

Tracking Protection in Firefox For Privacy and Performance

Georgios Kontaxis

Columbia University

kontaxis@cs.columbia.edu

Monica Chew

monica.m.chew@gmail.com

Protecting user privacy from online tracking

- Our adversary is a powerful billion-dollar online advertising and social-networking industry
- User tracking is ubiquitous and threatens the privacy of all Internet users
- Impossible to know which sites track users before actually visiting them (too late)

Tracking protection for Firefox

- Addresses all forms of third-party tracking
- Built in the browser
- Should not break sites
- User friendly
- Comes with privacy as well as performance benefits

User visits are tracked across sites

Zappos.com
POWERED BY SERVICE®

Shoes, Clothing, Bags, etc. **SEARCH**

NEW ARRIVALS: **SANDALS**
SHOP NOW »

== **FREE** ==
SHIPPING & RETURNS

MY CART

SEARCH BY: [Size](#), [Narrow Shoes](#), [Wide Shoes](#), [Popular Searches](#)

SHOES CLOTHING BAGS & HANDBAGS ACCESSORIES SHOP BY... WOMEN'S MEN'S KIDS' ALL DEPARTMENTS

« Back | Shoes > Sneakers & Athletic Shoes > Converse SKU 108000

Converse Chuck Taylor® All Star® Core Ox

★★★★★ 3,388 Reviews

VIDEO

Black

Choose Men's Size

Width: Medium

Don't see your size?

Add to Cart

Add to Favorites

Notify Me of New Styles

Share: [f](#) [t](#) [p](#) [e](#)

Don't Forget...

Fit Survey: 62% Felt true to size 92% Felt true to width 54% No arch support

Tracked user gets personalized third-party content

4/3 RUMORS
Panasonic and Olympus Digital Camera News

RUMORS NEWS REVIEWS DEALS

ABOUT US

SEARCH

SHARE RUMORS AND NEWS WITH 43 RUMORS
CLICK HERE

TAMRON
Security Simplified.
Full coverage in just 2 lenses.


DOUBLE VARI-FOCAL
The Simple Choice

1/3" 2.8-8mm/1.2
Mega-Pixel IR
Vari-Focal

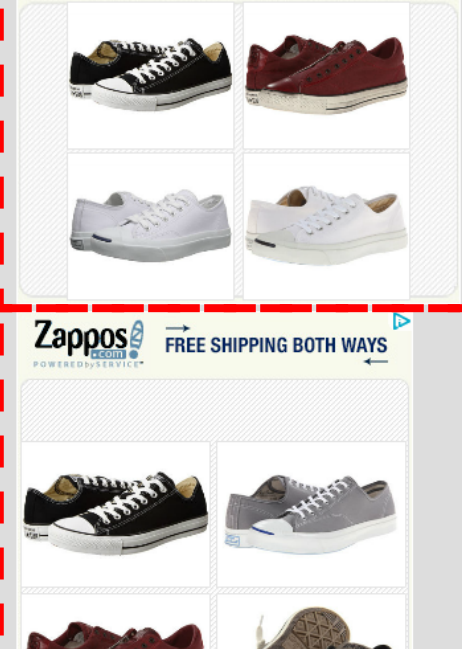
1/3" 8-50mm/1.6
Mega-Pixel IR
Vari-Focal

tamron-usa.com

(FT5) Titanium E-M5II image gets leaked. To be announced aftertomorrow!



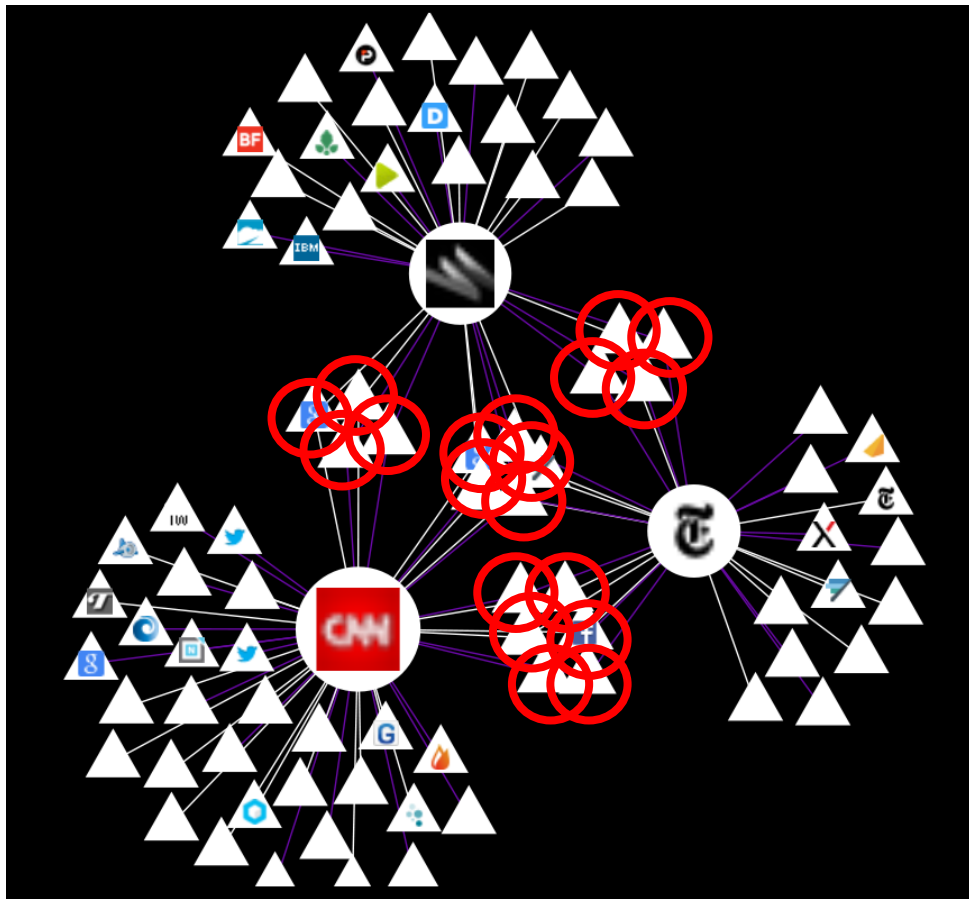
Zappos
POWERED BY SERVICE
FREE SHIPPING BOTH WAYS



Zappos
POWERED BY SERVICE
FREE SHIPPING BOTH WAYS

Tracking leaks 40% of browsing history to third parties

googleadservices
googletagservices
demdex
outbrain
moatads
googlesyndication
doubleclick
scorecardresearch
chartbeat



krxid
adnxs
2mdn
imrworldwide
facebook
nr-data
amazon-adsystem
iasds01
adsafeprotected

Users don't appreciate being stalked online

TECH | 2/16/2012 @ 11:02AM | 2,514,831 views

How Target Figured Out A Teen Girl Was Pregnant Before Her Father Did

Canadian e-Marketing Law

by

NNOVATION LLP

Ads targeted at sleep apnea sufferer violate
PIPEDA

Posted on January 15, 2014 by Shaun Brown

Network attackers piggyback on user tracking

- Tracking identifiers usually transmitted in clear text
- ISPs and Intelligence agencies collect and exploit this information



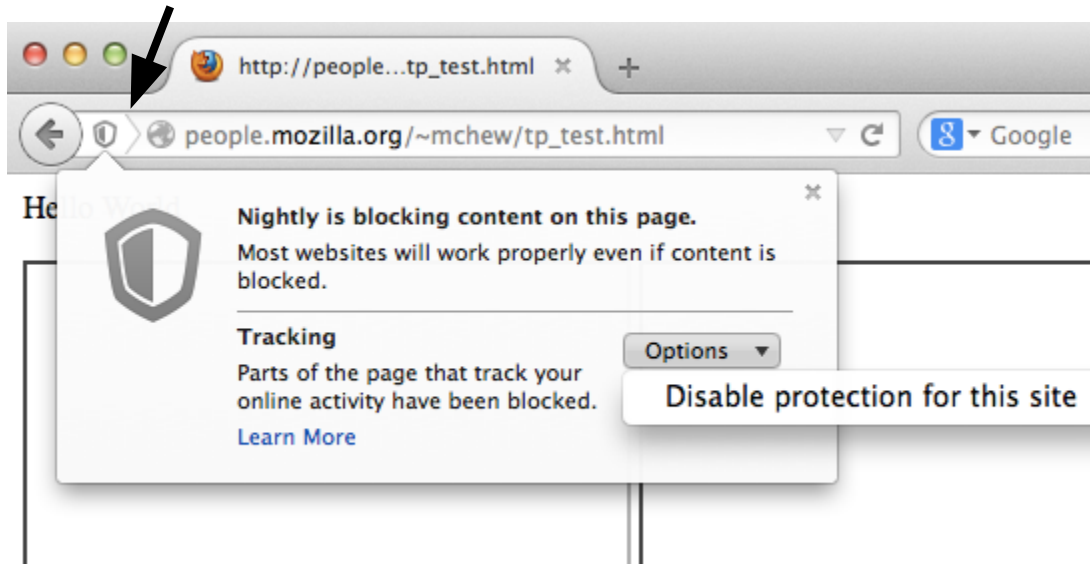
Blocking cookies is not enough

Tracking Protection Measure	Counter-measure
Blocking third-party HTTP cookies	14+ other ways to store state on the client http://samy.pl/evercookie/
Preventing all (?) persistent state	Fingerprinting the browser's environment https://panopticklick.eff.org/
Please do not track me (DNT)	Server ignores it "What is tracking?" "Won't track but will collect"

Tracking protection for Firefox 35

- Safe Browsing blocks connections to tracking domains
- Curated list of known trackers
 - Blocking tracking elements preserves functionality
 - Served by Mozilla
- Implemented in the browser's core
 - Document Security State
 - Annotated Tracking Page Elements
 - User Interface

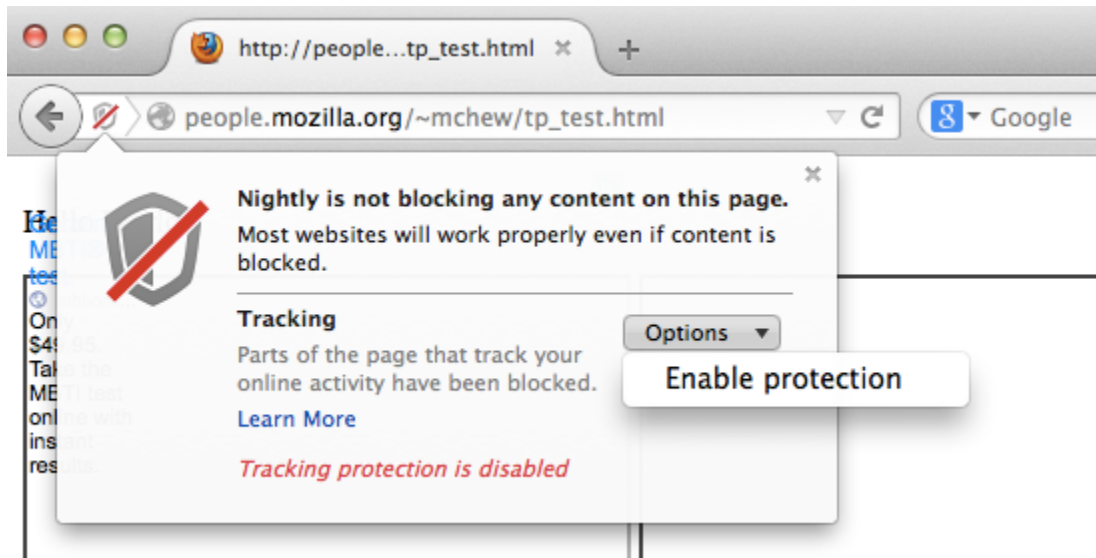
Tracking protection UI



Non-intrusive shield icon

Doorhanger expands to provide context

Tracking protection UI

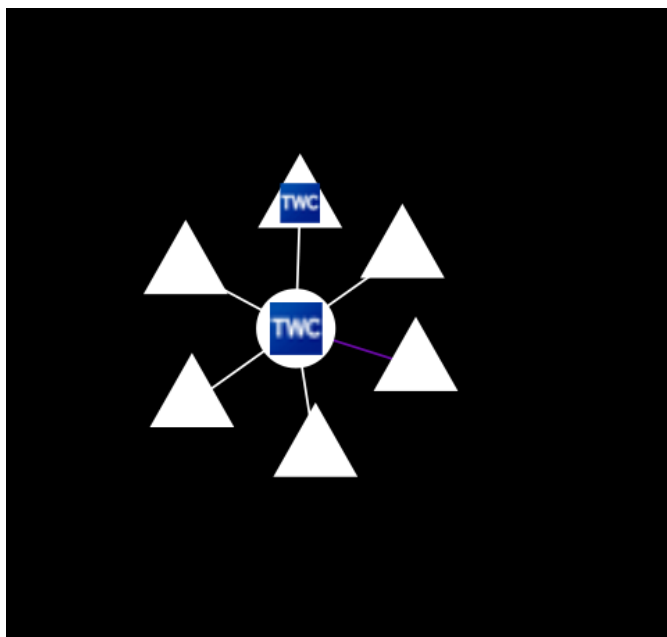


Users can disable protection temporarily for a site
Shield icon reflects the insecure state

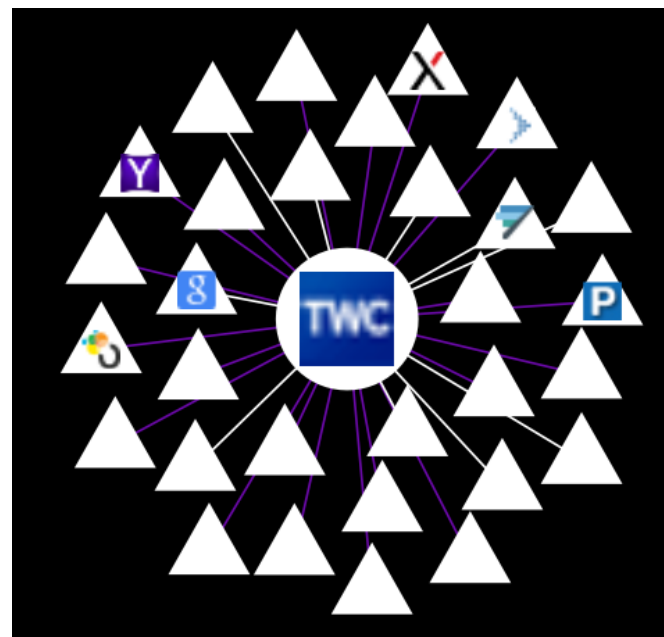
Users exposed to significantly fewer third parties

weather.com - You get the weather in both cases!

Tracking Protection **Enabled**
4 tracking domains blocked

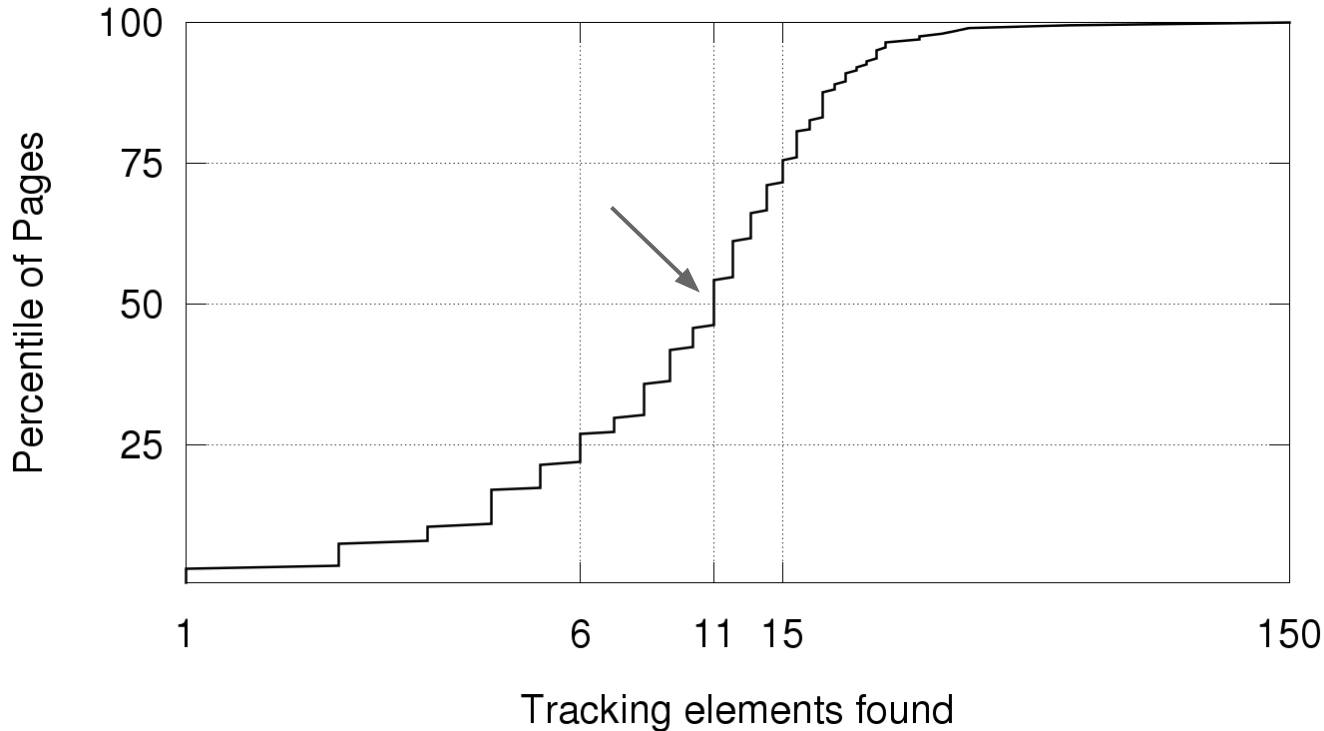


Tracking Protection **Disabled**
+45 domains contacted



VS

Users exposed to significantly fewer third parties



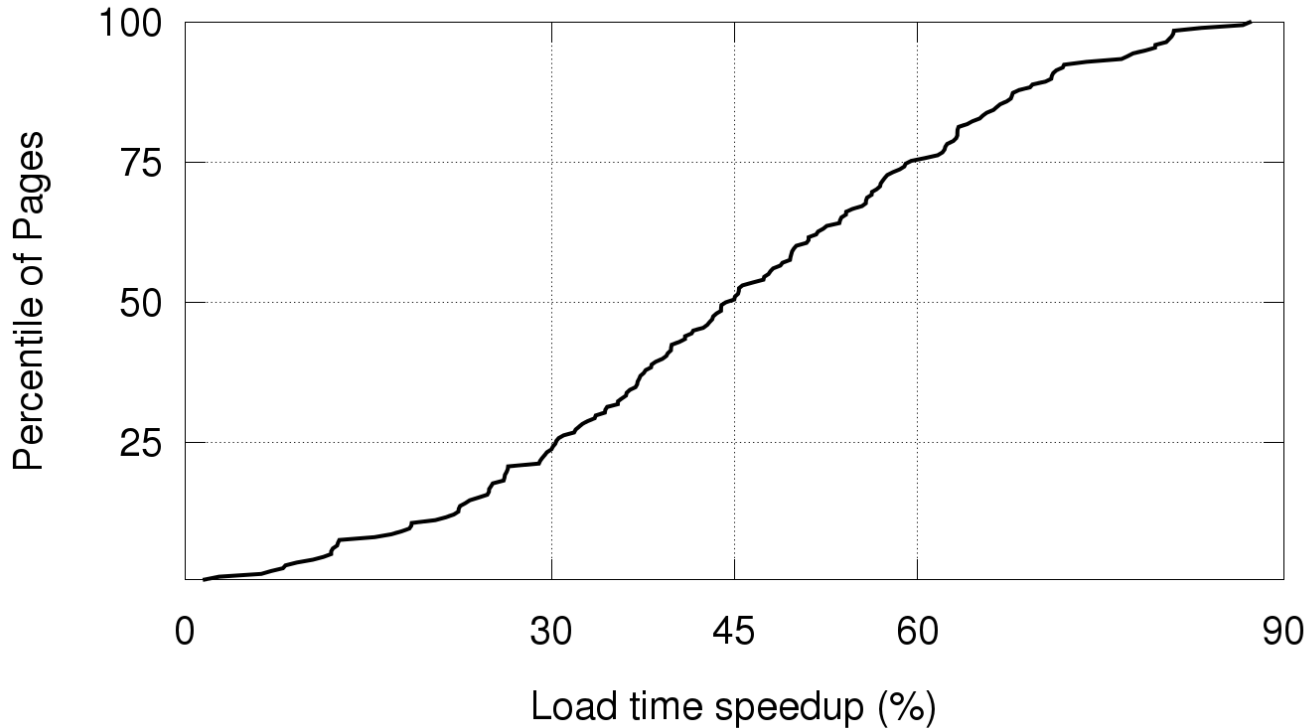
At least 11 trackers found in half of the sites

67.5% fewer HTTP cookies

Pages load faster

	Without Tracking Protection (seconds) X	With Tracking Protection (seconds) ✓	Speedup
Accuweather	9.5	1.9	80%
CNN	3.3	1.7	48%
The Guardian	8.3	2.7	67%
LA Times	3.2	0.8	75%
NY Times	3.7	2.5	32%

Pages load faster



Half of the pages load 45% faster

Third-party content was slowing them down

Future work

- Do better than blocklists
 - Dynamically [identify](#) and block trackers
- Determining third parties
 - facebook.com == fbcdn.net ?
- Dealing with first party tracking
 - ads.nytimes.com
- Alternatives to user tracking
 - Privacy-preserving service implementations
 - [Adnostic](#), [Safebutton](#)
 - Revenue models beyond advertisements
 - [Google Contributor](#)

Try Tracking protection in Firefox today!

Instructions

<https://support.mozilla.org/en-US/kb/tracking-protection-firefox>

Project page

<http://kontaxis.github.io/trackingprotectionfirefox>