# ECE 455: CYBERSECURITY

Lecture #9

Daniel Gitzel

# Announcements

- **Read papers for quiz next week.**
- **Continue work final project.**
  - Project check-in tonight.
- **Lab 2 will be posted after the holiday.**

# In the news

**“The org that doles out .org websites just sold itself to a for-profit company” - The Verge**

**“.ORG gets sold to a private equity firm called Ethos Capital”**

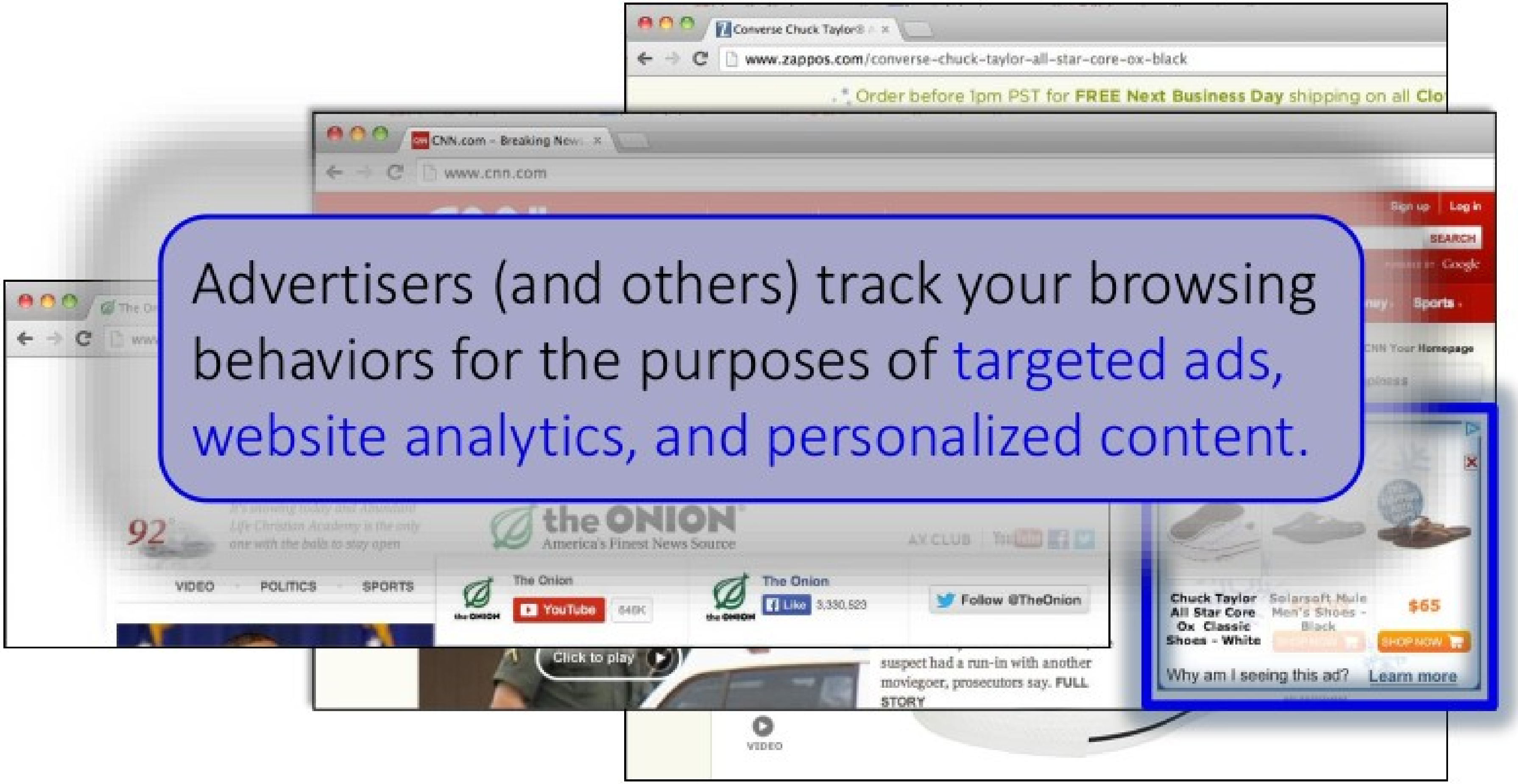
**Update 2020:**

**ICANN rejects sale of .org registry to for-profit investor group**

[1] https://www.reuters.com/article/us-icann-org-sale-idUSKBN22D4FV

# TRACKING ON THE WEB

# Those ads that seem to follow you...


Converse Chuck Taylor®
www.zappos.com/converse-chuck-taylor-all-star-core-ox-black
Order before 1pm PST for FREE Next Business Day shipping on all Clo
CNN.com - Breaking News
www.cnn.com
Sign up
Log in
SEARCH
Sports
CNN Your Homepage
The Onion
the ONION
America's Finest News Source
AV CLUB
VIDEO
POLITICS
SPORTS
YouTube
Like
Follow @TheOnion
Click to play
suspect had a run-in with another moviegoer, prosecutors say. FULL STORY
Chuck Taylor All Star Core Ox Classic Shoes - White
Solarsoft Mule Men's Shoes - Black
$65
SHOP NOW
Why am I seeing this ad?
Learn more

Advertisers (and others) track your browsing behaviors for the purposes of targeted ads, website analytics, and personalized content.

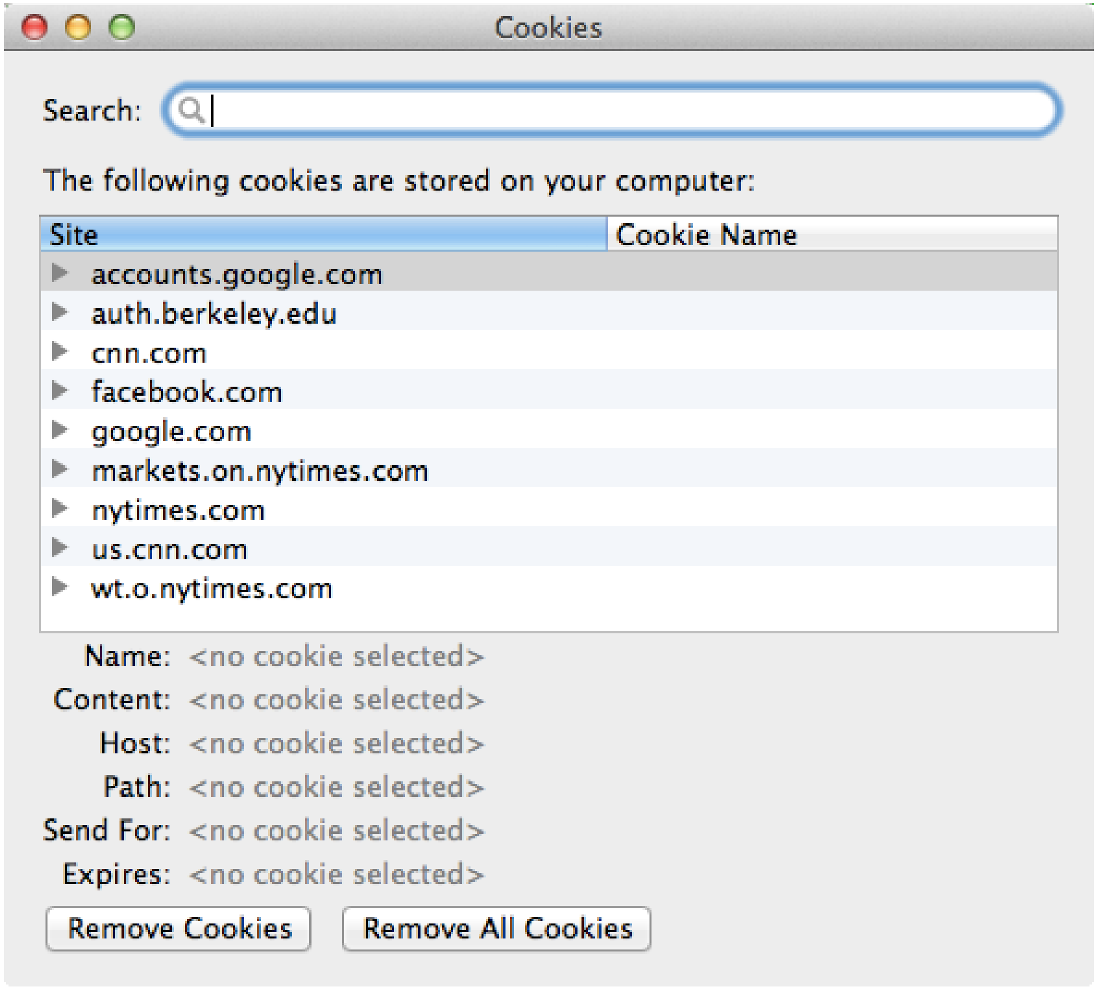
# What does a site learn about you when you visit?

- **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 “Referrer” header
- **They also learn about cookies**

# They also learn about cookies

**Why could this be harmful?**

# What happens when we remove cookies?



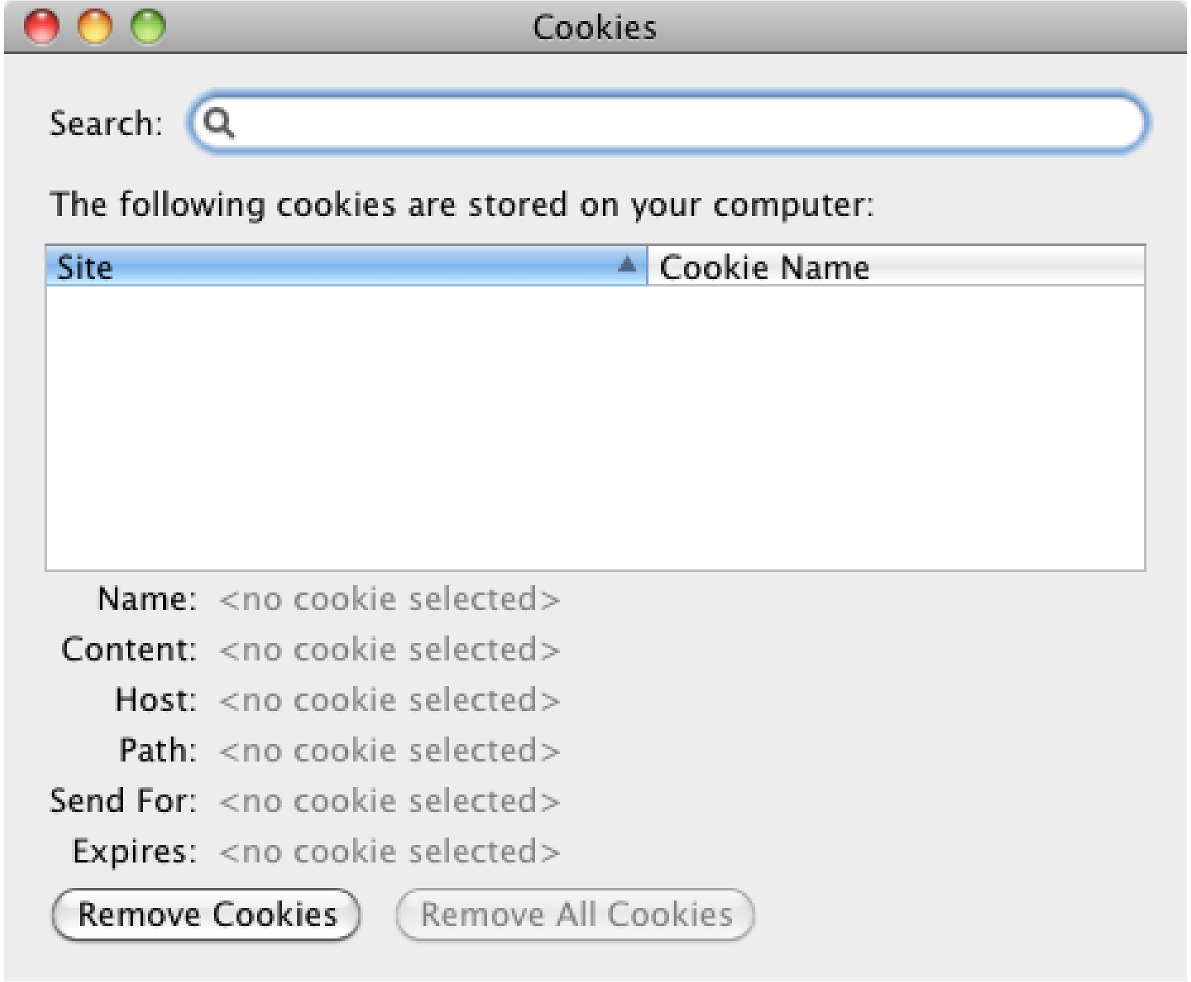
Search:

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>

# Cookies deleted!



The following cookies are stored on your computer:

| Site ▲ | Cookie Name |
|---|---|

Name: <no cookie selected>

Content: <no cookie selected>

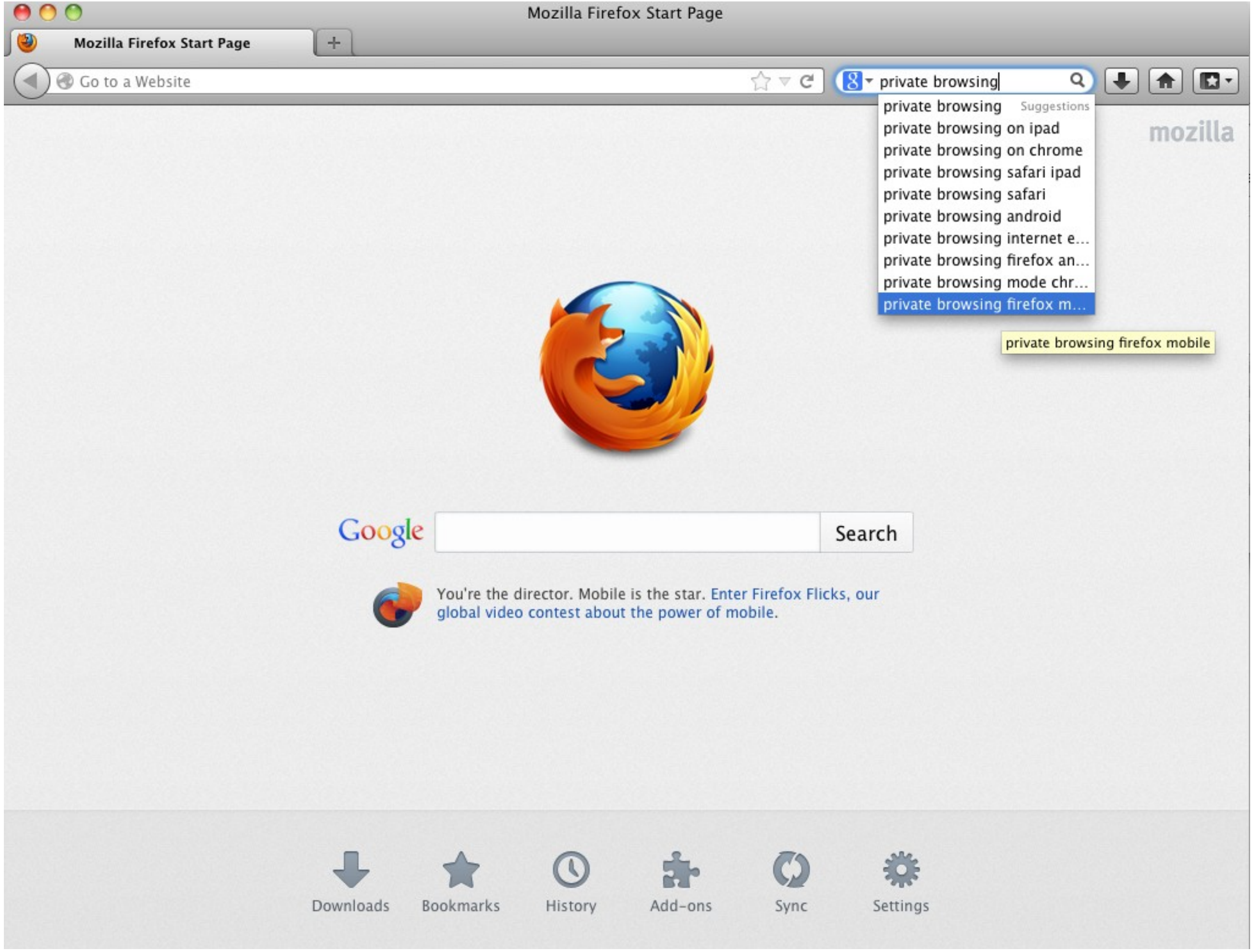
Host: <no cookie selected>

Path: <no cookie selected>

Send For: <no cookie selected>

Expires: <no cookie selected>

# Now search Google...



Mozilla Firefox Start Page

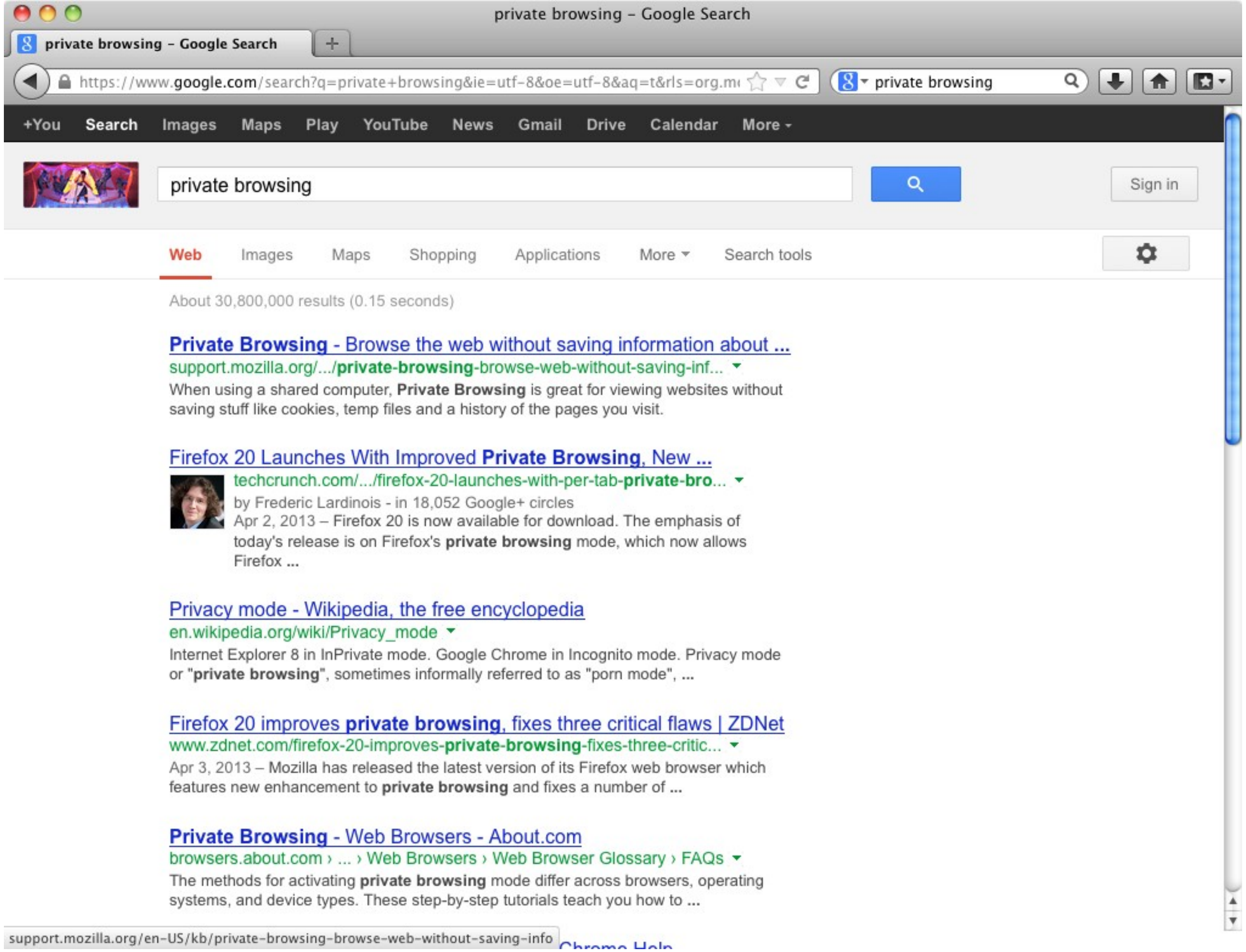
private browsing

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

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

# We get some results...


private browsing – Google Search
private browsing – Google Search
https://www.google.com/search?q=private+browsing&ie=utf-8&oe=utf-8&aq=t&rls=org.m
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...
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 ...

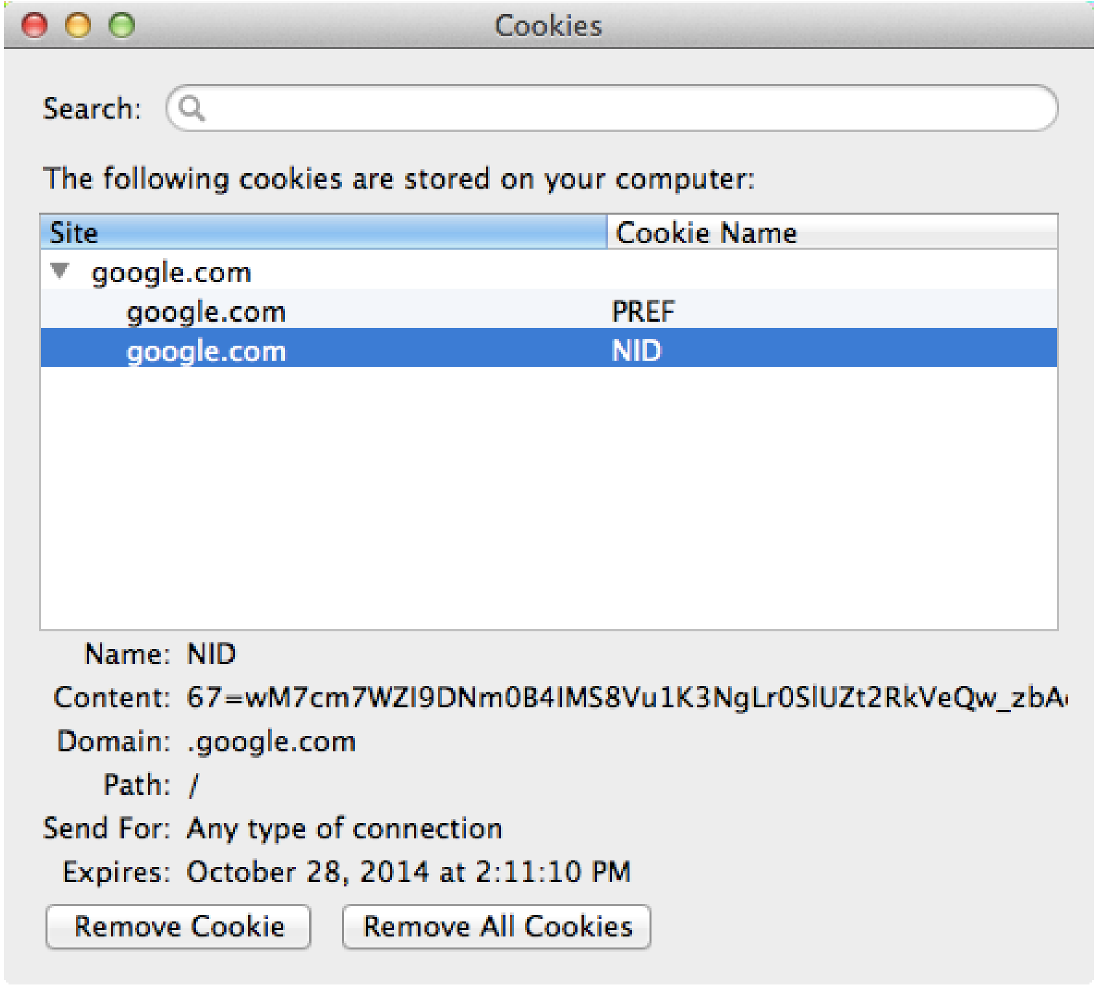
Privacy mode - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Privacy_mode
Internet Explorer 8 in InPrivate mode. Google Chrome in Incognito mode. Privacy mode or "**private browsing**", sometimes informally referred to as "porn mode", ...

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 ...

support.mozilla.org/en-US/kb/private-browsing-browse-web-without-saving-info

# Google has stored some cookies...



The following cookies are stored on your computer:

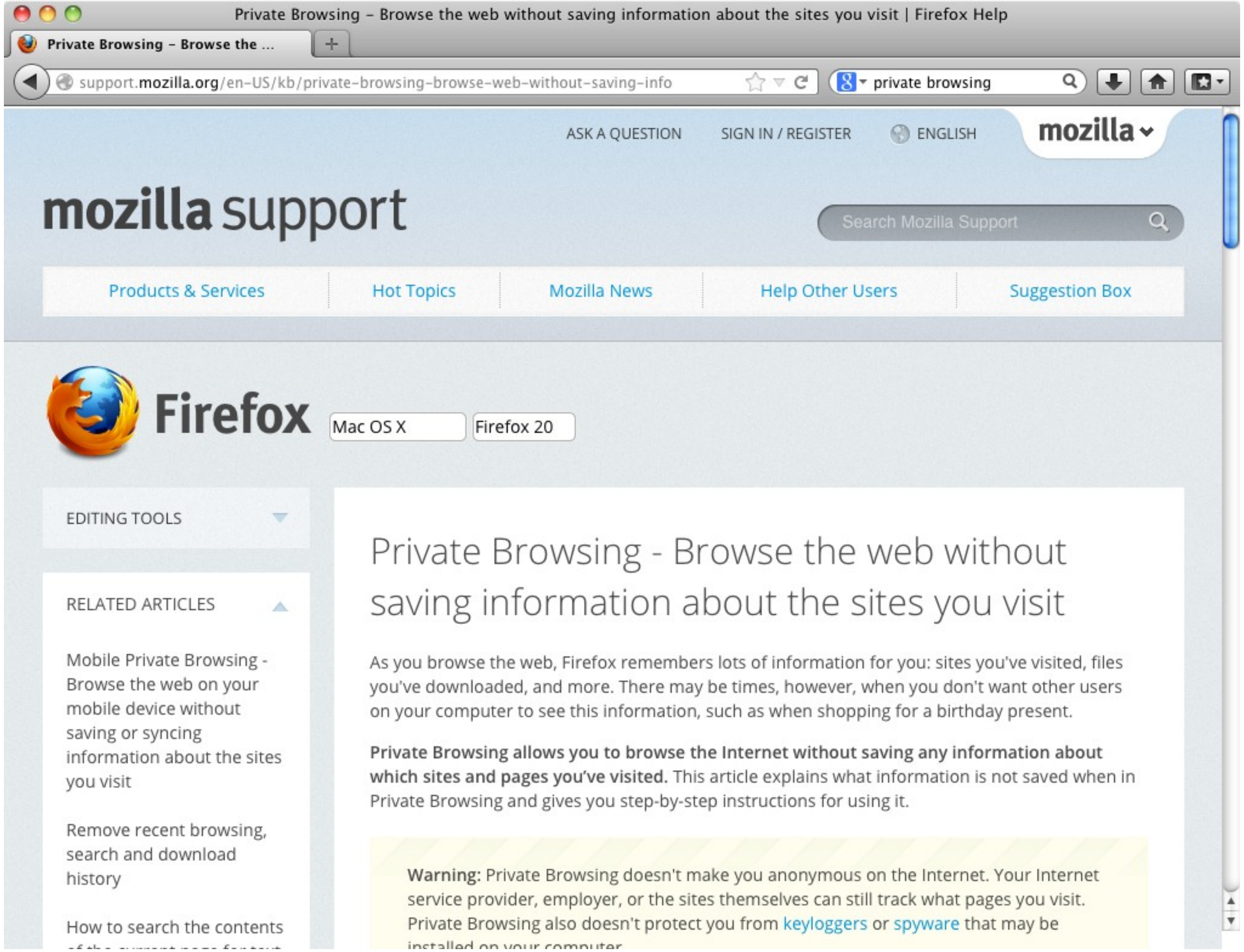
| Site | Cookie Name |
|---|---|
| ▼ google.com | |
| google.com | PREF |
| google.com | NID |

Name: NID
Content: 67=wM7cm7WZI9DNm0B4IMS8Vu1K3NgLr0SlUZt2RkVeQw_zbA
Domain: .google.com
Path: /
Send For: Any type of connection
Expires: October 28, 2014 at 2:11:10 PM

# Private Browsing

- You can turn on a mode called “private browsing” in your browser
- What is this?
- Does it protect you against tracking?

# From Mozilla



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 of the current page for text

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

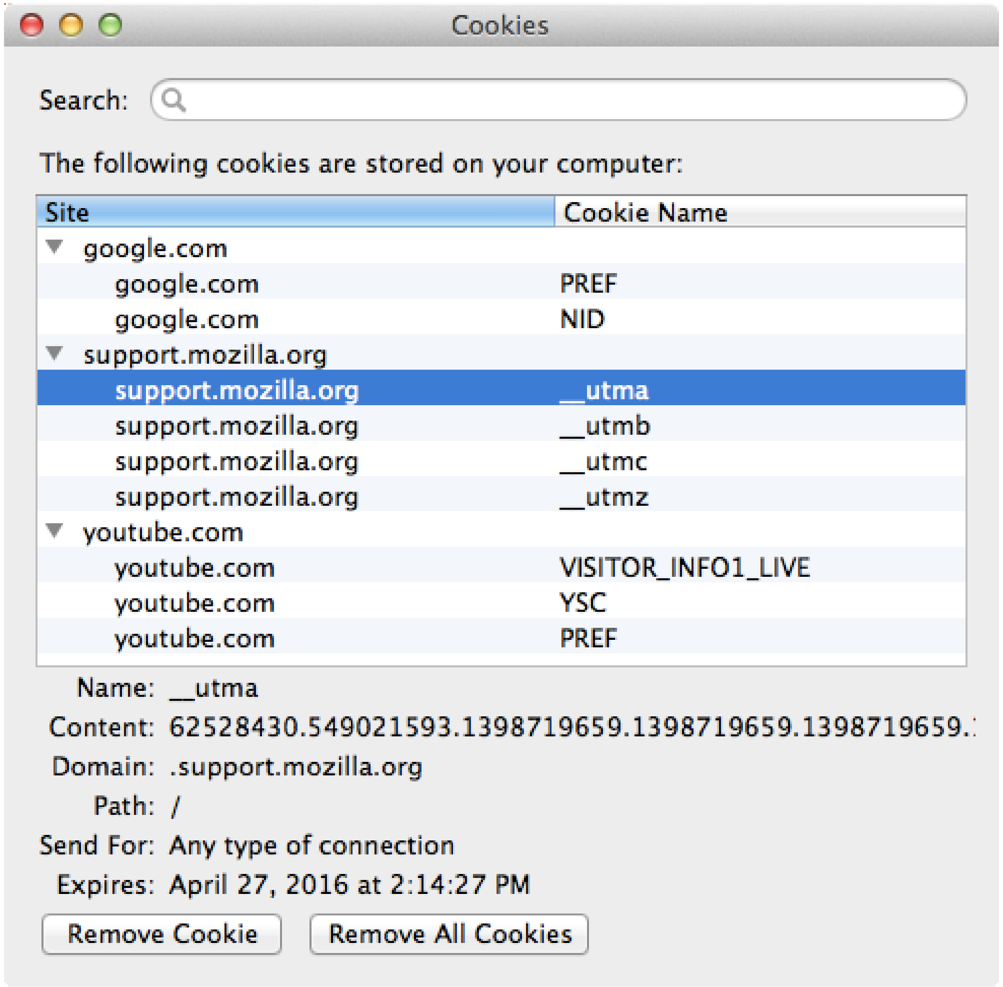
As you browse the web, Firefox remembers lots of information for you: sites you've visited, files you've downloaded, and more. There may be times, however, when you don't want other users on your computer to see this information, such as when shopping for a birthday present.

**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 installed on your computer.

- **“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, and cookies
- **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!

# Ironically, we’ve collected some 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.

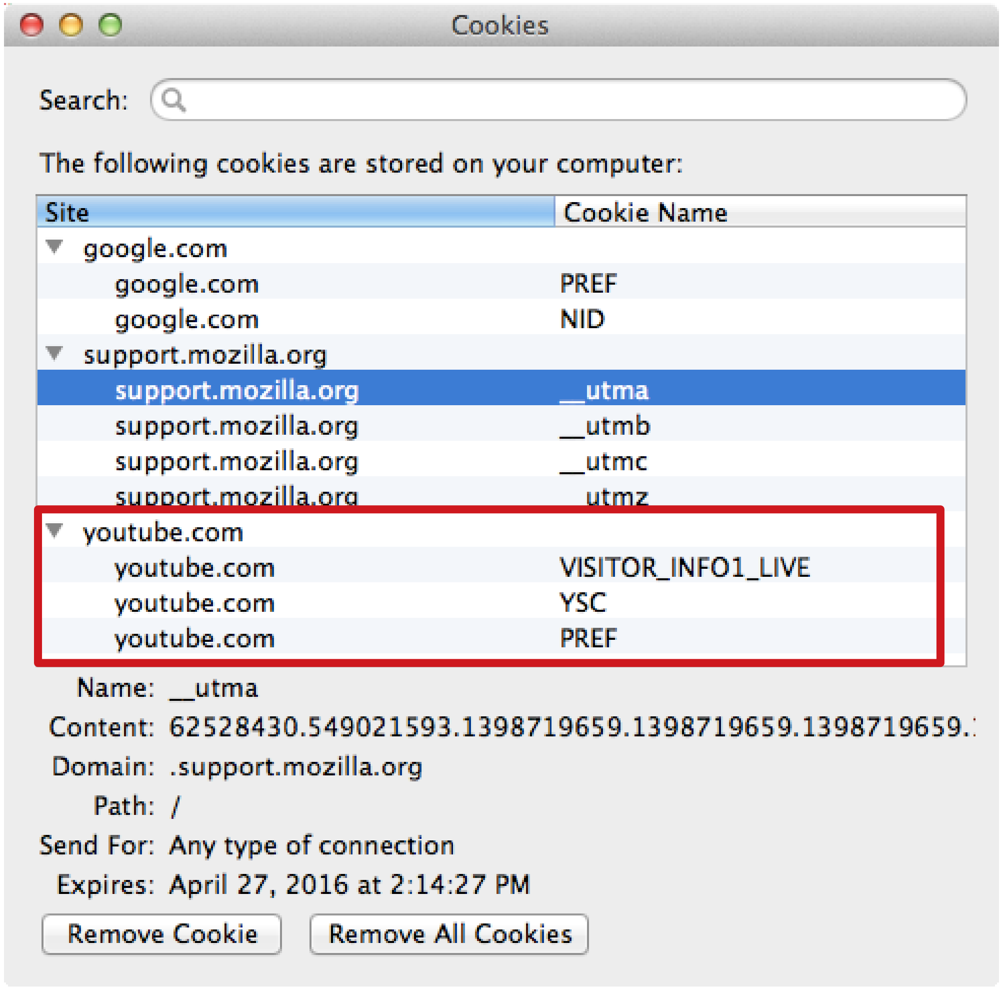
Domain: .support.mozilla.org

Path: /

Send For: Any type of connection

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

# How did youtube get involved?

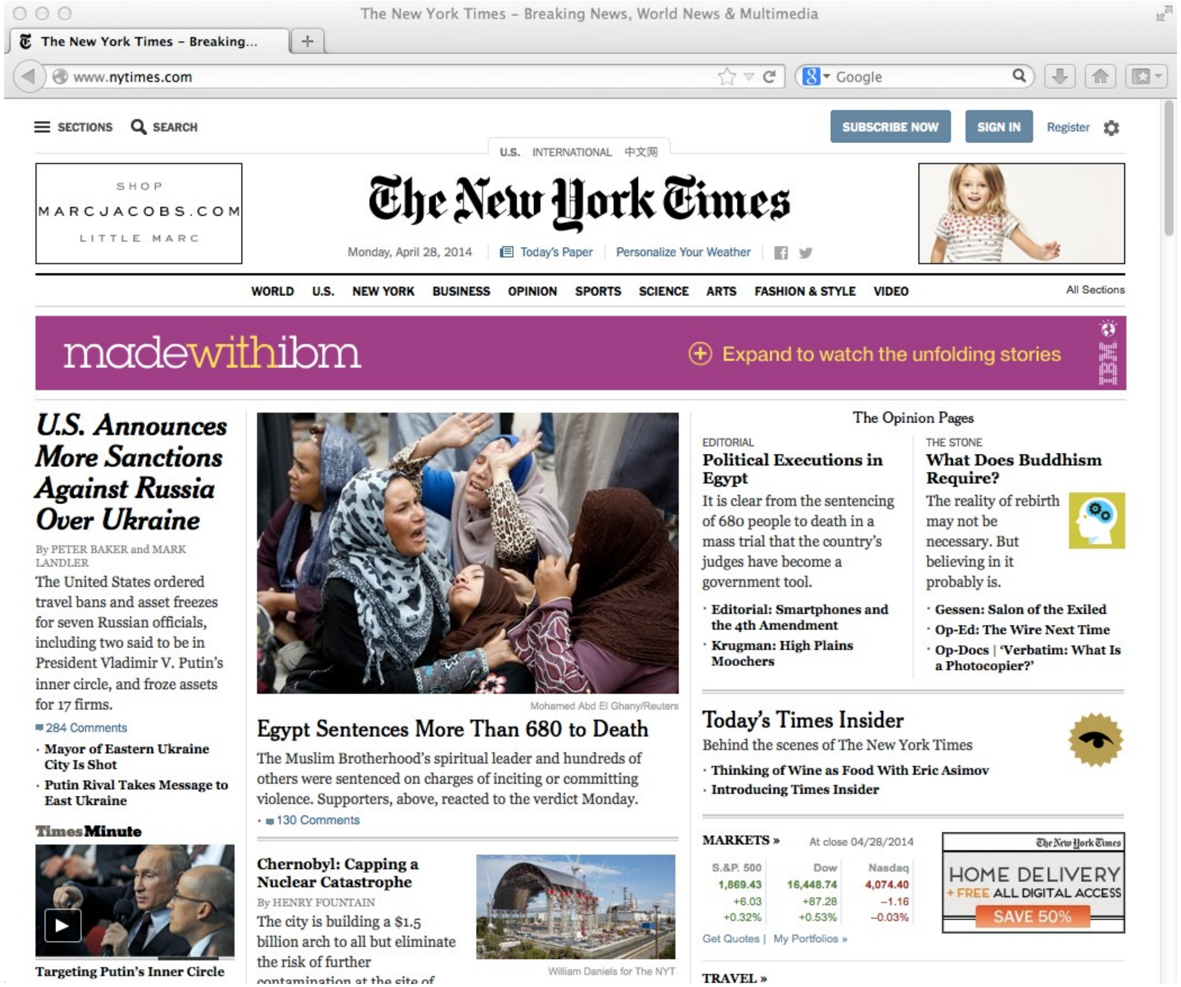


The following cookies are stored on your computer:

| 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

# Let’s go to a news site…



The New York Times

Monday, April 28, 2014

## 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

TimesMinute

Targeting Putin’s Inner Circle

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

By HENRY FOUNTAIN

The city is building a $1.5 billion arch to all but eliminate the risk of further contamination at the site of

William Daniels for The NYT

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

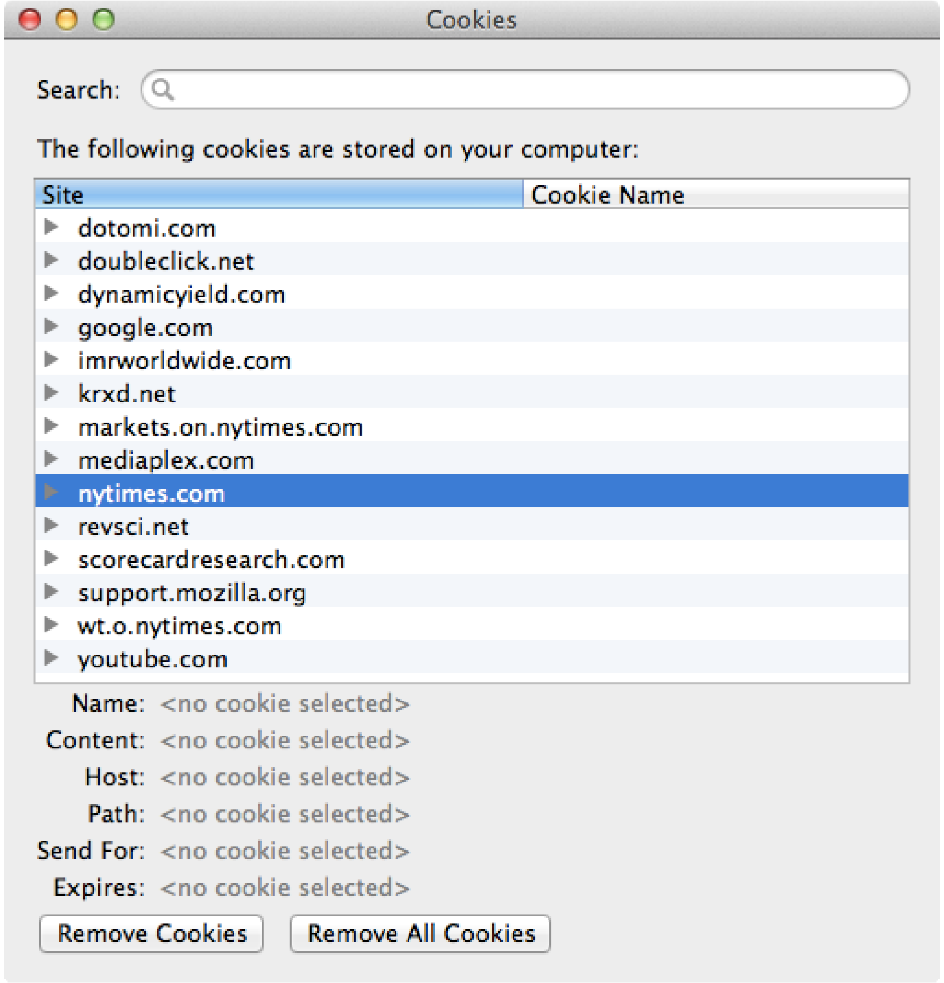
MARKETS » At close 04/28/2014

| S.&P. 500 | Dow | Nasdaq |
|---|---|---|
| 1,869.43 | 16,448.74 | 4,074.40 |
| +6.03 | +87.28 | –1.16 |
| +0.32% | +0.53% | –0.03% |

Get Quotes | My Portfolios »

TRAVEL »

# Delicious cookies!



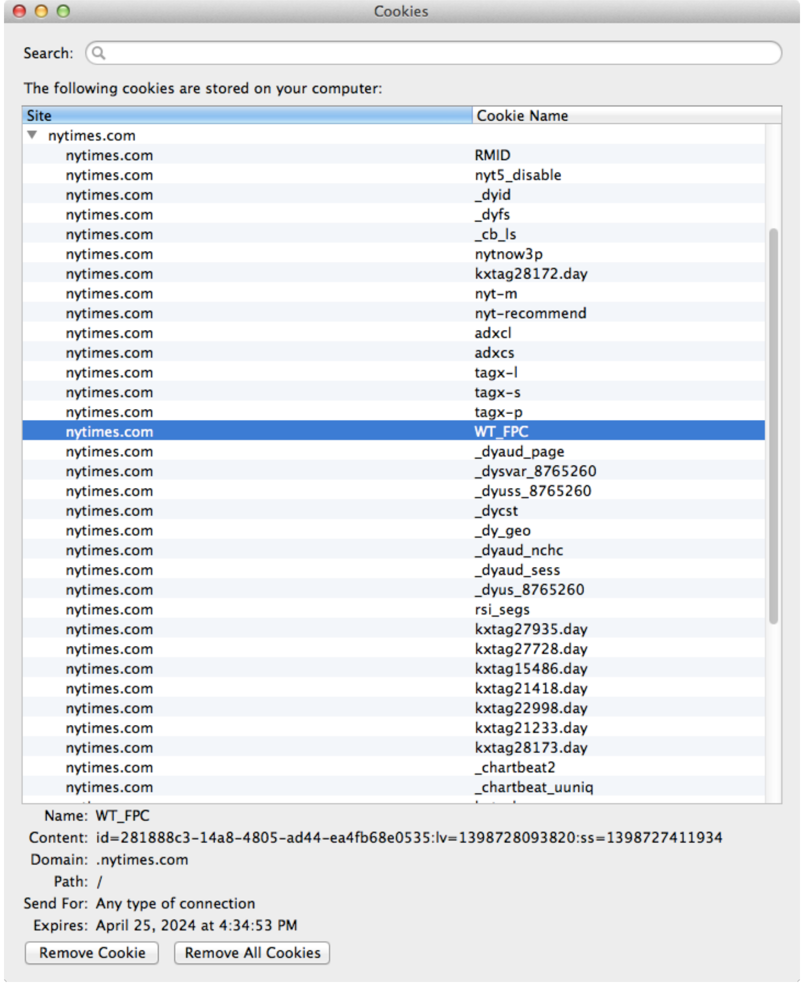
Search:

The following cookies are stored on your computer:

| Site | Cookie Name |
|---|---|
| dotomi.com | |
| doubleclick.net | |
| dynamicyield.com | |
| google.com | |
| imrworldwide.com | |
| krxd.net | |
| markets.on.nytimes.com | |
| mediaplex.com | |
| nytimes.com | |
| revsci.net | |
| scorecardresearch.com | |
| support.mozilla.org | |
| wt.o.nytimes.com | |
| youtube.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>

# Nytimes.com alone sets several dozen

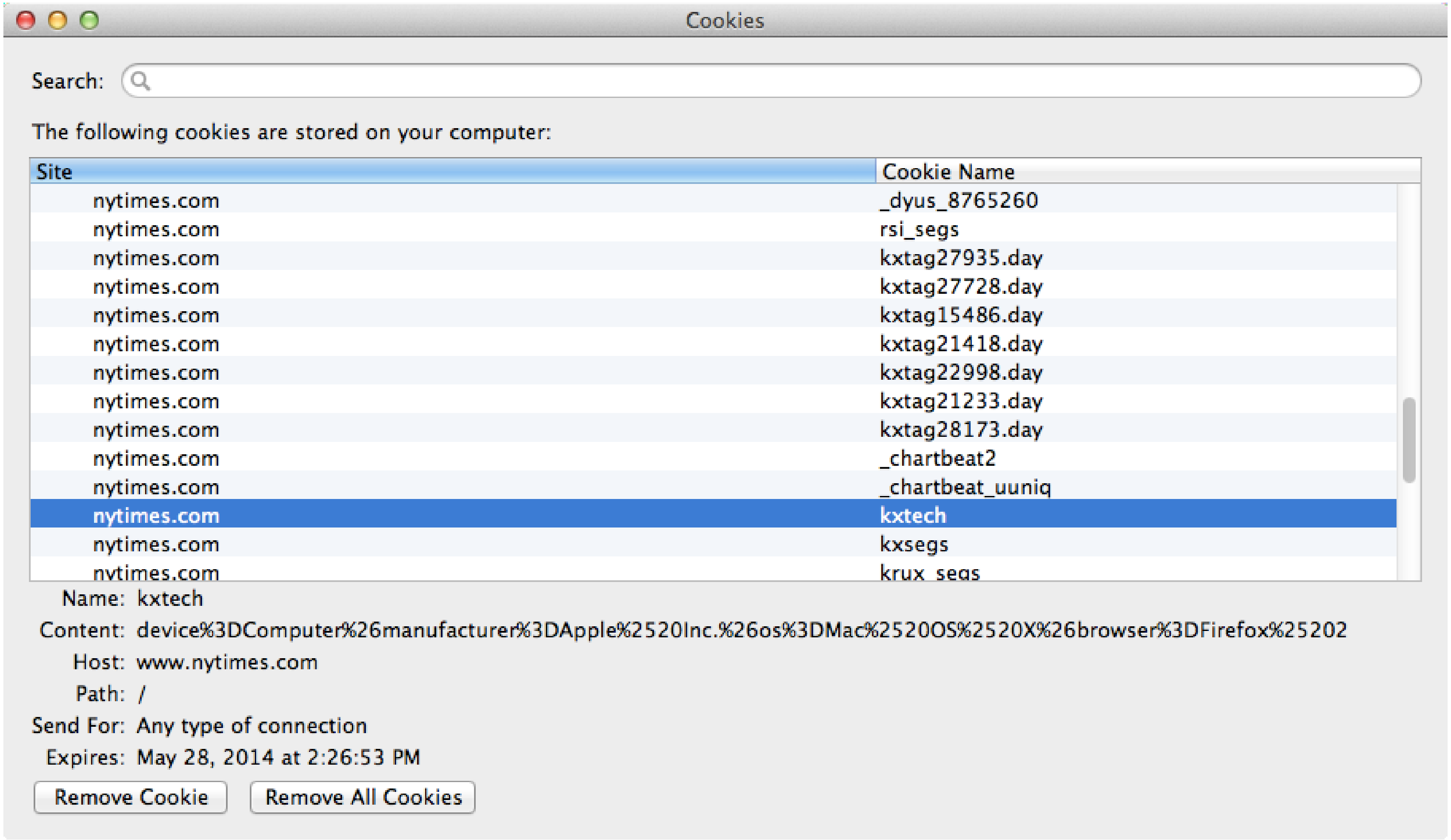


The following cookies are stored on your computer:

| Site | Cookie Name |
|---|---|
| ▼ nytimes.com | |
| 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

# Tracks device ID, system, and browser



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 |

Name: kxtech

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

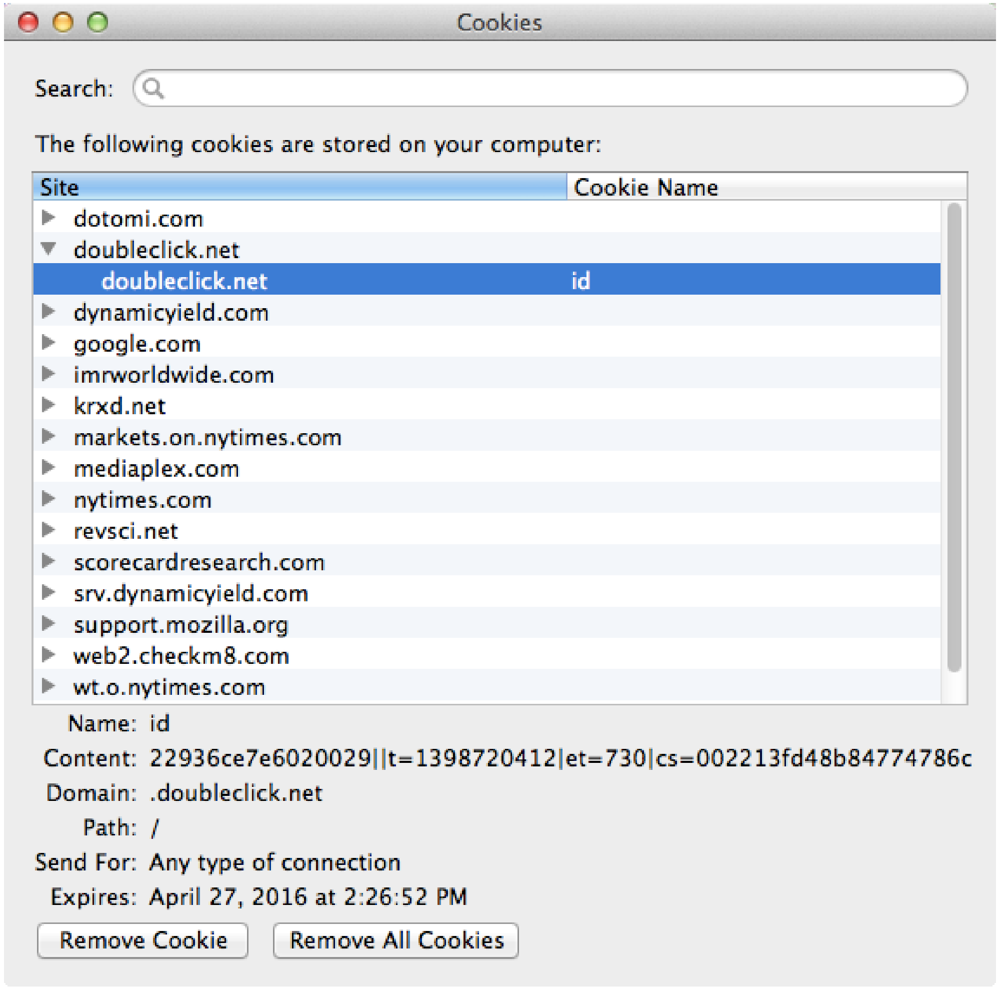
Host: www.nytimes.com

Path: /

Send For: Any type of connection

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

# Doubleclick is a google tracking cookie



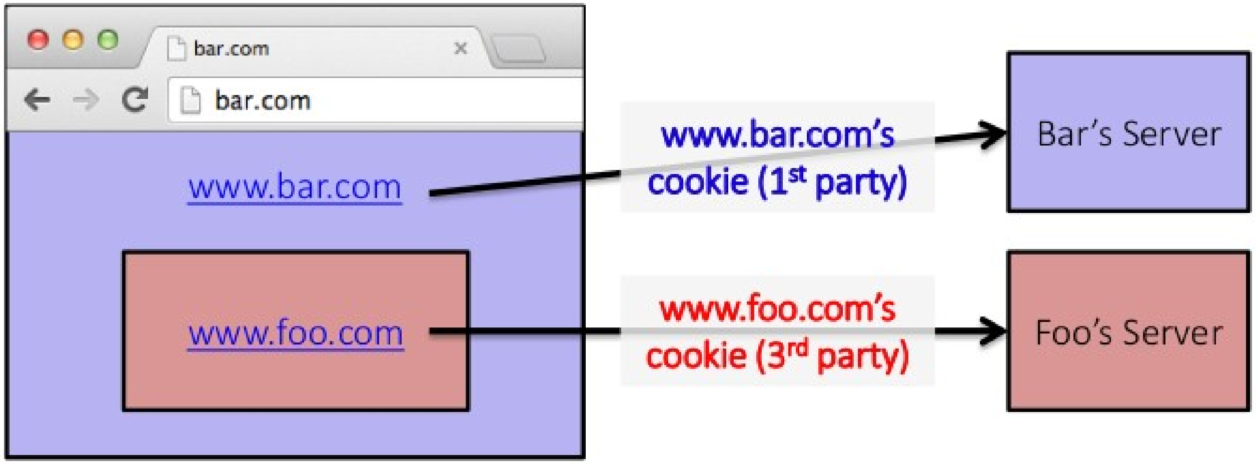
The following cookies are stored on your computer:

| 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

# First and Third Parties

- **First-party cookie: belongs to top-level domain.**
- **Third-party cookie: belongs to domain of embedded content (such as image, iframe).**

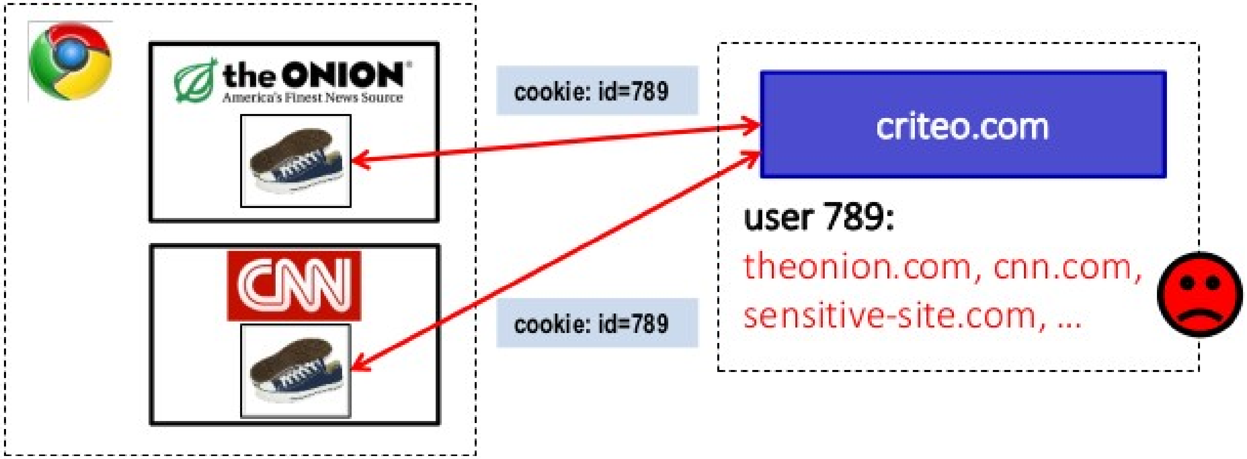

bar.com
bar.com
www.bar.com
www.foo.com
www.bar.com's cookie (1st party)
www.foo.com's cookie (3rd party)
Bar's Server
Foo's Server

# 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):
    - <img src="http://doubleclick.net/ad.gif" width=1 height=1>
- **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

# Anonymous Tracking

**Trackers included in other sites use third-party cookies containing unique identifiers to create browsing profiles.**

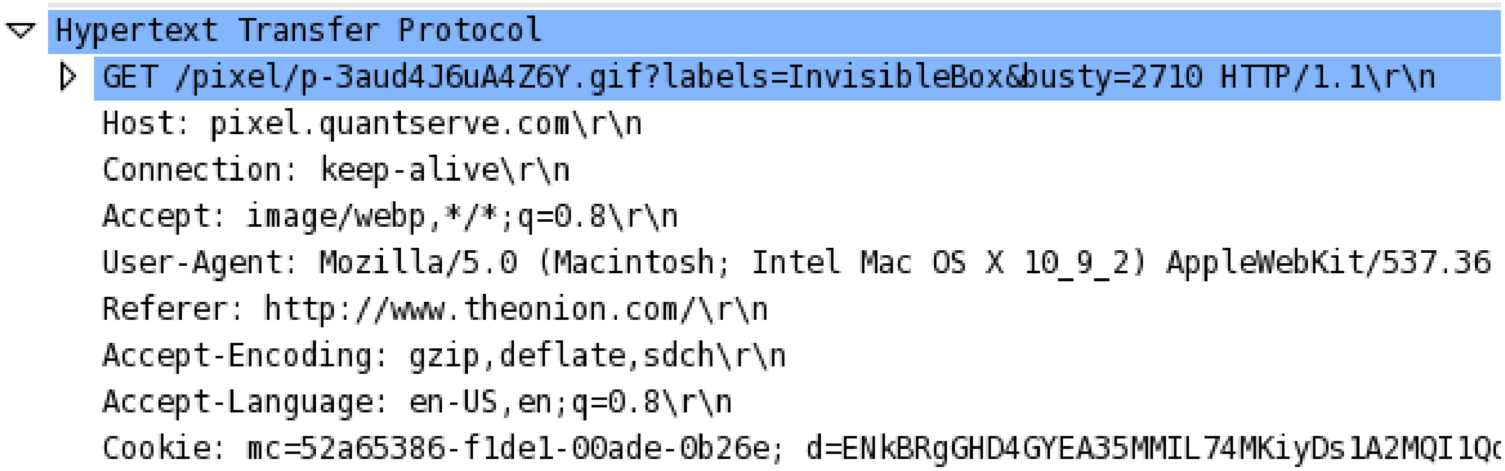


# Basic Tracking Concepts

**Tracking requires:**

**(1) re-identifying a user.**

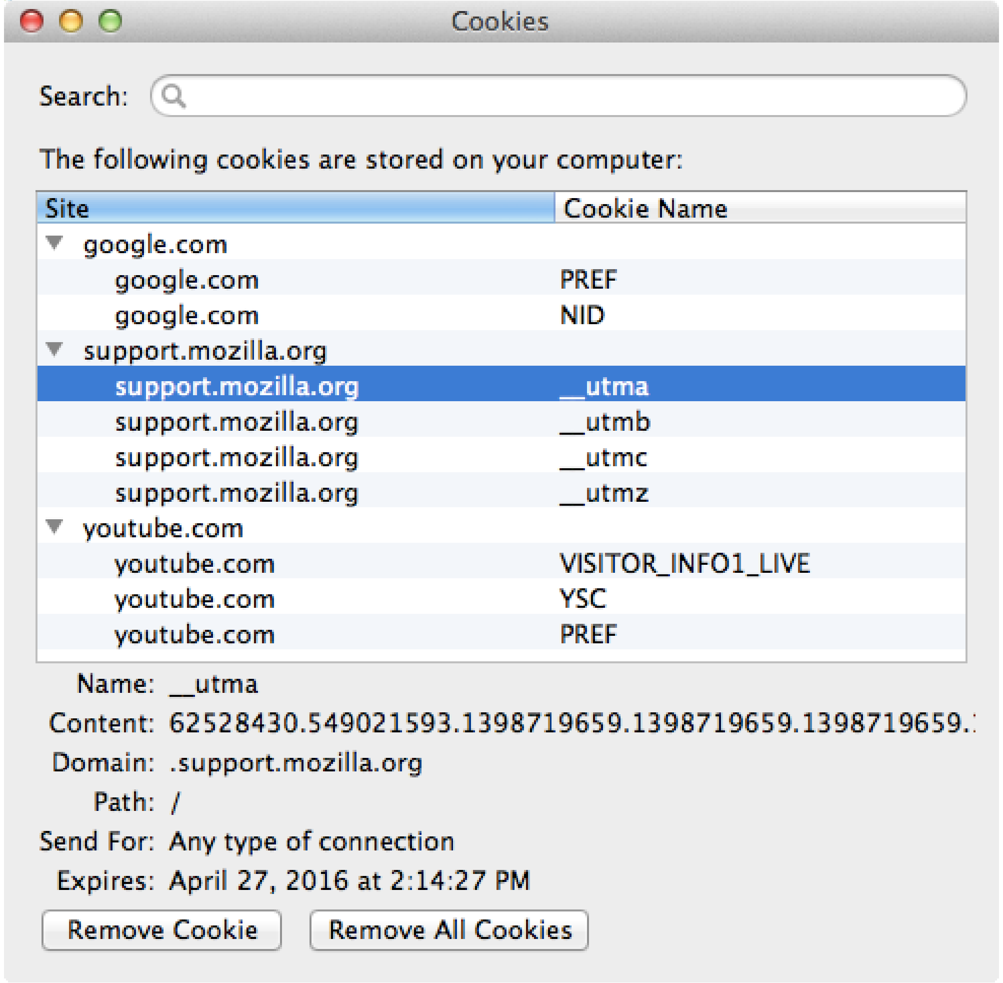
**(2) communicating id + visited site back to tracker.**



```
▽ Hypertext Transfer Protocol
  ▷ GET /pixel/p-3aud4J6uA4Z6Y.gif?labels=InvisibleBox&busty=2710 HTTP/1.1\r\n
    Host: pixel.quantserve.com\r\n
    Connection: keep-alive\r\n
    Accept: image/webp,*/*;q=0.8\r\n
    User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_2) AppleWebKit/537.36
    Referer: http://www.theonion.com/\r\n
    Accept-Encoding: gzip,deflate,sdch\r\n
    Accept-Language: en-US,en;q=0.8\r\n
    Cookie: mc=52a65386-f1de1-00ade-0b26e; d=ENkBRgGHD4GYEA35MMIL74MKiyDs1A2MQI1Q
```

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

# Remember this Mozilla cookie?



The following cookies are stored on your computer:

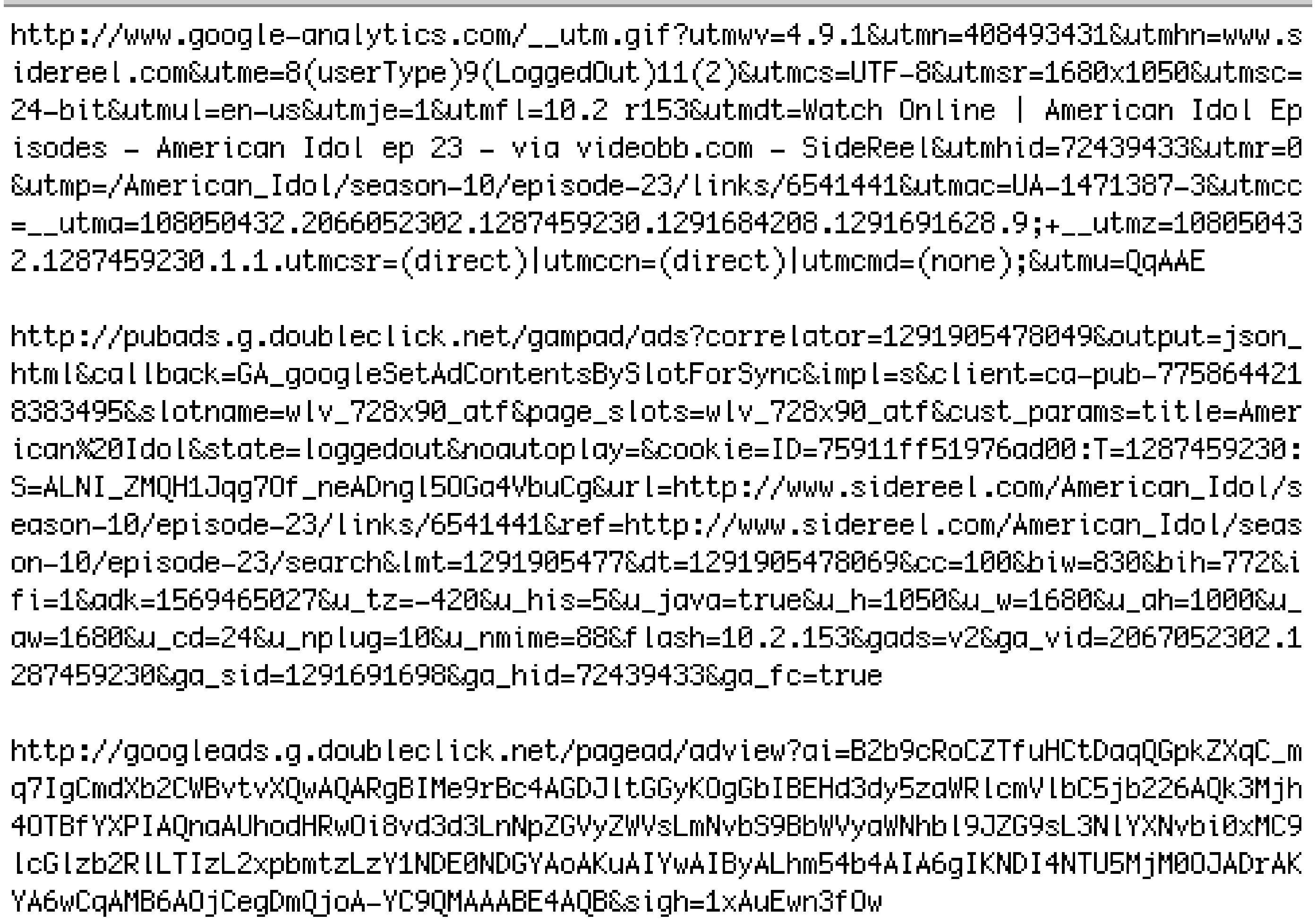
| Site | Cookie Name |
|---|---|
| ▼ google.com | |
| google.com | PREF |
| google.com | NID |
| ▼ support.mozilla.org | |
| support.mozilla.org | __utma |
| support.mozilla.org | __utmb |
| support.mozilla.org | __utmc |
| support.mozilla.org | __utmz |
| ▼ youtube.com | |
| youtube.com | VISITOR_INFO1_LIVE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

# 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 ...

# There’s a lot encoded in that URL…

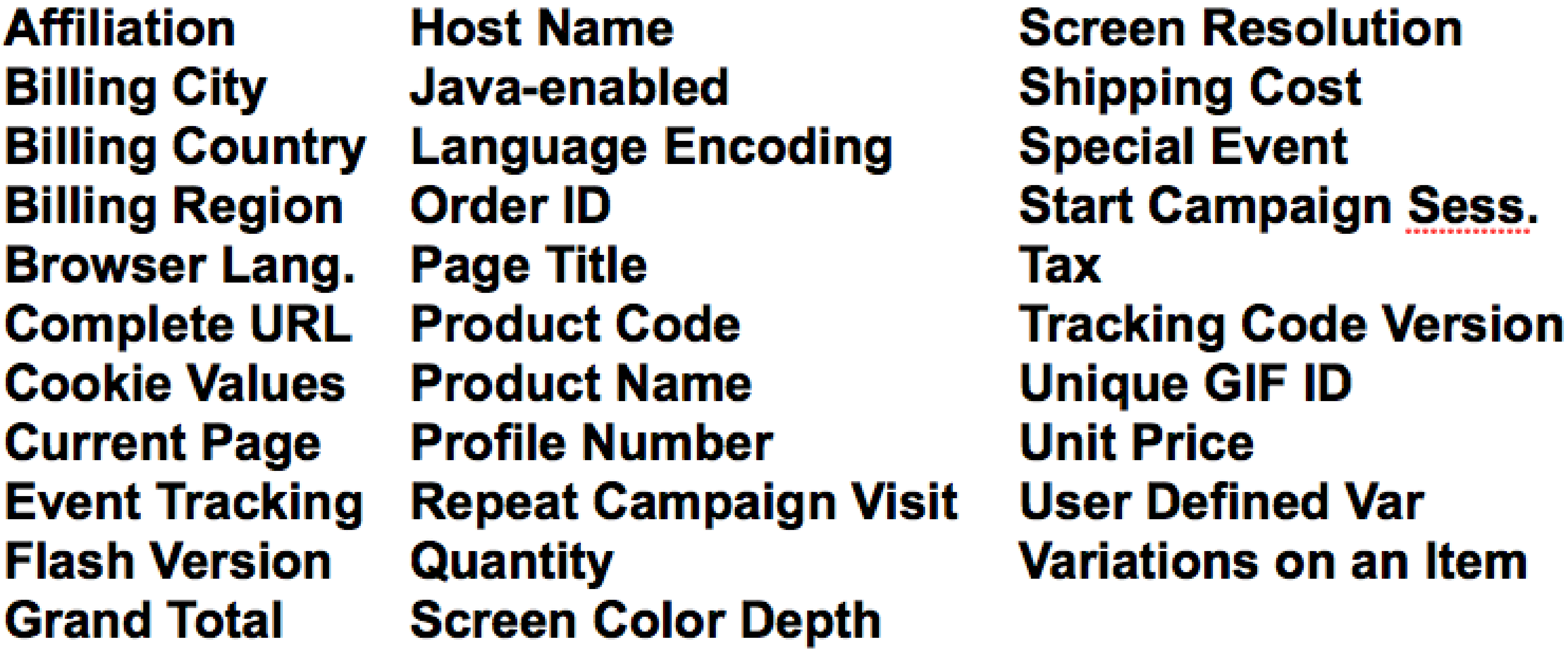


```
http://www.google-analytics.com/__utm.gif?utmwv=4.9.1&utmn=408493431&utmhn=www.s
idereel.com&utme=8(userType)9(LoggedOut)11(2)&utmcs=UTF-8&utmsr=1680x1050&utmsc=
24-bit&utmul=en-us&utmje=1&utmfl=10.2 r153&utmdt=Watch Online | American Idol Ep
isodes - American Idol ep 23 - via videobb.com - SideReel&utmhid=72439433&utmr=0
&utmp=/American_Idol/season-10/episode-23/links/6541441&utmac=UA-1471387-3&utmcc
=__utma=108050432.2066052302.1287459230.1291684208.1291691628.9;+__utmz=10805043
2.1287459230.1.1.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-775864421
8383495&slotname=wlv_728x90_atf&page_slots=wlv_728x90_atf&cust_params=title=Amer
ican%20Idol&state=loggedout&noautoplay=&cookie=ID=75911ff51976ad00:T=1287459230:
S=ALNI_ZMQH1Jqg7Of_neADngl5OGa4VbuCg&url=http://www.sidereel.com/American_Idol/s
eason-10/episode-23/links/6541441&ref=http://www.sidereel.com/American_Idol/seas
on-10/episode-23/search&lmt=1291905477&dt=1291905478069&cc=100&biw=830&bih=772&i
fi=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=2067052302.1
287459230&ga_sid=1291691698&ga_hid=72439433&ga_fc=true

http://googleads.g.doubleclick.net/pagead/adview?ai=B2b9cRoCZTfuHCtDaqQGpkZXqC_m
q7IgCmdXb2CWBvtvXQwAQARgBIMe9rBc4AGDJltGGyKOgGbIBEHd3dy5zaWRlcmVlbC5jb226AQk3Mjh
4OTBfYXPIAQnaAUhodHRwOi8vd3d3LnNpZGVyZWVsLmNvbS9BbWVyaWNhbl9JZG9sL3NlYXNvbi0xMC9
lcGlzb2RlLTIzL2xpbmtzLzY1NDE0NDGYAoAKuAIYwAIByALhm54b4AIA6gIKNDI4NTU5MjM0OJADrAK
YA6wCqAMB6AOjCegDmQjoA-YC9QMAAABE4AQB&sigh=1xAuEwn3fOw
```

# Values Reportable via Google Analytics



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

# Urchin Tracking Module (pre-GA)

- **Named for “street urchins” that Sherlock Holmes pays to follow criminals**
- **URL parameter encoding:**
  - https://www.example.com/page?utm_content=buffercf3b2&utm_medium=social&utm_source=facebook.com&utm_campaign=buffer
  - Parameters encode ad-campaign data and source attribution

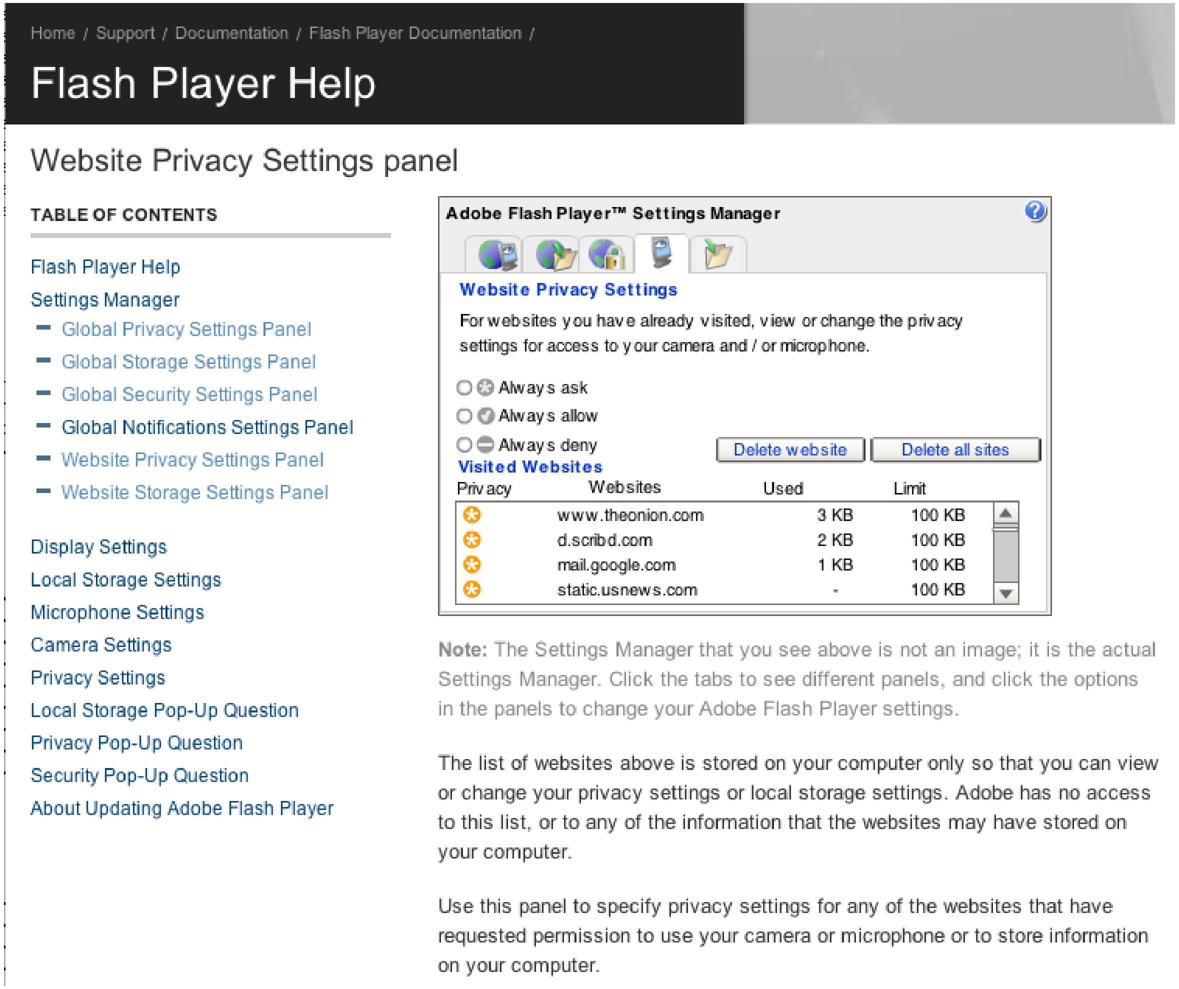
| Parameter | Purpose | Example |
|---|---|---|
| utm_source | Example utm_source Identifies which site sent the traffic, and is a required parameter. | utm_source=google |
| utm_medium | Identifies what type of link was used, such as cost per click or email. | utm_medium=cpc |
| utm_campaign | Identifies a specific product promotion or strategic campaign. | utm_campaign=spring_sale |
| utm_term | Identifies search terms. | utm_term=running+shoes |
| utm_content | Identifies what specifically was clicked to bring the user to the site, such as a banner ad or a text link. It is often used for A/B testing and content-targeted ads. | utm_content=logolink or<br>utm_content=textlink |

[2] https://en.wikipedia.org/wiki/UTM_parameters

# More Tracking Techniques…

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

# Flash maintains separate state



Home / Support / Documentation / Flash Player Documentation /

## Flash Player Help

### Website Privacy Settings panel

TABLE OF CONTENTS

Adobe Flash Player™ Settings Manager

**Website Privacy Settings**

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

○ Always ask
○ Always allow
○ Always deny

**Visited Websites**

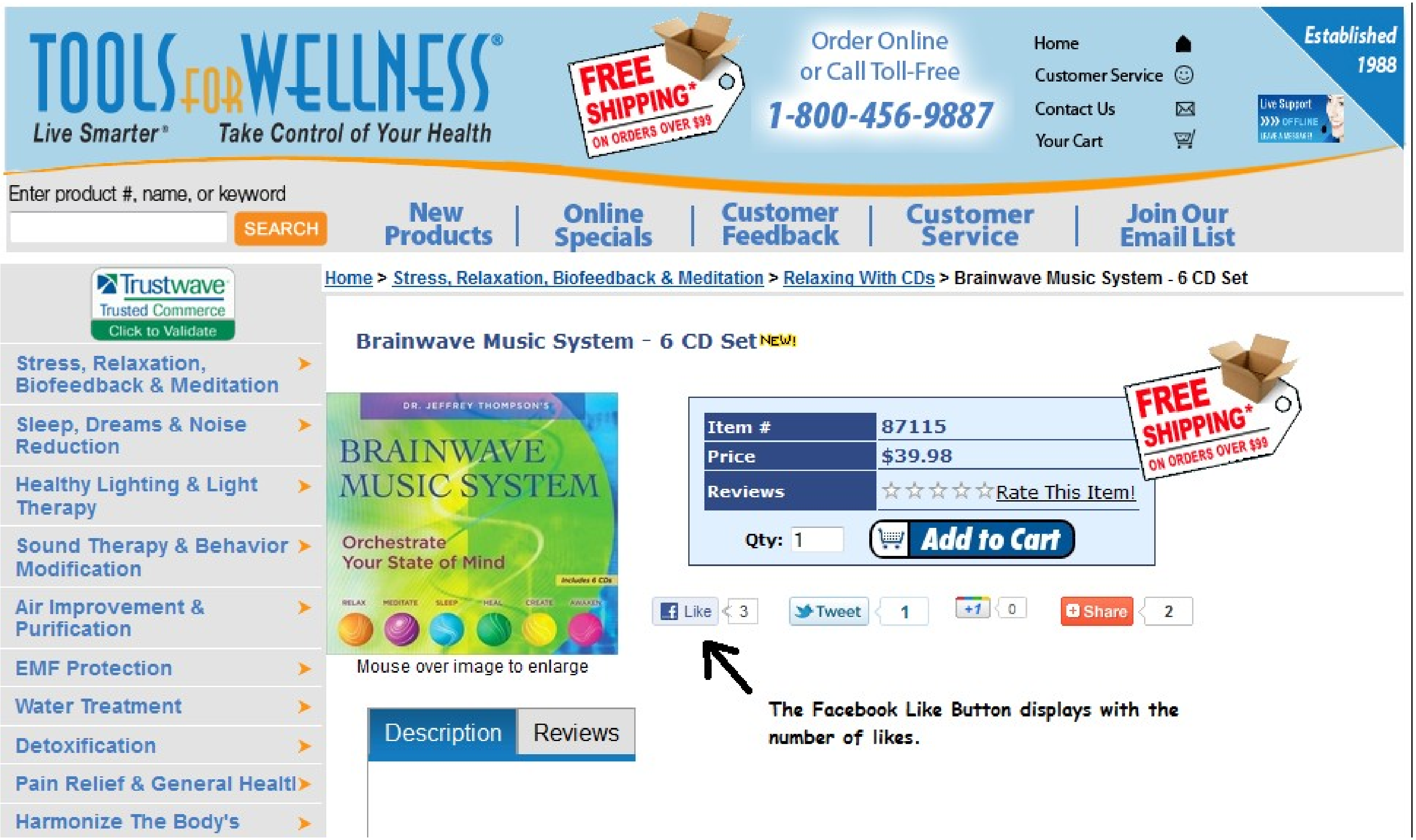
| Privacy | Websites | Used | Limit |
|---|---|---|---|
| ✪ | www.theonion.com | 3 KB | 100 KB |
| ✪ | d.scribd.com | 2 KB | 100 KB |
| ✪ | mail.google.com | 1 KB | 100 KB |
| ✪ | static.usnews.com | - | 100 KB |

**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 only so that you can view or change your privacy settings or local storage settings. Adobe has no access to this list, or to any of the information that the websites may have stored on your computer.

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.

# Like, Tweet, Share Buttons



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SEARCH

New Products | Online Specials | Customer Feedback | Customer Service | Join Our Email List

Trustwave Trusted Commerce Click to Validate

- Stress, Relaxation, Biofeedback & Meditation
- Sleep, Dreams & Noise Reduction
- Healthy Lighting & Light Therapy
- Sound Therapy & Behavior Modification
- Air Improvement & Purification
- EMF Protection
- Water Treatment
- Detoxification
- Pain Relief & General Healt
- Harmonize The Body's

Home > Stress, Relaxation, Biofeedback & Meditation > Relaxing With CDs > Brainwave Music System - 6 CD Set

Brainwave Music System - 6 CD Set NEW!

DR. JEFFREY THOMPSON'S BRAINWAVE MUSIC SYSTEM

Orchestrate Your State of Mind

Includes 6 CDs

RELAX MEDITATE SLEEP HEAL CREATE AWAKEN

Mouse over image to enlarge

| | |
|---|---|
| Item # | 87115 |
| Price | $39.98 |
| Reviews | ☆☆☆☆☆ Rate This Item! |

Qty: 1 Add to Cart

FREE SHIPPING* ON ORDERS OVER $99

Like 3 Tweet 1 +1 0 Share 2

The Facebook Like Button displays with the number of likes.

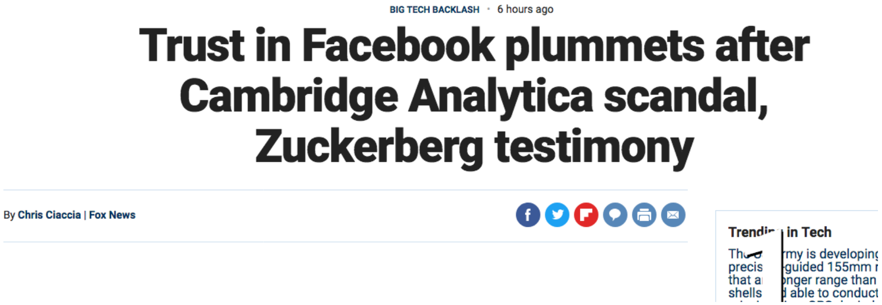
Description Reviews

- **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 actually visit Facebook**

# 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**
  - Losing control of how it’s used
  - Privacy concerns
  - Large amounts of private data in one place

# Privacy Scandal



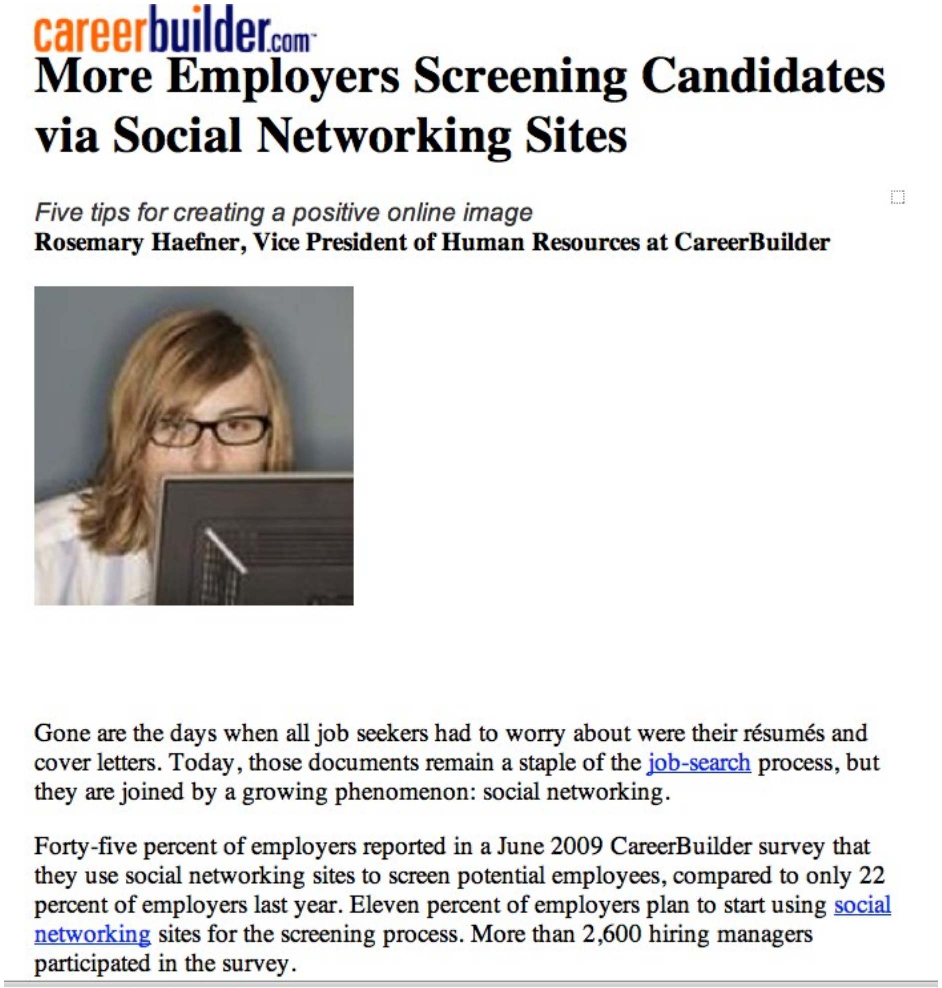
BIG TECH BACKLASH • 6 hours ago

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

By Chris Ciaccia | Fox News

Trendi in Tech

Th rmy is developing
precis guided 155mm
that a nger range than
shells d able to conduct



careerbuilder.com

## 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**

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.

**"New Social Media Screening for U.S. Visitors Goes Into Effect" - June 2017**

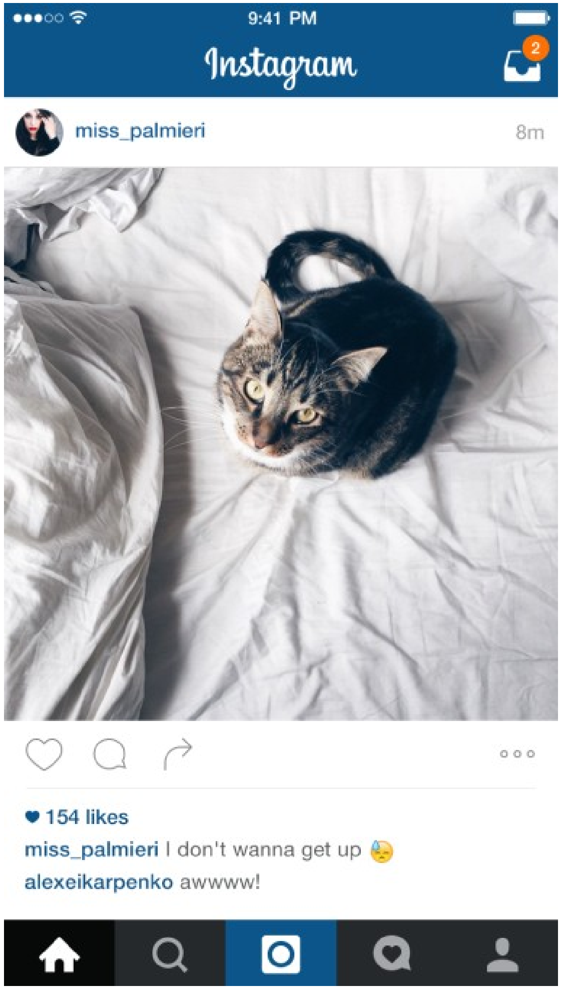
**Social Media posts checked at border**

# Tracking – So What?

**You really don’t have a good sense of just what you’re giving away …**

# Inadvertent information leaking

- **Consider posting a picture on Twitter**
- **What more can a stranger figure out about you?**



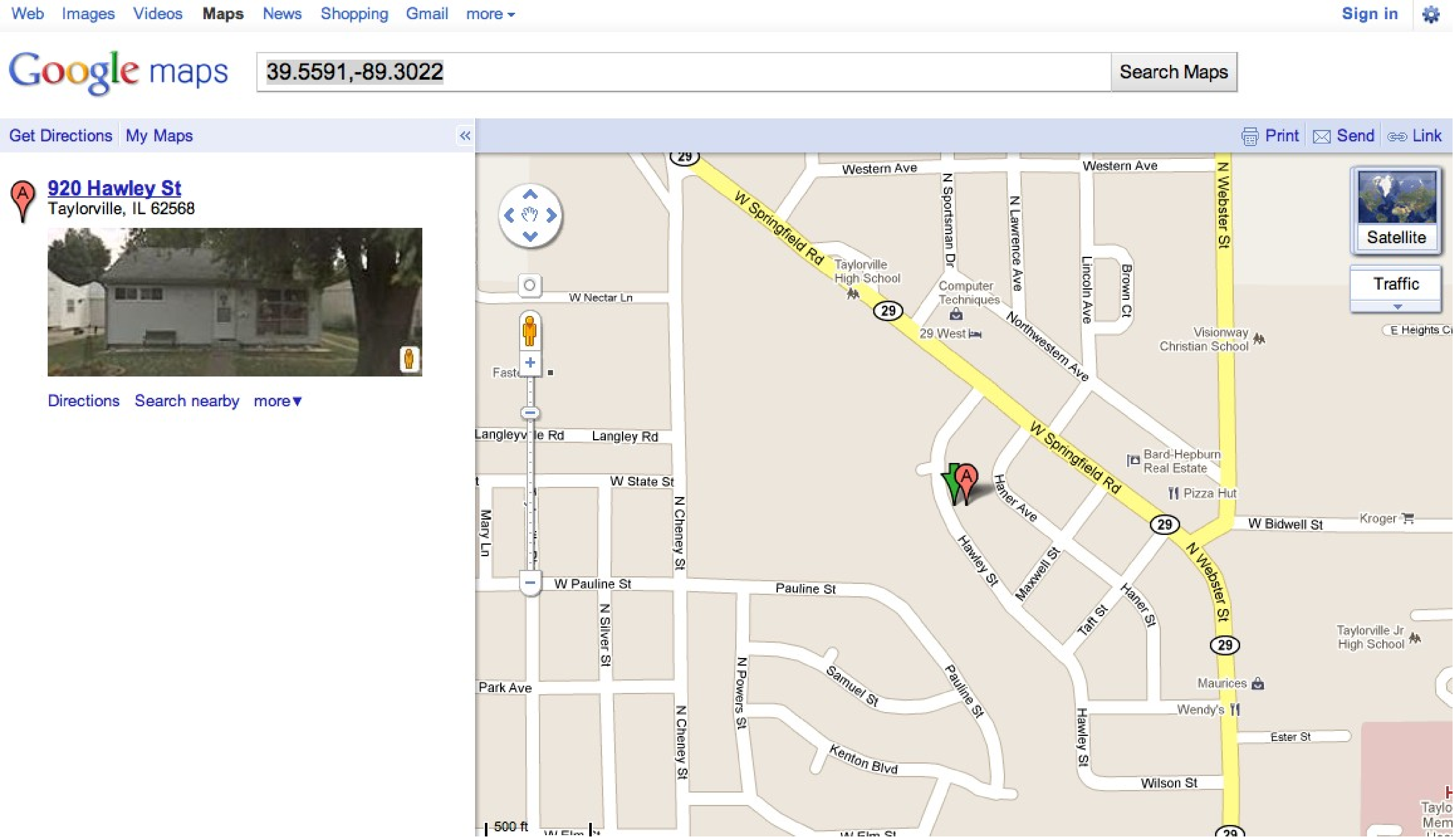
miss_palmieri

♥ 154 likes

miss_palmieri I don't wanna get up 😓

alexeikarpenko awwww!

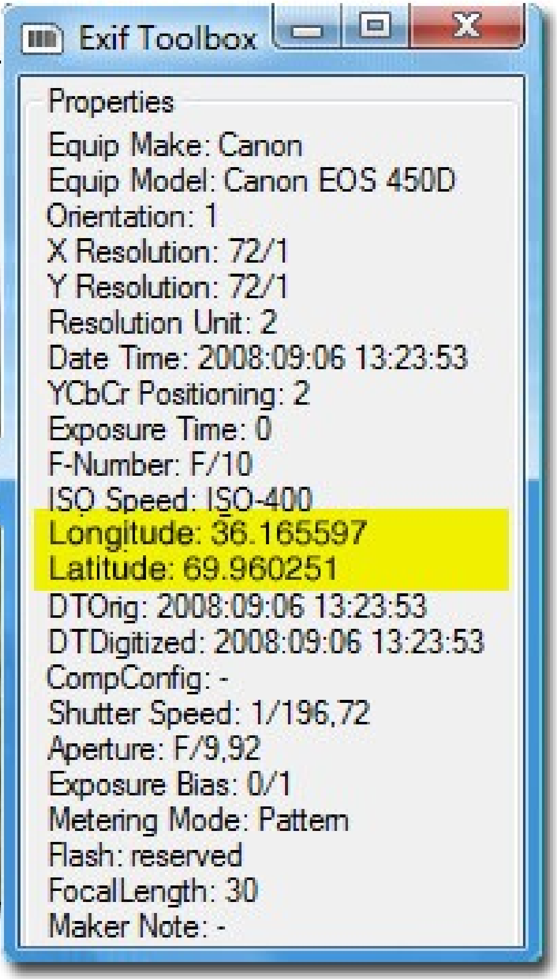
# Photos are tagged with EXIF metadata



39.5591,-89.3022

**920 Hawley St**
Taylorville, IL 62568

# Also useful for catching criminals!



Properties

Equip Make: Canon
Equip Model: Canon EOS 450D
Orientation: 1
X Resolution: 72/1
Y Resolution: 72/1
Resolution Unit: 2
Date Time: 2008:09:06 13:23:53
YCbCr Positioning: 2
Exposure Time: 0
F-Number: F/10
ISO Speed: ISO-400
Longitude: 36.165597
Latitude: 69.960251
DTOrig: 2008:09:06 13:23:53
DTDigitized: 2008:09:06 13:23:53
CompConfig: -
Shutter Speed: 1/196,72
Aperture: F/9,92
Exposure Bias: 0/1
Metering Mode: Pattern
Flash: reserved
FocalLength: 30
Maker Note: -

# Tracking Technologies

- HTTP Cookies
- HTTP Auth
- HTTP Etags
- Content cache
- IE userData
- HTML5 protocol and
- content handlers
- HTML5 storage
- Flash cookies
- Silverlight storage
- TLS session ID & resume
- Browsing history
- window.name
- HTTP STS
- DNS cache
- http://samy.pl/evercookie

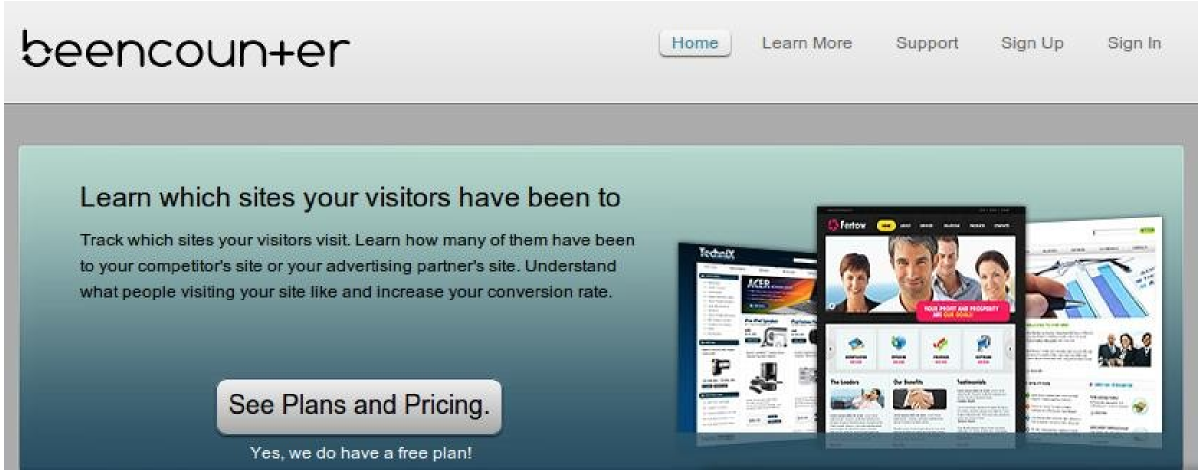
# Fingerprinting Web Browsers

- User agent
- HTTP ACCEPT headers
- Browser plug-ins
- MIME support
- Clock skew

- Installed fonts
- Cookies enabled?
- Browser add-ons
- Screen resolution
- HTML5 canvas
- (differences in graphics SW/HW!)

# History Sniffing

- **How can a page figure out which sites you visited previously?**
- **Color of links**
  - CSS :visited property
  - getComputedStyle()
- **Cached Web content timing**
- **DNS timing**



beencounter

Learn which sites your visitors have been to

Track which sites your visitors visit. Learn how many of them have been to your competitor's site or your advertising partner's site. Understand what people visiting your site like and increase your conversion rate.

Yes, we do have a free plan!

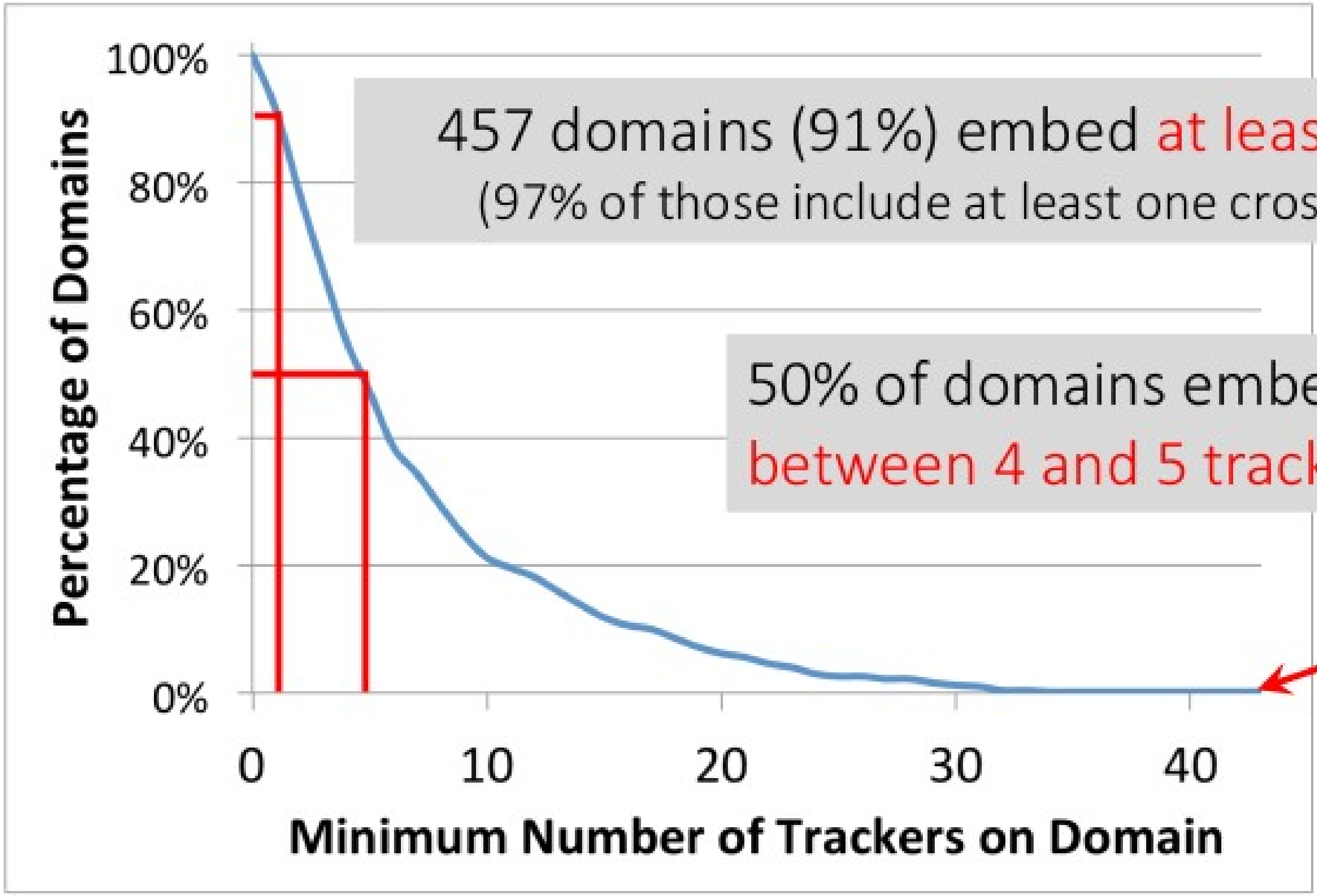
# How Websites Get Your Identity

- **Personal trackers**
- **Leakage of identifiers**
- **Security bugs**
- **Third party buys your identity**
  - Profit $

# Measurement Study (2011)

- **Questions:**
  - How prevalent is tracking (of different types)?
  - How much of a user's browsing history is captured?
  - How effective are defenses?
- **Approach: Build tool to automatically crawl web, detect and categorize trackers based on our taxonomy.**
- **Longitudinal studies since then: tracking has increased and become more complex.**

# How prevalent is tracking?

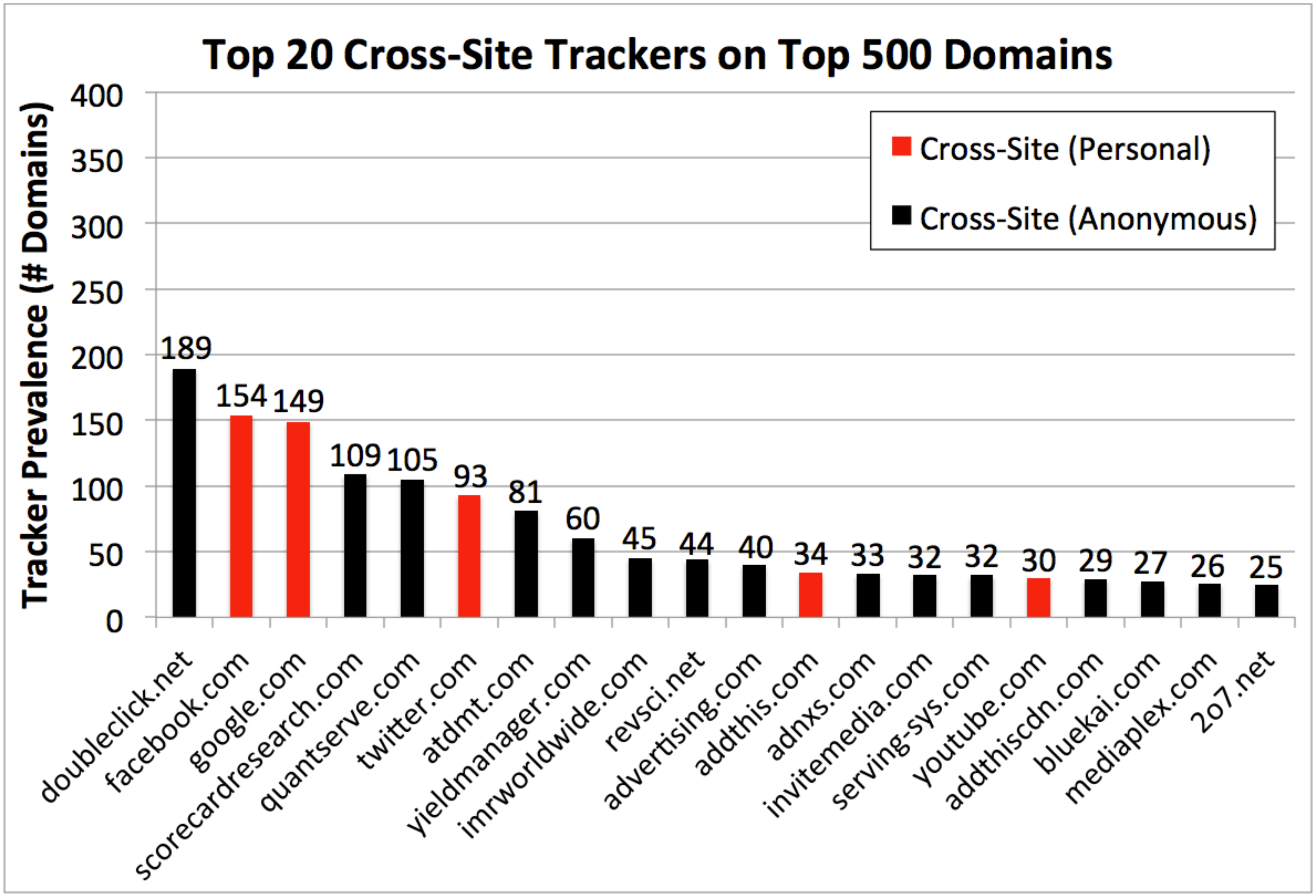


457 domains (91%) embed at least one tracker.
(97% of those include at least one cross-site tracker.)

50% of domains embed between 4 and 5 trackers.

One domain includes 43 trackers.

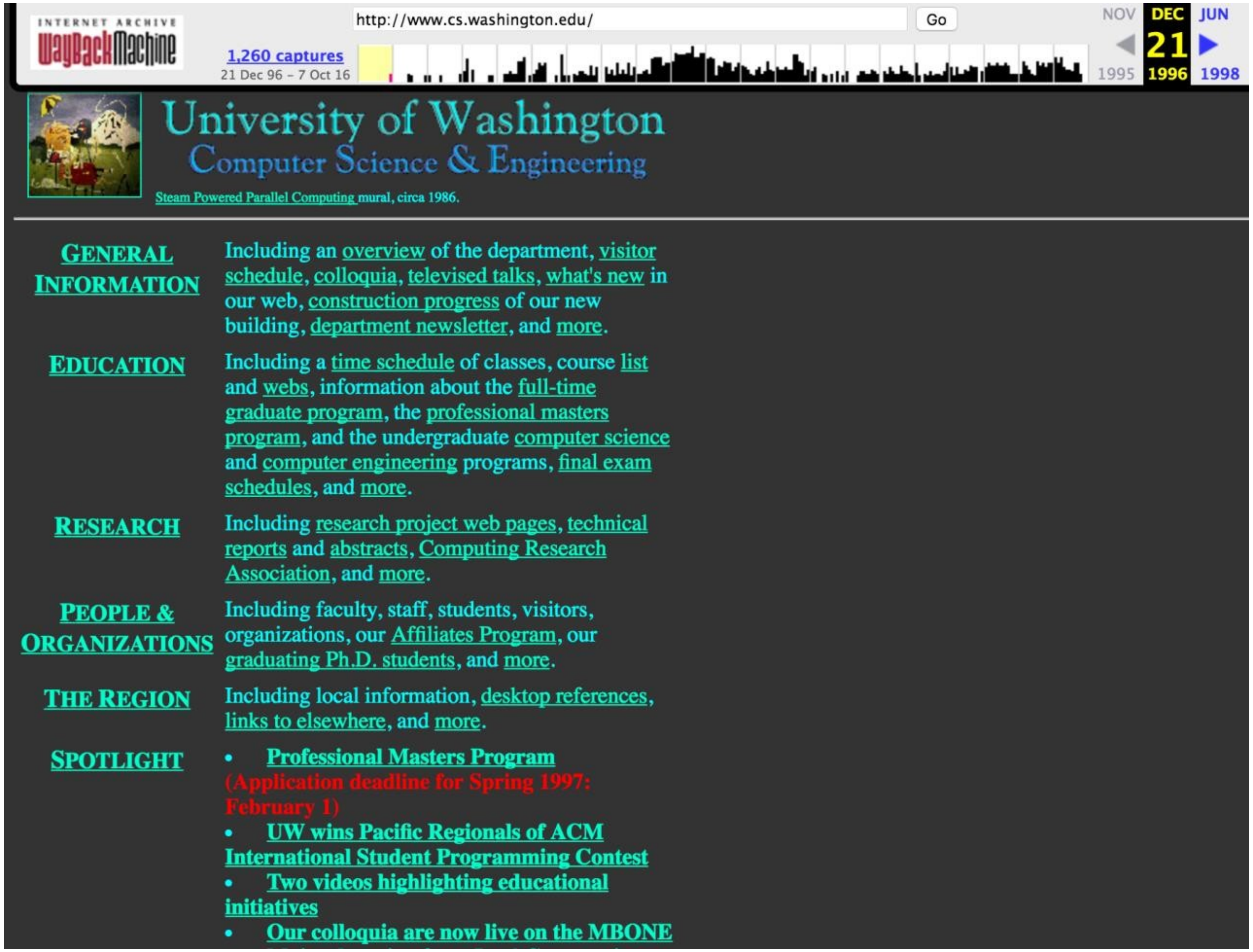
# Who/what are the top trackers? (2011)



# How has this changed over time?

- **The web has existed for a while now...**
  - What about tracking before 2011?
  - What about tracking before 2009? (first academic study)

# The Wayback Machine to the Rescue



University of Washington
Computer Science & Engineering

Steam Powered Parallel Computing mural, circa 1986.

**GENERAL INFORMATION** Including an overview of the department, visitor schedule, colloquia, televised talks, what's new in our web, construction progress of our new building, department newsletter, and more.

**EDUCATION** Including a time schedule of classes, course list and webs, information about the full-time graduate program, the professional masters program, and the undergraduate computer science and computer engineering programs, final exam schedules, and more.

**RESEARCH** Including research project web pages, technical reports and abstracts, Computing Research Association, and more.

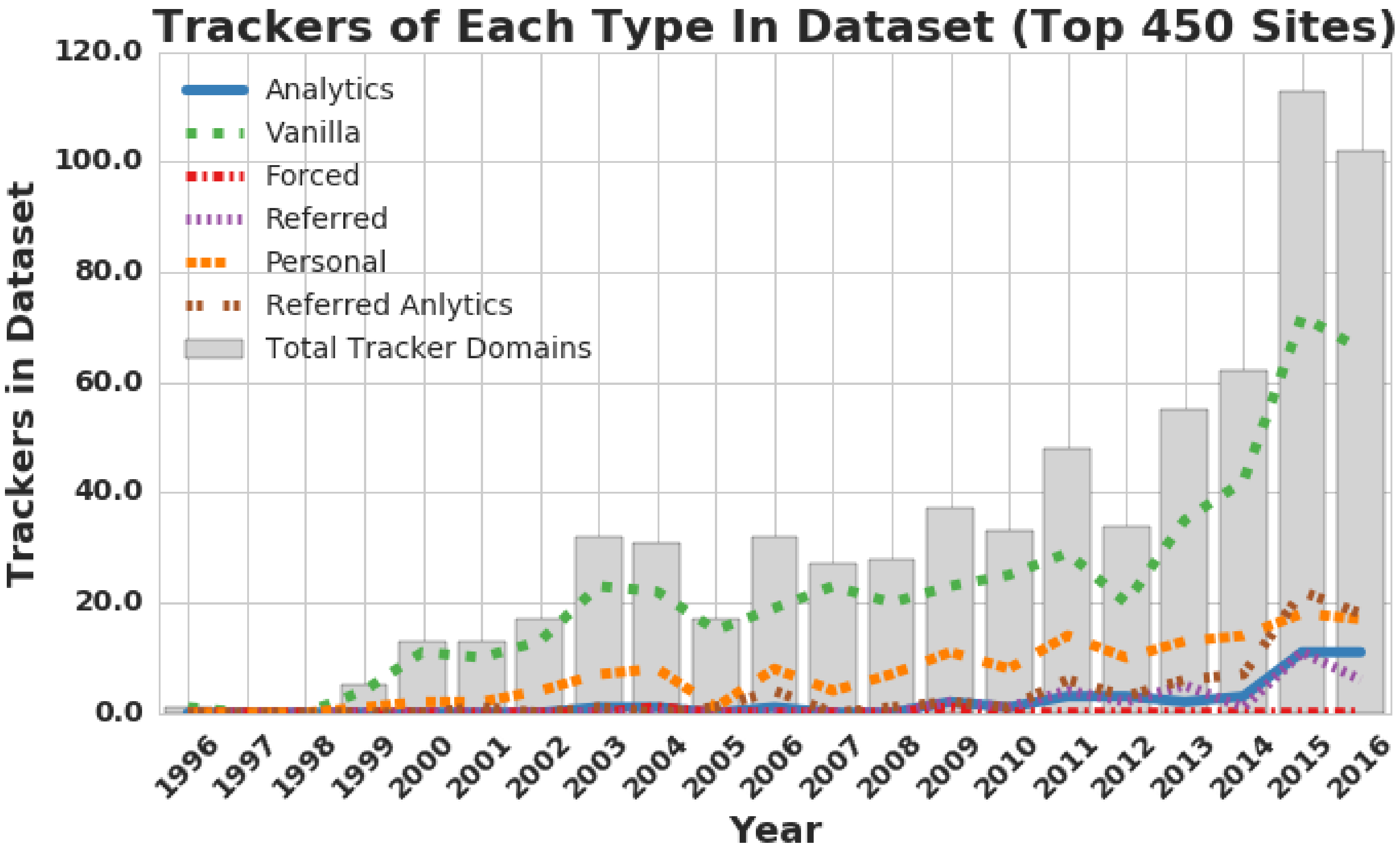
**PEOPLE & ORGANIZATIONS** Including faculty, staff, students, visitors, organizations, our Affiliates Program, our graduating Ph.D. students, and more.

**THE REGION** Including local information, desktop references, links to elsewhere, and more.

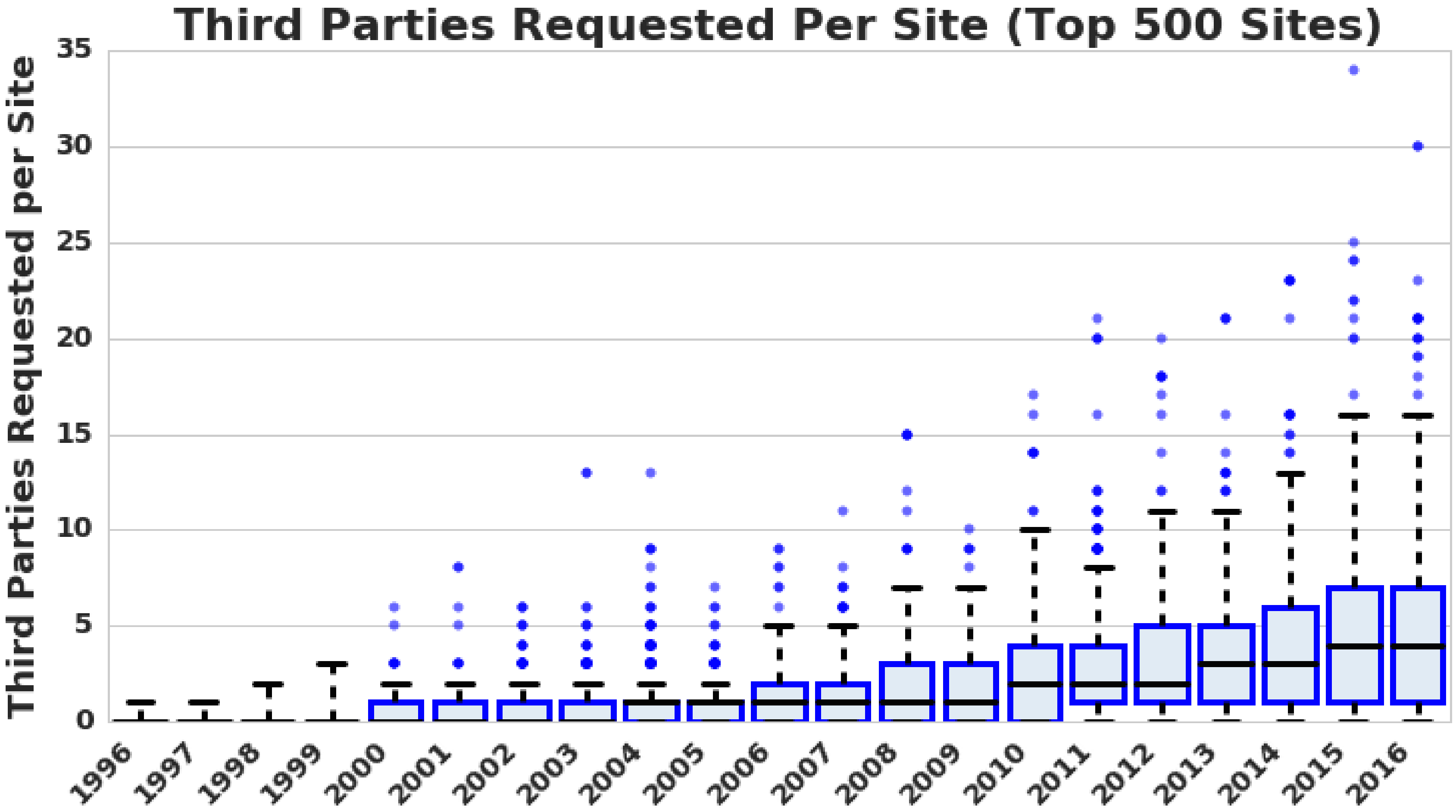
**SPOTLIGHT**

- **Professional Masters Program** (Application deadline for Spring 1997: February 1)
- **UW wins Pacific Regionals of ACM International Student Programming Contest**
- **Two videos highlighting educational initiatives**
- **Our colloquia are now live on the MBONE**

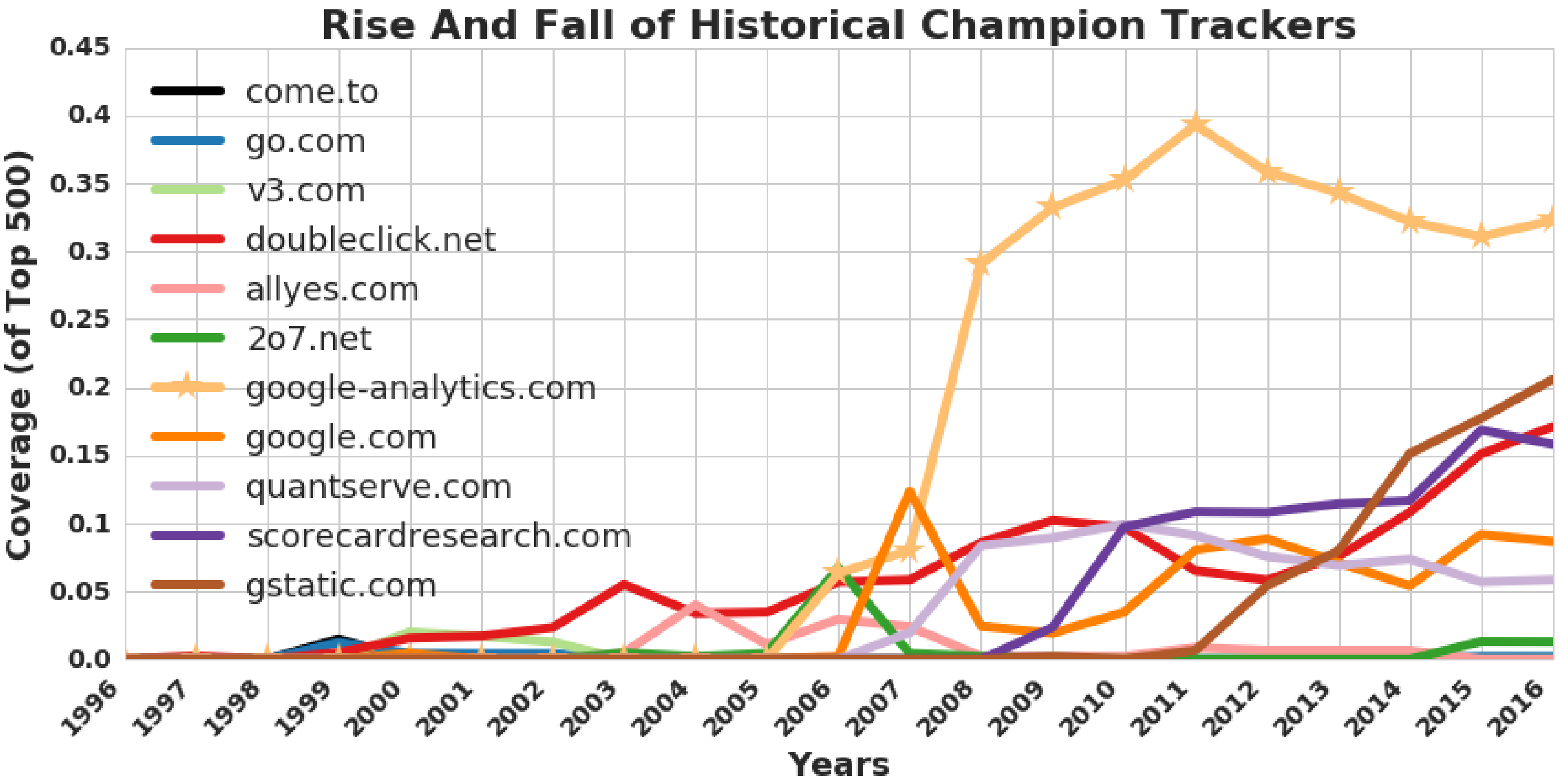
# 1996-2016: More & More Tracking



# 1996-2016: More & More Tracking



# 1996-2016: More & More Tracking



# Why has tracking become so wide-spread?

- **Money and the advertising business**
  - Why pay for ads targeted toward everyone?
    - Sports betting targeted to young men
    - Political ads targeted to likely voters
  - Traditional TV/Radio/Newspaper ads reached everyone
    - Might not want to pay for that! Only want likely customers
  - Need data to support this strategy
- **Attribute ads to sales**
  - Did your ad actually work? How can we tell?
    - Link customer id to click/impression to sale
    - Need to track long-term customer behavior
  - Pay advertiser based on results

# ADINT (2017)

- **Advertising for Intelligence Gathering**
- **Adversary can buy ads and use analytics from those ads to learn information about targets**
  - Some ad networks provide location-based ad services
- **Purchaser of ads can figure out**
  - What mobile phone applications are in use in individual homes
  - A target’s movements through the physical world (e.g., stores, doctors offices, etc)

# How to Maintain Better Privacy?

**Discuss with your classmates**

# How to Maintain 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!”

# Nobody Ever Reads the EULA!

**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 Maintain Better Privacy?

- **Force of law**
  - 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.
- **Applies to all Companies with EU customers**

# How to Maintain Better Privacy?

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

# Browser: “Tracking protection”

- **You can choose a blocking list in your browser**
- **For example, from Firefox**
  - Basic (default): Blocks third-party trackers based on lists.
    - 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

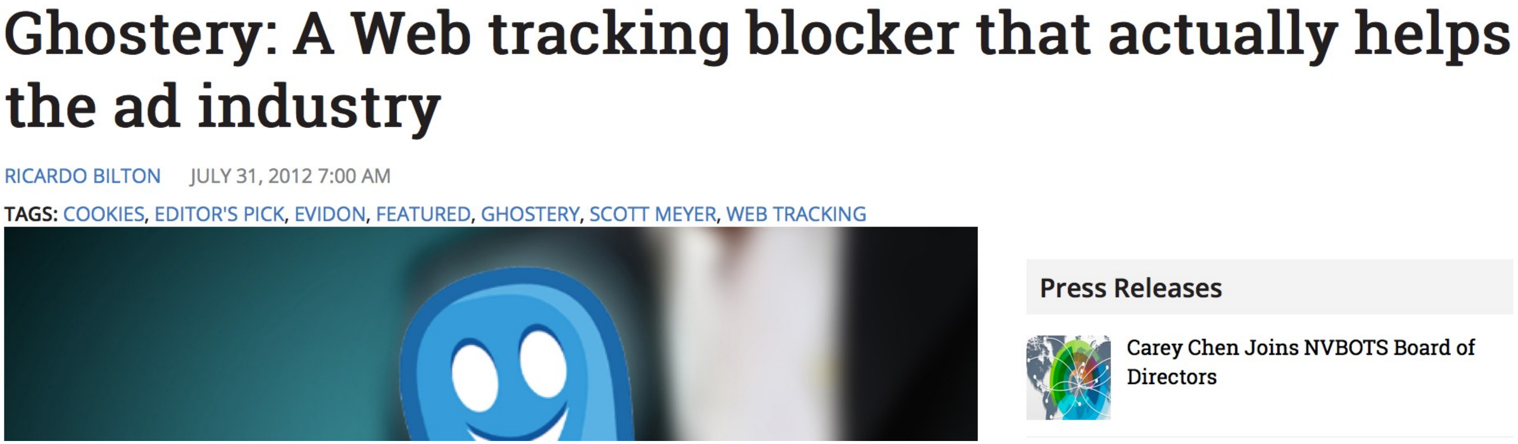
- **You can turn on this flag in your browser**
- **What does it do?**
  - Tells web servers you want to opt-out of tracking
  - It does this by transmitting a Do Not Track HTTP header every time your data is requested from a web server
- **It does not enforce no tracking, it is up to the web servers whether they decide to track**

# Browser extensions: e.g. Ghostery

- **User installs browser extension:**
  - Recognizes third-party tracking scripts on a web page based on an actively curated database
  - Blocks HTTP requests to these sites as a result, Facebook buttons don’t even show
  - 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...

- 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



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

# 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