

# **Miscellaneous: Tracking on the Web**

CS 161: Computer Security  
Ruta Jawale and Rafael Dutra

**August 13, 2019**

# Announcements

- Final Review Session today Cory 293 2-5pm
- Homework 3 due tonight (8/13)
- Course Evaluation “HW 4” due tomorrow (8/14)
- Final Exam is this Thursday

# 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**
  - public database links IP & 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
Cool, no web site is tracking us ...	

Name: <no cookie selected>

Content: <no cookie selected>

Host: <no cookie selected>

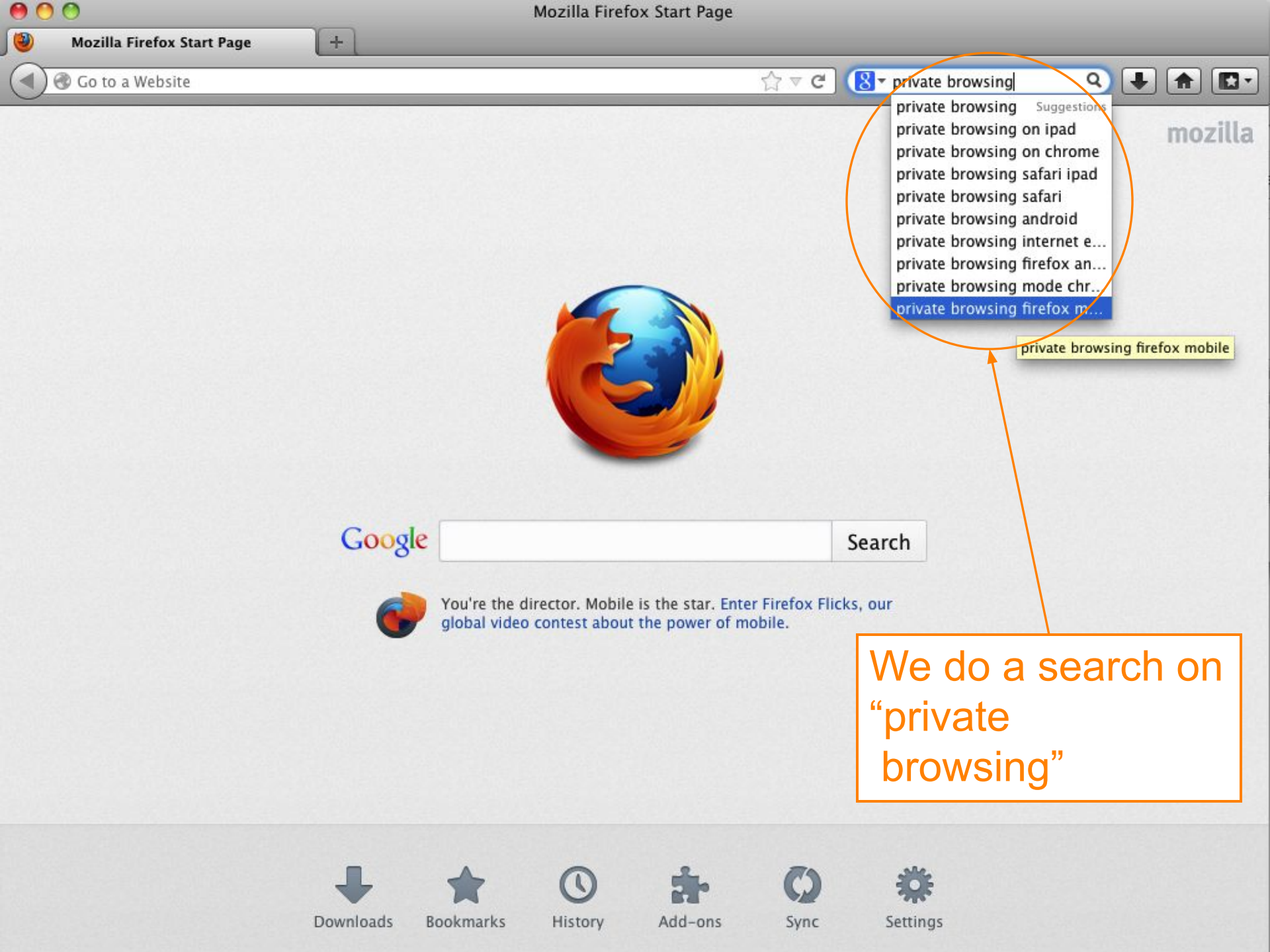
Path: <no cookie selected>

Send For: <no cookie selected>

Expires: <no cookie selected>

Remove Cookies

Remove All Cookies



- private browsing Suggestions
- 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

We do a search on  
“private  
browsing”



[+You](#) [Search](#) [Images](#) [Maps](#) [Play](#) [YouTube](#) [News](#) [Gmail](#) [Drive](#) [Calendar](#) [More](#)

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...](https://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...](http://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](http://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...](http://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](http://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=wM7cm7WZl9DNm0B4lMS8Vu1K3Ngl

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, 2014

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/en-US/kb/private-browsing-browse-web-without-saving-inf](https://support.mozilla.org/en-US/kb/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/2013/04/02/firefox-20-launches-with-per-tab-private-browsing/](http://techcrunch.com/2013/04/02/firefox-20-launches-with-per-tab-private-browsing/)

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](http://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-critical-flaws/](http://www.zdnet.com/firefox-20-improves-private-browsing-fixes-three-critical-flaws/)

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/od/private\\_browsing/a/private\\_browsing\\_101.aspx](http://browsers.about.com/od/private_browsing/a/private_browsing_101.aspx)

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 &amp; Services

Hot Topics

Mo

ox



Firefox

Mac OS X

Firefox 20

EDITING TOOLS

RELATED ARTICLES

Mobile Private Browsing -  
Browse the web on your  
mobile device without  
saving or syncing  
information about the sites  
you visit

Remove recent browsing,  
search and download  
history

How to search the contents

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

## 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

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: /

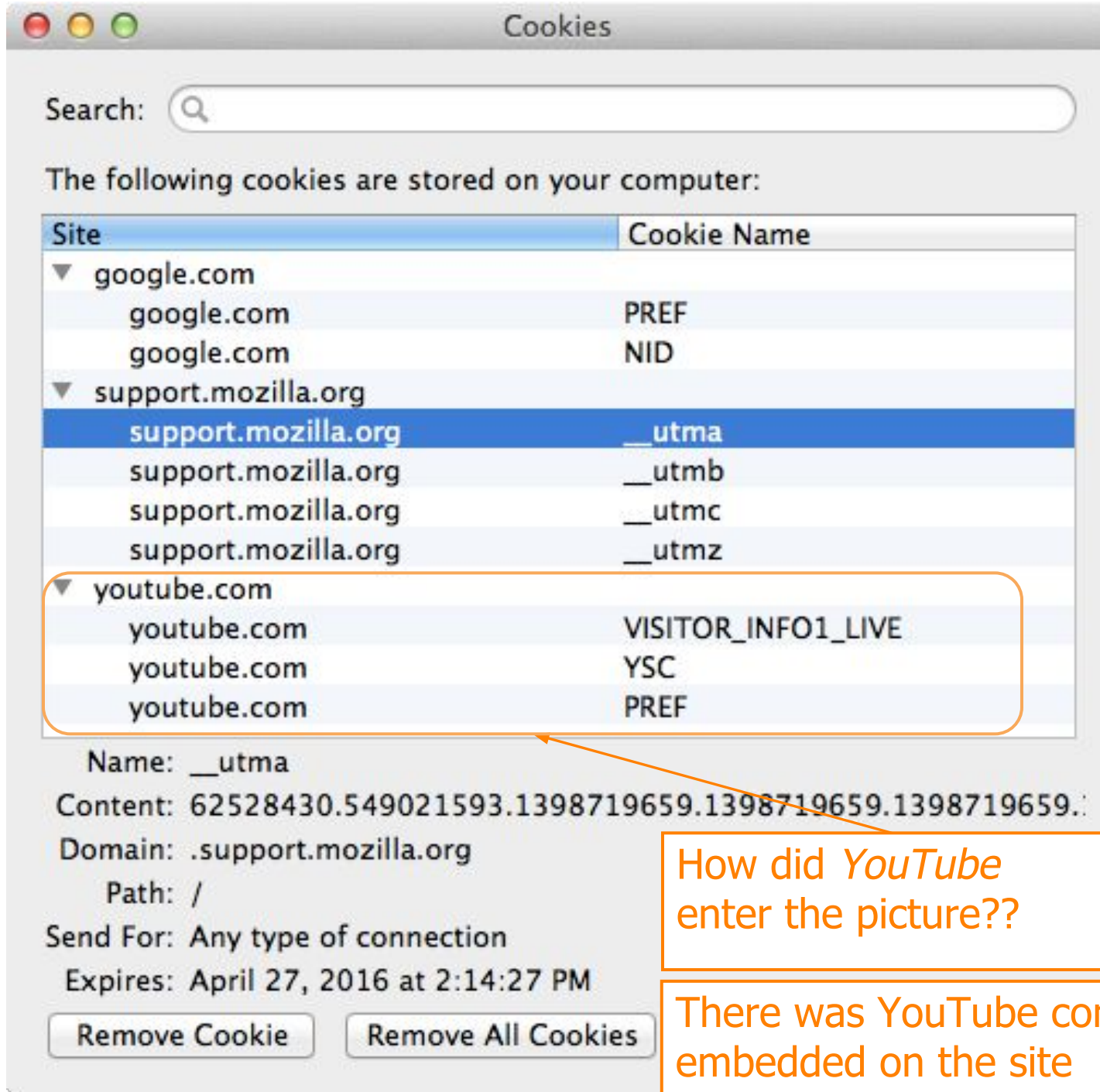
Send For: Any type of connection

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

Remove Cookie

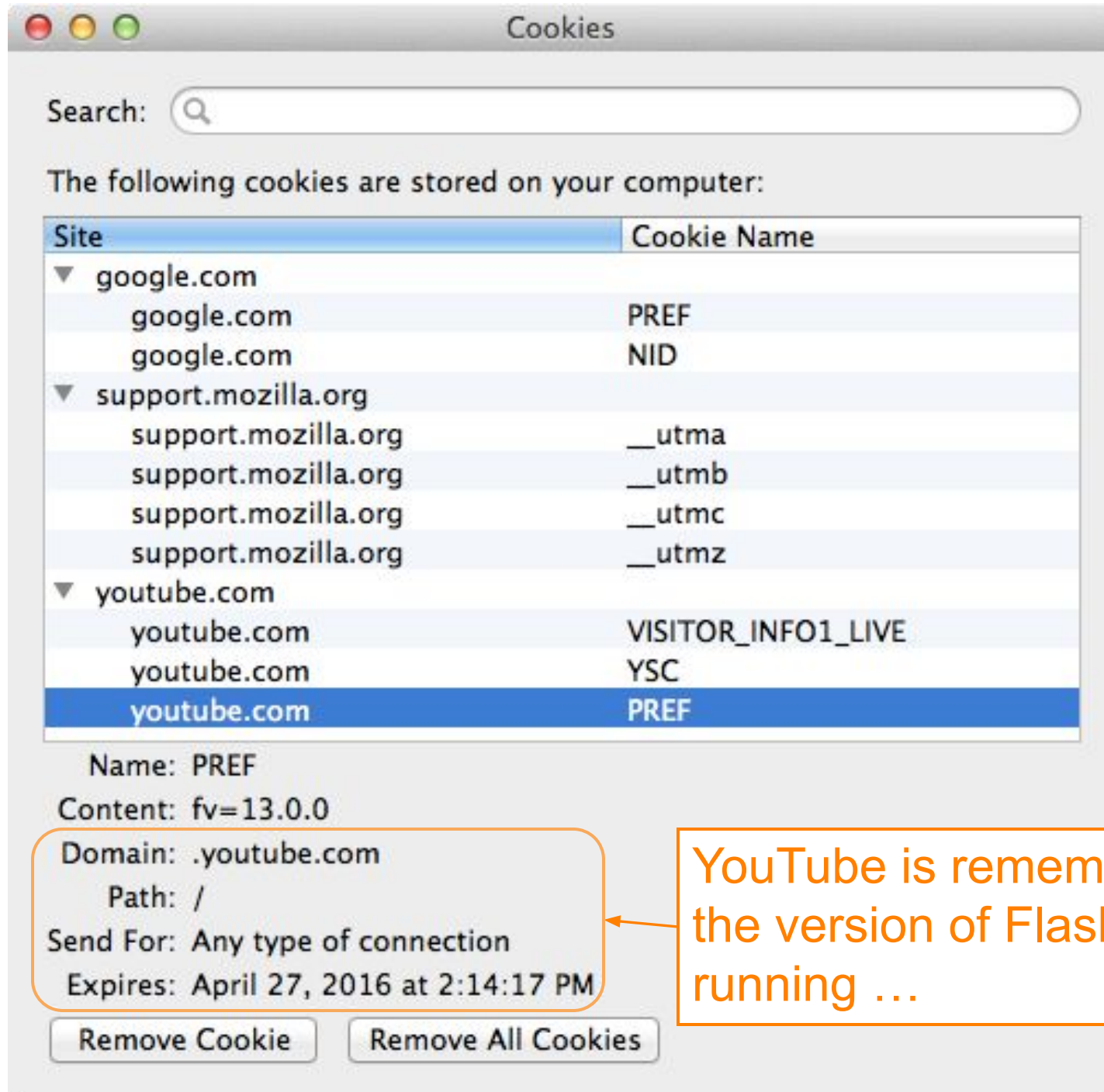
Remove All Cookies

This one sticks around for two years.



## How did *YouTube* enter the picture??

## There was YouTube content embedded on the site



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



www.nytimes.com

private browsing

ASK A QUESTION

SIGN IN / REGISTER

ENGLISH

mozilla ▾

mozilla support

Search Mozilla Support

Products &amp; Services

Other Users

Suggestion Box

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



Firefox

Mac OS X

Firefox 20

EDITING TOOLS ▾

RELATED ARTICLES ▲

Mobile Private Browsing -  
Browse the web on your  
mobile device without  
saving or syncing  
information about the sites  
you visit

Remove recent browsing,  
search and download  
history

How to search the contents

## 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

SECTIONS  SEARCH

SUBSCRIBE NOW

SIGN IN

Register



U.S. INTERNATIONAL 中文网

# The New York Times

Monday, April 28, 2014

 Today's Paper

Personalize Your Weather



WORLD U.S. NEW YORK BUSINESS OPINION SPORTS SCIENCE ARTS FASHION & STYLE VIDEO

All Sections

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

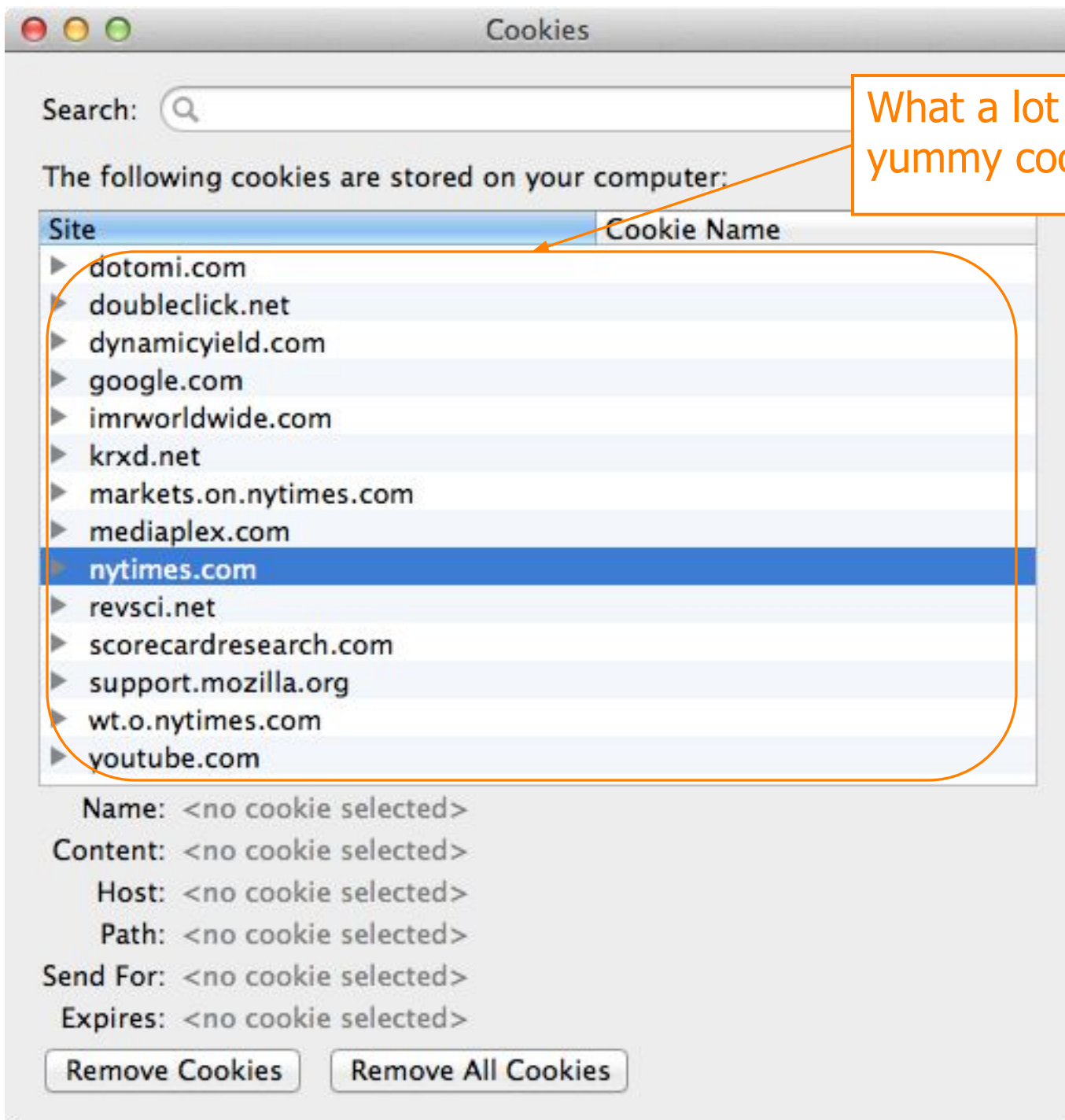
Dow

Nasdaq

The New York Times

HOME DELIVERY





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	kxtech
nytimes.com	kxsegs
nytimes.com	krux_segs

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

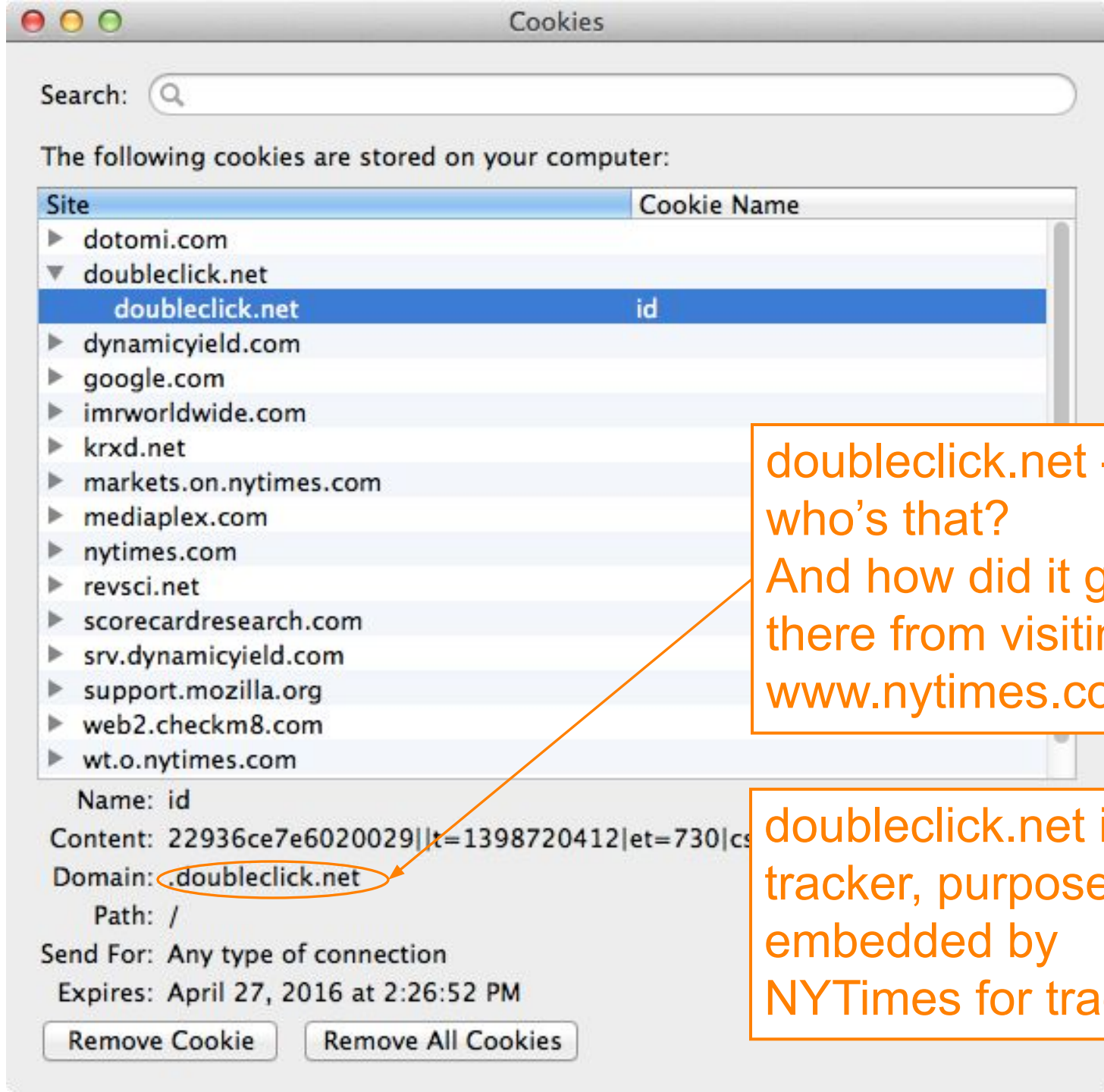
Path: /

Send For: Any type of connection

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

Remove Cookie

Remove All Cookies



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

doubleclick.net is a  
tracker, purposefully  
embedded by  
NYTimes for tracking

# 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

Moral: you can be tracked by  
a site even if you do not visit  
that site

ⓧ ⓪ Ⓜ

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&utmsc=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&lm=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/adview?ai=B2b9cRoCZTfuHCtDaqQGpkZXqC\_mq7IqCmdXb2CWbvtvXQwAQARgBIMe9rBc4AGDJltGGyK0gGbIBEHd3dy5zaWRlcmVlbC5jb226AQk3Mjh40TBfYXPiAQnaAUhodHRwOi8vd3d3LnNpZGVyZWVsLmNvbS9BbWVyaWNhbl9JZG9sL3NlYXNvbi0xMC9lcGlzb2RlLTlZL2xpbmtzLzY1NDE0NDGYAoAKuAIYwAIBYALhm54b4AIA6gIKNDI4NTU5MjM0JADrAKYA6wCqAMB6A0jCegDmQjoA-YC9QMAAABE4AQB&sig=1xAuEwn3f0w

# Values Reportable via Google Analytics

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



# 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

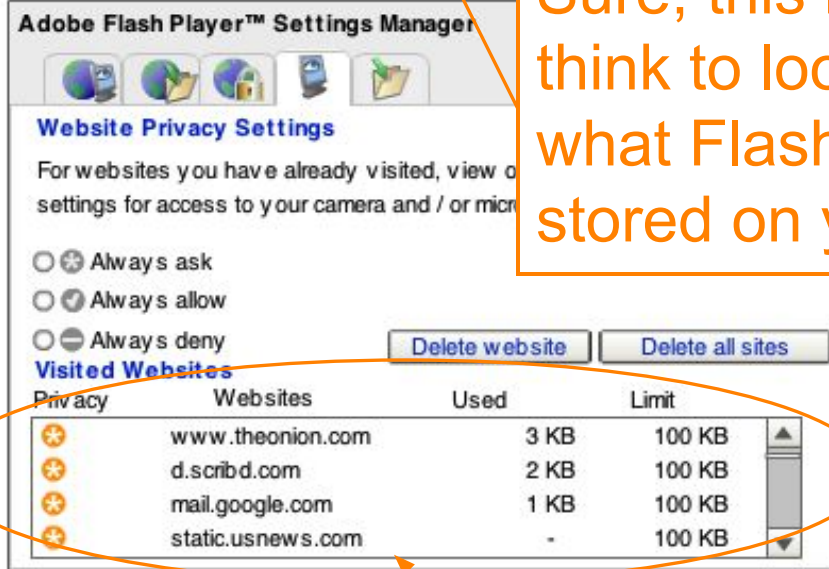
#### Privacy Settings

#### Local Storage Pop-Up Question

#### Privacy Pop-Up Question

#### Security Pop-Up Question

#### About Updating Adobe Flash Player



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 click on any of the information that the websites have stored on your computer.

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

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

My browser had Flash cookies from 67 sites!

Internet Explorer bug lets hacker control your PC - Apr. 28, 2014

Internet Explorer bug lets hack...

money.cnn.com/2014/04/28/technology/security/li ☆ facebook "recorQ

# Internet Explorer bug lets hacker control your PC

CNNMoney

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

Recommend 4.3k

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, not only when you are actually visit Facebook



From Facebook:

## 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



BIG TECH BACKLASH · 6 hours ago

# Trust in Facebook plummets after Cambridge Analytica scandal, Zuckerberg testimony

By Chris Ciaccia | Fox News



## Trending in Tech

The  
precis  
that a  
shells

my is developing  
guided 155mm m  
onger range than  
able to conduct

# 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?

- Cookies etc. 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
  - 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 ...

# Inadvertent information leaking

Consider posting a picture on Twitter



The image is a screenshot of a Twitter interface. At the top left is the Twitter logo. At the top right is a button that says "Login Join Twitter!". Below this is a tweet from a user named BritBangert. The tweet text is "My baby girl...." followed by a blue hyperlink "http://t.co/5qLfLV6". Below the text, it says "2 minutes ago via Twitter for Android". To the left of the user's name is a small profile picture of a woman. The user's name "BritBangert" is in blue and underlined, with "Brittany Bangert" in black below it. At the bottom of the page is a footer with copyright information and various links.

twitter

Login Join Twitter!

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

2 minutes ago via Twitter for Android

 **BritBangert**  
Brittany Bangert

© 2011 Twitter [About Us](#) [Contact](#) [Blog](#) [Status](#) [Resources](#) [API](#) [Business](#) [Help](#) [Jobs](#) [Terms](#) [Privacy](#)

The world can see it, but what more can an outside figure out about you?



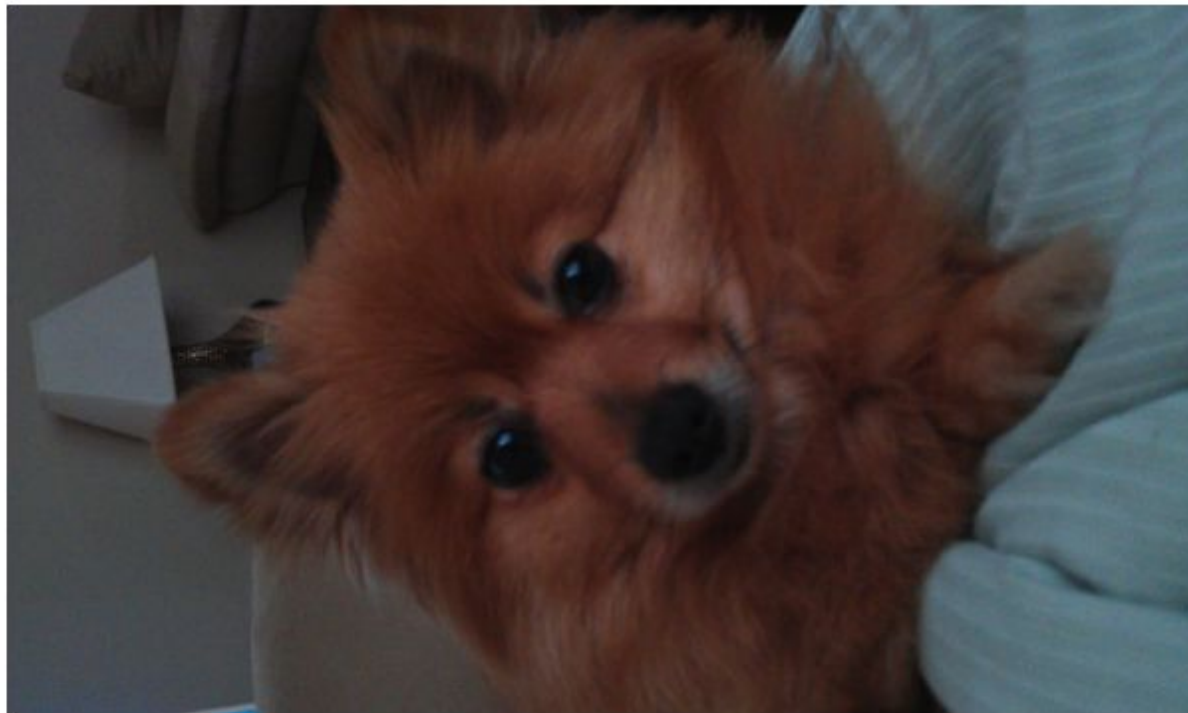
[Click here to login or create an account](#) ›

[Sign in with Twitter](#)



**@BritBangert**

Brittany Bangert April 5, 2011



[Login](#) to leave a comment



**Do you own a business?**

Be found on Google for free

[Claim your free listing today ►](#)

**Google places**



[Share this photo](#)

[Put this photo on your website](#)

**Views 11**

**Events**



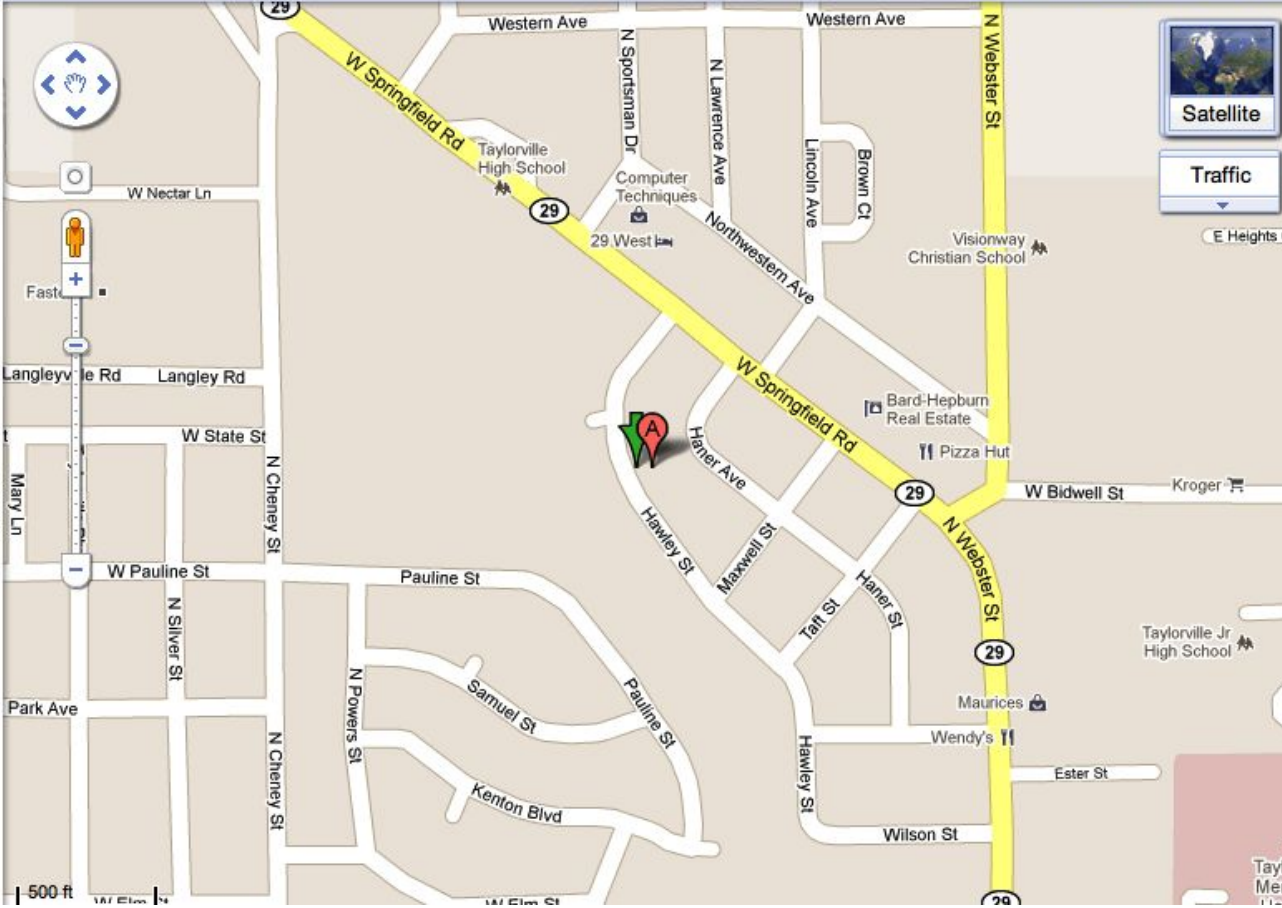
Photos are tagged with location  
from the camera



 **920 Hawley St**  
Taylorville, IL 62568



[Directions](#) [Search nearby](#) [more ▾](#)







# I Can Stalk U

Raising awareness about inadvertent information sharing

[Home](#)

[How](#)

[Why](#)

[About Us](#)

[Contact Us](#)

## Who have we stalked recently?



ICanStalkU was able to stalk [RangeLifeEnt](#) at 51 Great Jones St New York NY

1 minute ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to RangeLifeEnt](#)



ICanStalkU was able to stalk [lnicklasson](#) at <http://maps.google.com/?q=57.1344444444,12.7141666667>

2 minutes ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to lnicklasson](#)



ICanStalkU was able to stalk [Welerson13](#) at <http://maps.google.com/?q=-15.7380555556,-47.8986111111>

2 minutes ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to Welerson13](#)



ICanStalkU was able to stalk [BritBangert](#) at 920 Hawley St Taylorville IL

1 minute ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to BritBangert](#)



ICanStalkU was able to stalk [jiggy Owla](#) at <http://maps.google.com/?q=13.7830055879,100.518500685>

4 minutes ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to jiggy Owla](#)



ICanStalkU was able to stalk [gcolony](#) at <http://maps.google.com/?q=37.7851666667,-122.404166667>

4 minutes ago · [Map Location](#) · [View Tweet](#) · [View Picture](#) · [Reply to gcolony](#)

## 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** (bill in CA legislature)
    - ◆ *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



[Home](#) > [News](#) > [Security](#)

## 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

0

tweet



Share

*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?

- 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 (bill in CA legislature)
    - ◆ *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
  - Example #3: **GDPR law**

# General Data Protection Regulation (GDPR)

New European law (2018) designed to allow individuals to better control their personal data

- Requires consent or strong reason to process and store personal information
- Gives a user the right to know what information is held about them
- Allows a user to request that their information is deleted and that they are 'forgotten'
- Requires that personal information is properly protected.
- ... and more

Applies to US companies with European customers too

# How To Gain Better Privacy?

- Technology
  - Various browser additions
  - Special browser extensions
  - Tor and anonymizers to hide IP addresses

# Browser: “Tracking protection”

Private browsing includes tracking protection

You can choose a blocking list in your Firefox browser for example:



- Basic (default): Blocks third-party trackers based on Disconnect.me. **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 whether they decide to track or not

# 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 as a result of this flag

# Browser extension: Ghostery

User installs browser extension:

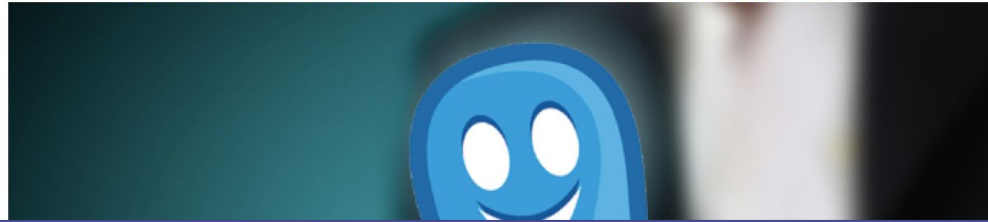
1. Recognizes third-party tracking scripts on a web page based on an actively curated database of such scripts
2. Blocks HTTP requests to these sites
  - as a result, Facebook buttons don't even show
3. Users can create "Whitelists" of allowed sites
  - e.g., allow FB button but note that you allow tracking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



# Break Time: Random Fact



# Certificate Transparency

See Spring 2019 lecture