

Lecture 17: Tracking

CMSC 25900 / DATA 25900

Spring 2021

The University of Chicago



**THE UNIVERSITY OF
CHICAGO**

Surveillance of Students (Continued)

Exam-Proctoring Software

Online exam monitoring can invade privacy and erode trust at universities

December 3, 2020 5:16pm EST

Testing and exam proctoring methods that invade privacy and erode trust undermine the very integrity that institutions demand students uphold. (Shutterstock)

Email

Twitter

72

Facebook

353

LinkedIn

Print

The health risks posed by COVID-19 mean most Canadian university classes are online this year. As a result, some students will write exams online via remote proctoring platforms that surveil their activities.

These tools go by names like ProctorU, Examity, Respondus and Proctorio, among others. Designed by for-profit tech startups, they monitor students' laptops, tablets or phones during the course of an exam. Proctoring tools can monitor eye movements, capture students' keystrokes, record their screens and track their searches as well as their home environments and

Author




Bonnie Stewart


Assistant Professor, Online Pedagogy & Workplace Learning, Faculty of Education, University of Windsor

Disclosure statement

Bonnie Stewart does not work for, consult, own shares in or receive funding from any company or organization that would benefit from this article, and has disclosed no relevant affiliations beyond their academic appointment.

Virtual Meetings

 1.888.799.9666

[JOIN A MEETING](#) [HOST A MEETING](#) 

From:

Maximum report duration: 1 Month

The report displays information for meetings that ended at least 15 minutes ago.

[Export as CSV File](#) [Toggle columns](#)

Topic	Meeting ID	User Name	User Email	Department	Group	Has Zoom Rooms?	Creation Time	Start Time	End Time	Duration (Minutes)	Participants	Source
CS 259 (Spring 2021)		Blase Ur (he/him)	blase@uchicago.edu	Computer Sci	22	No	03/25/2021 03:59:57 PM	05/20/2021 02:39:22 PM	05/20/2021 04:01:52 PM	83	30	Zoom

[Attend Live Training](#)

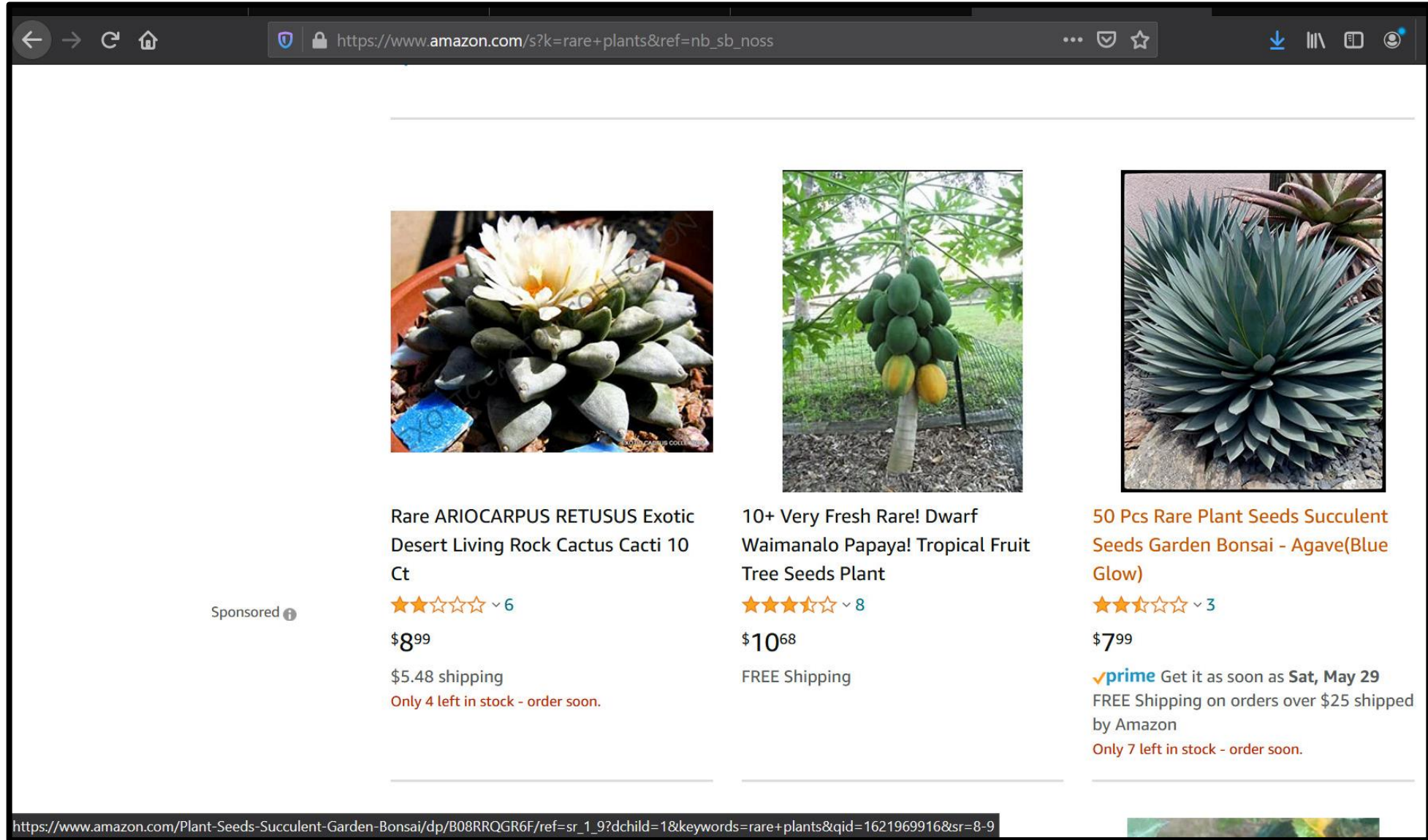
Virtual Meetings

Meeting Participants

uchicago.edu	05/20/2021 02:40:43 PM	05/20/2021 04:01:51 PM	82	No
hicago.edu	05/20/2021 02:40:44 PM	05/20/2021 04:01:52 PM	82	No
uchicago.edu	05/20/2021 02:40:55 PM	05/20/2021 04:01:51 PM	81	No
uchicago.edu	05/20/2021 02:41:16 PM	05/20/2021 03:08:19 PM	28	No
@uchicago.edu	05/20/2021 02:41:21 PM	05/20/2021 04:01:51 PM	81	No
@uchicago.edu	05/20/2021 02:41:29 PM	05/20/2021 03:04:39 PM	24	No
uchicago.edu	05/20/2021 02:41:30 PM	05/20/2021 04:01:52 PM	81	No
uchicago.edu	05/20/2021 02:42:38 PM	05/20/2021 04:01:52 PM	80	No
icago.edu	05/20/2021 02:43:02 PM	05/20/2021 02:48:42 PM	6	No
icago.edu	05/20/2021 02:43:07 PM	05/20/2021 04:01:50 PM	79	No
icago.edu	05/20/2021 02:43:17 PM	05/20/2021 03:08:53 PM	26	No

Tracking Website Visits

First-Party Tracking (The Website You Are Visiting)



The screenshot shows a web browser window with the address bar displaying https://www.amazon.com/s?k=rare+plants&ref=nb_sb_noss. The page content features three sponsored product listings:

- Product 1:** Rare ARIOCARPUS RETUSUS Exotic Desert Living Rock Cactus Cacti 10 Ct. Price: \$8⁹⁹. Shipping: \$5.48. Stock: Only 4 left in stock - order soon. Rating: 5 stars (6 reviews).
- Product 2:** 10+ Very Fresh Rare! Dwarf Waimanalo Papaya! Tropical Fruit Tree Seeds Plant. Price: \$10⁶⁸. Shipping: FREE. Stock: Not specified. Rating: 5 stars (8 reviews).
- Product 3:** 50 Pcs Rare Plant Seeds Succulent Seeds Garden Bonsai - Agave(Blue Glow). Price: \$7⁹⁹. Shipping: FREE. Stock: Only 7 left in stock - order soon. Rating: 5 stars (3 reviews). Prime delivery: Get it as soon as Sat, May 29.

The footer of the browser window shows the URL: https://www.amazon.com/Plant-Seeds-Succulent-Garden-Bonsai/dp/B08RRQGR6F/ref=sr_1_9?dchild=1&keywords=rare+plants&qid=1621969916&sr=8-9


First-Party Tracking (The Website You Are Visiting)


<p>Sponsored ⓘ</p>	<p>Desert Living Rock Cactus Cacti 10 Ct</p> <p>★★★★☆ v 6</p> <p>\$8⁹⁹</p> <p>\$5.48 shipping</p> <p>Only 4 left in stock - order soon.</p>	<p>Waimanalo Papaya! Tropical Fruit Tree Seeds Plant</p> <p>★★★★☆ v 8</p> <p>\$10⁶⁸</p> <p>FREE Shipping</p>	<p>Seed Glow</p> <p>★★</p> <p>\$7⁹⁹</p> <p>✓prime</p> <p>FREE by An</p> <p>Only 7</p>
<p>https://www.amazon.com/Plant-Seeds-Succulent-Garden-Bonsai/dp/B08RRQGR6F/ref=sr_1_9?dchild=1&keywords=rare+plants&qid=1621969916&sr=8-9</p>			


Third-Party Tracking (**Not** The Website You Are Visiting)

UChicago News

- Visit the [UChicago Forward website](#), for the University's COVID-19 health protocols, campus guidelines, and other Spring Quarter information.

 What Americans are thinking a year after George Floyd's death


 Big Brains podcast: Why You're Likely Paying An Unfair Share of Property Taxes

 University announces COVID-19 vaccine requirement for all students

Latest News

Founded at UChicago, nonprofit Climate Vault proposes new solution for carbon reduction

[MORE NEWS >](#)

 Explore Chicago: Discover the Global City UChicago... Watch later Share

Explore Chicago




Discover the global city UChicago calls home—filled with inspiration, innovation, and countless opportunities to explore.

[VISIT UCHICAGO >](#)

Third-Party Tracking (**Not** The Website You Are Visiting)

The screenshot shows a web browser at the URL <https://www.uchicago.edu>. The page title is "UChicago News" and the main text reads: "- Visit the [UChicago Forward website](#), for the University's COVID-19 health protocols, campus guidelines, and other Spring Quarter information."

Below the text are three news items:

- 
What Americans are thinking a year after George Floyd's death
- 
Big Brains podcast: Why You're Likely Paying An Unfair Share of Property Taxes
- 
University announces COVID-19 vaccine requirement for all students

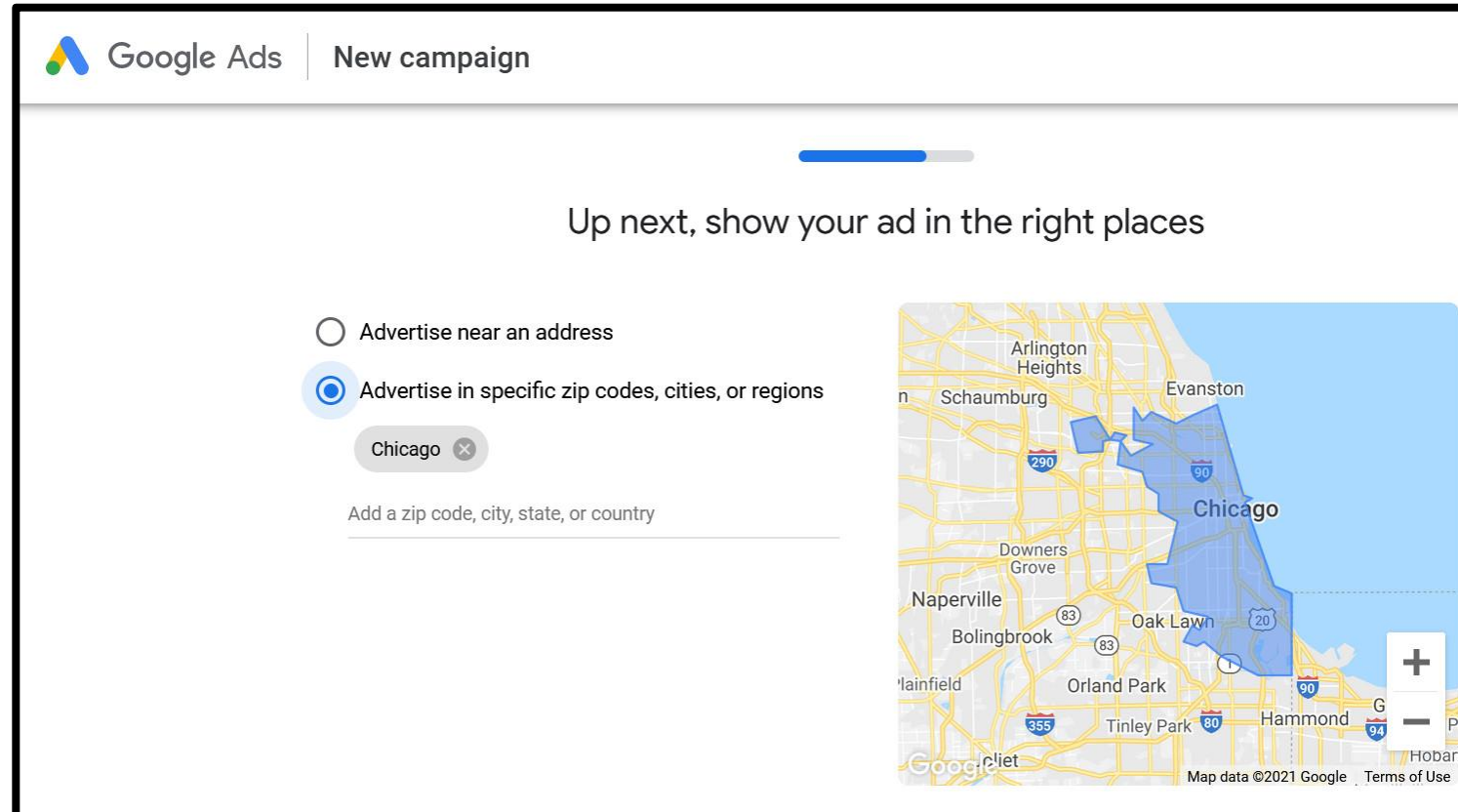
To the right of these items is a "Latest News" section with the text: "Founded at UChicago, nonprofit Climate Vault proposes new solution for carbon reduction". A "MORE NEWS >" link is located at the bottom right of this section.

At the bottom of the page, a video player is highlighted with a red border. The video title is "Explore Chicago: Discover the Global City UChicago...". The video player includes a "Watch later" button, a "Share" button, and a "Watch on YouTube" button. The video content shows a street scene with a large building and the text "A WORLD-CLASS UNIVERSITY" overlaid.

To the right of the video player is an "Explore Chicago" section with the text: "Discover the global city UChicago calls home—filled with inspiration, innovation, and countless opportunities to explore." A "VISIT UCHICAGO >" link is located at the bottom of this section.

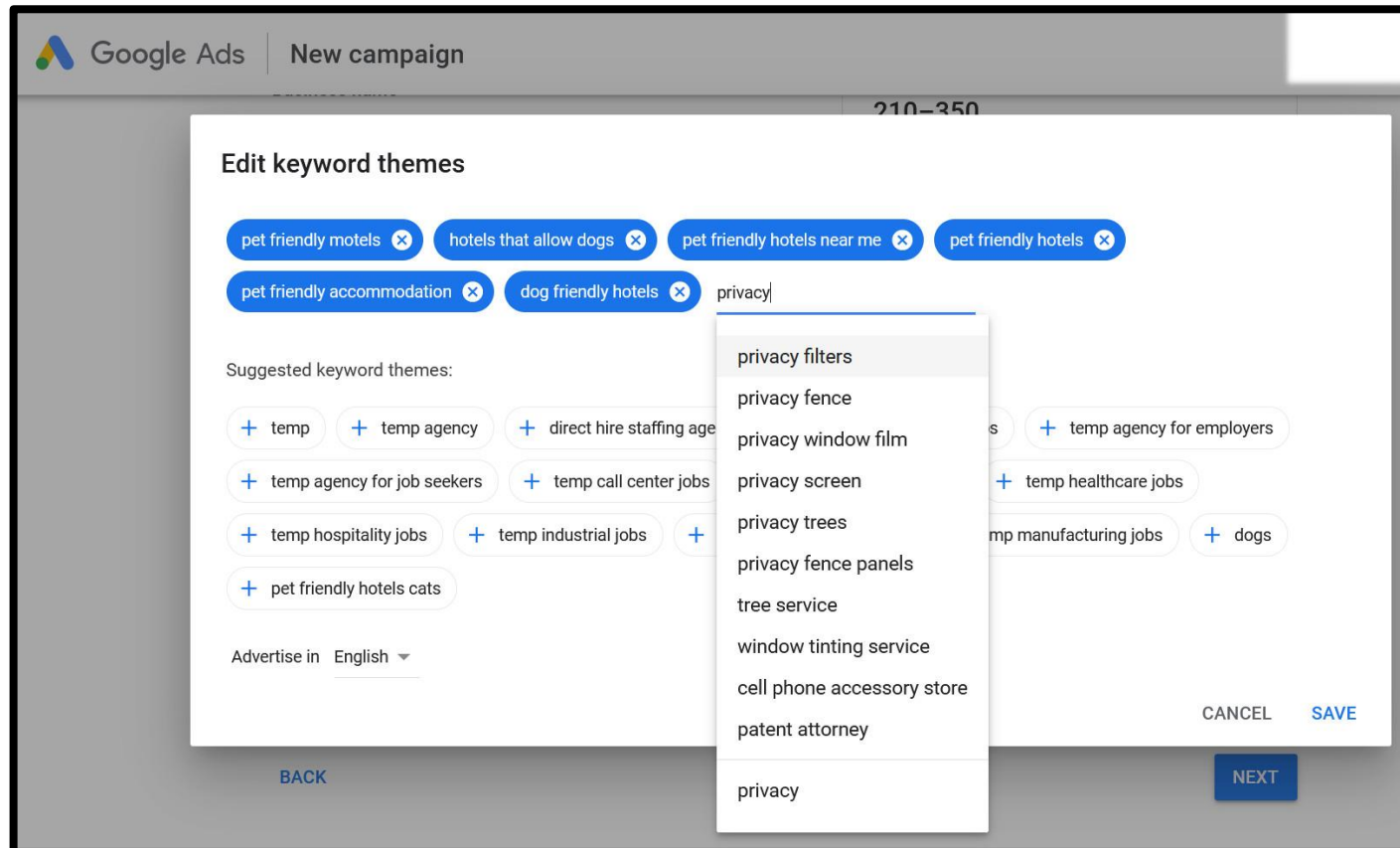
Ad Targeting

- Goal: Target advertisements to particular users
 - Based on interests, demographics, past interactions (online/offline)



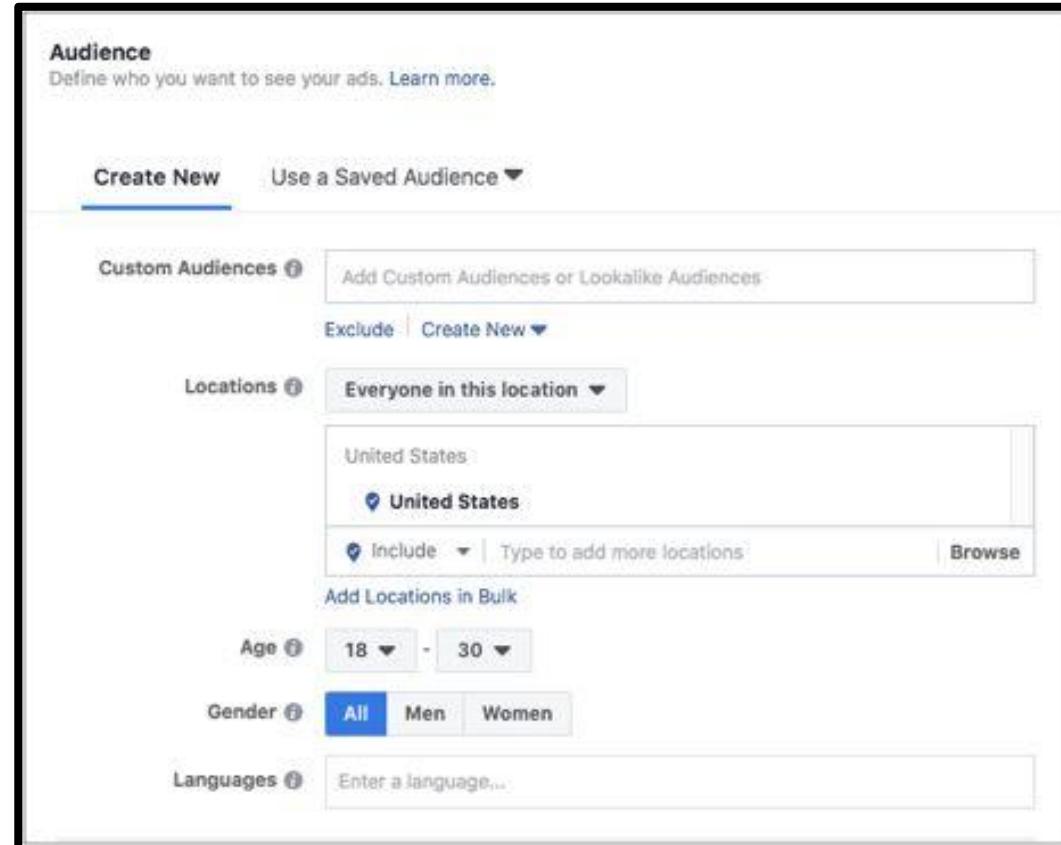
Ad Targeting

- Goal: Target advertisements to particular users
 - Based on interests, demographics, past interactions (online/offline)



Ad Targeting

- Goal: Target advertisements to particular users
 - Based on interests, demographics, past interactions (online/offline)



The screenshot displays the Facebook Audience targeting interface. At the top, it says "Audience" and "Define who you want to see your ads. Learn more." Below this, there are two tabs: "Create New" (which is active) and "Use a Saved Audience". The main section is titled "Custom Audiences" and contains a text input field with the placeholder "Add Custom Audiences or Lookalike Audiences". Below this field are "Exclude" and "Create New" options. The "Locations" section is set to "Everyone in this location" and shows a list of "United States" with a location pin icon. Below the list, there are "Include" and "Type to add more locations" options, along with a "Browse" button. The "Age" section is set to "18 - 30". The "Gender" section has three buttons: "All" (which is selected), "Men", and "Women". The "Languages" section has a text input field with the placeholder "Enter a language...".

Data-Driven Inferences



☰ Southern Living SUBSCRIBE

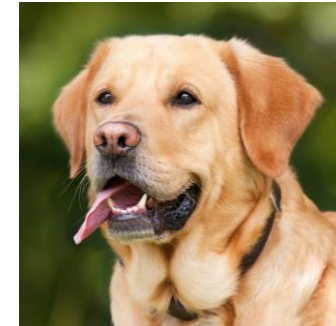
TRAVEL

Here Are the Most Dog-Friendly Restaurants in the United States

f p t e

KELLI BENDER

A photograph of a dog sitting at a restaurant table with food. A small red pin icon is visible in the bottom right corner of the image.



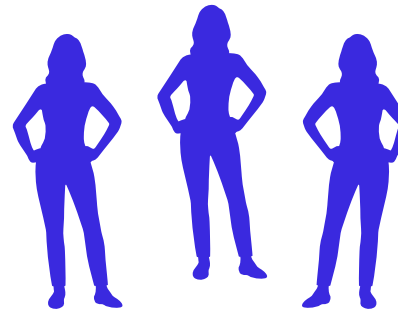
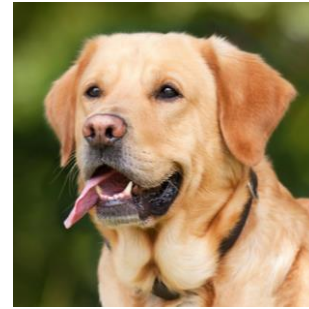
↘
You might like
dogs!

Targeted Advertising

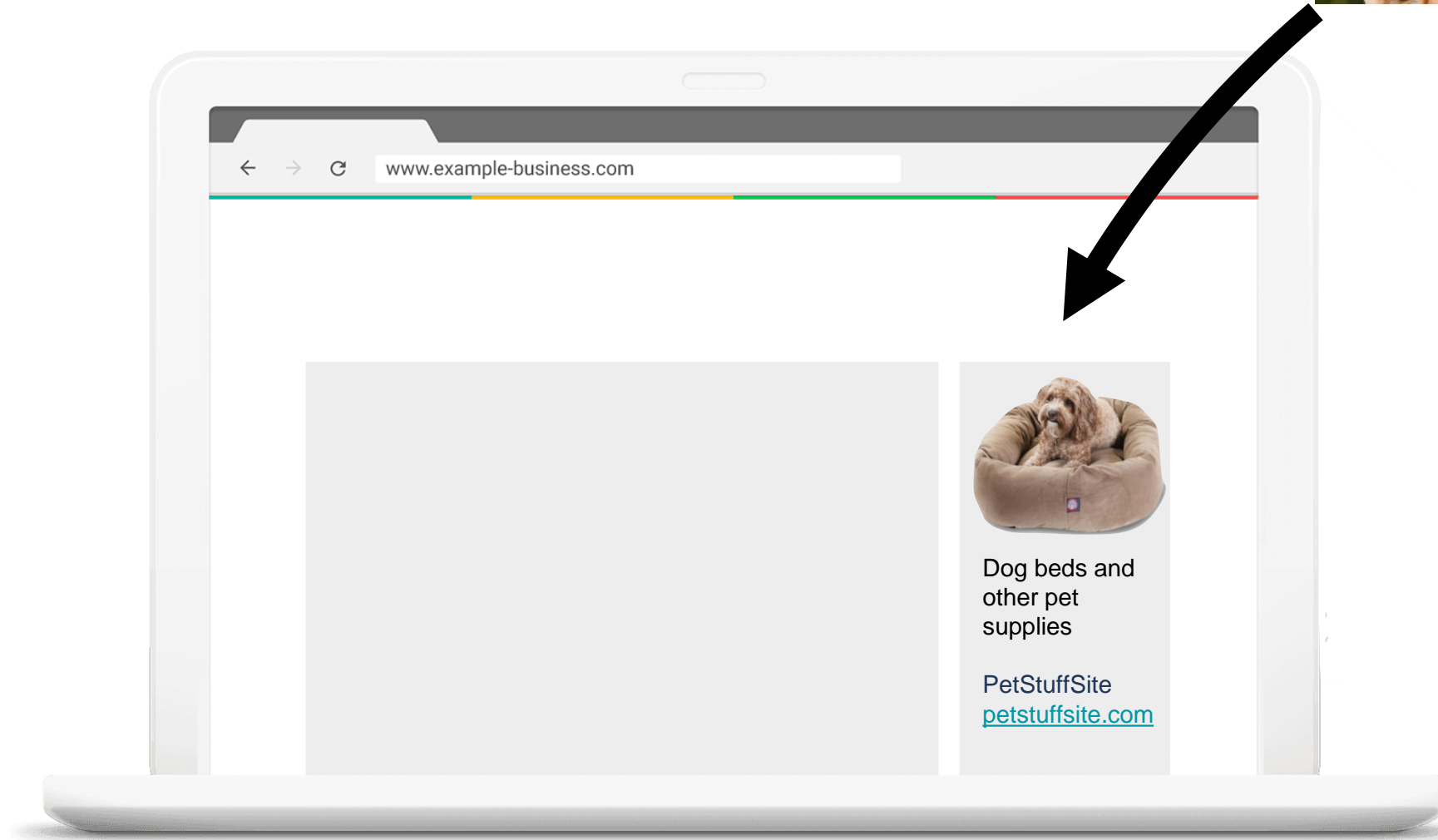
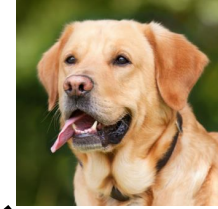
Interests & remarketing

Affinity audiences

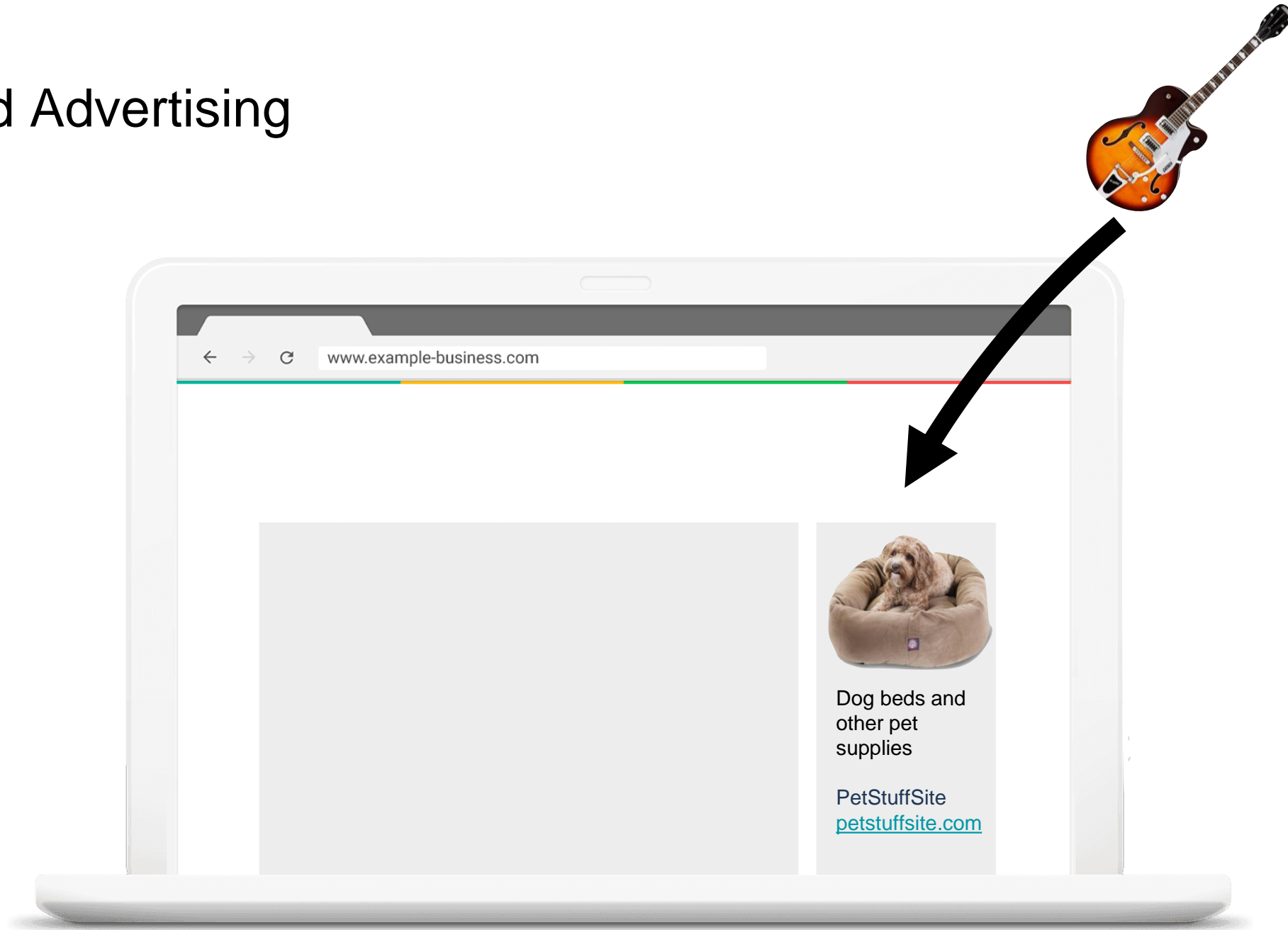
- Music Lovers >>
- News Junkies >>
- Nightlife Enthusiasts >>
- Outdoor Enthusiasts >>
- Pet Lovers >>



Targeted Advertising

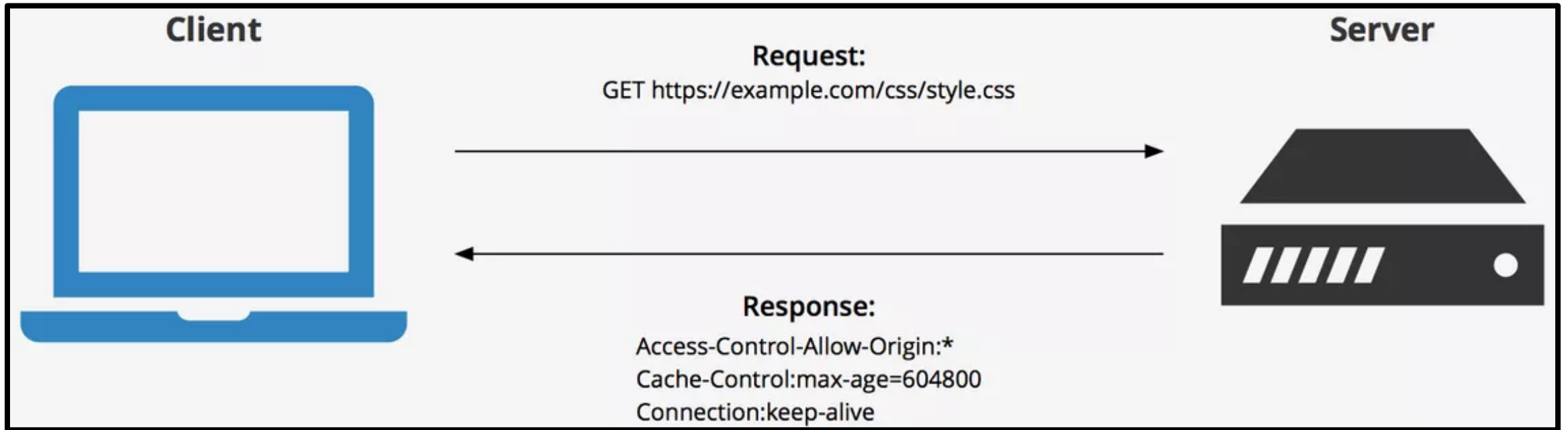


Targeted Advertising



Mechanics of Tracking (Cookie Version)

HTTP Basics



HTTP Headers (uchicago.edu)

The screenshot displays the Chrome DevTools Network tab with the 'Headers' sub-tab selected. The network log shows a 200 OK GET request to www.uchicago.edu. The response headers are expanded, showing a list of headers including date, content-type, server, x-frame-options, expires, pragma, vary, set-cookie, content-encoding, x-varnish, age, via, accept-ranges, and X-Firefox-Spdy. The request headers are also expanded, showing a list of headers including Host, User-Agent, Accept, Accept-Language, Accept-Encoding, DNT, Connection, Cookie, Upgrade-Insecure-Requests, If-Modified-Since, and TE.

Status	Meth...	Domain	File	Initiator	Type	Transferred	Size
200	GET	www.uchic...	/	document	html	11.41 KB	39.87...
204	POST	www.youtu...	atr?ns=yt&el=embedded&cpn=ho5PKBh-p_	base.js:1023 (x...	html	604 B	0 B
200	GET	www.youtu...	P-xlixF7B2U?autohide=1&fs=1&autoplay=0&	subdocument	html	21.81 KB	51.50...
200	GET	cdn.hypem...	uchicagowww?width=1169&paginate=true&	a5b5e5.js:3 (su...	html	128.06 KB	127.6...
200	GET	cdn.hypem...	popUpModalEndpoint	a5b5e5.js:3 (su...	html	10.99 KB	10.64...

Response Headers (1.078 KB)

```
HTTP/2 200 OK
date: Tue, 25 May 2021 18:00:35 GMT
content-type: text/html; charset=UTF-8
server: Apache
x-frame-options: SAMEORIGIN
expires: Mon, 26 Jul 1997 05:00:00 GMT
pragma: no-cache
vary: Accept-Encoding
set-cookie: uchicago-prod_last_visit=1306605629; expires=Wed, 25-May-2022 18:00:29 G
set-cookie: uchicago-prod_last_activity=1621965629; expires=Wed, 25-May-2022 18:00:2
set-cookie: uchicago-prod_tracker=%7B%220%22%3A%22index%22%2C%22token%22%3A%2226944a
set-cookie: uchicago-prod_csrf_token=deleted; expires=Thu, 01-Jan-1970 00:00:01 GMT;
set-cookie: uchicago-prod_csrf_token=86d47d8690aa7646e1628dd095cd5b464db16bd3; expir
last-modified: Tue, 25 May 2021 18:00:29 GMT
content-encoding: gzip
x-varnish: 10696657 9201444
age: 5
via: 1.1 varnish (Varnish/5.2)
accept-ranges: bytes
X-Firefox-Spdy: h2
```

Request Headers (735 B)

```
GET / HTTP/2
Host: www.uchicago.edu
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefo
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
DNT: 1
Connection: keep-alive
Cookie: uchicago-prod_last_visit=1306604446; uchicago-prod_last_activity=1621964446;
Upgrade-Insecure-Requests: 1
If-Modified-Since: Tue, 25 May 2021 17:40:36 GMT
TE: Trailers
```

5 requests | 229.65 KB / 172.86 KB transferred | Finish: 4.03 min | DOMContentLoaded: 451 ms | load: 1.70 s

HTTP Headers (uchicago.edu): Request

```
▼ Request Headers (735 B) Raw   
GET / HTTP/2  
Host: www.uchicago.edu  
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefox/88.0  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate, br  
DNT: 1  
Connection: keep-alive  
Cookie: uchicago-prod_last_visit=1306604446; uchicago-prod_last_activity=1621964446;  
Upgrade-Insecure-Requests: 1  
If-Modified-Since: Tue, 25 May 2021 17:40:36 GMT  
TE: Trailers
```

HTTP Headers (uchicago.edu): Request

```
▼ Request Headers (735 B) Raw   
GET / HTTP/2  
Host: www.uchicago.edu  
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefo  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate, br  
DNT: 1  
Connection: keep-alive  
Cookie: uchicago-prod_last_visit=1306604446; uchicago-prod_last_activity=1621964446;  
Upgrade-Insecure-Requests: 1  
If-Modified-Since: Tue, 25 May 2021 17:40:36 GMT  
TE: Trailers
```

HTTP Headers (uchicago.edu): Request

```
▼ Request Headers (735 B) Raw   
GET / HTTP/2  
Host: www.uchicago.edu  
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefo  
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8  
Accept-Language: en-US,en;q=0.5  
Accept-Encoding: gzip, deflate, br  
DNT: 1  
Connection: keep-alive  
Cookie: uchicago-prod_last_visit=1306604446; uchicago-prod_last_activity=1621964446;  
Upgrade-Insecure-Requests: 1  
If-Modified-Since: Tue, 25 May 2021 17:40:36 GMT  
TE: Trailers
```

Detail: HTTP Cookies



HTTP Headers (uchicago.edu): Response

▼ Response Headers (1.078 KB)

Raw

```
HTTP/2 200 OK
date: Tue, 25 May 2021 18:00:35 GMT
content-type: text/html; charset=UTF-8
server: Apache
x-frame-options: SAMEORIGIN
expires: Mon, 26 Jul 1997 05:00:00 GMT
pragma: no-cache
vary: Accept-Encoding
set-cookie: uchicago-prod_last_visit=1306605629; expires=Wed, 25-May-2022 18:00:29 G
set-cookie: uchicago-prod_last_activity=1621965629; expires=Wed, 25-May-2022 18:00:2
set-cookie: uchicago-prod_tracker=%7B%220%22%3A%22index%22%2C%22token%22%3A%2226944a
set-cookie: uchicago-prod_csrf_token=deleted; expires=Thu, 01-Jan-1970 00:00:01 GMT;
set-cookie: uchicago-prod_csrf_token=86d47d8690aa7646e1628dd095cd5b464db16bd3; expir
last-modified: Tue, 25 May 2021 18:00:29 GMT
content-encoding: gzip
x-varnish: 10696657 9201444
age: 5
via: 1.1 varnish (Varnish/5.2)
accept-ranges: bytes
X-Firefox-Spdy: h2
```

HTTP Headers (uchicago.edu): Response

```
▼ Response Headers (1.078 KB) Raw 
HTTP/2 200 OK
date: Tue, 25 May 2021 18:00:35 GMT
content-type: text/html; charset=UTF-8
server: Apache
x-frame-options: SAMEORIGIN
expires: Mon, 26 Jul 1997 05:00:00 GMT
pragma: no-cache
vary: Accept-Encoding
set-cookie: uchicago-prod_last_visit=1306605629; expires=Wed, 25-May-2022 18:00:29 G
set-cookie: uchicago-prod_last_activity=1621965629; expires=Wed, 25-May-2022 18:00:2
set-cookie: uchicago-prod_tracker=%7B%220%22%3A%22index%22%2C%22token%22%3A%2226944a
set-cookie: uchicago-prod_csrf_token=deleted; expires=Thu, 01-Jan-1970 00:00:01 GMT;
set-cookie: uchicago-prod_csrf_token=86d47d8690aa7646e1628dd095cd5b464db16bd3; expir
last-modified: Tue, 25 May 2021 18:00:29 GMT
content-encoding: gzip
x-varnish: 10696657 9201444
age: 5
via: 1.1 varnish (Varnish/5.2)
accept-ranges: bytes
X-Firefox-Spdy: h2
```


HTTP Headers (uchicago.edu → youtube.com)

The screenshot shows the Chrome DevTools Network tab with the 'Headers' sub-tab selected. The network log on the left shows a list of requests, with the third request (a GET request to a YouTube embed URL) highlighted in blue. The right pane displays the headers for this request.

Status	Met...	Domain	File	Initiator	Type	Transferred	Size
200	GET	www.uchica...	/	document	html	11.41 KB	39...
204	POST	www.youtub...	atr?ns=yt&el=embedded&cpn=ho5PKBh-	base.js:1023 (...)	html	604 B	0 B
200	GET	www.youtub...	P-xlixF7B2U?autohide=1&fs=1&autoplay=	subdocument	html	21.81 KB	51...
200	GET	cdn.hypemar...	uchicagowww?width=1169&paginate=tru	a5b5e5.js:3 (s...	html	128.06 KB	12...
200	GET	cdn.hypemar...	popUpModalEndpoint	a5b5e5.js:3 (s...	html	10.99 KB	10...

Response Headers (642 B)

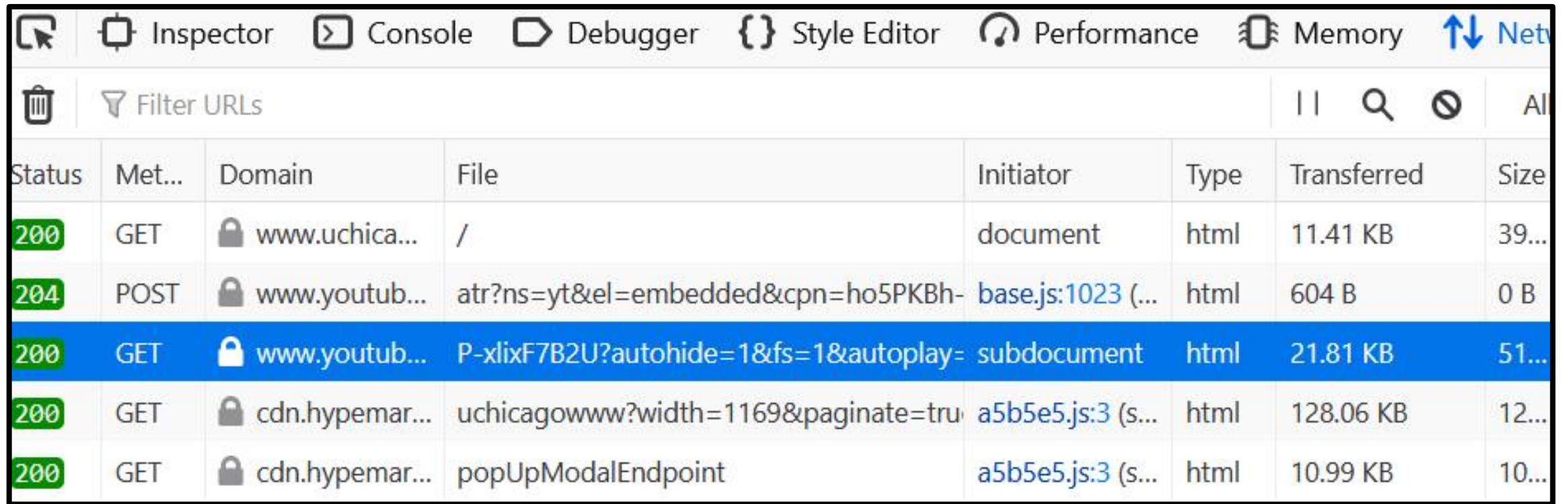
```
HTTP/3 200 OK
content-type: text/html; charset=utf-8
x-content-type-options: nosniff
cache-control: no-cache, no-store, max-age=0, must-revalidate
pragma: no-cache
expires: Mon, 01 Jan 1990 00:00:00 GMT
date: Tue, 25 May 2021 18:00:36 GMT
strict-transport-security: max-age=31536000
permissions-policy: ch-ua-full-version=*, ch-ua-platform=*, ch-ua-platform-version=*, ch-u
content-encoding: br
server: ESF
x-xss-protection: 0
alt-svc: h3-29=":443"; ma=2592000,h3-T051=":443"; ma=2592000,h3-Q050=":443"; ma=2592000,h3
```

Request Headers (621 B)

```
GET /embed/P-xlixF7B2U?autohide=1&fs=1&autoplay=0&rel=0&modestbranding=1&showinfo=0&hd=1&e
Host: www.youtube.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefox/88.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
DNT: 1
Alt-Used: www.youtube.com
Connection: keep-alive
Referer: https://www.uchicago.edu/
Cookie: VISITOR_INFO01_LIVE=dACtKPaJVlQ; PREF=tz=America.Chicago&f4=4000000; YSC=p2jSvxCMeI
Upgrade-Insecure-Requests: 1
TE: Trailers
```

5 requests | 229.65 KB / 172.86 KB transferred | Finish: 4.03 min | DOMContentLoaded: 451 ms | load: 1.70 s

HTTP Headers (uchicago.edu → youtube.com)



The screenshot shows the Chrome DevTools Network tab with a list of requests. The third request is highlighted in blue. The interface includes tabs for Inspector, Console, Debugger, Style Editor, Performance, Memory, and Network. A search bar for filtering URLs is visible above the table.

Status	Met...	Domain	File	Initiator	Type	Transferred	Size
200	GET	www.uchica...	/	document	html	11.41 KB	39...
204	POST	www.youtub...	atr?ns=yt&el=embedded&cpn=ho5PKBh-	base.js:1023 (...	html	604 B	0 B
200	GET	www.youtub...	P-xlixF7B2U?autohide=1&fs=1&autoplay=	subdocument	html	21.81 KB	51...
200	GET	cdn.hypemar...	uchicagowww?width=1169&paginate=tru	a5b5e5.js:3 (s...	html	128.06 KB	12...
200	GET	cdn.hypemar...	popUpModalEndpoint	a5b5e5.js:3 (s...	html	10.99 KB	10...

HTTP Headers (uchicago.edu → youtube.com)

▼ Request Headers (621 B)

Raw

```
GET /embed/P-xlixF7B2U?autohide=1&fs=1&autoplay=0&rel=0&modestbranding=1&showinfo=0&hd=1&e
Host: www.youtube.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefox/88.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
DNT: 1
Alt-Used: www.youtube.com
Connection: keep-alive
Referer: https://www.uchicago.edu/
Cookie: VISITOR_INFO01_LIVE=dACtKPaJViQ; PREF=tz=America.Chicago&f4=4000000; YSC=p2jSvxCMeI
Upgrade-Insecure-Requests: 1
TE: Trailers
```


HTTP Headers (uchicago.edu → youtube.com)

▼ Request Headers (621 B)

Raw

```
GET /embed/P-xlixF7B2U?autohide=1&fs=1&autoplay=0&rel=0&modestbranding=1&showinfo=0&hd=1&e
Host: www.youtube.com
```

```
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefox/88.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
DNT: 1
Alt-Used: www.youtube.com
Connection: keep-alive
Referer: https://www.uchicago.edu/
Cookie: VISITOR_INFO01_LIVE=dACtKPaJViQ; PREF=tz=America.Chicago&f4=4000000; YSC=p2jSvxCMeI
Upgrade-Insecure-Requests: 1
TE: Trailers
```

HTTP Headers (uchicago.edu → youtube.com)

▼ Request Headers (621 B)

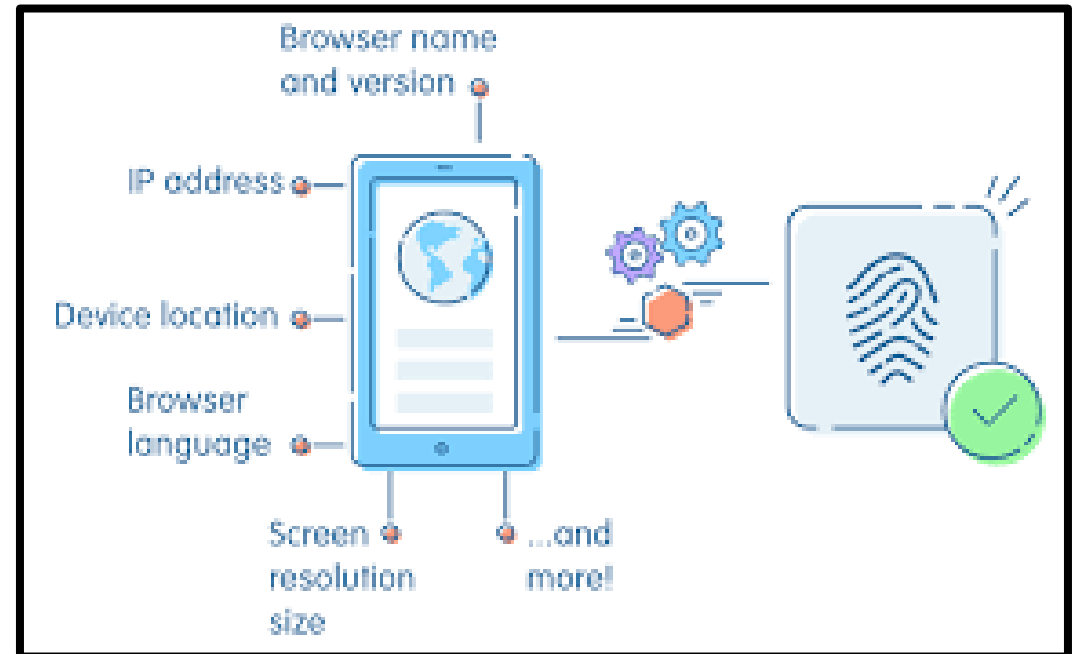
Raw

```
GET /embed/P-xlixF7B2U?autohide=1&fs=1&autoplay=0&rel=0&modestbranding=1&showinfo=0&hd=1&e
Host: www.youtube.com
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:88.0) Gecko/20100101 Firefox/88.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate, br
DNT: 1
Alt-Used: www.youtube.com
Connection: keep-alive
Referer: https://www.uchicago.edu/
Cookie: VISITOR_INFO01_LIVE=dACtKPaJViQ; PREF=tz=America.Chicago&f4=4000000; YSC=p2jSvxCMeI
Upgrade-Insecure-Requests: 1
TE: Trailers
```

Mechanics of Tracking (Fingerprinting Version)

Browser Fingerprinting

- Use features of the browser that are relatively unique to your machine
 - Fonts
 - GPU model anti-aliasing (Canvas fingerprinting)
 - User-agent string
 - *(Often not) IP address (Why not?)*



See Fingerprinting Happening

EFF TURNS 30! LEARN MORE ABOUT US, AND HOW YOU CAN HELP.



[About](#) [Issues](#) [Our Work](#) [Take Action](#) [Tools](#) [Donate](#) [Q](#)

Panopticlick 3.0

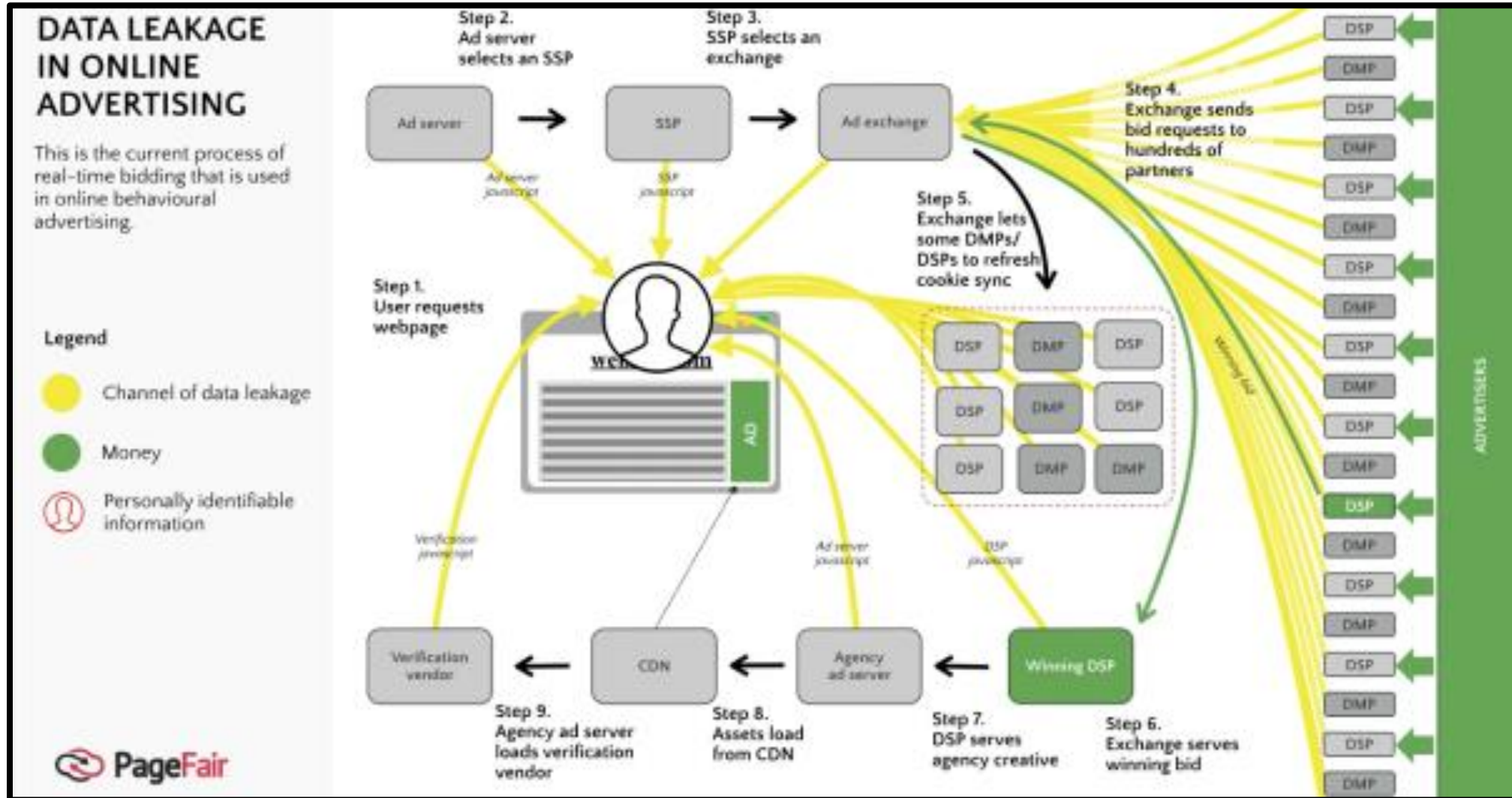
BY ALAN TONER, PETER ECKERSLEY, AND BILL BUDINGTON | NOVEMBER 28, 2017



PANOPTICCLICK 3.0

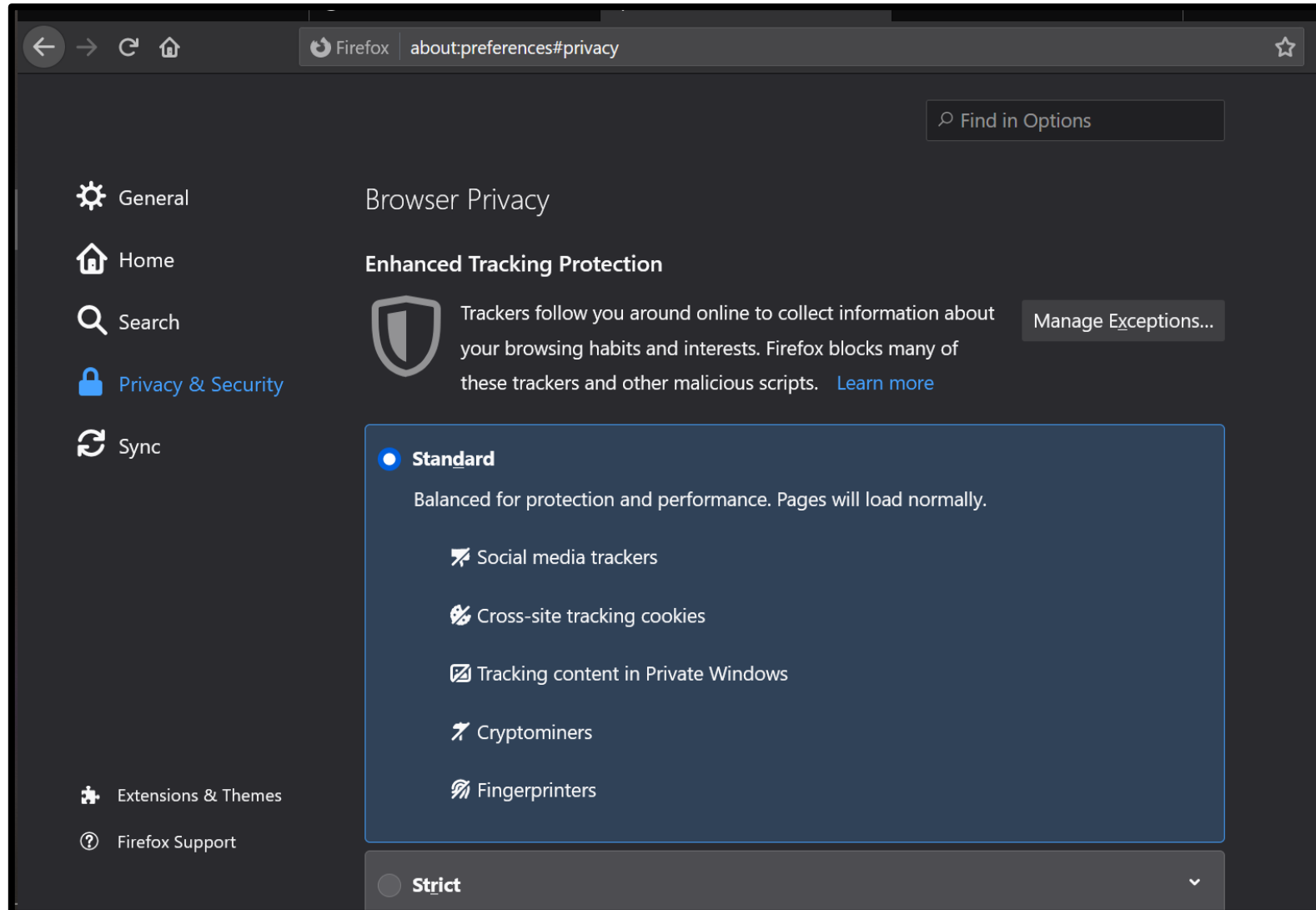
The Ecosystem Underlying Targeted Ads

Ad Bidding Marketplaces

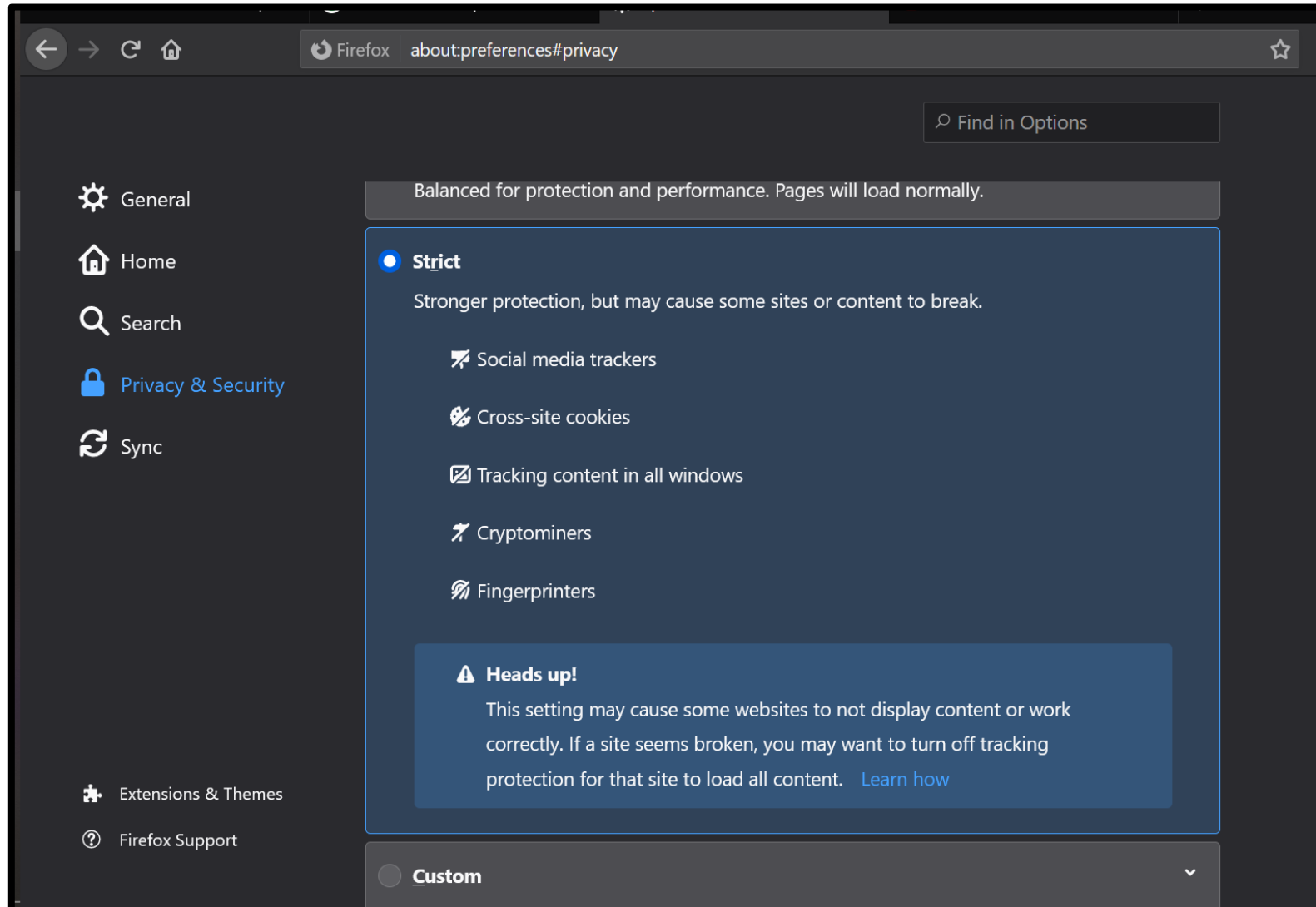


Anti-Tracking Mechanisms

Firefox Browser (New-ish) Default Settings



Firefox Browser Strict Settings



Ghostery

The screenshot displays the Ghostery browser extension interface. At the top, a blue header contains the Ghostery logo and the word "GHOSTERY". The main content is split into two panels. The left panel shows a summary for "22 Trackers found on www.mynews.com". A circular progress indicator shows 22 trackers, with 4 blocked. Below this are three buttons: "Trust Site" (with a shield icon), "Restrict Site" (with a lock icon), and "Pause Ghostery". A link "Map these trackers" is at the bottom. The right panel, titled "TRACKERS", has a "Block All" checkbox. It lists several trackers under the "Advertising" category, with 10 total and 3 blocked. The blocked trackers are Advertising.com, Moat, and NetRatings-Site-Center, each with a red checkmark icon. Other trackers like DoubleClick, Google Adsense, Korrelate, ScoreCard Research Beacon, and Tacoda have unchecked checkboxes.

22 Trackers found on
www.mynews.com

22

4 Blocked

Trust Site

Restrict Site

Pause Ghostery

[Map these trackers](#)

TRACKERS Block All

Advertising
10 TRACKERS 3 Blocked

Advertising.com	<input checked="" type="checkbox"/>
DoubleClick	<input type="checkbox"/>
Google Adsense	<input type="checkbox"/>
Korrelate	<input type="checkbox"/>
Moat	<input checked="" type="checkbox"/>
NetRatings-Site-Center	<input checked="" type="checkbox"/>
Polar-Mobile	<input checked="" type="checkbox"/>
ScoreCard Research Beacon	<input type="checkbox"/>
Tacoda	<input type="checkbox"/>

Existing Privacy Tools

The screenshot shows the Disconnect browser extension interface. At the top, it says "DISCONNECT" with "Help" and "Share" links. Below this are social media sharing buttons for Facebook (0), Google+ (1), and Twitter (1). The main interface is divided into several categories, each with a green icon and a dropdown arrow:

- Advertising**: 2 requests. Includes a list of blocked items: Adobe (1 request) and Nielsen (1 request).
- Analytics**: 7 requests.
- Social**: 0 requests.
- Content**: 0 requests.

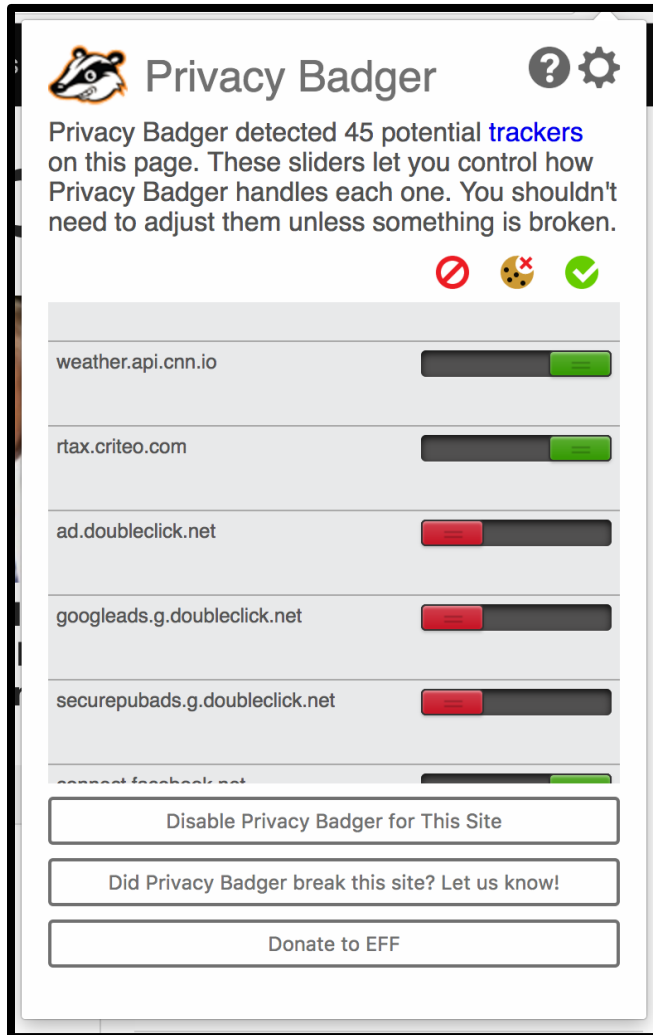
At the bottom of the interface, there are utility options: "Whitelist site" (with a menu icon), "Visualize page" (with a network diagram icon), "Show counter" (checked), and "Cap counter" (checked). Below these are two bar charts labeled "Time saved" and "Bandwidth saved". At the very bottom is a green button that says "Get Mobile Protection".

The screenshot shows the Blur browser extension interface overlaid on a webpage. The top bar is blue and displays "espn.com" with a close button and "8 trackers blocked". Below this, it states "Tracker blocking is on" with a green toggle switch. A list of blocked trackers is shown:

Google AdSense	blocked	🚫
Demdex	blocked	🚫
Twitter Badge	blocked	🚫
Omniure	blocked	🚫

Below the list is a red eye icon and a link: "see your tracker blocking stats and learn more about these companies". A large blue banner at the bottom of the interface displays "21 trackers blocked since Feb '17". Below the banner is a link: "Correct how Blur works in the form below". At the bottom of the interface, the "BLUR" logo is shown along with links for "Settings", "Help", and "Go Premium".

Existing Privacy Tools



Privacy Badger

Privacy Badger detected 45 potential **trackers** on this page. These sliders let you control how Privacy Badger handles each one. You shouldn't need to adjust them unless something is broken.

weather.api.cnn.io

rtax.criteo.com

ad.doubleclick.net

googleads.g.doubleclick.net

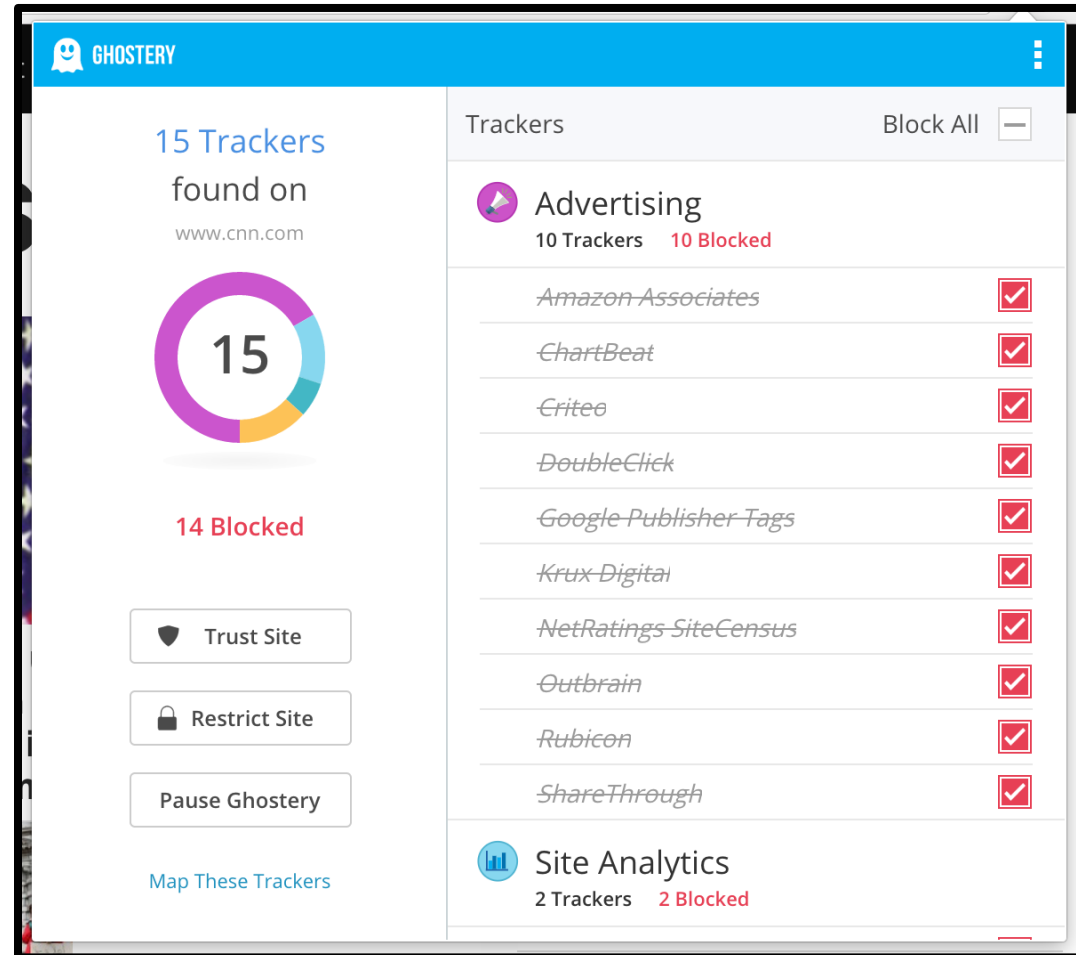
securepubads.g.doubleclick.net

connect.facebook.net

Disable Privacy Badger for This Site

Did Privacy Badger break this site? Let us know!

Donate to EFF



GHOSTERY

15 Trackers found on www.cnn.com

15

14 Blocked

Trust Site

Restrict Site

Pause Ghostery

Map These Trackers

Trackers Block All

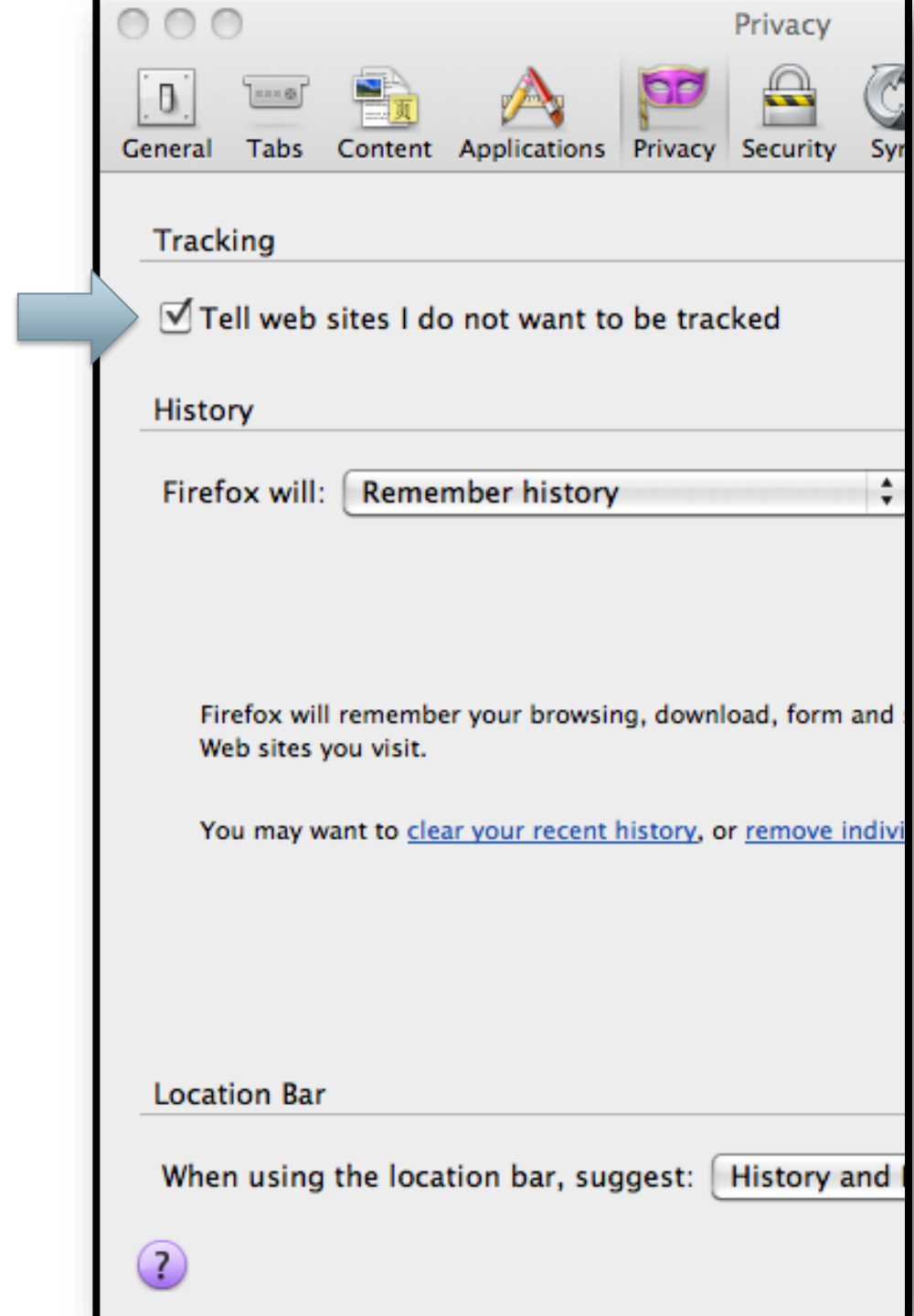
Advertising 10 Trackers 10 Blocked

- Amazon Associates
- ChartBeat
- Criteo
- DoubleClick
- Google Publisher Tags
- Krux-Digital
- NetRatings-SiteCensus
- Outbrain
- Rubicon
- ShareThrough

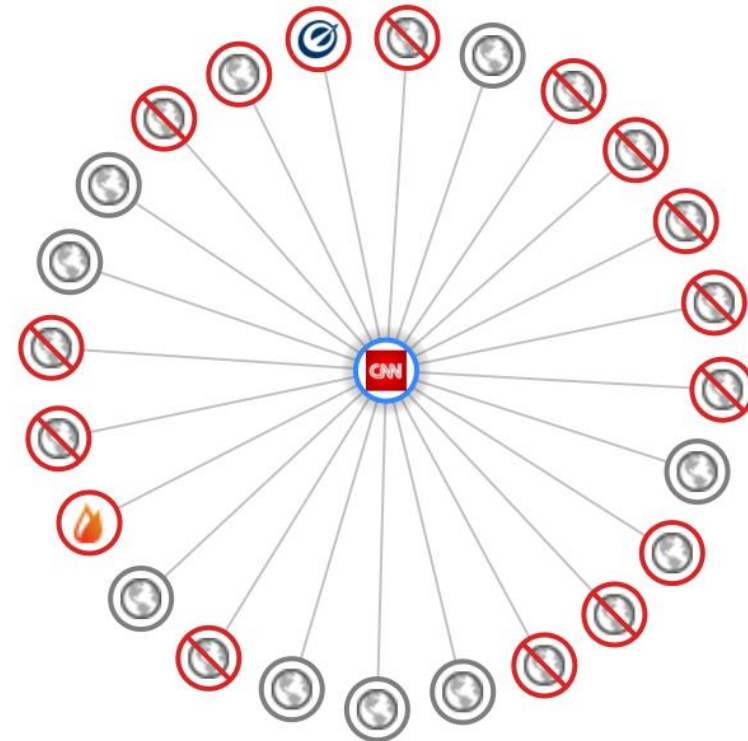
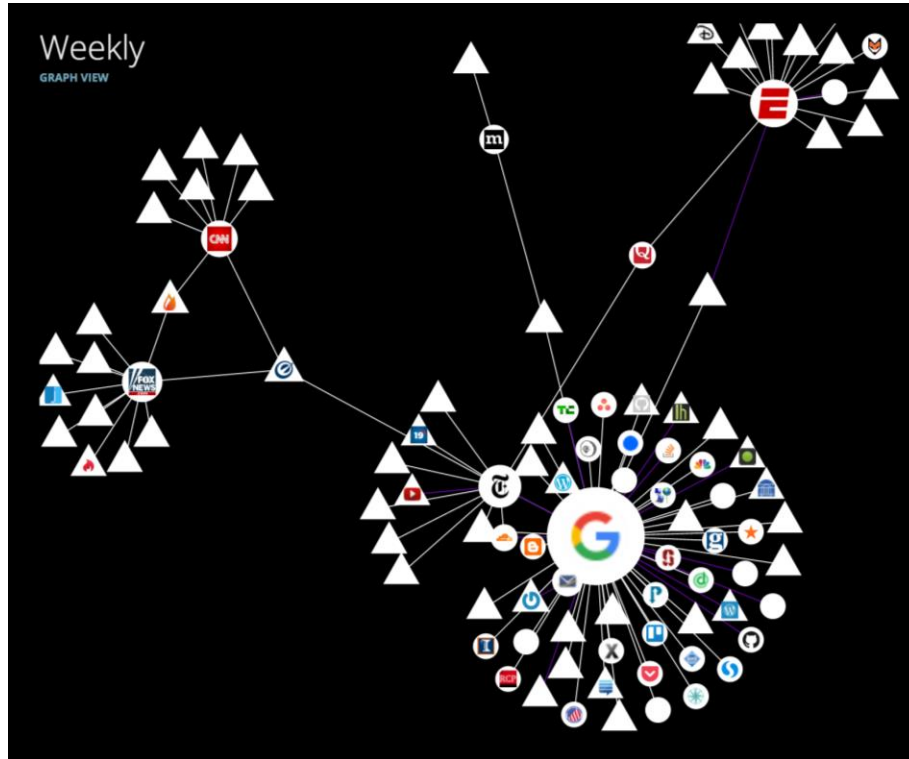
Site Analytics 2 Trackers 2 Blocked

Do not track

- W3C standard
- User checks a box
- Browser sends a “do not track” header to website
- Website stops “tracking”
- W3C working group tried to define what “stopping tracking” meant



Visualization: Connection Graphs



Tools to stop tracking, effective?

- Browser privacy settings
 - Cookie blocking
 - P3P
 - Tracking Protection Lists
 - Do Not Track
- Browser add-ons
- Opt-out cookies
- Digital Advertising Alliance (DAA) AdChoices icon and associated opt-out pages



DoNotTrackMe



(Our Group's) Tracking Transparency

The screenshot shows a Firefox browser window with three tabs: 'Debugging with Firefox Developer...', 'Tracking Transparency', and 'The New York Times - Breaking...'. The address bar shows 'https://www.nytimes.com'. The page content includes the New York Times logo, the date 'Friday, March 16, 2018', and a navigation menu with categories like 'World', 'U.S.', 'Politics', 'N.Y.', 'Business', 'Opinion', 'Tech', 'Science', 'Health', and 'Sports'. A prominent article headline reads 'Trump's Steel Tariffs Open Lobbying Floodgate' by ANA SWANSON and KENNETH P. A smaller article titled 'TRILOBITES' features a cartoon drawing of a person's head with handwritten notes: 'A FEW GREYS. (EXPERIENCED)' and 'LISTENS.'. Other article teasers for 'Controlled' by DANIEL McCARTHY and 'Elite' by SUSAN JACOBY are visible.

Tracking Transparency

On **The New York Times - Breaking ...**, there are **5 trackers**.

One of these trackers is **Google**, which knows about your activity on this page and **3829** others.

In total, **169 trackers** have seen you visit **12313 pages**. The Tracking Transparency extension has determined that these companies could have inferred your interest in **162 topics**.

Show me more about what the trackers know






(Our Group's) Tracking Transparency

The screenshot shows a web interface for Tracking Transparency. At the top is a dark red navigation bar with links for 'Tracking Transparency', 'Interests', 'Trackers', 'Sites', 'Activity', 'About', and a settings gear icon. Below the navigation is a 'Home' breadcrumb. The main content area features a section titled 'What are trackers and interests?' with a diagram. The diagram shows an eye icon representing tracking, followed by an arrow to a thumbs-up icon representing interests, and another arrow to three circular icons (paw print, magnifying glass, question mark) representing personalization. Below each icon is a text box explaining the concept. The bottom section is divided into three columns: 'Your Top Trackers' with a list of five items, 'Your Top Interests' with a list of five items, and a summary box with three statistics: 39 Trackers encountered, 7 Pages visited, and 6 Potential interests. Below the summary box are two columns: 'Recent Interests' and 'Recent Sites', each with a list of five items.

Tracking Transparency Interests Trackers Sites Activity About ⚙️

Home

What are *trackers* and *interests*?

 →  →   

When you browse online, your online activity can be tracked by ad networks and analytics companies.
We call these *trackers*.

These companies track your browsing to make guesses about what topics you might be interested in.
We call these topics *interests*.


Companies can personalize your online experience based on these interests.
Click on the circles above to learn more.


Your Top Trackers


- Google
- Chartbeat
- Optimizely
- Microsoft
- Amazon.com

Your Top Interests

- Law & Government
- Online Communities
- People & Society
- News
- Shopping

39  Trackers encountered

7  Pages visited

6  Potential interests

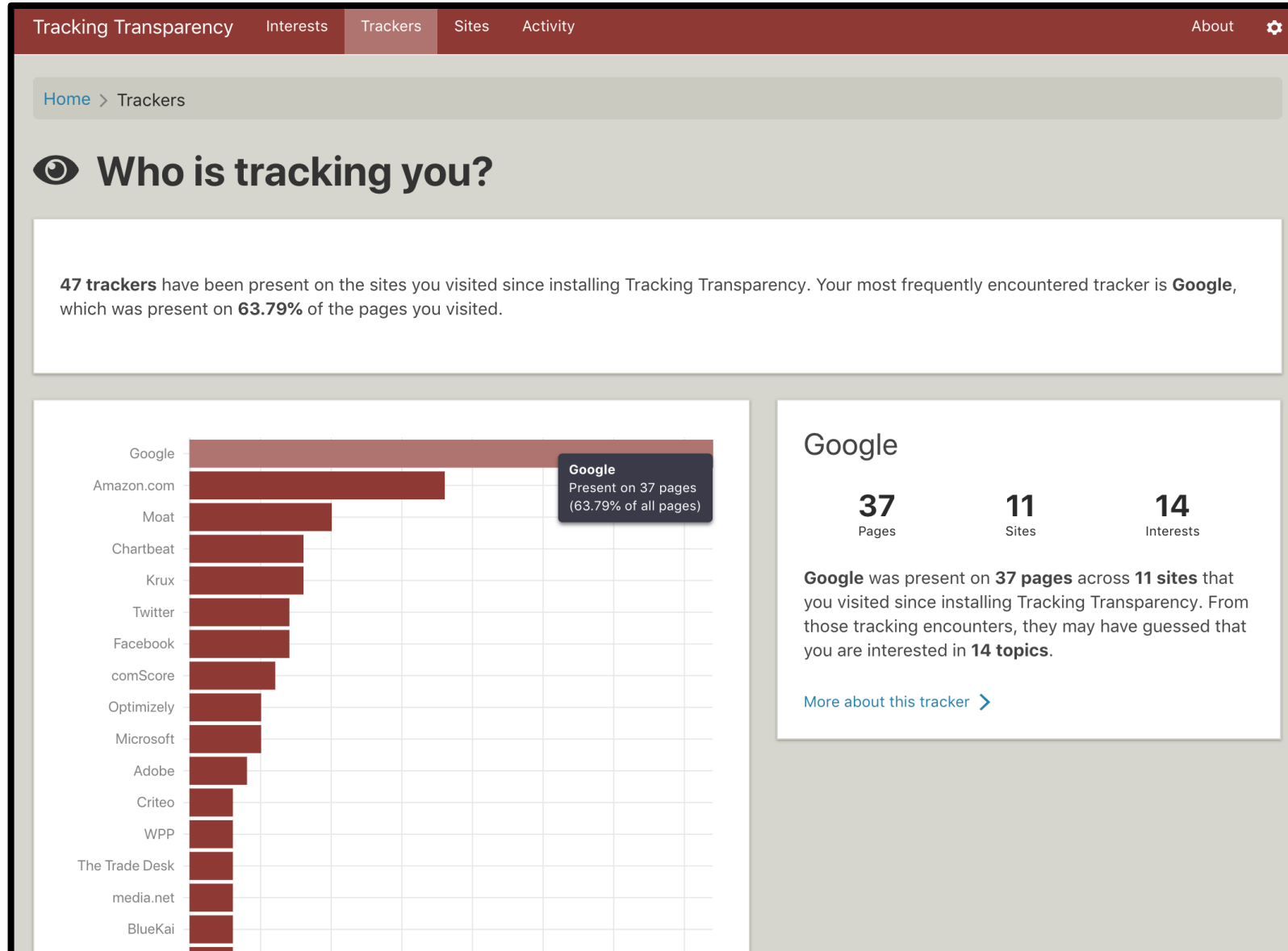
Recent Interests

- Law & Government
- Computers & Electronics
- Shopping
- News
- People & Society

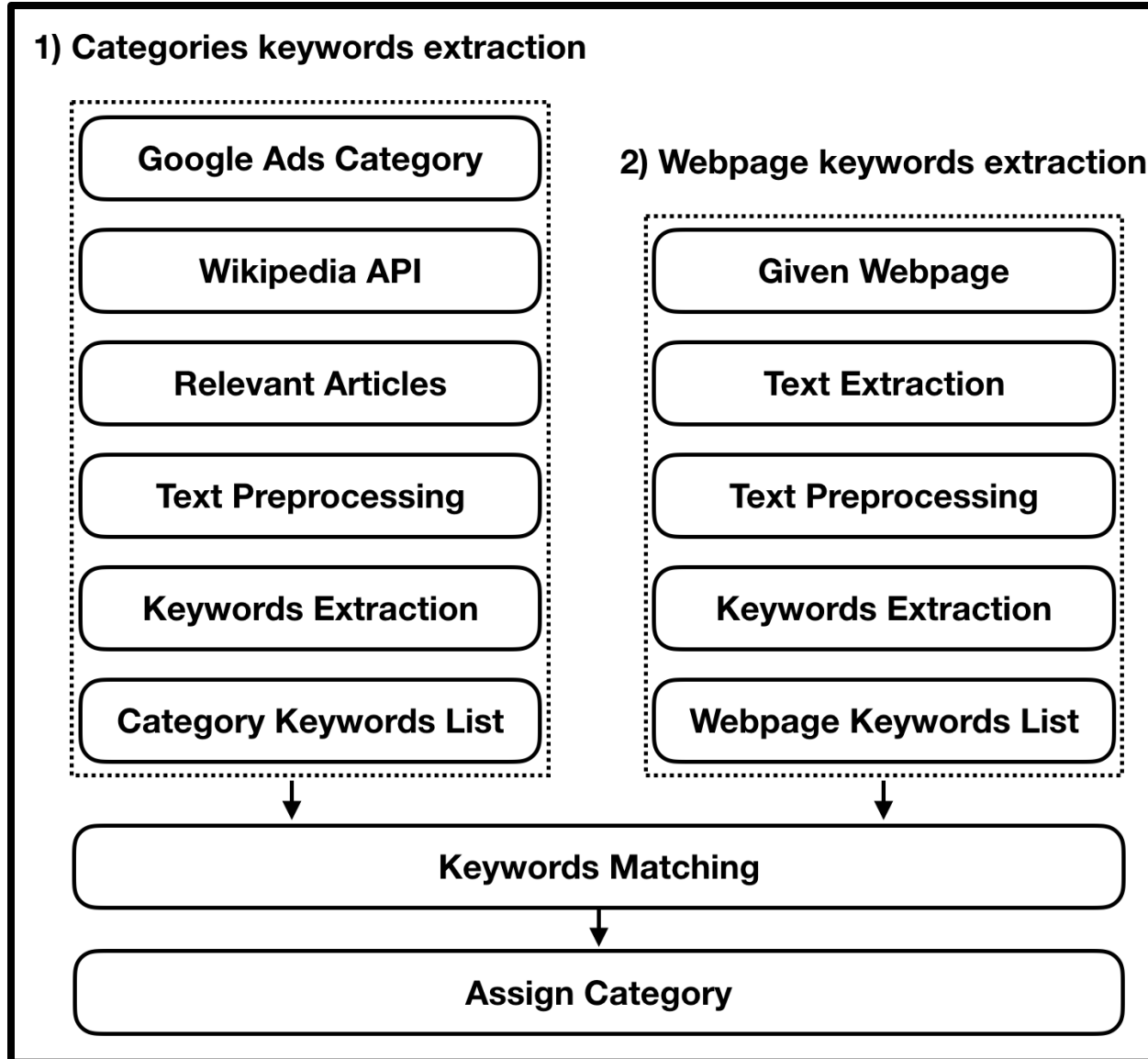
Recent Sites

- twitter.com
- eff.org
- amazon.com
- cnn.com
- nytimes.com

(Our Group's) Tracking Transparency



(Our Group's) Tracking Transparency



(Our Group's) Tracking Transparency

Tracking Transparency Interests Trackers Sites Activity About ⚙️


Home > Interests

👍 What interests might they think you have?

Trackers collect information about the pages you visit and use this information to identify topics, or *interests*, that might be relevant to you. These interests are then used to target ads to you and personalize what you see online. Companies don't usually reveal how they determine your potential interests. Based on the pages you visited, Tracking Transparency's simulations have identified **52 topics** trackers might think are relevant to you.

For example, you recently visited [theverge.com](#), which Tracking Transparency has determined may be about [News](#).

The chart below shows the interests suggested by your browsing activity. Click a slice of the chart to see more details.



Home Improvement

Home Improvement

1
Sites

8
Trackers

1 of the sites you visited were about Home Improvement. These sites contained a total of **8 trackers**.

Home Improvement is a **somewhat popular** interest.

Other people are often **somewhat comfortable** with having their interest in this topic being used to personalize their web experience.

[More about this interest >](#)

Filters

Recency ⓘ ALL 24 HRS 7 DAYS

Popularity ⓘ ALL LESS MORE

Comfort ⓘ ALL LESS MORE

Mozilla Firefox Protections Dashboard

