528430.549021593.1398719659.1398719659.1398719659.:

Domain: .support.mozilla.org

Path: /

Send For: Any type of connection

Expires: April 27, 2016 at 2:14:27 PM

Remove Cookie

Remove All Cookies

Ironically, we've gained a bunch of cookies in the process

Search: 

The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID
▼ support.mozilla.org	
support.mozilla.org	__utma
support.mozilla.org	__utmb
support.mozilla.org	__utmc
support.mozilla.org	__utmz
▼ youtube.com	
youtube.com	VISITOR_INFO1_LIVE
youtube.com	YSC
youtube.com	PREF

Name: \_\_utma

Content: 62528430.549021593.1398719659.1398719659.1398719659.:

Domain: .support.mozilla.org

Path: /

Send For: Any type of connection

Expires: April 17, 2018

Remove Cookie

Remove All Cookies

This one sticks  
around for two years.

# Cookies

Search:



The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID
▼ support.mozilla.org	
support.mozilla.org	__utma
support.mozilla.org	__utmb
support.mozilla.org	__utmc
support.mozilla.org	__utmz
▼ youtube.com	
youtube.com	VISITOR_INFO1_LIVE
youtube.com	YSC
youtube.com	PREF

Name: \_\_utma

Content: 62528430.549021593.1398719659.1398719659.1398719659.:

Domain: .support.mozilla.org

Path: /

Send For: Any type of connection

Expires: April 17, 2018

Remove Cookie

Remove All Cookies

How did *YouTube* enter the picture??

# Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID
▼ support.mozilla.org	
support.mozilla.org	__utma
support.mozilla.org	__utmb
support.mozilla.org	__utmc
support.mozilla.org	__utmz
▼ youtube.com	
youtube.com	VISITOR_INFO1_LIVE
youtube.com	YSC
youtube.com	PREF

Name: PREF

Content: fv=13.0.0

Domain: .youtube.com

Path: /

Send For: Any type of connection

Expires: April 17, 2018

Remove Cookie

Remove All Cookies

YouTube is remembering the version of Flash I'm running ...

www.nytimes.com

private browsing

mozilla

ASK A QUESTION

SIGN IN / REGISTER

ENGLISH

mozilla support

We navigate to *The New York Times* ...

Search Mozilla Support

Products & Services

Other Users

Suggestion Box



Firefox

Mac OS X

Firefox 20

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saving or syncing  
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you visit

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search and download  
history

How to search the contents

## Private Browsing - Browse the web without saving information about the sites you visit

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**Warning:** Private Browsing doesn't make you anonymous on the Internet. Your Internet service provider, employer, or the sites themselves can still track what pages you visit. Private Browsing also doesn't protect you from [keyloggers](#) or [spyware](#) that may be

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SHOP  
MARC JACOBS.COM  
LITTLE MARC

madewithibm

Expand to watch the unfolding stories



## U.S. Announces More Sanctions Against Russia Over Ukraine

By PETER BAKER and MARK LANDLER

The United States ordered travel bans and asset freezes for seven Russian officials, including two said to be in President Vladimir V. Putin's inner circle, and froze assets for 17 firms.

284 Comments

- Mayor of Eastern Ukraine City Is Shot
- Putin Rival Takes Message to East Ukraine

### Times Minute



Mohamed Abd El Ghany/Reuters

## Egypt Sentences More Than 680 to Death

The Muslim Brotherhood's spiritual leader and hundreds of others were sentenced on charges of inciting or committing violence. Supporters, above, reacted to the verdict Monday.

130 Comments

## Chernobyl: Capping a Nuclear Catastrophe



### The Opinion Pages

#### EDITORIAL

### Political Executions in Egypt

It is clear from the sentencing of 680 people to death in a mass trial that the country's judges have become a government tool.

- Editorial: Smartphones and the 4th Amendment
- Krugman: High Plains Moochers

#### THE STONE

### What Does Buddhism Require?

The reality of rebirth may not be necessary. But believing in it probably is.



- Gessen: Salon of the Exiled
- Op-Ed: The Wire Next Time
- Op-Docs | 'Verbatim: What Is a Photocopier?'

## Today's Times Insider

Behind the scenes of The New York Times



- Thinking of Wine as Food With Eric Asimov
- Introducing Times Insider

### MARKETS

At close 04/28/2014

S.&P. 500 Dow Nasdaq

The New York Times

HOME DELIVERY

Search: 

The following cookies are stored on your computer:

Site	Cookie Name
▶ dotomi.com	
▶ doubleclick.net	
▶ dynamicyield.com	
▶ google.com	
▶ imrworldwide.com	
▶ krx.com	
▶ markets.on.nytimes.com	
▶ mediaplex.com	
▶ nytimes.com	
▶ revsci.net	
▶ scorecardresearch.com	
▶ support.mozilla.org	
▶ wt.o.nytimes.com	
▶ youtube.com	

Name: &lt;no cookie selected&gt;

Content: &lt;no cookie selected&gt;

Host: &lt;no cookie selected&gt;

Path: &lt;no cookie selected&gt;

Send For: &lt;no cookie selected&gt;

Expires: &lt;no cookie selected&gt;

What a lot of  
yummy cookies!

Search: 

The following cookies are stored on your computer:

Site	Cookie Name
nytimes.com	RMID
nytimes.com	nyt5_disable
nytimes.com	_dyid
nytimes.com	_dyfs
nytimes.com	_cb_ls
nytimes.com	nytnow3p
nytimes.com	kxtag28172.day
nytimes.com	nyt-m
nytimes.com	nyt-recommend
nytimes.com	adxcl
nytimes.com	adxcs
nytimes.com	tagx-l
nytimes.com	tagx-s
nytimes.com	tagx-p
nytimes.com	WT_FPC
nytimes.com	_dyaud_page
nytimes.com	_dysvar_8765260
nytimes.com	_dyuss_8765260
nytimes.com	_dycst
nytimes.com	_dy_geo
nytimes.com	_dyaud_nchc
nytimes.com	_dyaud_sess
nytimes.com	_dyus_8765260
nytimes.com	rsi_segs
nytimes.com	kxtag27935.day
nytimes.com	kxtag27728.day
nytimes.com	kxtag15486.day
nytimes.com	kxtag21418.day
nytimes.com	kxtag22998.day
nytimes.com	kxtag21233.day
nytimes.com	kxtag28173.day
nytimes.com	_chartbeat2
nytimes.com	_chartbeat_uuniq

Name: WT\_FPC

Content: id=281888c3-14a8-4805-ad44-ea4fb68e0535:lv=1398728093820:ss=1398727411934

Domain: .nytimes.com

Path: /

Send For: Any type of connection

Expires: April 25, 2024 at 4:34:53 PM

Remove Cookie

Remove All Cookies

Here are the ones  
from the website  
itself ...



## Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
nytimes.com	_dyus_8765260
nytimes.com	rsi_segs
nytimes.com	kxtag27935.day
nytimes.com	kxtag27728.day
nytimes.com	kxtag15486.day
nytimes.com	kxtag21418.day
nytimes.com	kxtag22998.day
nytimes.com	kxtag21233.day
nytimes.com	kxtag28173.day
nytimes.com	_chartbeat2
nytimes.com	_chartbeat_uuniq
nytimes.com	<b>kxtech</b>
nytimes.com	kxsegs
nytimes.com	kxux_seas

This one tracks the details of my system & browser

Name: kxtech

Content: device%3DComputer%26manufacturer%3DApple%2520Inc.%26os%3DMac%2520OS%2520X%26browser%3DFirefox%25202

Host: www.nytimes.com

Path: /

Send For: Any type of connection

Expires: May 28, 2014 at 2:26:53 PM

[Remove Cookie](#)

[Remove All Cookies](#)

# Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
▶ dotomi.com	
▼ doubleclick.net	
▶ doubleclick.net	id
▶ dynamicyield.com	
▶ google.com	
▶ imrworldwide.com	
▶ krxd.net	
▶ markets.on.nytimes.com	
▶ mediaplex.com	
▶ nytimes.com	
▶ revsci.net	
▶ scorecardresearch.com	
▶ srv.dynamicyield.com	
▶ support.mozilla.org	
▶ web2.checkm8.com	
▶ wt.o.nytimes.com	

Name: id

Content: 22936ce7e6020029||t=1398720412|et=730|cs=002213fd48b84774786c

Domain: doubleclick.net

Path: /

Send For: Any type of connection

Expires: April 27, 2016 at 2:26:52 PM

Remove Cookie

Remove All Cookies

doubleclick.net -  
who's that?  
And how did it get  
there from visiting  
www.nytimes.com?

# Third-Party Cookies

- How can a web site enable a third party to plant cookies in your browser & later retrieve them?
  - Include on the site's page (for example):
    - ``
- Why would a site do that?
  - Site has a business relationship w/ DoubleClick \*
- Why can this track you?
  - Now DoubleClick sees all of your activity that involves their web sites
  - Because your browser dutifully sends them their cookies for any web page that has that img
  - Identifier in cookie ties together activity as = YOU

\* Owned by Google, by the way

# Cookies

Search:



The following cookies are stored on your computer:

Site	Cookie Name
▼ google.com	
google.com	PREF
google.com	NID
▼ support.mozilla.org	
support.mozilla.org	__utma
support.mozilla.org	__utmb
support.mozilla.org	__utmc
support.mozilla.org	__utmz
▼ youtube.com	
youtube.com	VISITOR_INFO1_LIVE
youtube.com	YSC
youtube.com	PREF

Name: \_\_utma

Content: 62528430.549021593.1398719659.1398719659.1398719659.:

Domain: .support.mozilla.org

Path: /

Send For: Any type of connection

Expires: April 27, 2016 at 2:14:27 PM

Remove Cookie

Remove All Cookies

Remember this 2-year  
Mozilla cookie?

# Google Analytics

- Any web site can (anonymously) register with Google to instrument their site for *analytics*
  - Gather information about who visits, what they do when they visit
- To do so, site adds a small Javascript snippet that loads `http://www.google-analytics.com/ga.js`
  - You can see sites that do this because they introduce a "`__utma`" cookie
- Code ships off to Google information associated with your visit to the web site
  - Shipped by fetching a GIF w/ values encoded in URL
  - Web site can use it to analyze their ad “campaigns”
  - Not a small amount of info ...

http://www.google-analytics.com/\_\_utm.gif?utmwv=4.9.1&utmn=408493431&utmhn=www.sidereel.com&utme=8(userType)9(LoggedOut)11(2)&utmcs=UTF-8&utmsr=1680x1050&utmssc=24-bit&utmul=en-us&utmje=1&utmfl=10.2 r153&utmdt=Watch Online | American Idol Episodes - American Idol ep 23 - via videobb.com - SideReel&utmhid=72439433&utmr=0&utmp=/American\_Idol/season-10/episode-23/links/6541441&utmcc=UA-1471387-3&utmcc=\_\_utma=108050432.2066052302.1287459230.1291684208.1291691628.9;+\_\_utmz=108050432.1287459230.1.1.utmcsr=(direct)|utmccn=(direct)|utmcmd=(none);&utmu=QqAAE

http://pubads.g.doubleclick.net/gampad/ads?correlator=1291905478049&output=json\_html&callback=GA\_googleSetAdContentsBySlotForSync&impl=s&client=ca-pub-7758644218383495&slotname=wlv\_728x90\_atf&page\_slots=wlv\_728x90\_atf&cust\_params=title=American%20Idol&state=loggedout&noautoplay=&cookie=ID=75911ff51976ad00:T=1287459230:S=ALNI\_ZMQH1Jqg70f\_neADngl50Ga4VbuCg&url=http://www.sidereel.com/American\_Idol/season-10/episode-23/links/6541441&ref=http://www.sidereel.com/American\_Idol/season-10/episode-23/search&lmt=1291905477&dt=1291905478069&cc=100&biw=830&bih=772&ifi=1&adk=1569465027&u\_tz=-420&u\_his=5&u\_java=true&u\_h=1050&u\_w=1680&u\_ah=1000&u\_aw=1680&u\_cd=24&u\_nplug=10&u\_nmime=88&flash=10.2.153&gads=v2&ga\_vid=2067052302.1287459230&ga\_sid=1291691698&ga\_hid=72439433&ga\_fc=true

http://googleads.g.doubleclick.net/pagead/advview?ai=B2b9cRoCZTfuHCtDaqQGpkZXqC\_mq7IqCmdXb2CWbvtvXQwAQARgBIMe9rBc4AGDJltGGyK0gGbIBEHd3dy5zaWRlcmVlbC5jb226AQk3Mjh40TBfYXPiAQnaUhodHRw0i8vd3d3LnNpZGVyZWVsLmNvbS9BbWVyaWNhbI9JZG9sL3NlYXNvbi0xMC9lcGlzb2RlLTlzL2xpbmtzLzY1NDE0NDGYAoAKuAIYwAIBYALhm54b4AIA6gIKNDI4NTU5MjM0JADrAKYA6wCqAMB6A0jCegDmQjoA-YC9QMAAABE4AQB&sig=1xAuEwn3f0w

# Values Reportable via Google Analytics

<b>Affiliation</b>	<b>Host Name</b>	<b>Screen Resolution</b>
<b>Billing City</b>	<b>Java-enabled</b>	<b>Shipping Cost</b>
<b>Billing Country</b>	<b>Language Encoding</b>	<b>Special Event</b>
<b>Billing Region</b>	<b>Order ID</b>	<b>Start Campaign Sess.</b>
<b>Browser Lang.</b>	<b>Page Title</b>	<b>Tax</b>
<b>Complete URL</b>	<b>Product Code</b>	<b>Tracking Code Version</b>
<b>Cookie Values</b>	<b>Product Name</b>	<b>Unique GIF ID</b>
<b>Current Page</b>	<b>Profile Number</b>	<b>Unit Price</b>
<b>Event Tracking</b>	<b>Repeat Campaign Visit</b>	<b>User Defined Var</b>
<b>Flash Version</b>	<b>Quantity</b>	<b>Variations on an Item</b>
<b>Grand Total</b>	<b>Screen Color Depth</b>	

# Still More Tracking Techniques ...

- Any scenario where browsers execute programs that manage persistent state can support tracking by cookies
  - Such as .... *Flash ?*



# Flash Player Help

## Website Privacy Settings panel

### TABLE OF CONTENTS

- Flash Player Help
- Settings Manager
  - Global Privacy Settings Panel
  - Global Storage Settings Panel
  - Global Security Settings Panel
  - Global Notifications Settings Panel
  - Website Privacy Settings Panel
  - Website Storage Settings Panel
- Display Settings
- Local Storage Settings
- Microphone Settings
- Camera Settings
- Privacy Settings
- Local Storage Pop-Up Question
- Privacy Pop-Up Question
- Security Pop-Up Question
- About Updating Adobe Flash Player

**Adobe Flash Player™ Settings Manager**

**Website Privacy Settings**

For websites you have already visited, view or change your privacy settings for access to your camera and / or microphone.

Always ask  
 Always allow  
 Always deny

**Visited Websites**

Privacy	Websites	Used	Limit
*	www.theonion.com	3 KB	100 KB
*	d.scribd.com	2 KB	100 KB
*	mail.google.com	1 KB	100 KB
*	static.usnews.com	-	100 KB

Delete website Delete all sites

Sure, this is where you'd think to look to analyze what Flash cookies are stored on your machine

**Note:** The Settings Manager that you see above is not an image; it is the actual Settings Manager. Click the tabs to see different panels, and click the options in the panels to change your Adobe Flash Player settings.

The list of websites above is stored on your computer or you can delete, add, or change your privacy settings or local storage settings to this list, or to any of the information that the websites have stored on your computer.

My browser had Flash cookies from 67 sites!

Some Flash cookies "respawn" regular browser cookies that you previously deleted!

Use this panel to specify privacy settings for any of the websites that have requested permission to use your camera or microphone or to store information on your computer.

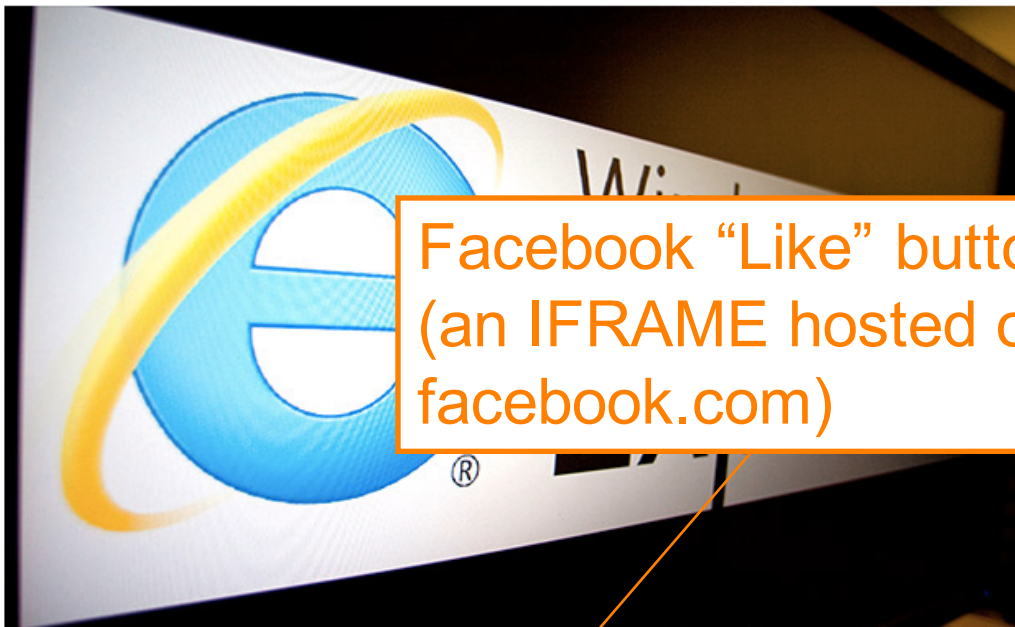
# Internet Explorer bug lets hacker control your PC

CNNMoney

By Jose Pagliery @Jose\_Pagliery April 28, 2014: 2:27 PM ET

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Facebook "Like" button (an IFRAME hosted on facebook.com)

PHOTO: ANDREW HARRER/BLOOMBERG VIA GETTY

A new bug in Internet Explorer allows hackers to commandeer your computer.

4K TOTAL SHARES

2K	455	206	1K

NEW YORK (CNNMoney)

If you're using Internet Explorer and click on the wrong link, a hacker could hijack your computer.

# What does Facebook learn?

- Many pages include a Facebook “Like” button.
- What are the implications, for user tracking?
- Facebook can track you on every site that you visit that embeds such a button



# What information does Facebook get when I visit a site with the Like button?

If you're logged into Facebook and visit a website with the **Like** button, your browser sends us information about your visit. Since the **Like** button is a little piece of Facebook embedded on another website, the browser is sending info about the request to load Facebook content on that page.

We record some of this info to help show you a personalized experience on that site and to improve our products. For example, when you go to a website with a **Like** button, we need to know who you are in order to show you what your Facebook friends have liked on that site. The data we receive includes your user ID, the website you're visiting, the date and time and other browser-related info.

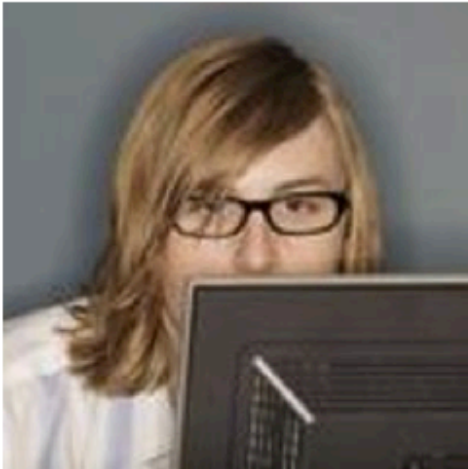
# Tracking – So What?

- Cookies form the core of how Internet advertising works today
  - Without them, arguably you'd have to pay for content up front a lot more
    - (and payment would mean you'd lose anonymity anyway)
  - A “better ad experience” is not necessarily bad
    - Ads that reflect your interests; not seeing repeated ads
- But: ease of gathering so much data so easily ⇒ concern of losing control how it's used
  - Privacy concerns
  - Large amounts of private data in one place

# More Employers Screening Candidates via Social Networking Sites

*Five tips for creating a positive online image*

**Rosemary Haefner, Vice President of Human Resources at CareerBuilder**



When you interview, they Know What You've Posted

Gone are the days when all job seekers had to worry about were their résumés and cover letters. Today, those documents remain a staple of the [job-search](#) process, but they are joined by a growing phenomenon: social networking.

Forty-five percent of employers reported in a June 2009 CareerBuilder survey that they use social networking sites to screen potential employees, compared to only 22 percent of employers last year. Eleven percent of employers plan to start using [social networking](#) sites for the screening process. More than 2,600 hiring managers participated in the survey.

## **Why employers disregard candidates after screening online**

Thirty-five percent of employers reported they have found content on social networking sites that caused them not to hire the candidate, including:

- Candidate posted provocative or inappropriate photographs or information -- 53 percent
- Candidate posted content about them drinking or using drugs -- 44 percent
- Candidate bad-mouthed their previous employer, co-workers or clients -- 35 percent
- Candidate showed poor communication skills -- 29 percent
- Candidate made discriminatory comments -- 26 percent
- Candidate lied about qualifications -- 24 percent
- Candidate shared confidential information from previous employer -- 20 percent

# Tracking – So What?

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  - A “better ad experience” is not necessarily bad
    - Ads that reflect your interests; not seeing repeated ads
- But: ease of gathering so much data so easily ⇒ concern of losing control how it's used
  - Content shared with friends doesn't just stay with friends ...
  - You really don't have a good sense of just what you're giving away ...



My baby girl.... <http://t.co/5qLfLV6>

2 minutes ago via Twitter for Android



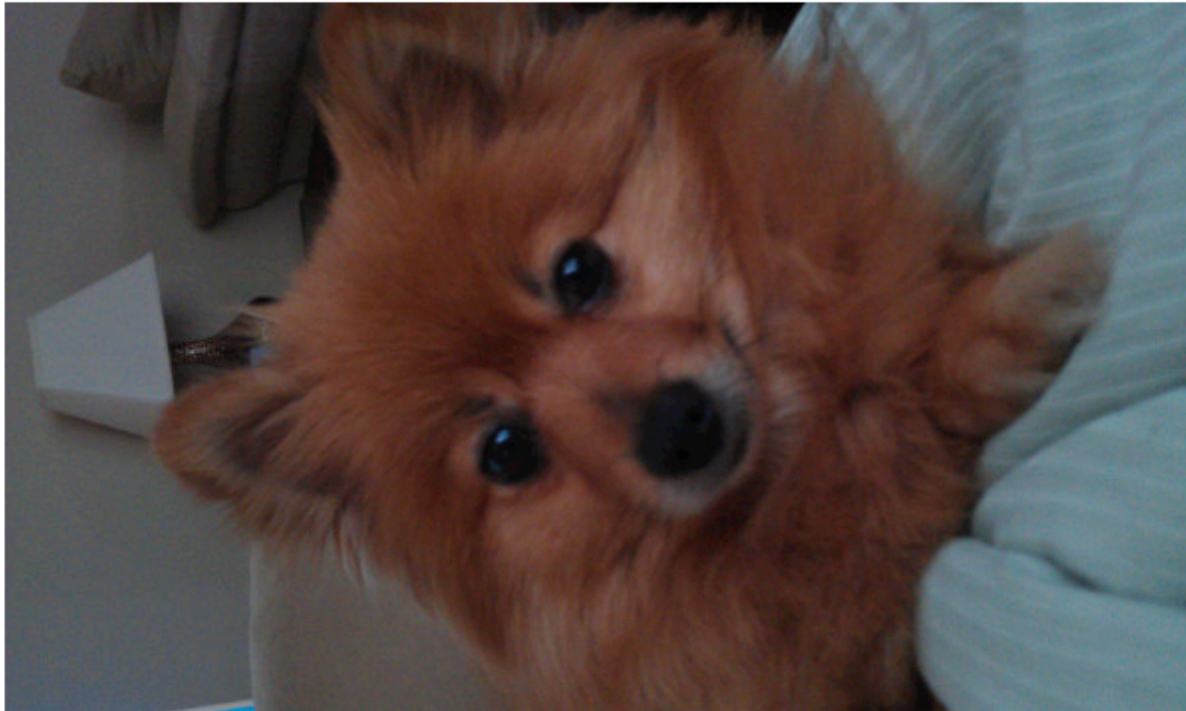
[BritBangert](#)

Brittany Bangert

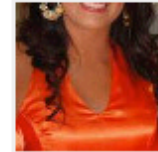


**@BritBangert**

Brittany Bangert April 5, 2011



[Login](#) to leave a comment

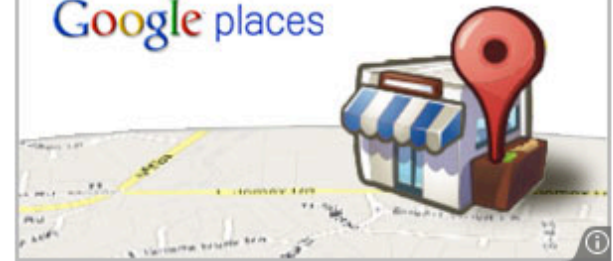


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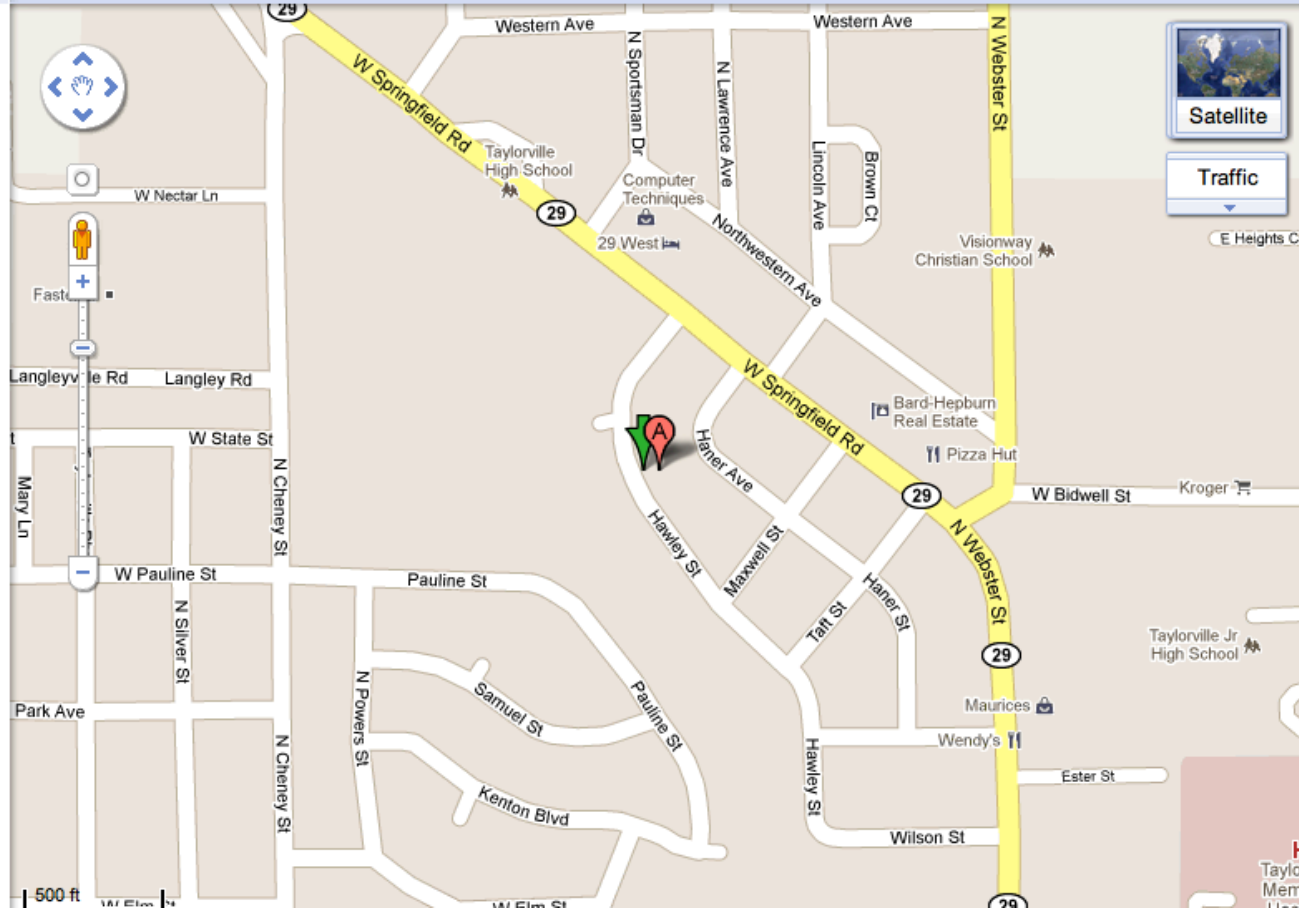
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LATITUDE	: N	47° 55.512'
LONGITUDE	: E	8° 29.804'
ALTITUDE	: 697m	
TIME (UTC)	: 10/11/2009	12:53:14
HEADING	: 235.90°	

NIKON D5000

3/3

Nikon



# I Can Stalk U

Raising awareness about inadvertent information sharing

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## Who have we stalked recently?



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## Links

- [Mayhemic Labs](#)
- [PaulDotCom](#)
- [SANS ISC](#)
- [Electronic Frontier Foundation](#)
- [Center for Democracy & Technology](#)

[How did you find me?](#)

Did you know that a lot of smart phones encode the location of where pictures are taken? Anyone who has a copy can access this information.

[read more](#)

[Help me fix this!](#)

Disabling Geo-Tagging on your phone is easy.

# How To Gain Better Privacy?

discuss with your neighbor

# How To Gain Better Privacy?

- Force of law
  - Example #1: web site privacy policies
    - US sites that violate them commit false advertising
    - **But:** policy might be “*Yep, we sell everything about you, Ha Ha!*”

# THE NEW YORKER' s Privacy Policy (when you buy their archives)

- 7. Collection of Viewing Information. You acknowledge that you are aware of and consent to the collection of your viewing information during your use of the Software and/or Content. Viewing information may include, without limitation, the time spent viewing specific pages, the order in which pages are viewed, the time of day pages are accessed, IP address and user ID. This viewing information may be linked to personally identifiable information, such as name or address and shared with third parties.*



# How To Gain Better Privacy?

- Force of law
  - Example #1: web site privacy policies
    - US sites that violate them commit false advertising
    - But: policy might be “*Yep, we sell everything about you, Ha Ha!*”
  - Example #2: **SB 1386**
    - *Requires an agency, person or business that conducts business in California and owns or licenses computerized 'personal information' to disclose any breach of security (to any resident whose unencrypted data is believed to have been disclosed)*
    - Quite effective at getting sites to pay attention to securing personal information

## Security



May 8, 2009 1:53 PM PDT

# UC Berkeley computers hacked, 160,000 at risk

by [Michelle Meyers](#)



Font size



Print



E-mail



Share



20 comments

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*This post was updated at 2:16 p.m. PDT with comment from an outside database security software vendor.*

Hackers broke into the University of California at Berkeley's health services center computer and potentially stole the personal information of more than 160,000 students, alumni, and others, the university announced Friday.

At particular risk of identity theft are some 97,000 individuals whose Social Security numbers were accessed in the breach, but it's still unclear whether hackers were able to match up those SSNs with individual names, Shelton Waggener, UCB's chief technology officer, said in a press conference Friday afternoon.

# How To Gain Better Privacy?

- Technology
  - Various browser additions
  - Special browser extensions
  - Tor and anonymizers – later in course

# Browser: “Tracking protection”

Private browsing includes tracking protection



Blocks third-party trackers based on Disconnect.me

- basic: blocks commonly known analytics trackers, social sharing trackers, and advertising trackers, but allows some known content trackers to reduce website breakage.
- strict: blocks all known trackers, including analytics, trackers, social sharing trackers, and advertising trackers as well as content trackers. The strict list will break some videos, photo slideshows, and some social networks.

# Browsers: Do not track flag

You can turn on this flag in your browser

What does it do?

- Tells web servers you want to opt-out of tracking
- It does this by transmitting a Do Not Track HTTP header every time your data is requested from a web server

It does not enforce that there is no tracking, it is up to the web servers

# WHY DO NOT TRACK MAY NOT PROTECT ANYBODY'S PRIVACY

By **Geoff Duncan** — June 9, 2012



f 30



GET C  
TOP S  
AND M  
Delivered to

Some ad companies do provide more generic ads then

# Browser extension: Ghostery

User installs browser extension:

1. Recognizes third-party tracking scripts on a web page based on an actively curated database of such scripts
2. Blocks HTTP requests to these sites
  - as a result, Facebook buttons don't even show
3. Users can create "Whitelists" of allowed sites
  - e.g., allow FB button but note that you allow tracking by FB too

# But you have to be careful...

## Ghostery: A Web tracking blocker that actually helps the ad industry

RICARDO BILTON JULY 31, 2012 7:00 AM

TAGS: COOKIES, EDITOR'S PICK, EVIDON, FEATURED, GHOSTERY, SCOTT MEYER, WEB TRACKING



### Press Releases



Carey Chen Joins NVBOTS Board of Directors

- Users can opt-in to sending anonymously data back to Evidon, the parent company, to improve its tracking database
- Evidon sells this data to ad companies..
- But strategy is transparent, users opt into this



# Conclusions

- Third-party apps can track us even if when we don't visit their website
- Tracking is very common on the web and can collect a lot of data about you
- Some solutions exist, but have caveats