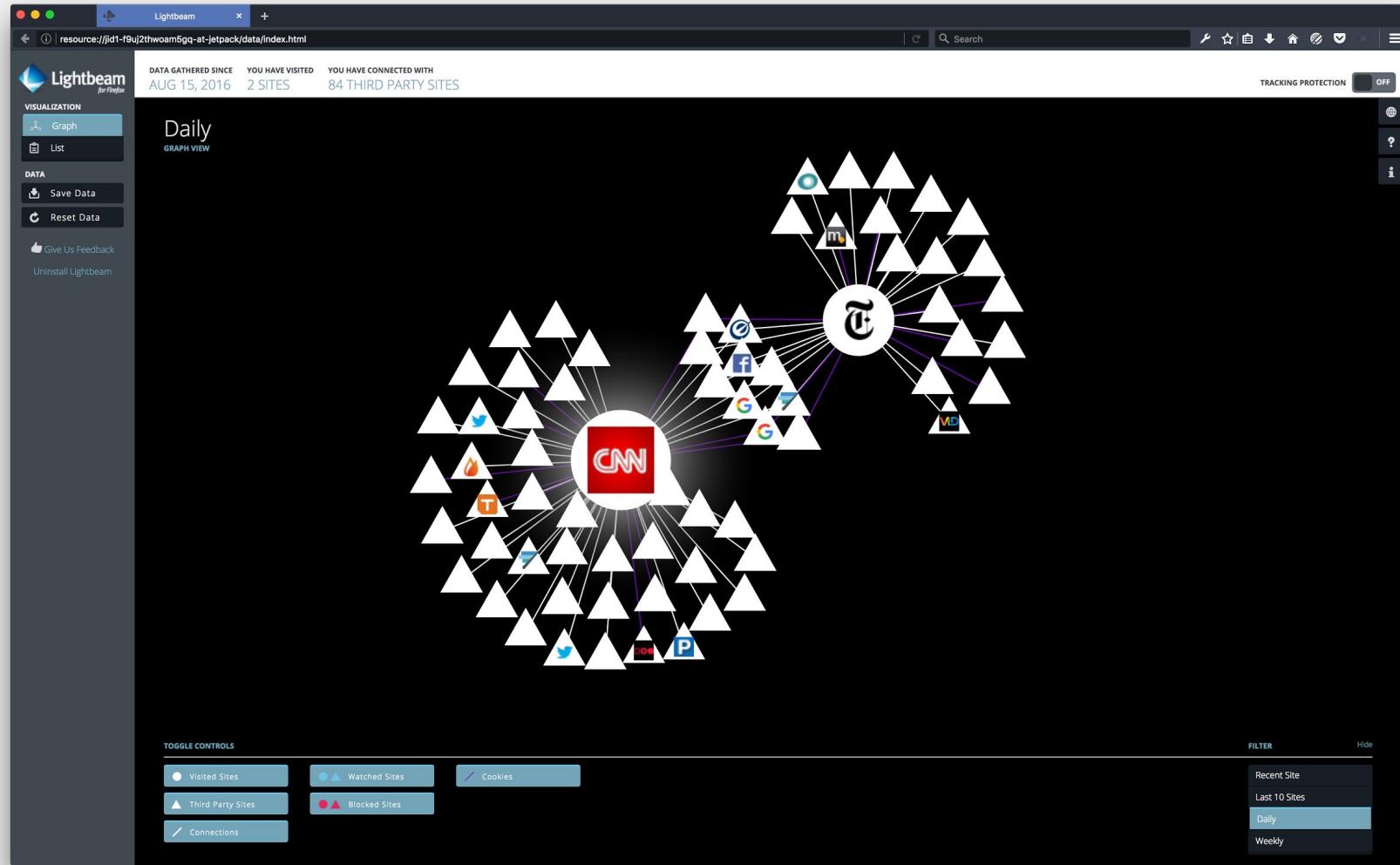


Sandboxing Trackers with Tracking Protection

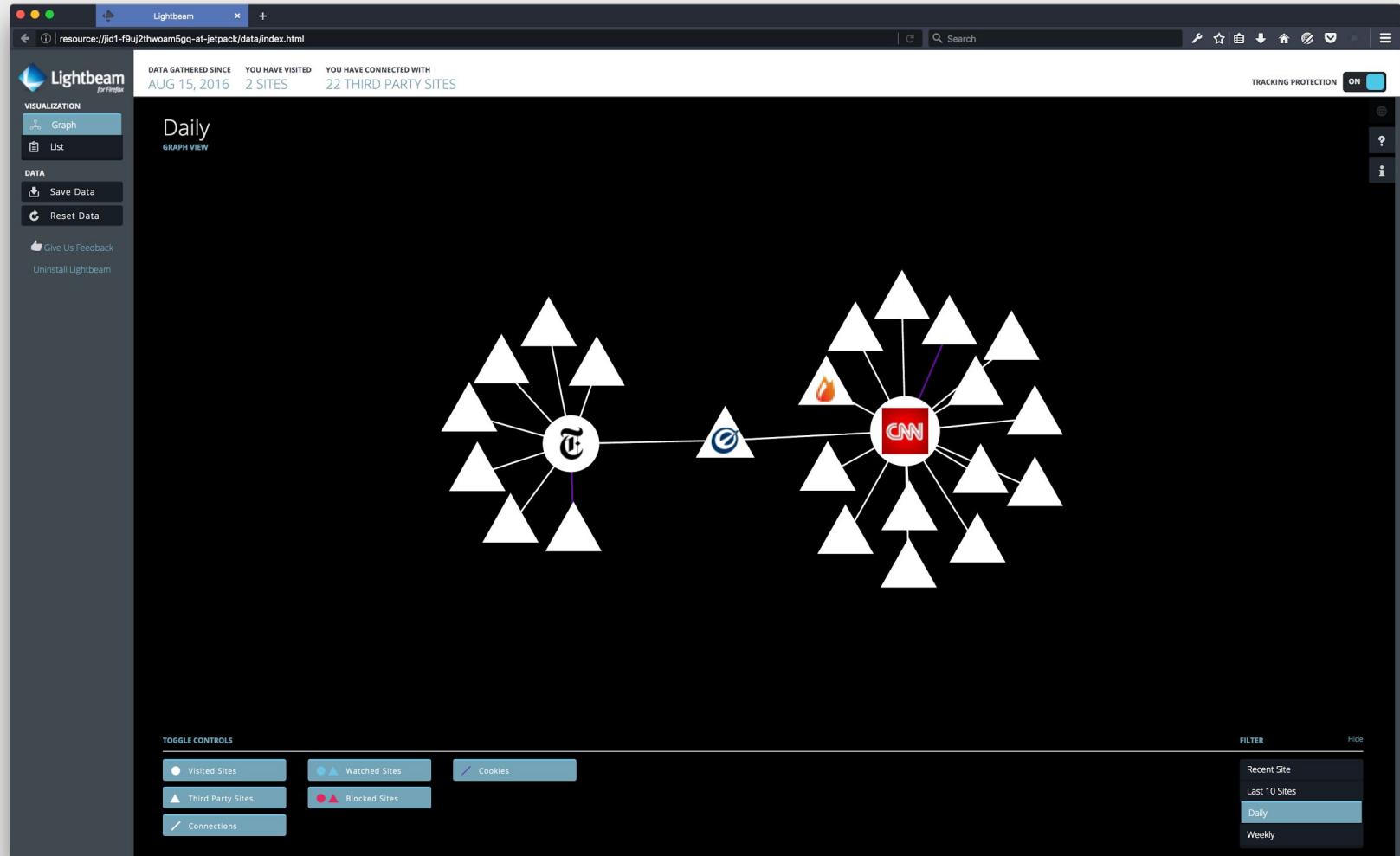
Steven Englehardt
@s_englehardt





Tracking Protection





Manchester City 2-1 Sunde... +

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A black leather sneaker with white stitching and a tan sole, labeled "THE ROYALE NERO".

SHOP NOW

A blue rectangular mattress with the word "Casper" on it. Text above the mattress says "WINNER OF TIME MAGAZINE'S BEST INVENTIONS OF 2015" and below it says "TRY IT FOR 100 NIGHTS >".

Manchester City 2-1 Sunderland: Former Manchester United defender Paddy McNair scores late own goal to gift first Premier League victory to Pep Guardiola

- Late Paddy McNair own goal handed Manchester City a win in Pep Guardiola's first match in charge
- An equaliser from Jermain Defoe had looked like denying Guardiola in the Premier League opener
- Sub McNair, signed from Manchester United this week, headed into his own net after 87 minutes
- New City boss had made an immediate impact at City by dropping Joe Hart and Yaya Toure

By ROB DRAPER FOR THE MAIL ON SUNDAY

PUBLISHED: 13:21 EST, 13 August 2016 | UPDATED: 15:41 EST, 13 August 2016

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At the end, the Etihad Stadium roared with the kind of enthusiasm you might expect when greeting one of the world's finest and most iconic coaches. Poor Paddy McNair, brought on to safeguard the score, had just headed into his own goal within four minutes of his debut, and City finally had their breakthrough.

Jesus Navas crossed the ball, Vito Mannone flicked it away from the feet of Kelechi Iheanacho and McNair simply could not react quick enough to avoid nodding home from close range. The clock read 87 minutes and City fans sang with gusto, as though they finally believed a Messianic figure was about to lead them to the promised land. And so it will be recorded that the Pep Guardiola era began with a win.

And, after the years of anticipation, it was really Guardiola on the touchline, finally overseeing a Premier League match. There was the familiar expensive, well-cut suit and the distinctive bald head, bobbing up and down as he waved his arms in excitement and exasperation in equal measure. On the pitch, the look was not quite so good.

A blurry photo showing a soccer ball in the air near a goal post, with spectators in the background.

Manchester City 2-1 Sunde... +

www.dailymail.co.uk/sport/football/article-3739115/Manchester-City-2-1-Sunderland-Fomer-Manchester-United-midfielder-Paddy-McNair-scores-late-goal-gift-Premier-League-victory-P

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Forbes

QUOTE OF THE DAY

"The rewards in business go to the man who does something with an idea."

- William Benton

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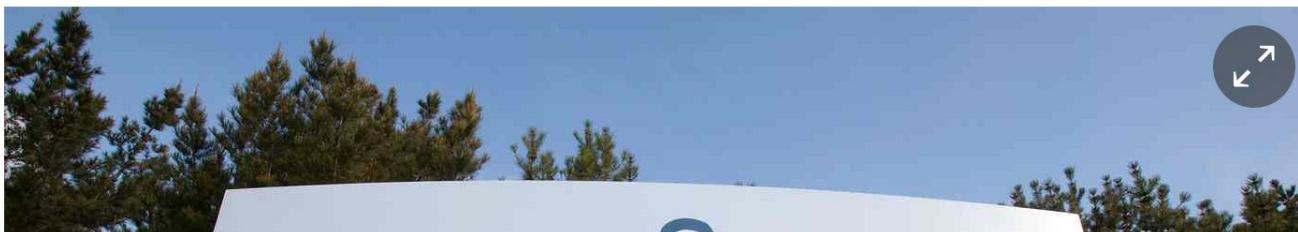
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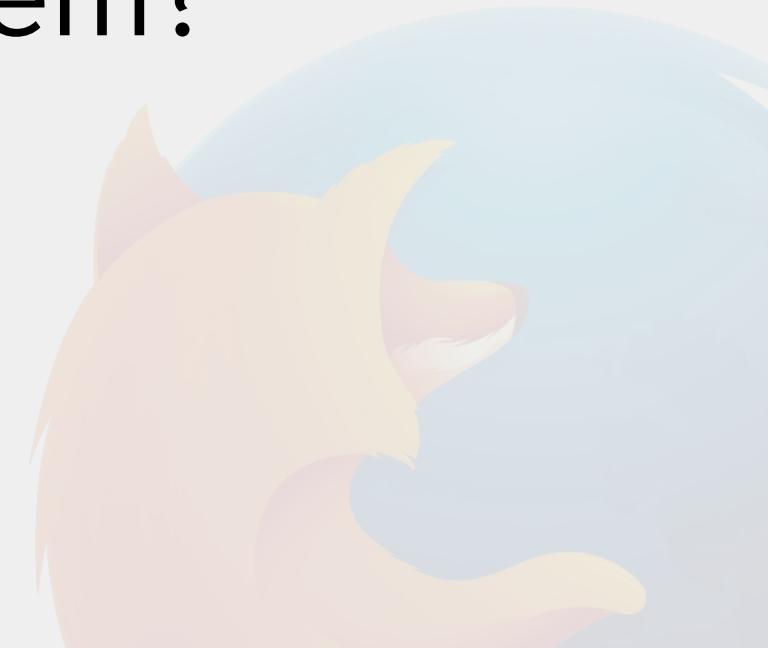
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Facebook will start bypassing adblockers on desktop browsers

- Users of mobile adblockers will continue to experience an ad-free version
- Decision 'takes a dark path against user choice', Adblock Plus warns

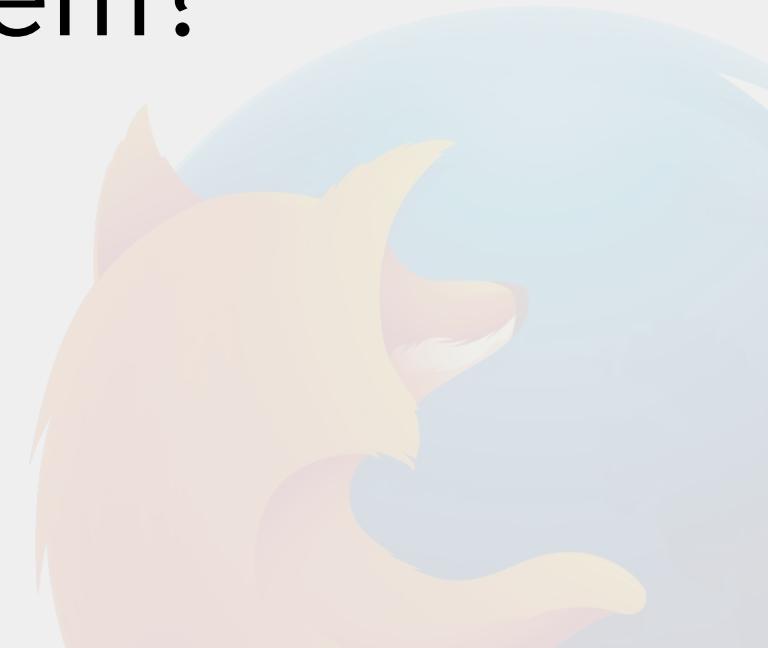


Can sandbox trackers instead of block them?

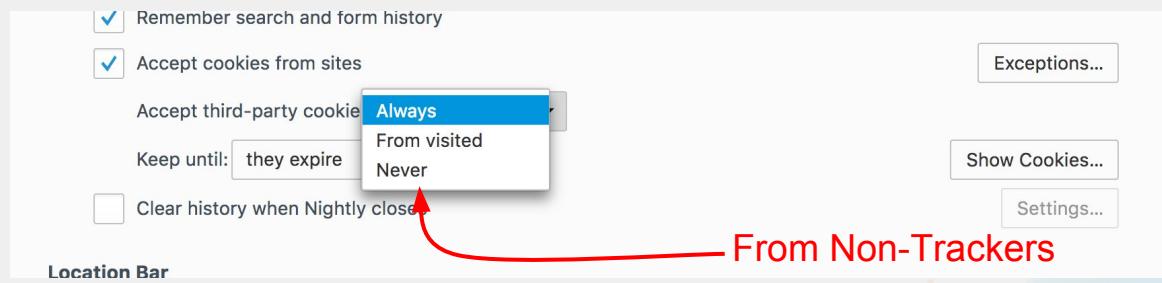


Can sandbox trackers instead
of block them?

No :(

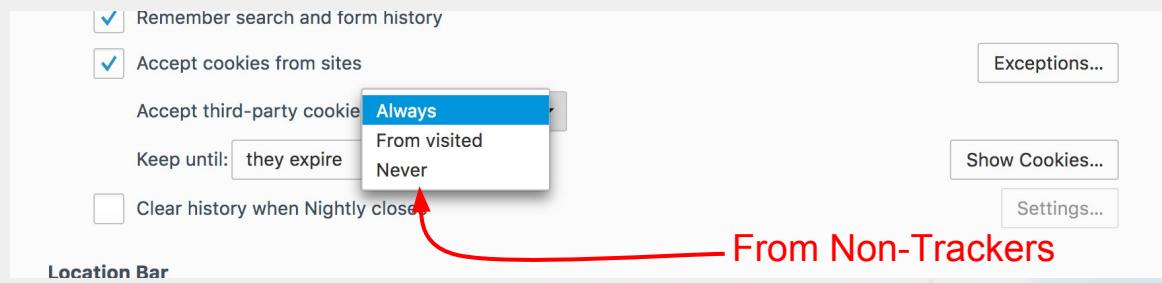


1. Make a new third-party cookie blocking mode



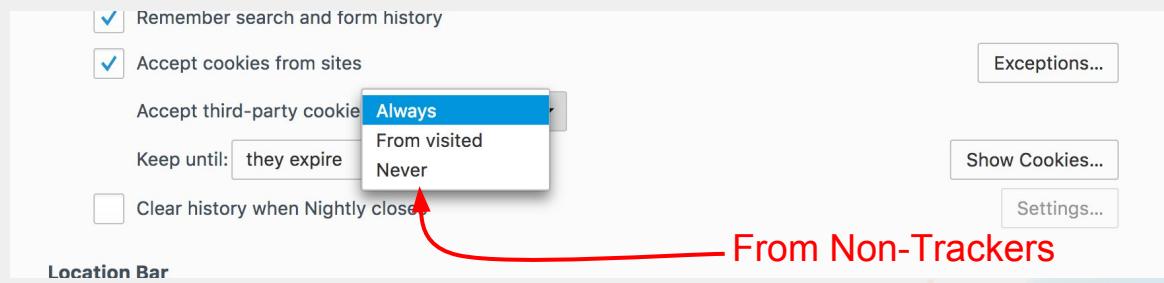
From Non-Trackers

1. Make a new third-party cookie blocking mode



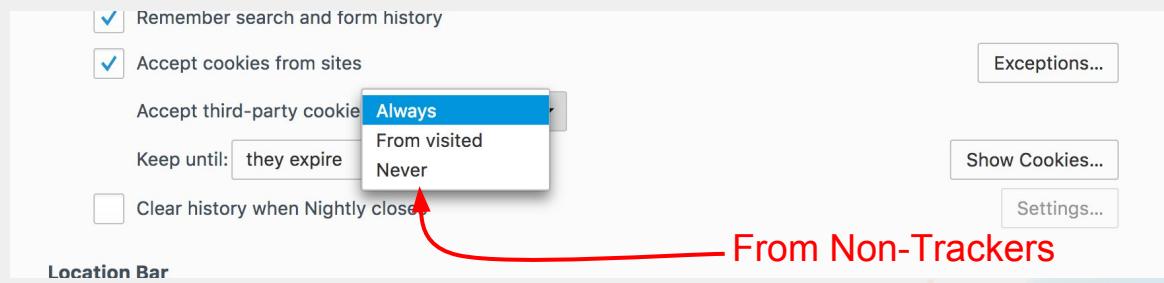
+ No stateful tracking in 3rd party iframes

1. Make a new third-party cookie blocking mode



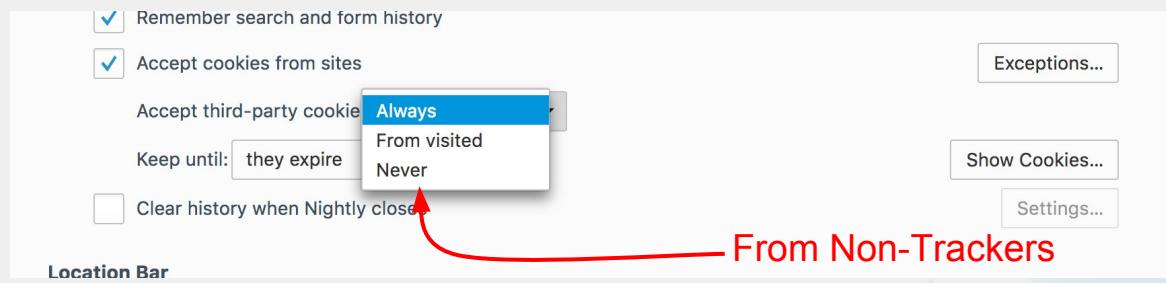
- + No stateful tracking in 3rd party iframes
- + No cookies with <script src...> embeds

1. Make a new third-party cookie blocking mode



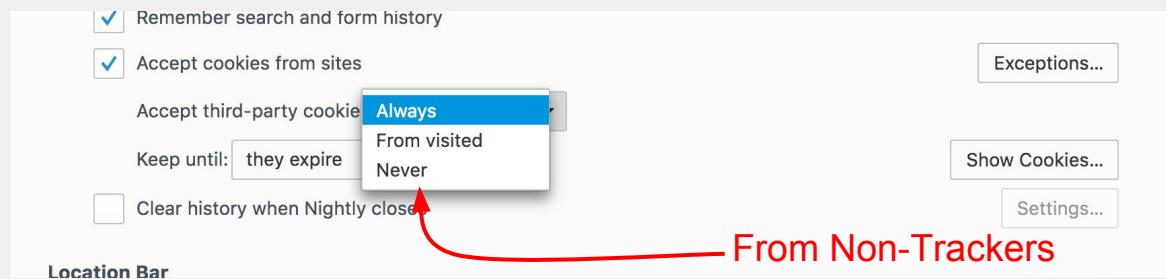
- + No stateful tracking in 3rd party iframes
- + No cookies with <script src...> embeds
- + Less breakage than other cookie blocking

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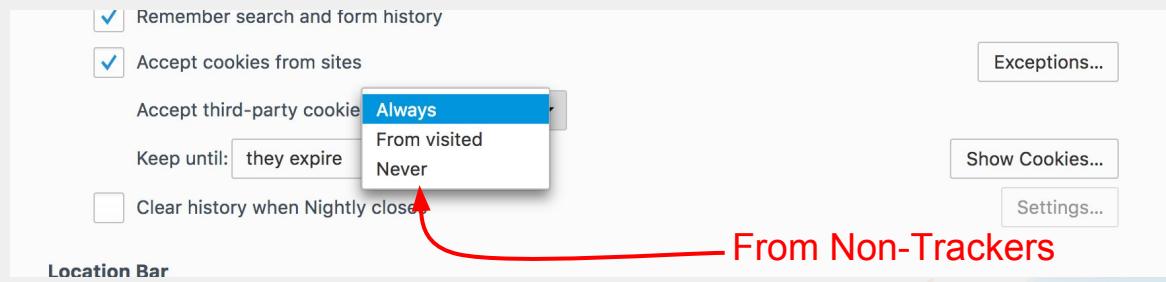
- + No stateful tracking in 3rd party iframes
- <script src...> DOM access
- + No cookies with <script src...> embeds
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1. Make a new third-party cookie blocking mode



- + No stateful tracking in 3rd party iframes
- + No cookies with <script src...> embeds
- + Less breakage than other cookie blocking
- <script src...> DOM access
- Active content can still fingerprint

1. Make a new third-party cookie blocking mode



- + No stateful tracking in 3rd party iframes
- + No cookies with <script src...> embeds
- + Less breakage than other cookie blocking
- <script src...> DOM access
- Active content can still fingerprint
- Will encourage fingerprinting

2. Block cookies and use iframe sandbox

The diagram illustrates a browser window with two distinct frames. The top frame is a rounded rectangle containing a large, solid black padlock icon, symbolizing a secure connection or a blocked resource. The bottom frame is a larger, rounded rectangle containing a block of Latin placeholder text (Lorem ipsum), which is typical for testing or displaying content within a web page. To the right of the browser window, there is a vertical rectangle with rounded corners, also containing a black padlock icon, possibly representing a separate security measure or a related component.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Curabitur gravida aliquam lectus ut condimentum. Sed tristique lorem et accumsan rutrum. Donec metus sapien, viverra sed nibh id, pulvinar posuere nisi. Maecenas pretium nulla vel fringilla porta. Vivamus sodales sapien in pulvinar bibendum. Cras vestibulum faucibus est id tristique. Aenean sit amet efficitur ligula, ut congue libero.

Sed facilisis tellus sed odio volutpat hendrerit. Mauris turpis sem, bibendum nec ullamcorper et, varius sed tellus. Mauris ullamcorper scelerisque mollis. Donec mollis tincidunt malesuada. Pellentesque vitae dignissim risus. Cras facilisis, mi a vulputate laoreet, nisl turpis euismod libero, a porttitor urna sapien id felis. Cras aliquet efficitur metus, at venenatis justo sagittis vel. Suspendisse cursus ante quis diam faucibus dignissim. Aenean quis mi ac justo euismod consequat. Donec imperdiet, sapien ac euismod dapibus, sapien tortor bibendum nibh, vitae facilisis ligula enim tempor velit. Nulla accumsan eget nunc non tristique. Curabitur dictum fringilla nisl. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Donec pharetra tellus ut ex finibus, non tempor est commodo. Etiam malesuada ultricies malesuada. Aliquam vel orci aliquet, semper erat at, volutpat elit.

2. Block cookies and use iframe sandbox

- + No fingerprinting in iframes
- + Restrict plugin use, modal dialogs, top-level navigation, etc

2. Block cookies and use iframe sandbox

- + No fingerprinting in iframes
- + Restrict plugin use, modal dialogs, top-level navigation, etc

Not enough trackers are embedded in iframes.

3. Block active content and sandbox iframes

Built a prototype to test this...

3. Block active content and sandbox iframes

Built a prototype to test this...

breakage is still too high!

3. Block scripts and sandbox iframes

- Google, Facebook, Twitter all require or recommend first-party script access
- 2 out of 10,000 sites iframe Doubleclick
- 209 out of 10,000 sites iframe Facebook

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15 New iOS 9.3.3 Jailbreak Tweaks Worth Trying On Your iPhone Or iPad

By Oliver Haslam on August 14th, 2016

Here are 15 newly released jailbreak tweaks compatible with iOS 9.3.3, the latest version of firmware to have a jailbreak to its name. If you're running iOS 9.3.3 and are jailbroken, this list is for you.

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Enable Android Notifications On Windows 10 Anniversary Update, Here's How

By Paul Morris on August 14th, 2016

Here's a step-by-step guide on how to enable your Android phone to push notifications to a Windows 10 Anniversary Update (or over)-running PC.

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Apple Is Giving Away A \$2 Kids-Oriented iPhone And iPad App For Free

By Zayed Rehman on August 14th, 2016

Another week has come to an end, which means we are ready to get our hands on yet another paid iOS app gone free for limited time. As part of Apple's Free App of the Week promotion, this week's app happens to be a game intended for children which usually retails for \$1.99 on the App Store, but till next Thursday, it can be downloaded for free on iPhones and iPads.

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Ihr Wetter für heute in
Berlin

bis **21°C**
leicht bewölkt

Zur Tagesvorhersage →

Aussichten

Heute ist es im Norden und zum Teil auch in der Mitte teilweise bewölkt und vor allem in Richtung Küste sind einzelne Schauer möglich. In der Südhälfte scheint hingegen häufiger die Sonne und es wird sehr warm. Abgesehen von einzelnen gewitterigen Schauern an den Alpen bleibt es meist trocken.

Höchstwerte heute

0°	5°	10°	15°	20°	25°	30°	35°	40°
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Blocking with Tracking Protection

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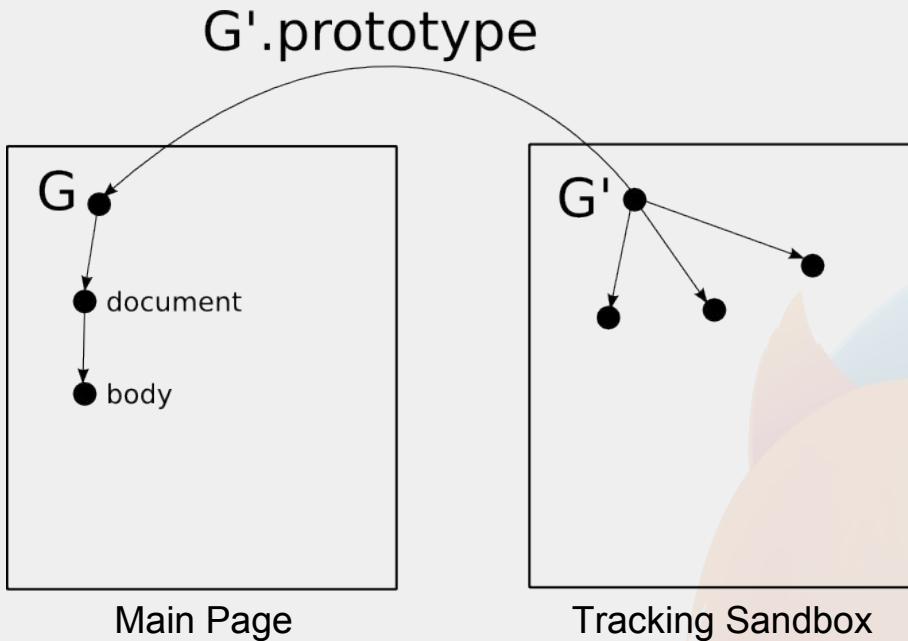
**wirkaufen
deinauto.de**
VERKAUFE JETZT

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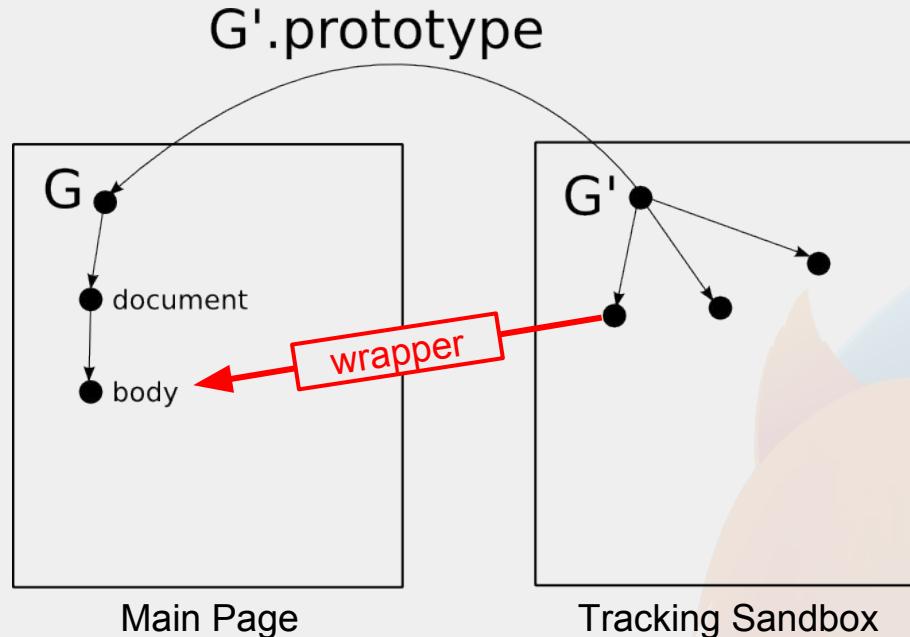
^ Nach oben

Sandboxing with Tracking Protection

4. Sandbox active content and sandbox iframes



4. Sandbox active content and sandbox iframes



Define *tracking wrappers* for interactions across the sandbox boundary

What do Google scripts do?



What do Google scripts do?

```
<iframe  
    onload = ...  
    id = "aswift_0"  
    width = "300"  
    height = "250"  
>< /iframe>
```

What do Google scripts do?

```
<iframe  
    onload = ...  
    id = "aswift_0"  
    width = "300"  
    height = "250"  
></iframe>
```

```
var i = this.id,  
s = window.google_iframe_oncopy,  
    h = s &amp; &amp;  
s.handlers, h = h &amp; &amp;  
h[i], w = this.contentwindow, d;  
d = w.document  
if (h &amp; &amp; d &amp; &amp;  
`  
    ...  
w.location.replace(h)  
}  
}
```

Tracking scripts require inline javascript access

- Google iframes with `onload` -- 10% of sites
- Iframes with `javascript: src` urls -- 20% of sites
- Insert inline scripts into first-party -- 18% of sites

Sandboxing Javascript is infeasible

- Breakage still too high
- Requires support for inline javascript
 - Inline function rewriting
 - Function reflection from sandbox to main page
- **Sandbox design will change as scripts change**

Tracking Protection



Thank you!

Joint work with Tanvi Vyas (my mentor!) and Eric Rescorla

Thanks to my manager Steve Workman, the Security Engineering team, and the University team!

Contact me:

senglehardt.com

@s_englehardt