

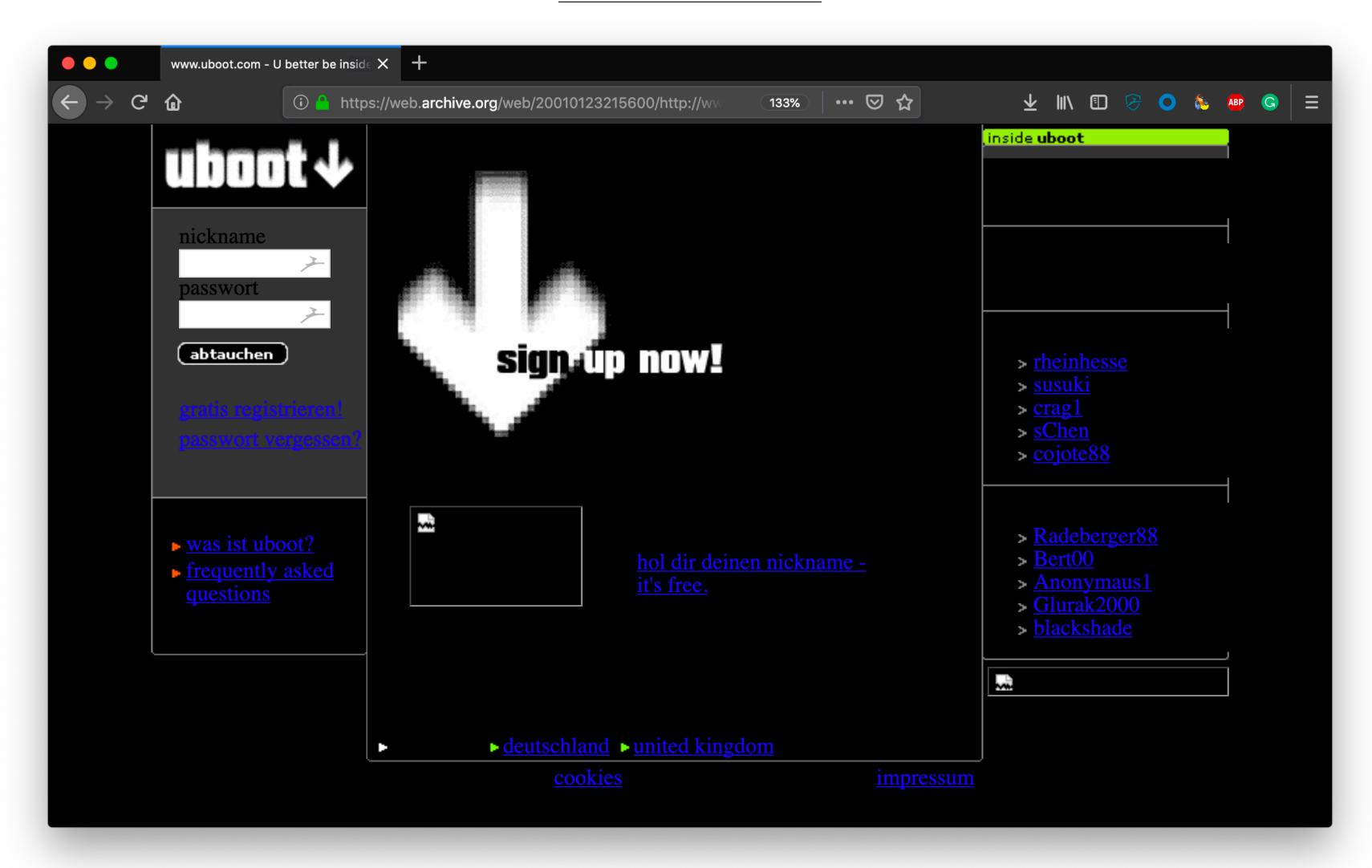
HTTP headers for the responsible developer

@stefanjudis

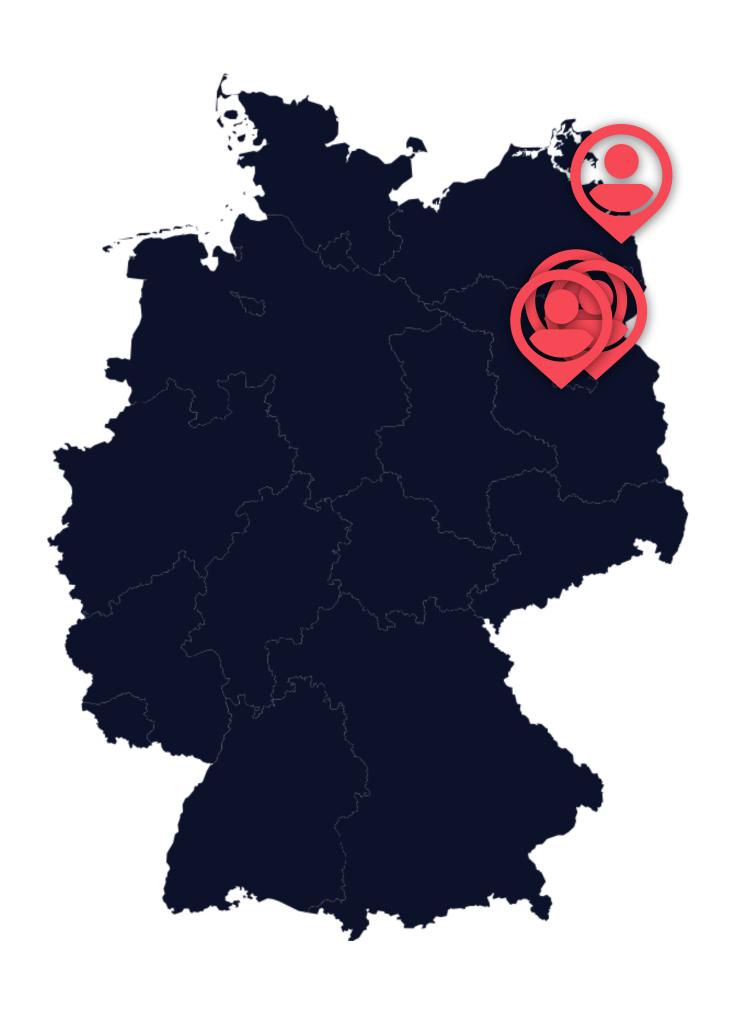


My journey on the web

uboot.com









The web connects people







The web connects people



We connect people!



We connect people! We enable people!



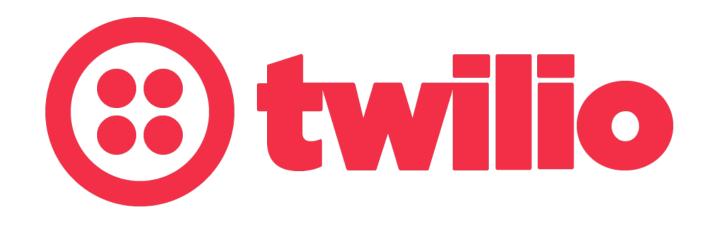
We connect people! We enable people! We help people!



Heyo, I'm Stefan!

@stefanjudis www.stefanjudis.com







... and I want to be a responsible developer



















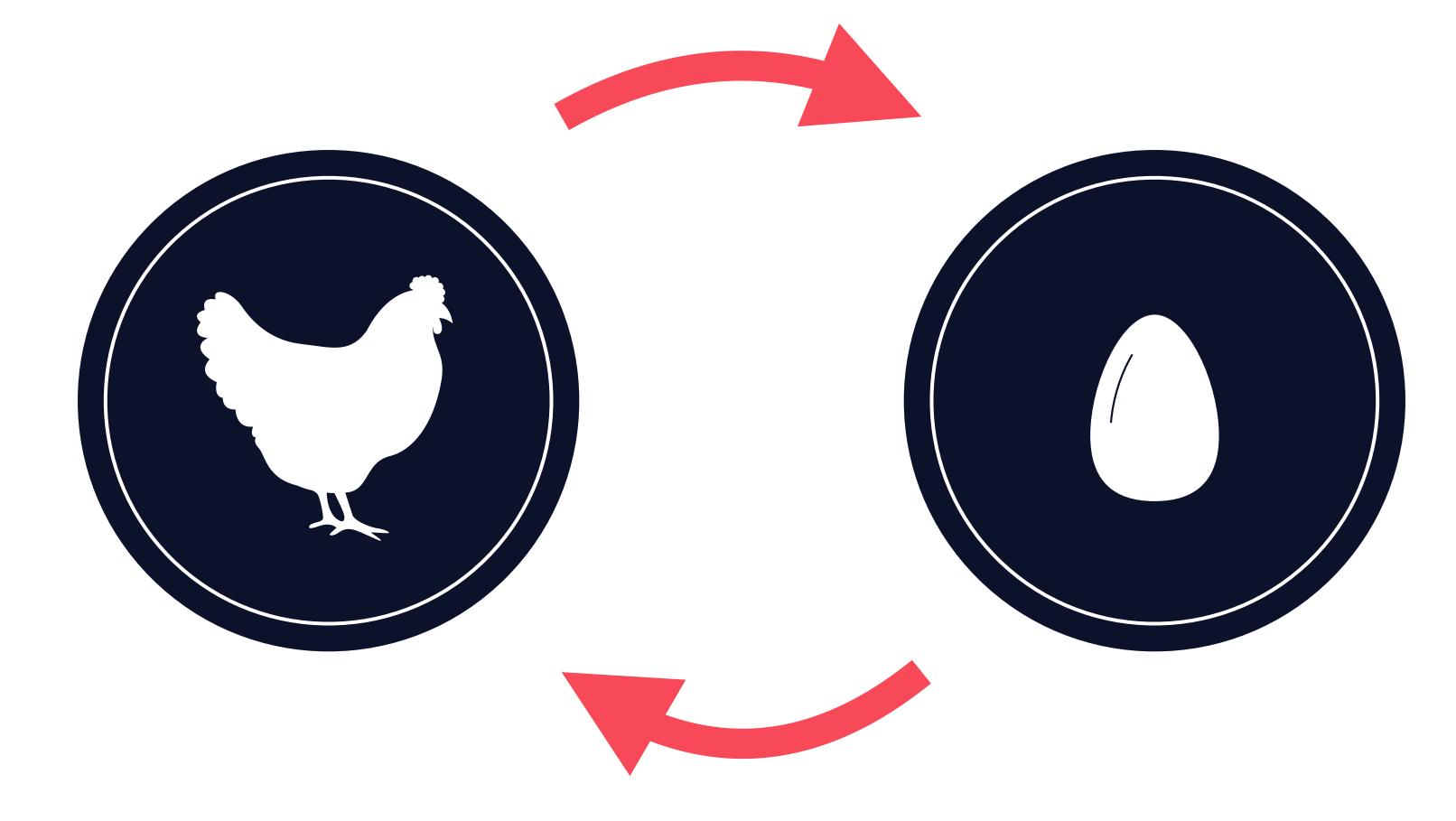






"We don't have users in/that ..."





"We don't have users in/that ..."



The challenge of building a "good" website







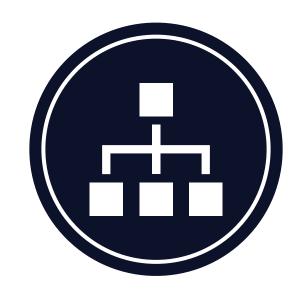


Content

Performance Accessibility







Network



Devices





Let's talk HTTP



https://the-responsible.dev/

```
Accept: text/html,application/xhtml+xml,application/xml
Accept-Encoding: gzip, deflate, br
Accept-Language: en-GB,en-US;q=0.9,en;q=0.8,de;q=0.7
...
```

Connection: keep-alive

Content-Type: text/html; charset=utf-8

Date: Mon, 11 Mar 2019 12:59:38 GMT

. . .

Response Body



https://the-responsible.dev/

```
Accept: text/html,application/xhtml+xml,application/xml Accept-Encoding: gzip, deflate, br Accept-Language: en-GB,en-US;q=0.9,en;q=0.8,de;q=0.7
```

Connection: keep-alive

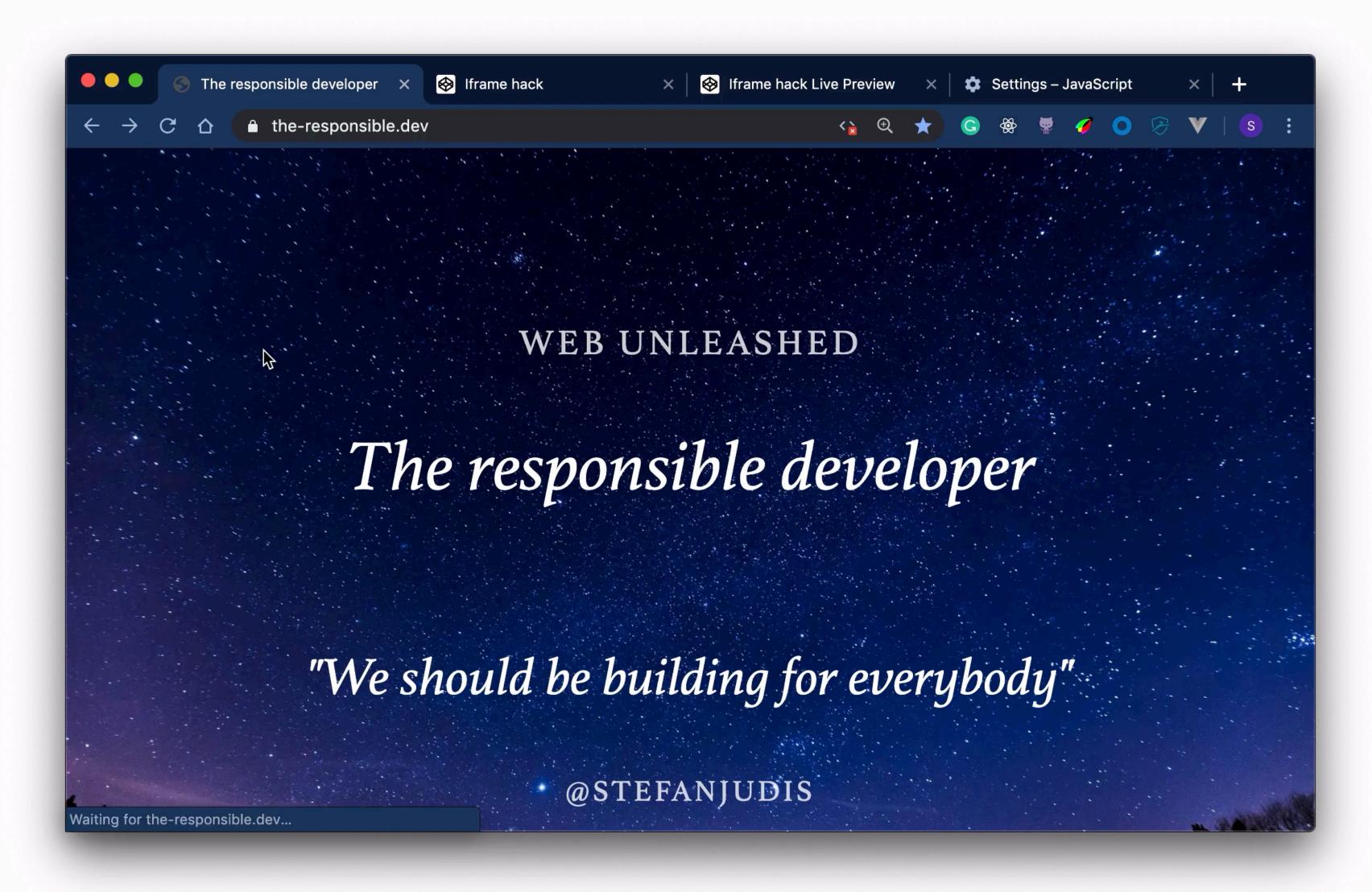
Content-Type: text/html; charset=utf-8

Date: Mon, 11 Mar 2019 12:59:38 GMT

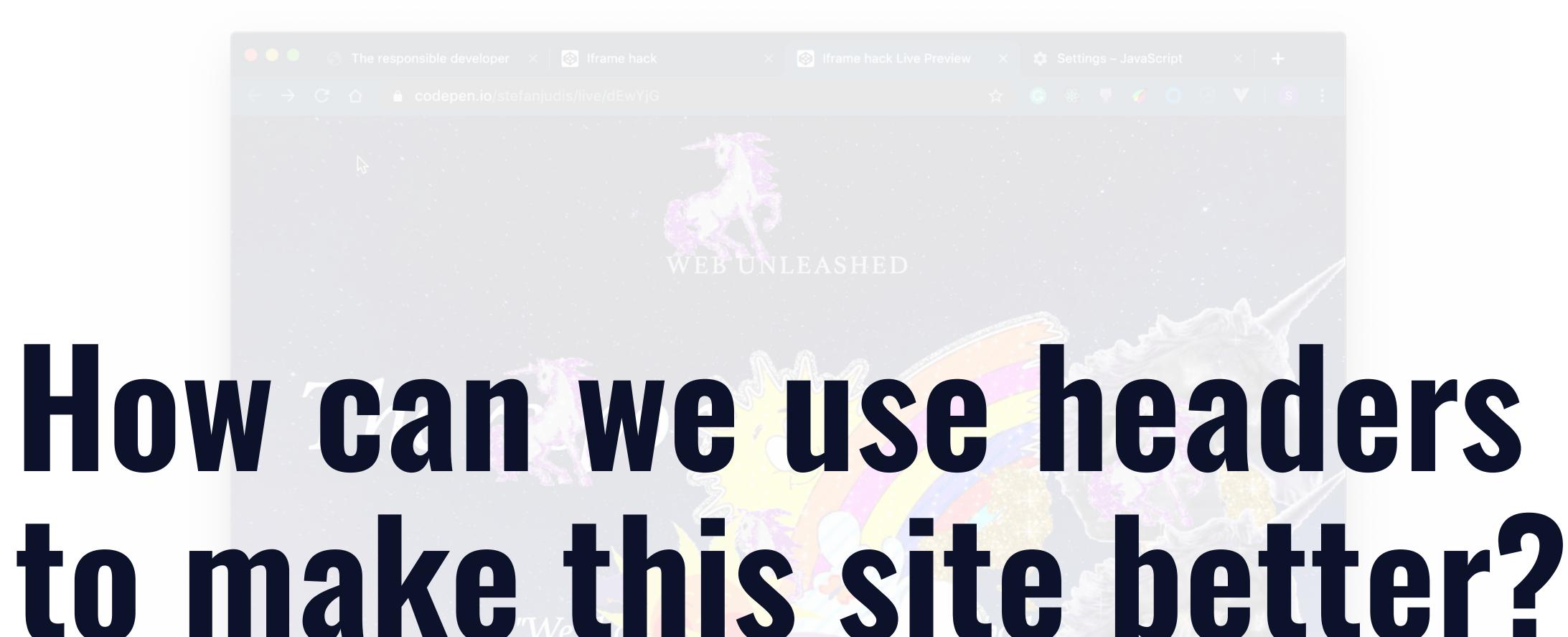
. . .

Response Body

the-responsible.dev



the-responsible.dev

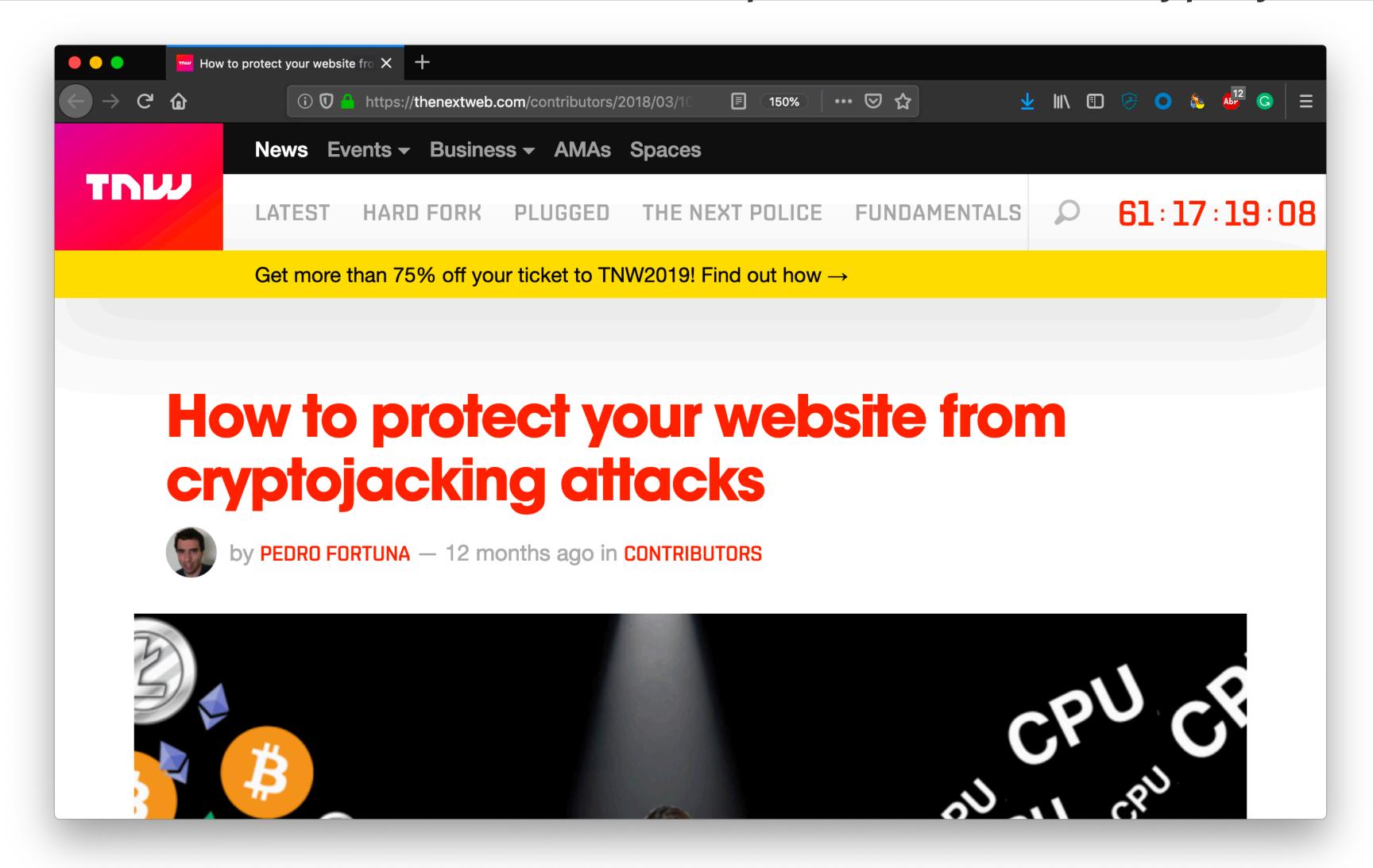


321 UNICOPINS & RAINBOWS CREATED

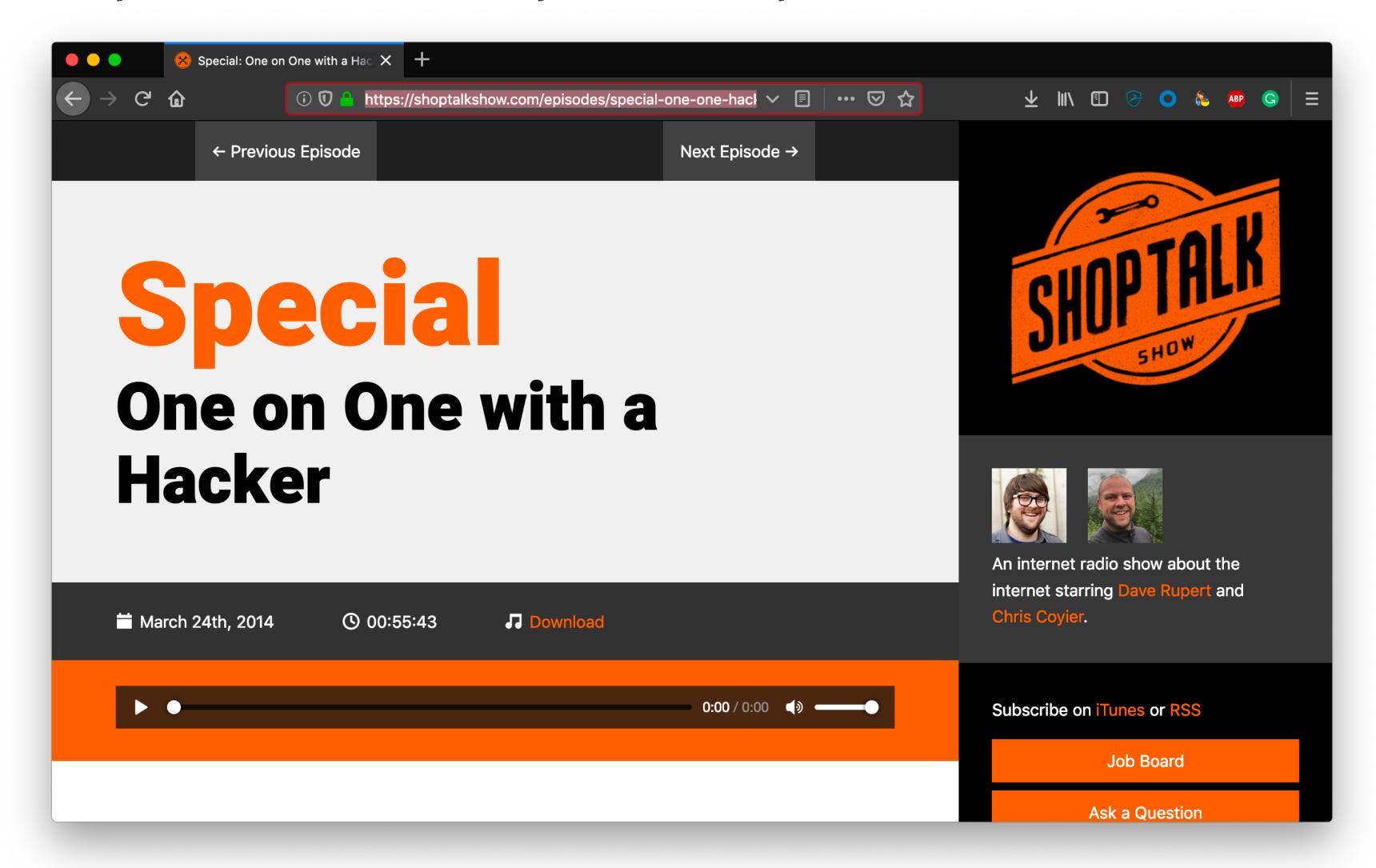


The web is a scary place

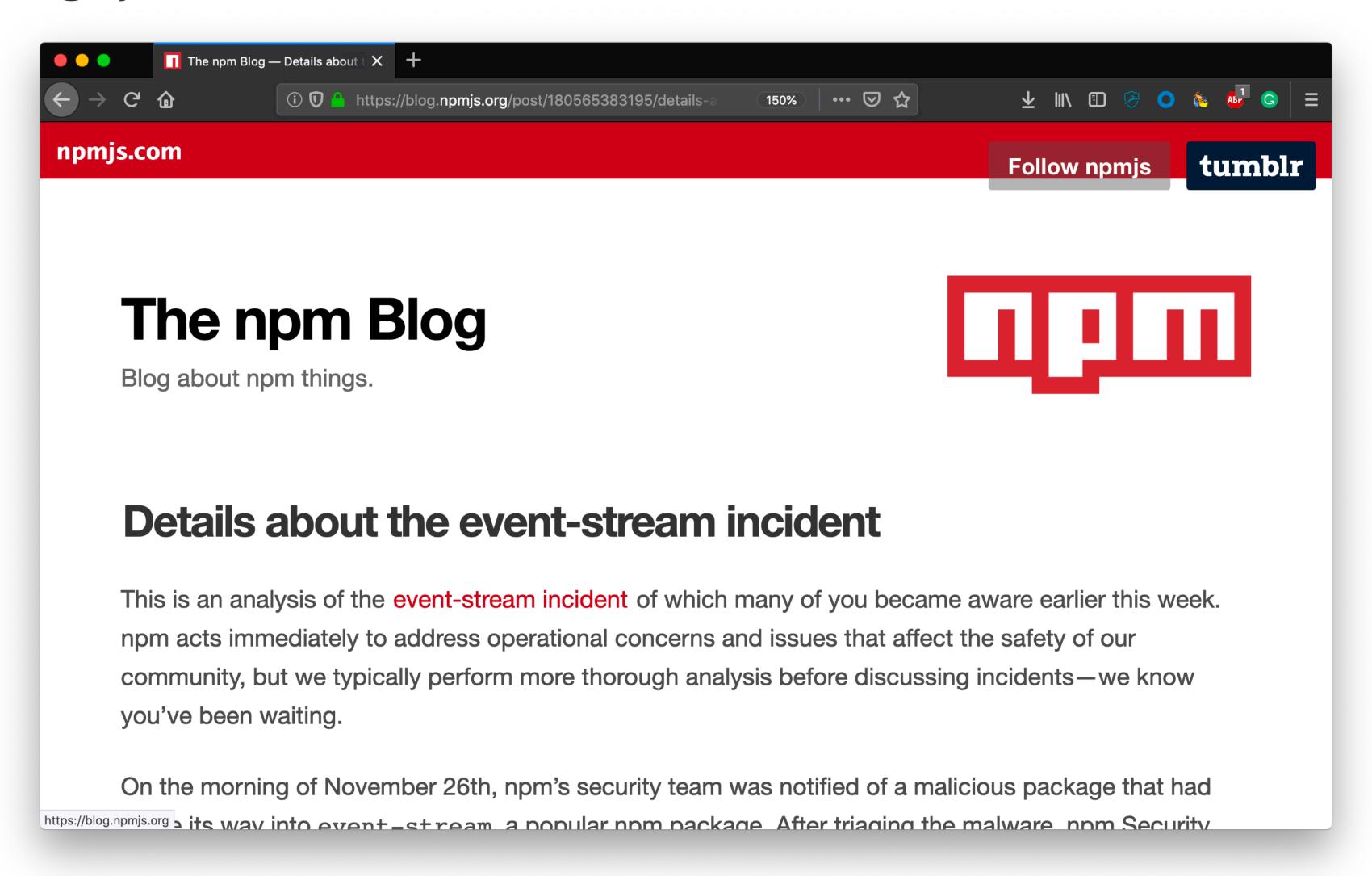
thenextweb.com/contributors/2018/03/10/protect-website-cryptojacking-attacks/



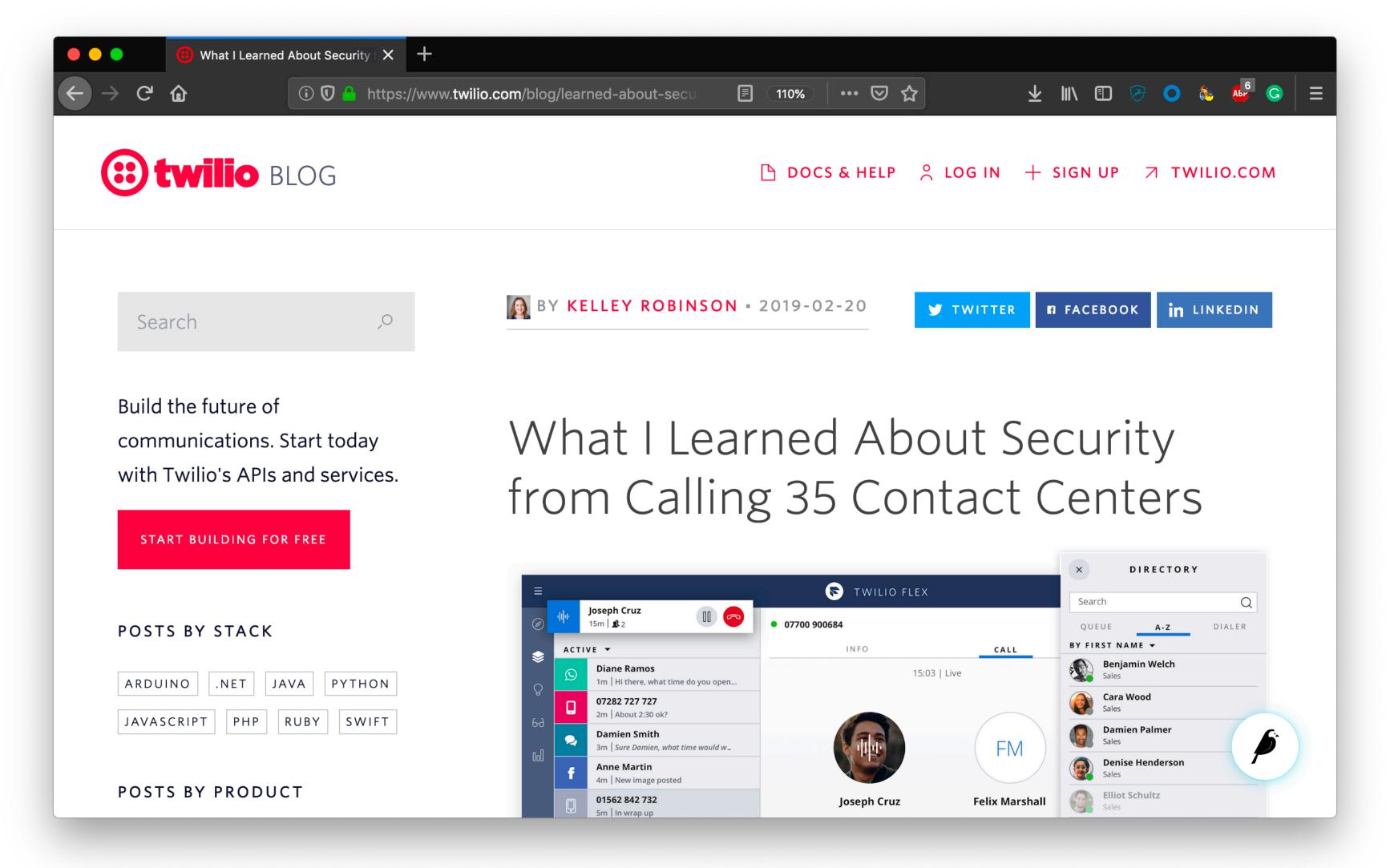
shoptalkshow.com/episodes/special-one-one-hacker/



blog.npmjs.org/post/180565383195/details-about-the-event-stream-incident



www.twilio.com/blog/learned-about-security-from-calling-35-contact-centers



www.twilio.com/blog/learned-about-security-from-calling-35-contact-centers

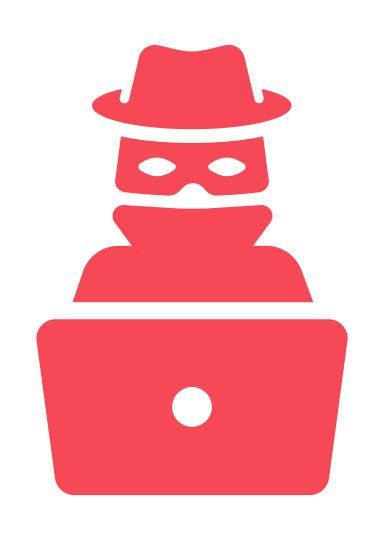




The web has to be safe!

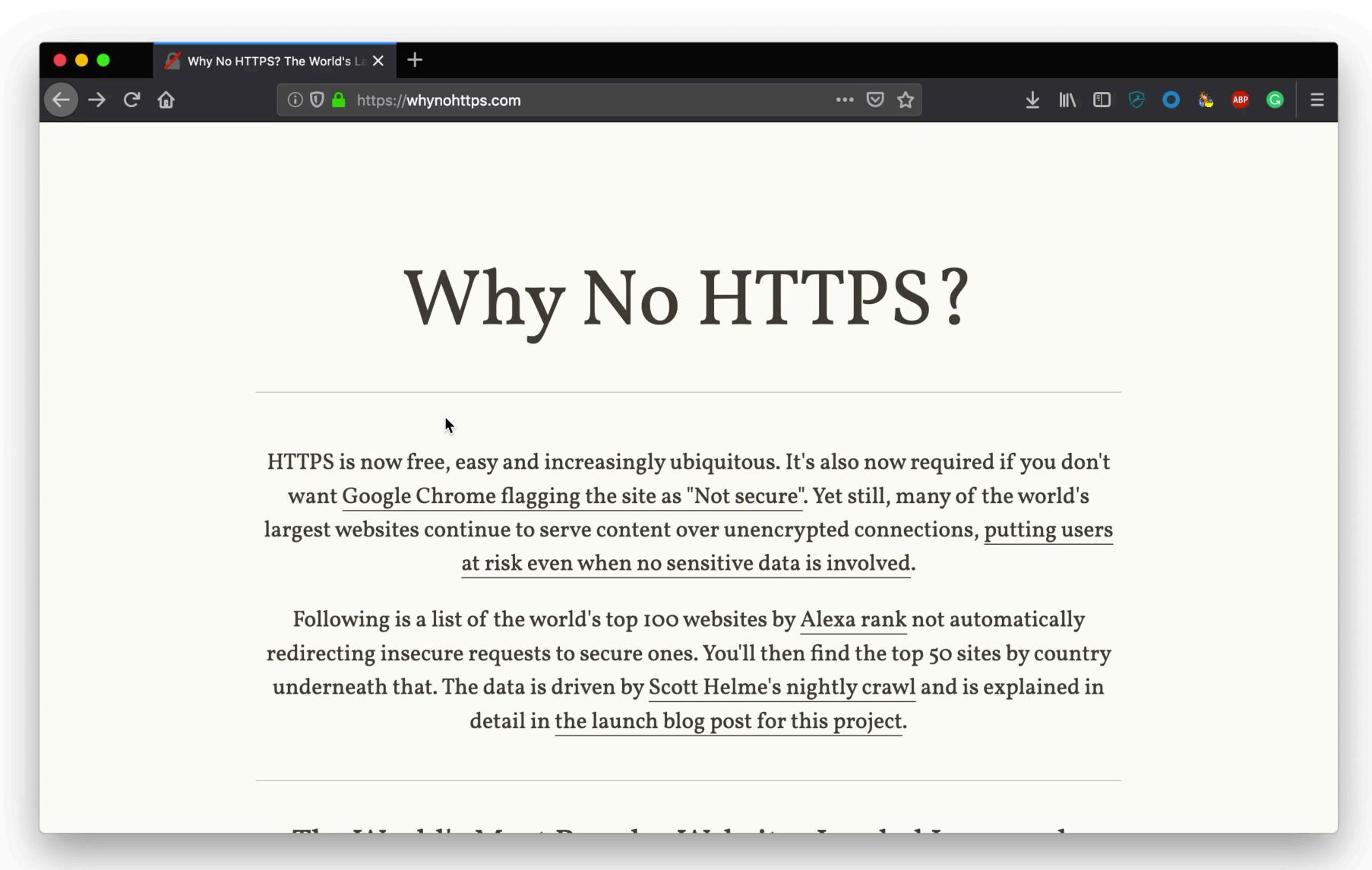






HTTP/2 ServiceWorker getUserMedia() ...

whynohttps.com



V

ARD.de®



Nachrichten



Nach Ankündigung von Zöllen

Trumps Drohung schockt Mexiko

Eigentlich war die Stimmung in Nordamerika gerade versöhnlich umso schockierter ist Mexiko von Trumps Zoll-Drohung. Präsident López Obrador schrieb einen zweiseitigen Brief. Von Anne-Katrin Mellmann. | mehr

Mexiko: Abschiebung statt Arbeitsvisum, 17.05.2019

Mexikos Antwort auf Trumps Strafzoll-Drohung | audio

Strafzölle für Mexiko: Trump könnte US-Autobauer treffen

Machtkampf in der SPD: Nahles wackelt

Bundesregierung will IS-Waisen zurückholen

Ärztetag positioniert sich klar in Sachen Impfpflicht

EU-Wahl: Finanzdebakel für rechtsextreme NPD

Neue Vorwürfe gegen Wirecard

Sport

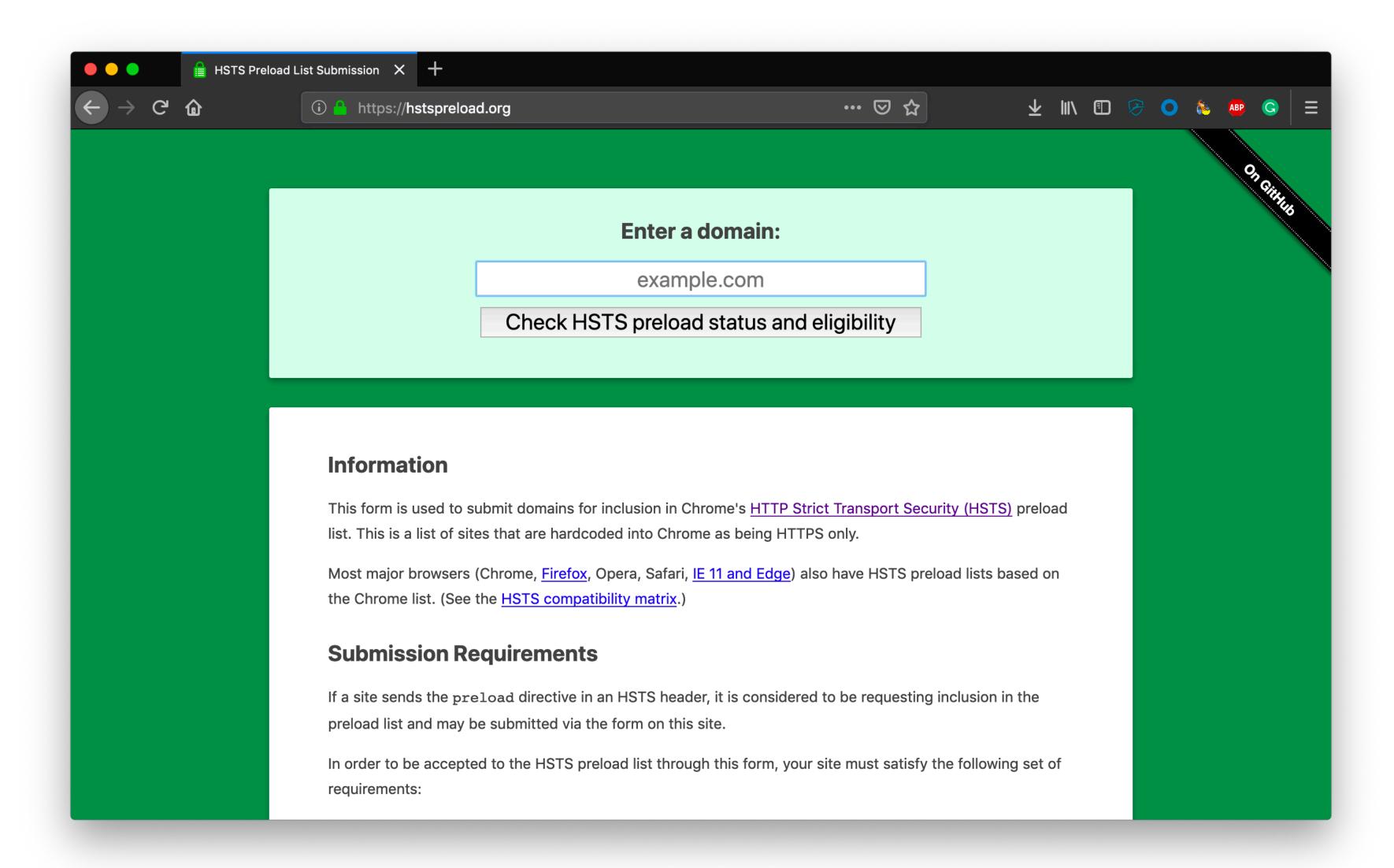


Ensure encryption



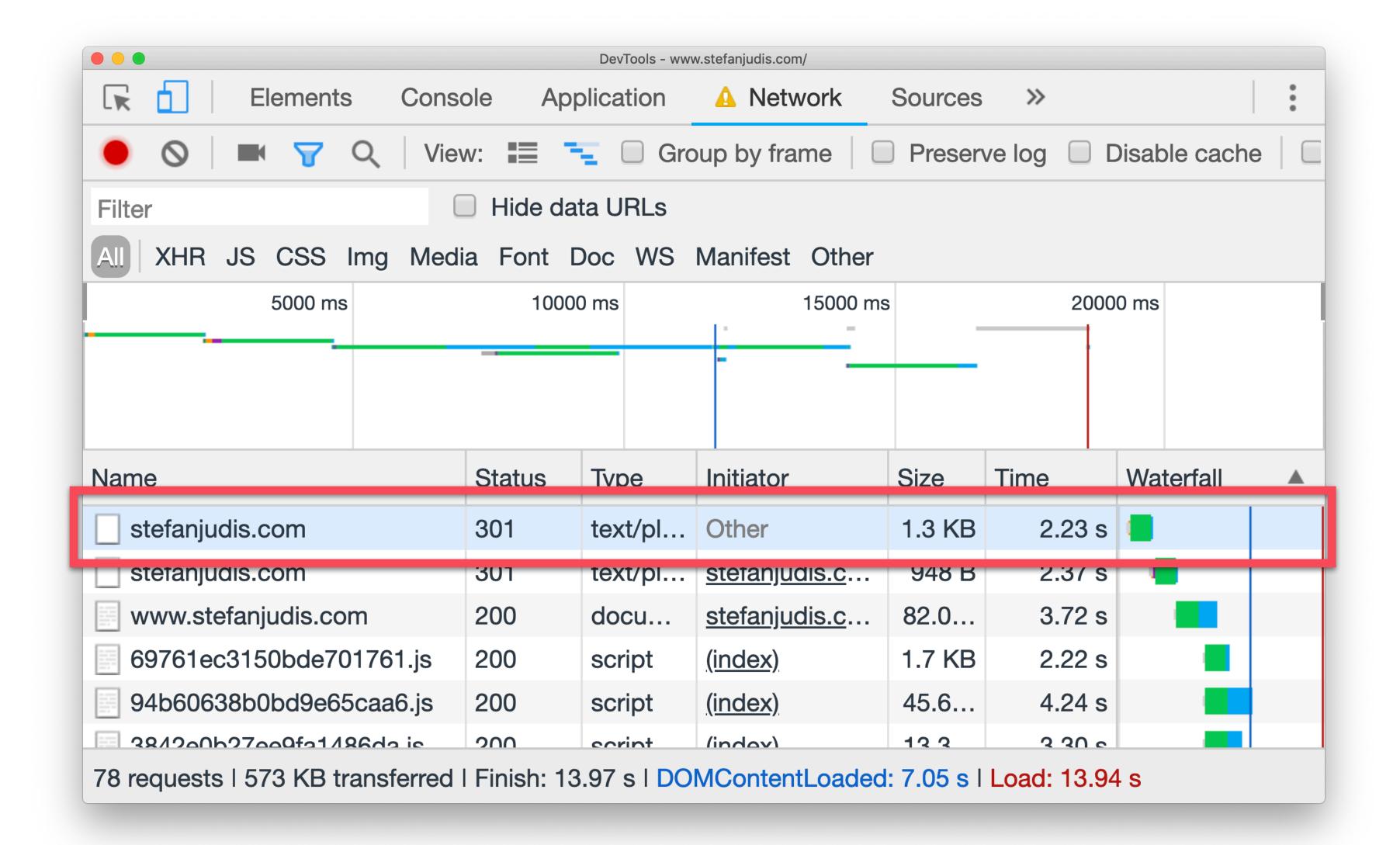
Strict-Transport-Security: max-age=1000; includeSubDomains; preload

hstspreload.org



<u>chromium.googlesource.com/chromium/src/net/+/master/http/</u> transport_security_state_static.json

```
transport_security_state_static.json — chromium
          transport_security_state_static.json ×
          net ▶ http ▶ {} transport_security_state_static.json ▶ ...
            235
                         "report_uri": "https://cspreports.srvcs.tumblr.com/hpkp"
            236
            237
            238
            239
            240
                       "entries": [
                        // gTLDs and eTLDs are welcome to preload if they are interested.
            241
                       { "name": "android", "policy": "public-suffix", "mode": "force-htt
            242
 (%)
            243
                       { "name": "app", "policy": "public-suffix", "mode": "force-https",
                       { "name": "bank", "policy": "public-suffix", "mode": "force-https'
            244
                       { "name": "chrome", "policy": "public-suffix", "mode": "force-http
            245
                       { "name": "dev", "policy": "public-suffix", "mode": "force-https"
            246
                       { "name": "foo", "policy": "public-suffix", "mode": "force-https"
            247
                       { "name": "gle", "policy": "public-suffix", "mode": "force-https"
            248
                       { "name": "google", "policy": "public-suffix", "mode": "force-http
            249
                       { "name": "insurance", "policy": "public-suffix", "mode": "force-h
            250
                       { "name": "new", "policy": "public-suffix", "mode": "force-https"
            251
                       { "name" · "nage" "nolicy" · "nublic-suffix" · "mode" · "force-https
                 🗴 53 🛕 0 Ln 245, Col 29 Spaces: 2 UTF-8 LF JSON Prettier
```



caniuse.com/#feat=stricttransportsecurity





Upgrade HTTP requests

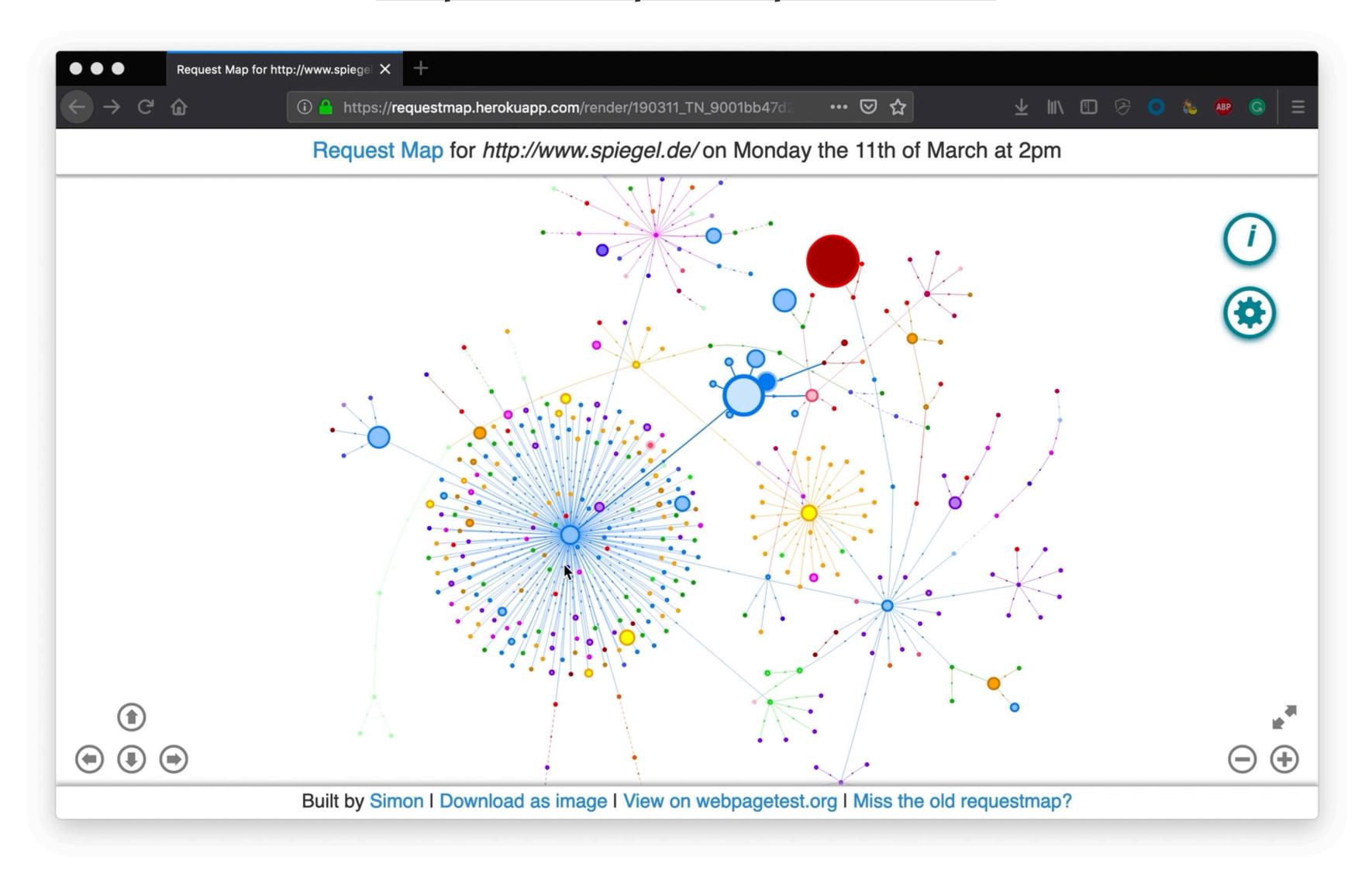


Content-Security-Policy: upgrade-insecure-requests



Limit what's allowed

requestmap.webperf.tools



developer.mozilla.org/en-US/docs/Web/HTTP/CSP

base-uri img-src report-to

block-all-mixed-content manifest-src require-sri-for

connect-src media-src sandbox

default-src navigate-to script-src

font-src object-src strict-dynamic

form-action plugin-types style-src

frame-ancestors prefetch-src worker-src

frame-src report-sample upgrade-insecure-requests

developer.mozilla.org/en-US/docs/Web/HTTP/CSP

base-uri img-src report-to

block-all-mixed-content manifest-src require-sri-for

connect-src media-src sandbox

default-src navigate-to script-src

font-src object-src strict-dynamic

form-action plugin-types style-src

frame-ancestors <u>prefetch-src</u> worker-src

frame-src <u>report-sample</u> upgrade-insecure-requests



```
<meta http-equiv="Content-Security-Policy"
content="default-src 'self'; img-src https://*;">
```

Content-Security-Policy: default-src 'self'; script-src 'self' 'unsafeinline' 'unsafe-eval' just-comments.com www.google-analytics.com production-assets.codepen.io storage.googleapis.com; style-src 'self' 'unsafe-inline'; img-src 'self' data: images.contentful.com images.ctfassets.net www.gravatar.com www.google-analytics.com justcomments.com; font-src 'self' data:; connect-src 'self' cdn.contentful.com images.contentful.com videos.contentful.com images.ctfassets.net videos.ctfassets.net service.just-comments.com www.google-analytics.com; media-src 'self' videos.contentful.com videos.ctfassets.net; object-src 'self'; frame-src codepen.io; frameancestors 'self'; worker-src 'self'; block-all-mixed-content; manifest-src 'self' 'self'; disown-opener; prefetch-src 'self'; report-uri https:// stefanjudis.report-uri.com/r/d/csp/reportOnly

Content-Security-Policy-Report-Only: default-src 'self'; script-src 'self' 'unsafe-inline' 'unsafe-eval' just-comments.com www.googleanalytics.com production-assets.codepen.io storage.googleapis.com; style-src 'self' 'unsafe-inline'; img-src 'self' data: images.contentful.com images.ctfassets.net www.gravatar.com www.google-analytics.com justcomments.com; font-src 'self' data:; connect-src 'self' cdn.contentful.com images.contentful.com videos.contentful.com images.ctfassets.net videos.ctfassets.net service.just-comments.com www.google-analytics.com; media-src 'self' videos.contentful.com videos.ctfassets.net; object-src 'self'; frame-src codepen.io; frameancestors 'self'; worker-src 'self'; block-all-mixed-content; manifest-src 'self' 'self'; disown-opener; prefetch-src 'self'; report-uri https:// stefanjudis.report-uri.com/r/d/csp/reportOnly

Content-Security-Policy-Report-Only: default-src 'self'; script-src 'self' 'unsafe-inline' 'unsafe-eval' just-comments.com www.googleanalytics.com production-assets.codepen.io storage.googleapis.com; style-src 'self' 'unsafe-inline'; img-src 'self' data: images.contentful.com images.ctfassets.net www.gravatar.com www.google-analytics.com justcomments.com; font-src 'self' data:; connect-src 'self' cdn.contentful.com images.contentful.com videos.contentful.com images.ctfassets.net videos.ctfassets.net service.just-comments.com www.google-analytics.com; media-src 'self' videos.contentful.com videos.ctfassets.net; object-src 'self'; frame-src codepen.io; frameancestors 'self'; worker-src 'self'; block-all-mixed-content; manifest-src 'self' 'self'; disown-opener; prefetch-src 'self'; report-uri https:// stefanjudis.report-uri.com/r/d/csp/reportOnly

Content-Security-Policy-Report-Only: default-src 'self'; script-src 'self' 'unsafe-inline' 'unsafe-eval' just-comments.com www.googleanalytics.com production-assets.codepen.io storage.googleapis.com; style-src 'self' 'unsafe-inline'; img-src 'self' data: images.contentful.com images.ctfassets.net www.gravatar.com www.google-analytics.com justcomments.com; font-src 'self' data:; connect-src 'self' cdn.contentful.com images.contentful.com videos.contentful.com images.ctfassets.net videos.ctfassets.net service.just-comments.com www.google-analytics.com; media-src 'self' videos.contentful.com videos.ctfassets.net; object-src 'self'; frame-src codepen.io; frameancestors 'self'; worker-src 'self'; block-all-mixed-content; manifest-src 'self' 'self'; disown-opener; prefetch-src 'self'; report-uri https:// stefanjudis.report-uri.com/r/d/csp/reportOnly



```
Content-Security-Policy:
   default-src 'self';
   script-src 'sha256-blL...'
```

```
<script>
  console.log('Inline script executing ...');
</script>
```



```
Content-Security-Policy:
   default-src 'self';
   script-src 'nonce-abc...'
```

```
<script nonce="abcdef">
  console.log('Inline script executing ...');
</script>
```

caniuse.com/#feat=contentsecuritypolicy

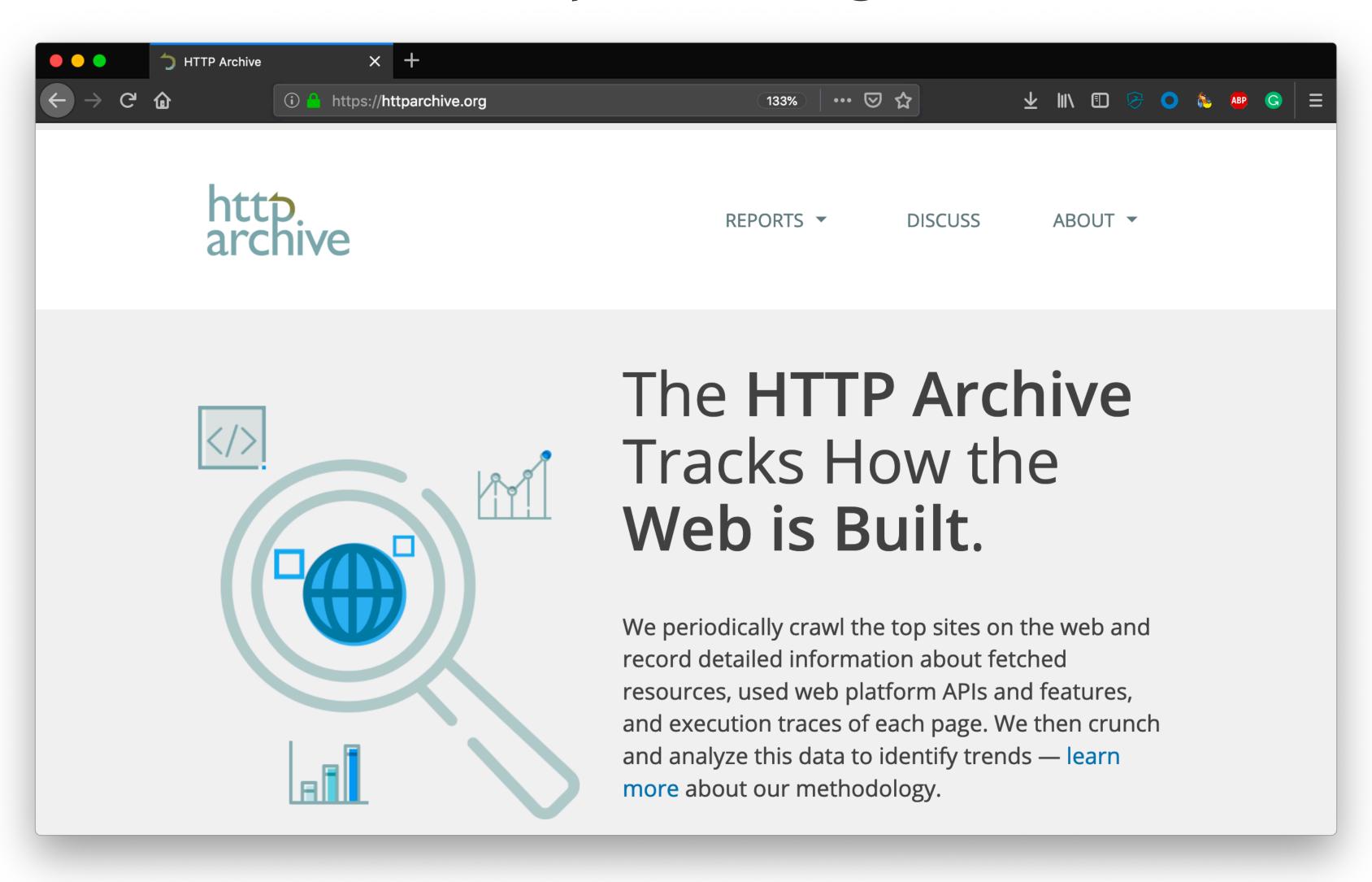


caniuse.com/#feat=contentsecuritypolicy2



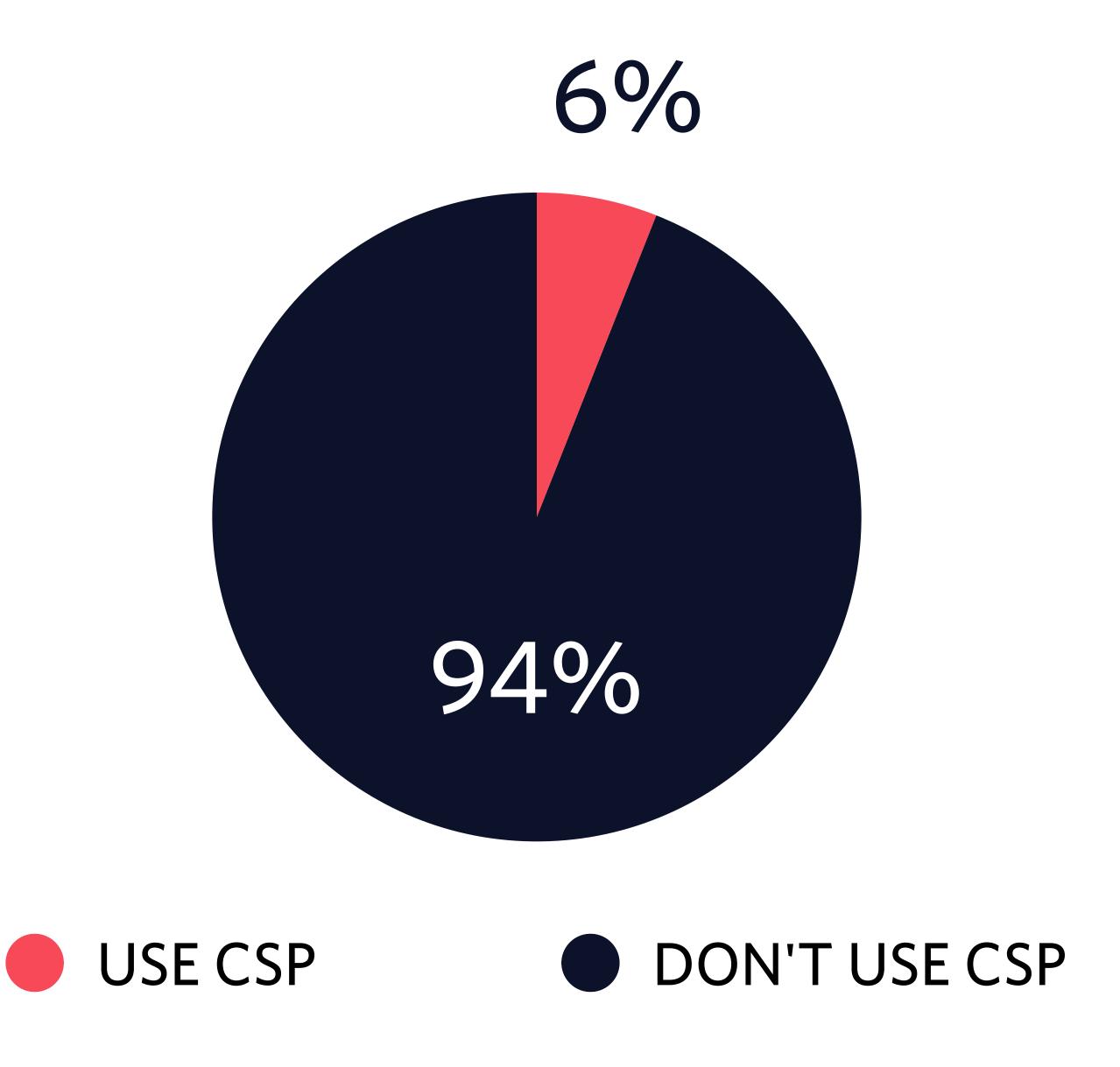
* not complete

httparchive.org





How many pages use CSP?



We can do better!







Always monitor your CSP reports and "test in production" with report-only before enforcing them!

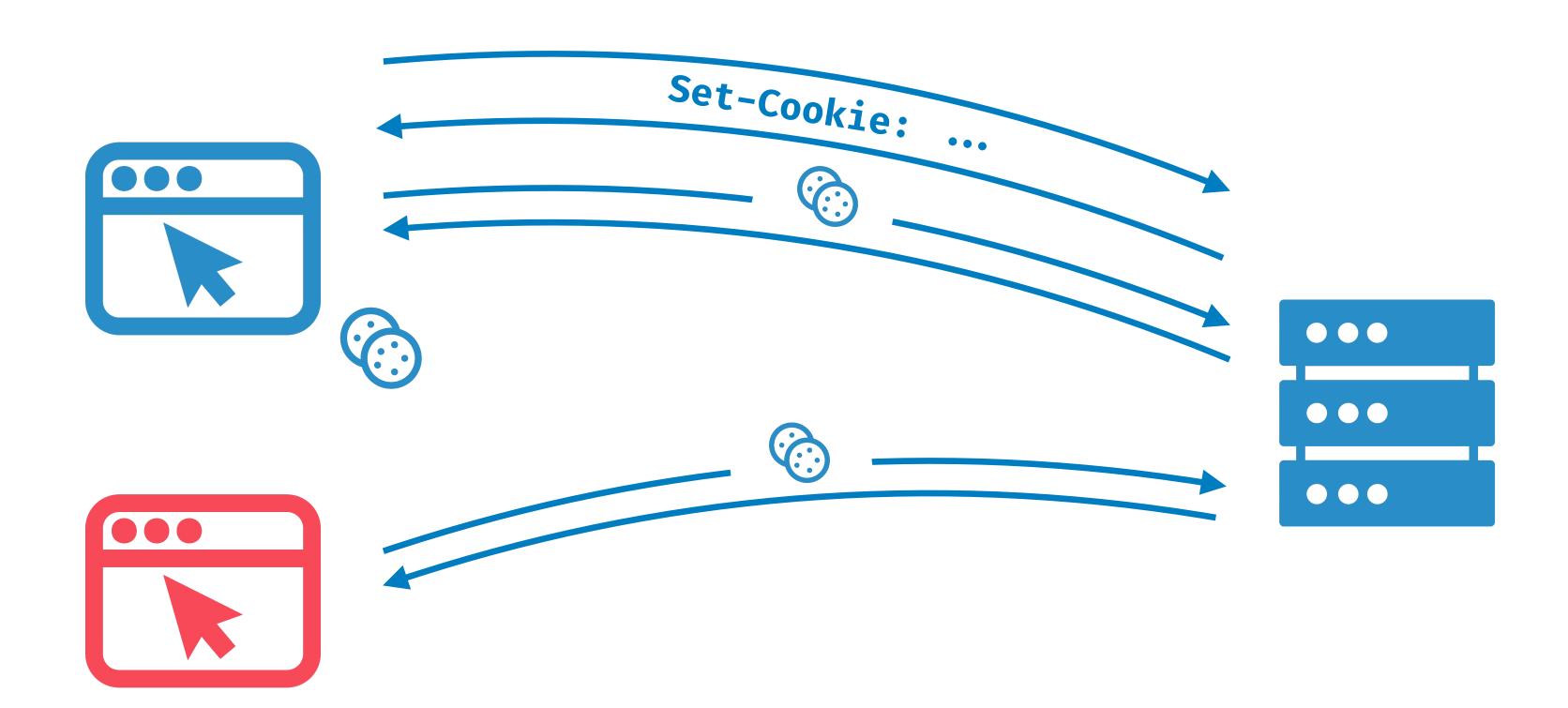
Troy Hunt



Disallow third-party cookies!



Set-Cookie: widget_session=abc123;





Set-Cookie: widget_session=abc123;

This behaviour leads to security and privacy concerns



Set-Cookie: widget_session=abc123; SameSite=None; Secure

Set-Cookie: widget_session=abc123; SameSite=Lax; Secure

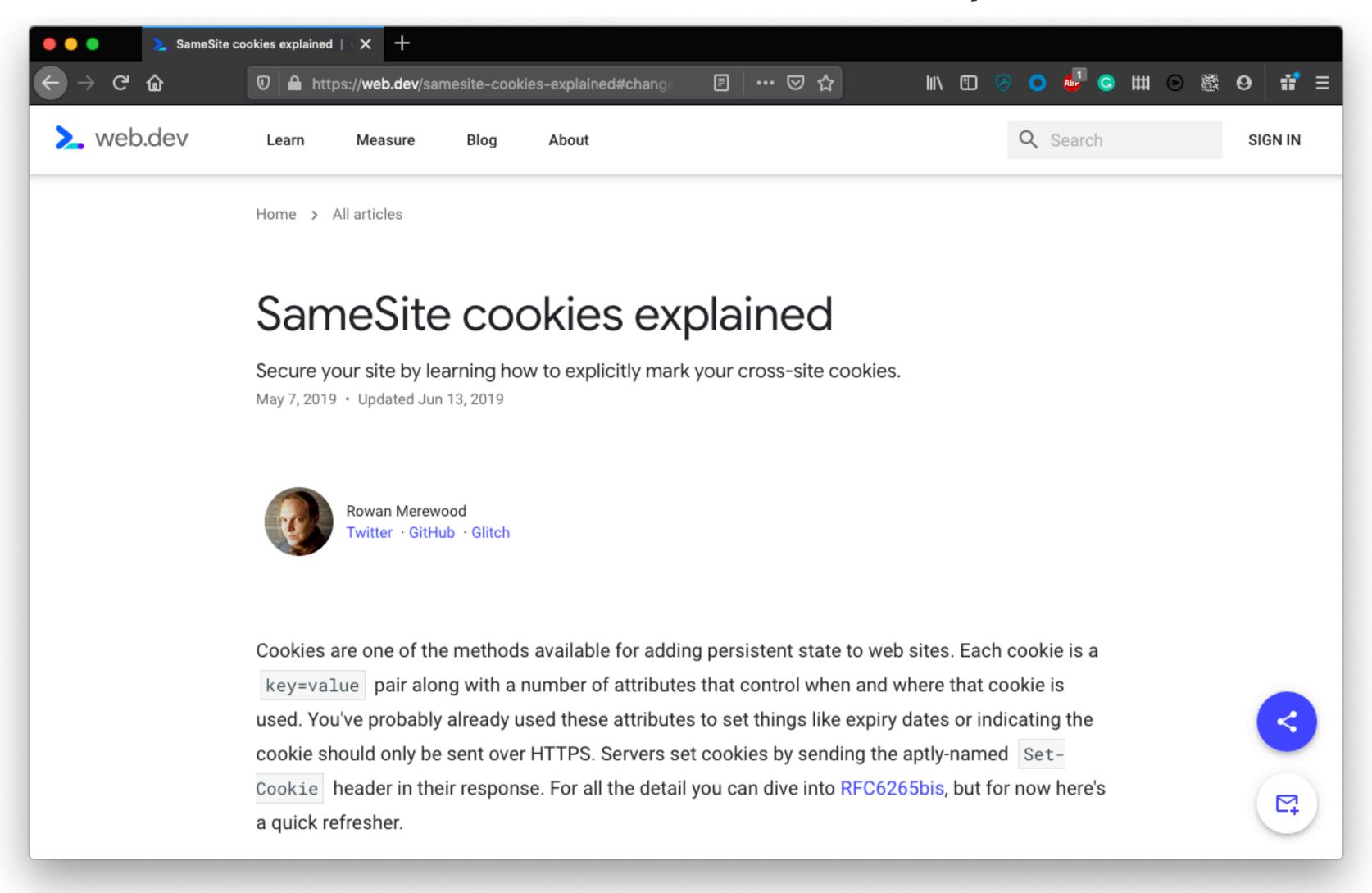
Set-Cookie: widget_session=abc123; SameSite=Strict; Secure

caniuse.com/#feat=same-site-cookie-attribute

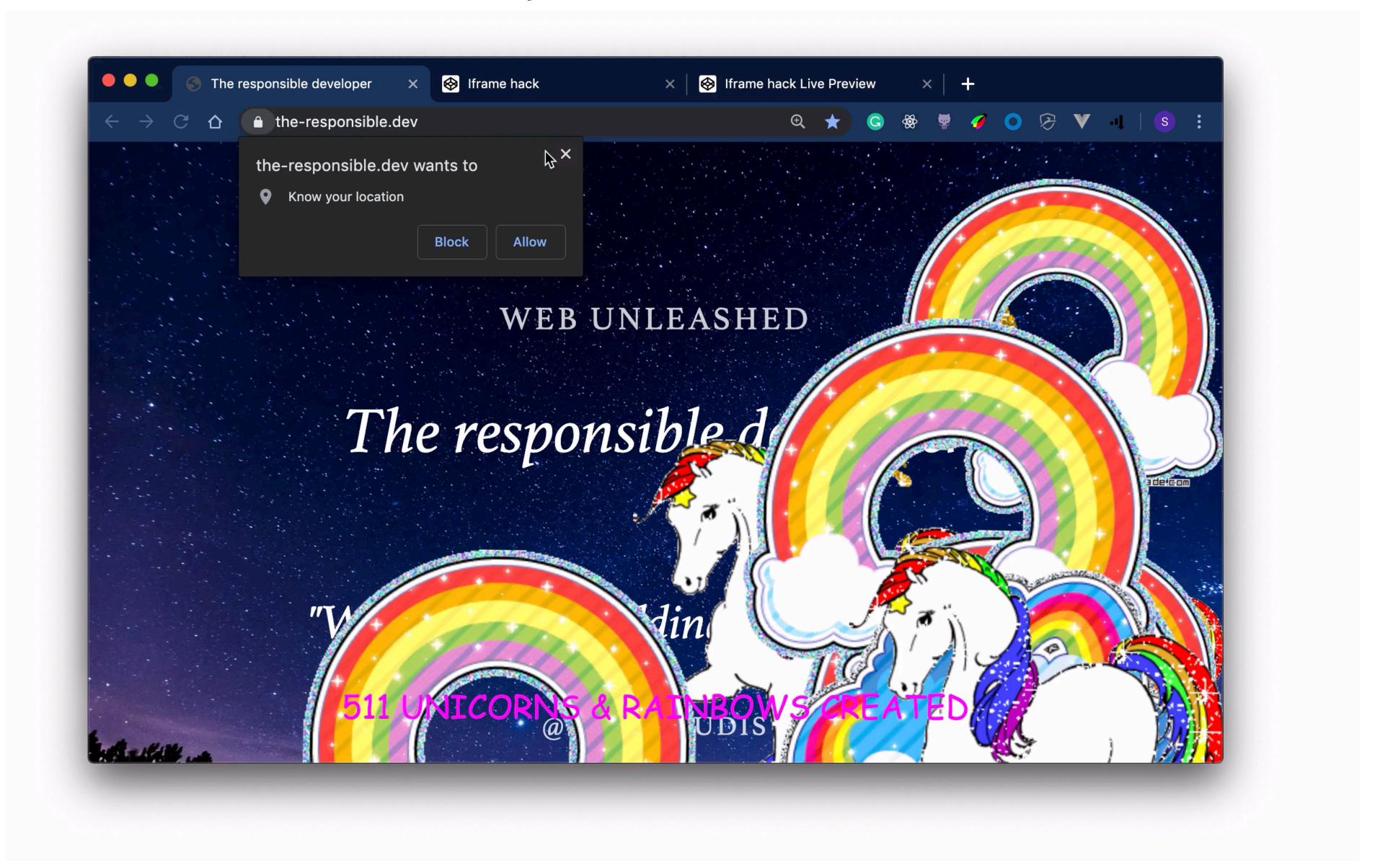


* somewhat ready but maybe buggy

web.dev/samesite-cookies-explained



the-responsible.dev/safe/





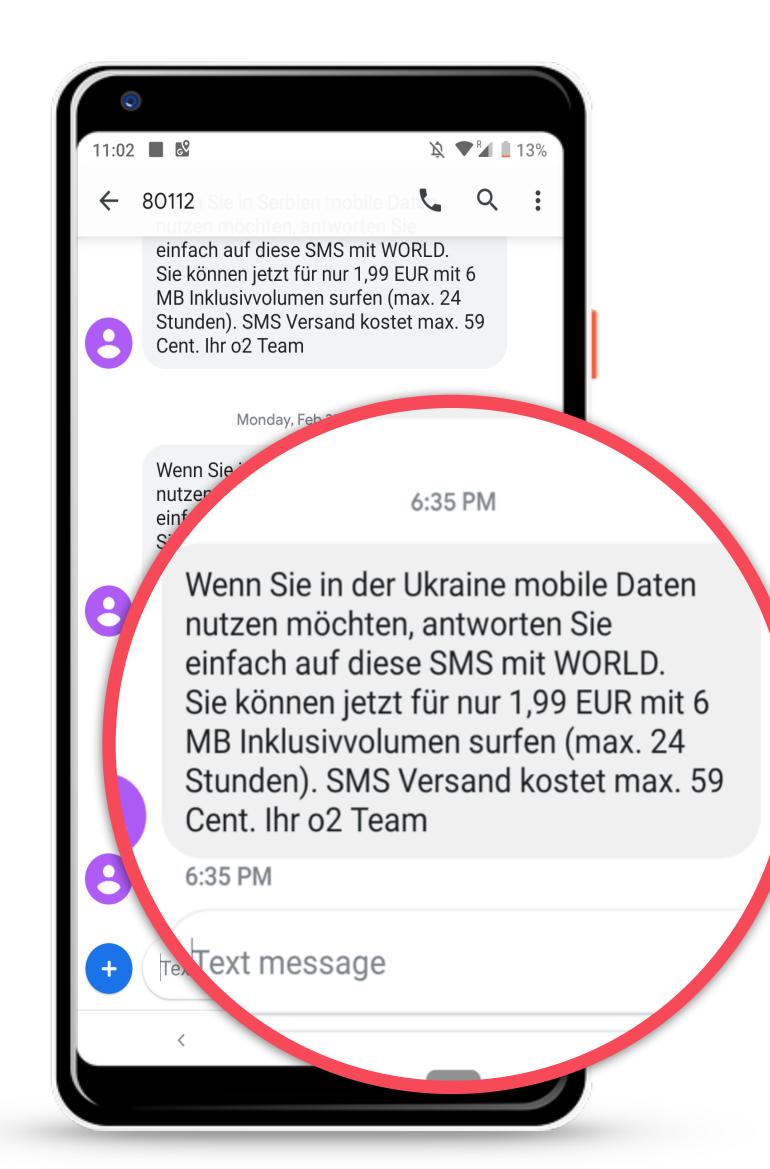
The web is crucial for people.



Your sh** doesn't work in Africa.

William Imoh

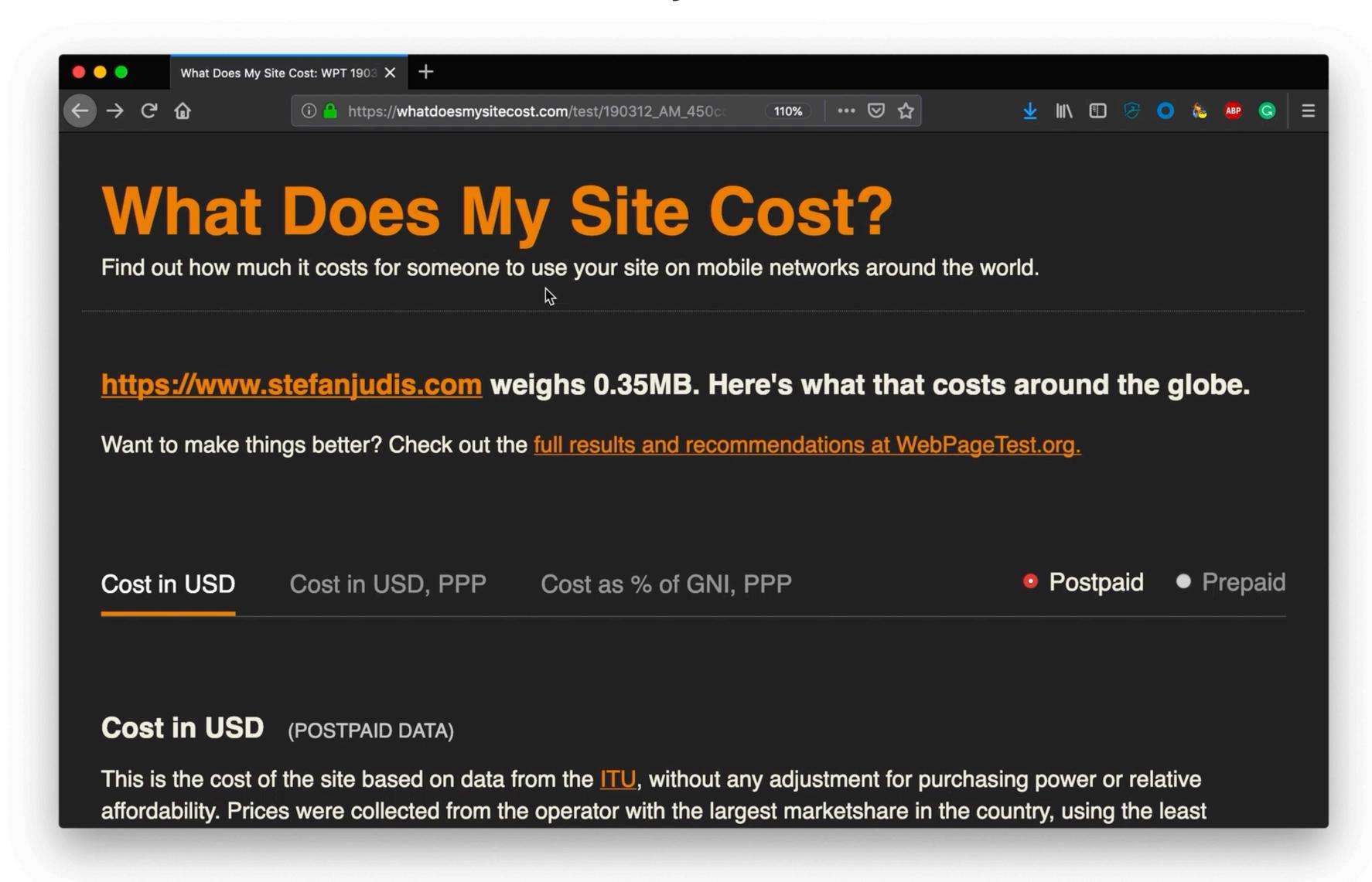








whatdoesmysitecost.com





The web has to be affordable!



Don't request the same content over and over again



Cache-Control: max-age=31536000, public



Cache-Control:

max-age=31536000, public, <u>immutable</u>

immutable developer.mozilla.org/en-US/docs/Web/HTTP/ Headers/Cache-Control



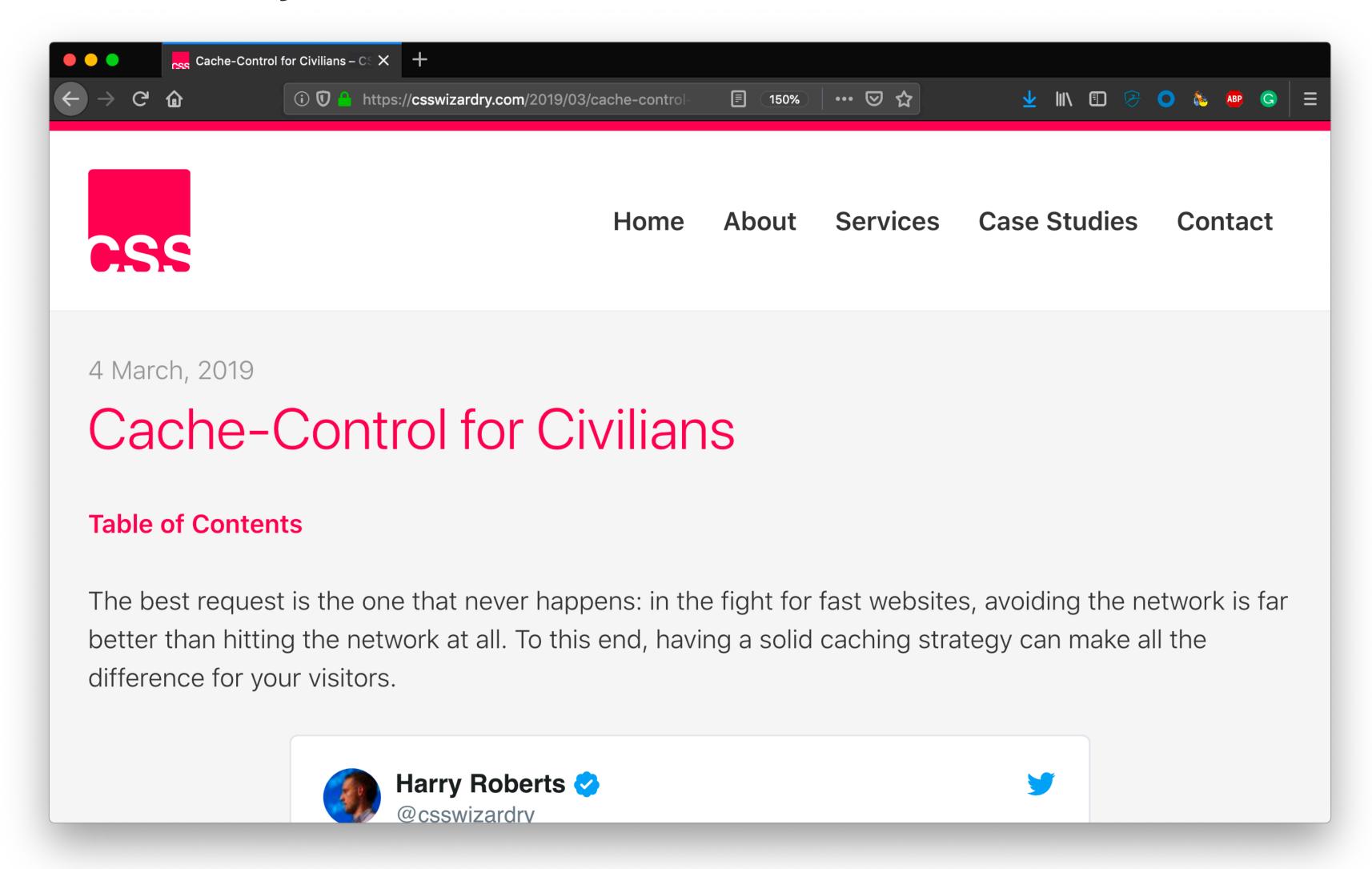








csswizardry.com/2019/03/cache-control-for-civilians/

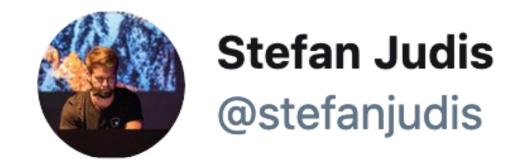




Send the right data



Accept-Encoding: gzip, deflate, br



I love these kind of stats.



A reduction of 9KB for the shipped JavaScript on Wikipedia's scale will lead to 1.4 Terrabytes that don't need to go over the wire.

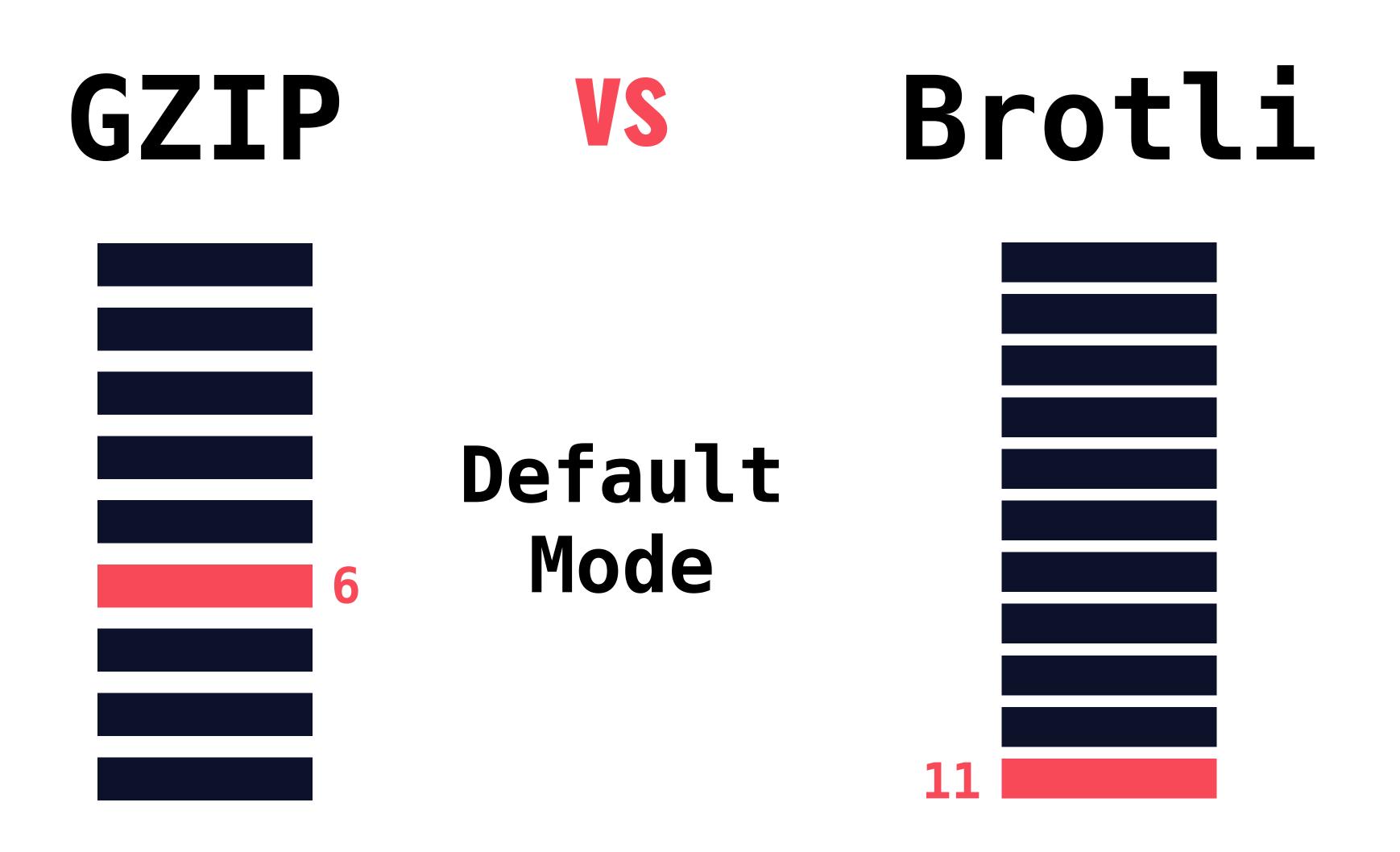
phabricator.wikimedia.org/phame/live/7/p...

Tweet übersetzen

We have around 363,000 page views a minute in total on Wikipedia and sister projects. That's 21.8M an hour, or 523 million every day (User pageview stats). This week's deployment saves around 1.4 Terabytes a day. In total, the year-long effort is saving rabytes a day of bandwidth on our users' page views.

But Brotli Compression is so slow!





Brotli GZIP VS Default Mode

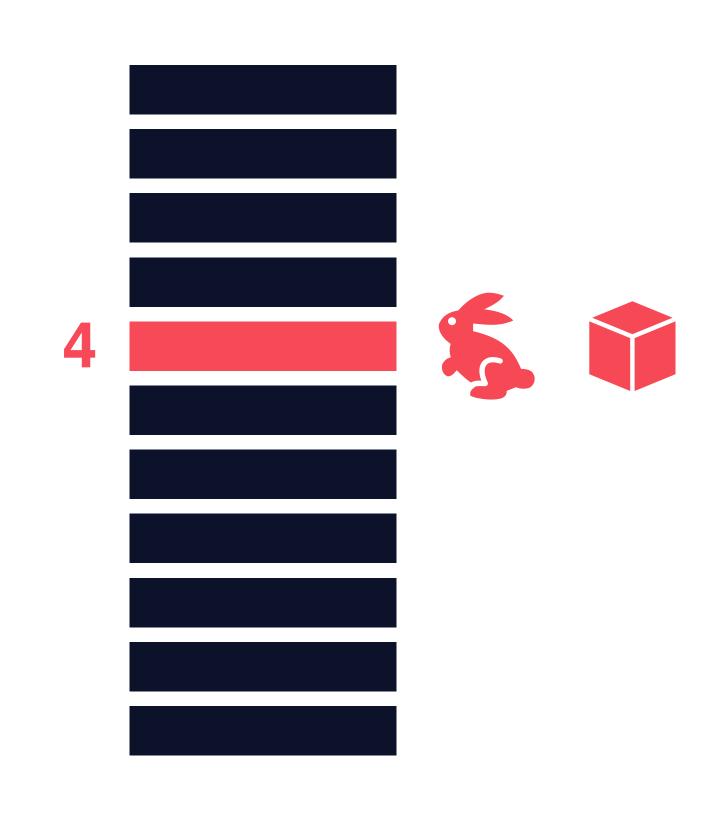
Brotli GZIP VS Default Mode

GZIP

Optimal middle ground

VS

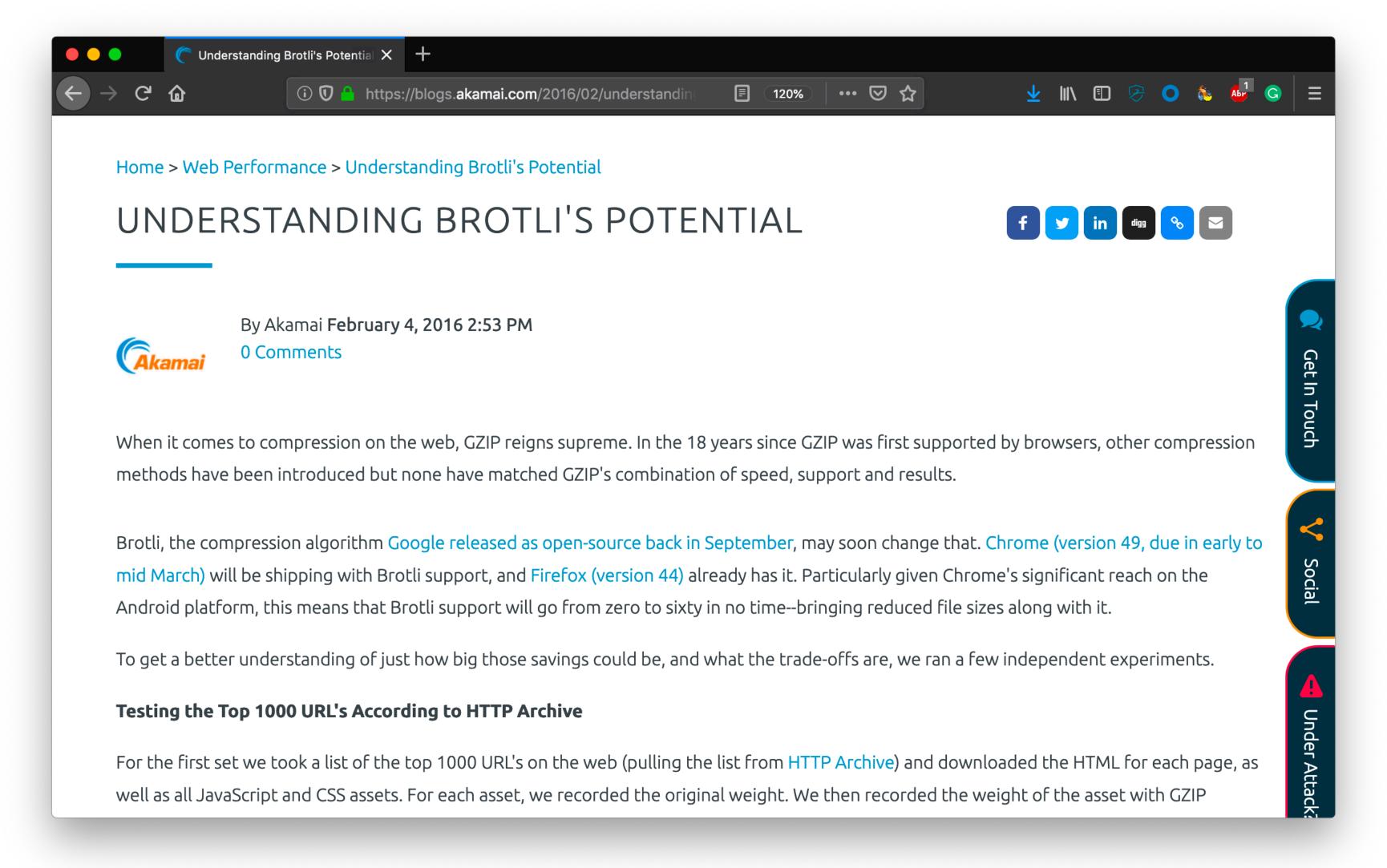
Brotli



Brotli tends to compress better with the same speed

You don't have to do it on the fly...

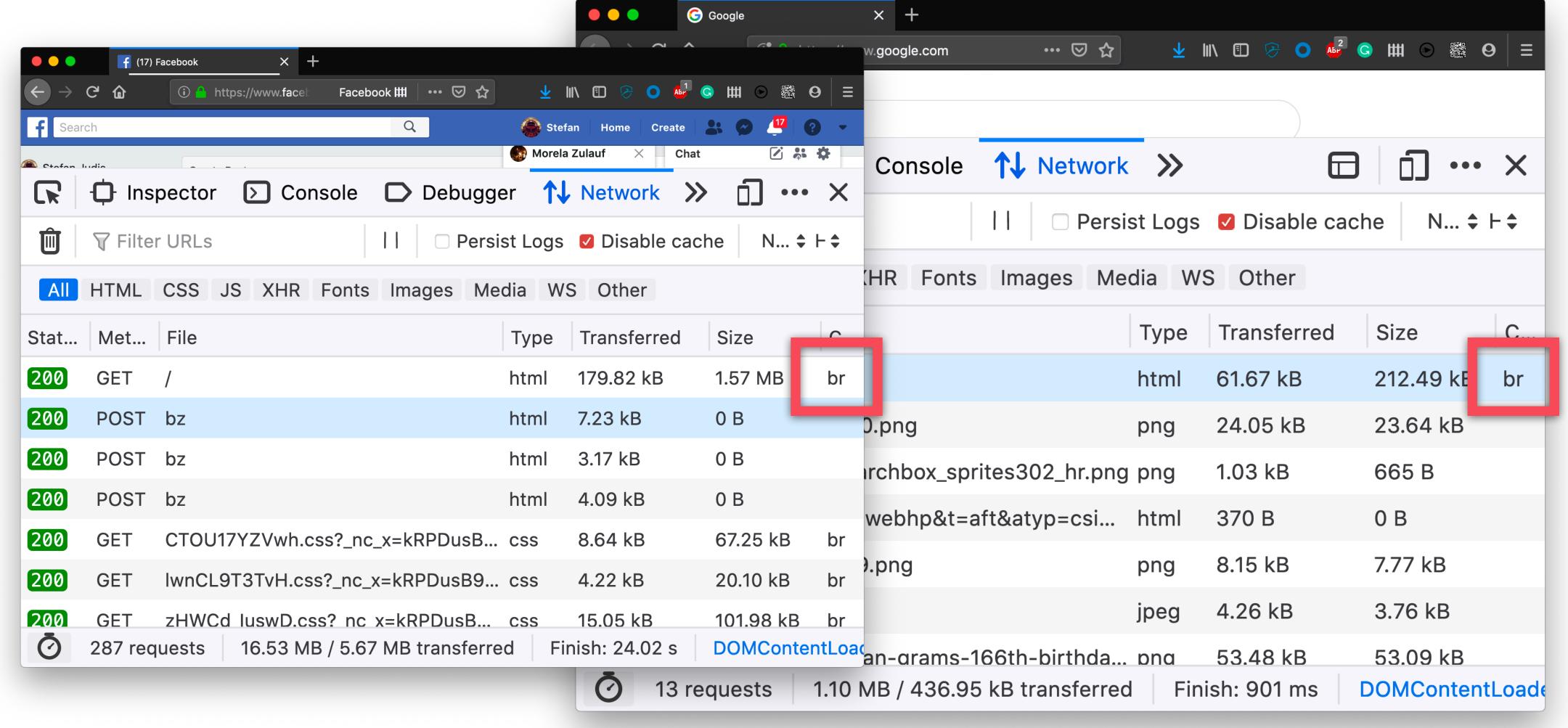
blogs.akamai.com/2016/02/understanding-brotlis-potential.html



caniuse.com/#feat=brotli









Serve tailored media

```
<picture>
  <!-- serve WebP to Chrome and Opera -->
  <source
    media="(min-width: 50em)"
    sizes="50vw"
    srcset="/image/thing-200.webp 200w, /image/thing-400.webp 400w,
        /image/thing-800.webp 800w, /image/thing-1200.webp 1200w,
        /image/thing-1600.webp 1600w, /image/thing-2000.webp 2000w"
    type="image/webp">
  <source
    sizes="(min-width: 30em) 100vw"
    srcset="/image/thing-crop-200.webp 200w, /image/thing-crop-400.webp 400w,
        /image/thing-crop-800.webp 800w, /image/thing-crop-1200.webp 1200w,
        /image/thing-crop-1600.webp 1600w, /image/thing-crop-2000.webp 2000w"
    type="image/webp">
 <!-- serve JPEG to others -->
  <source
    media="(min-width: 50em)"
    sizes="50vw"
    srcset="/image/thing-200.jpg 200w, /image/thing-400.jpg 400w,
        /image/thing-800.jpg 800w, /image/thing-1200.jpg 1200w,
        /image/thing-1600.jpg 1600w, /image/thing-2000.jpg 2000w">
  <source
```



Accept:

```
image/webp,
image/apng,
image/*,*/*;q=0.8
```

caniuse.com/#feat=webp





Accept-CH: Width, Viewport-Width Accept-CH-Lifetime: 100



Accept-CH: Width, Viewport-Width Accept-CH-Lifetime: 100

Request URL: https://.../header.jpg

Viewport-Width: 980

Width: 980





```
<img src="/header.jpg" alt="" sizes="100vw" />
```

Accept: image/webp,image/apng,image/*,*/*;q=0.8

Request URL: https://.../header.jpg

Viewport-Width: 980

Width: 980





```
<img src="/header.jpg" alt="" sizes="100vw" />
```

Accept: image/webp,image/apng,image/*,*/*;q=0.8

Request URL: https://.../header.jpg

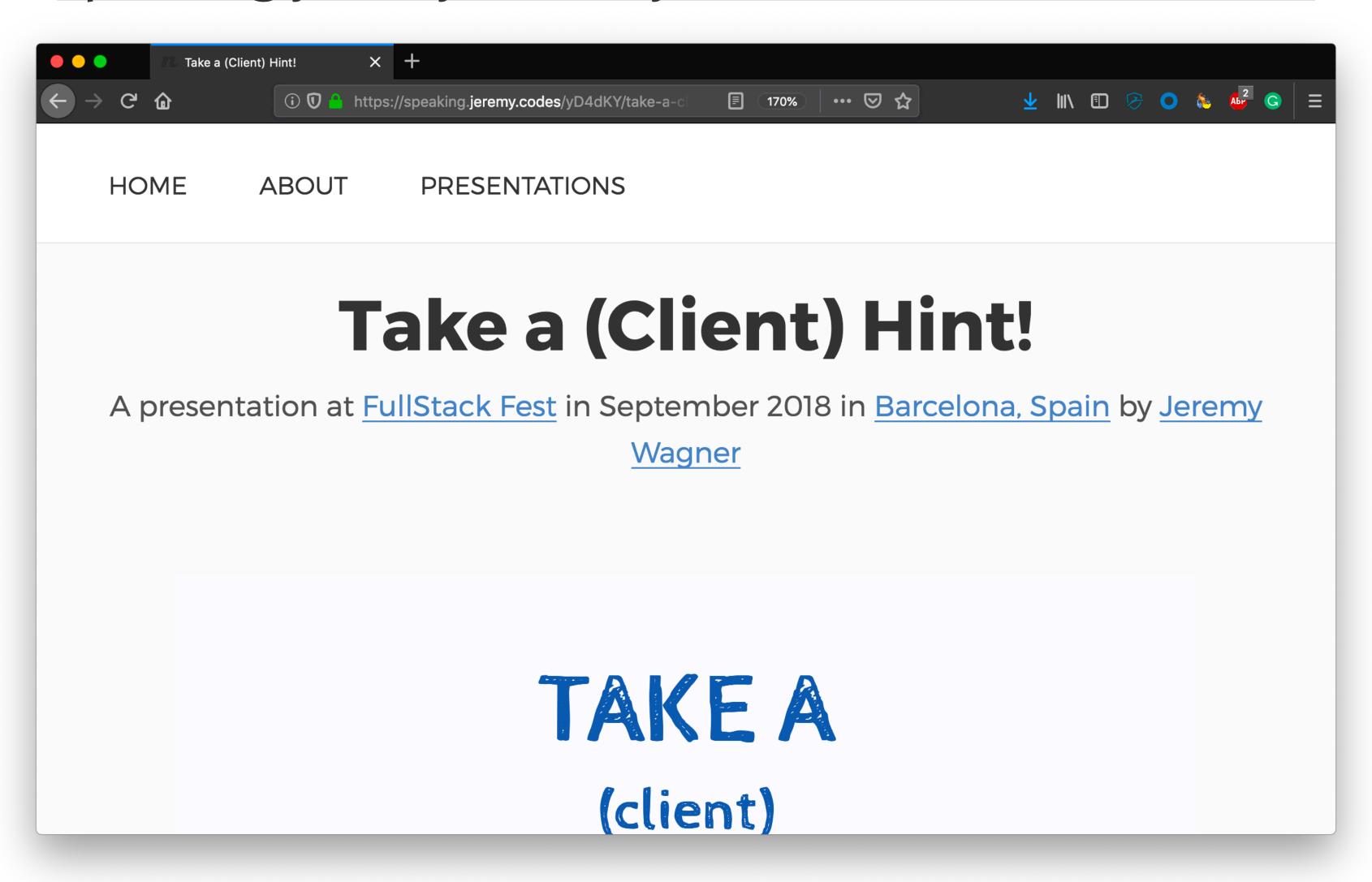
Viewport-Width: 980

Width: 1960



Serve a tailored version via server/service worker

speaking.jeremy.codes/yD4dKY/take-a-client-hint





Save data



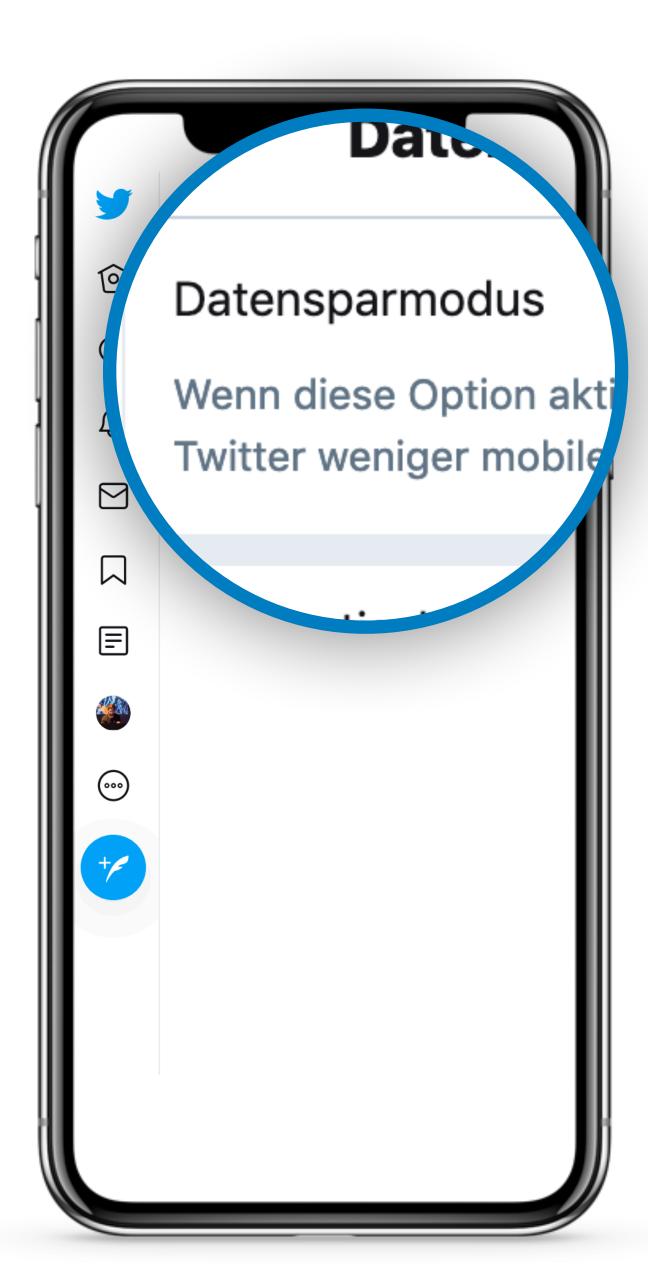
save-data: on



save-data: on

```
if ("connection" in navigator) {
   if (navigator.connection.saveData === true) {
      // Implement data saving operations here.
   }
}
```







Let's use the platform and make these features more visible



https://....



Save data?



We should provide an easy way to save data!



https://....

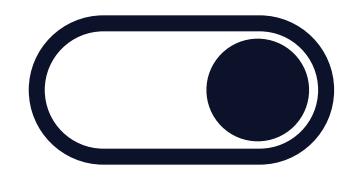


Save data?



https://....







interface?

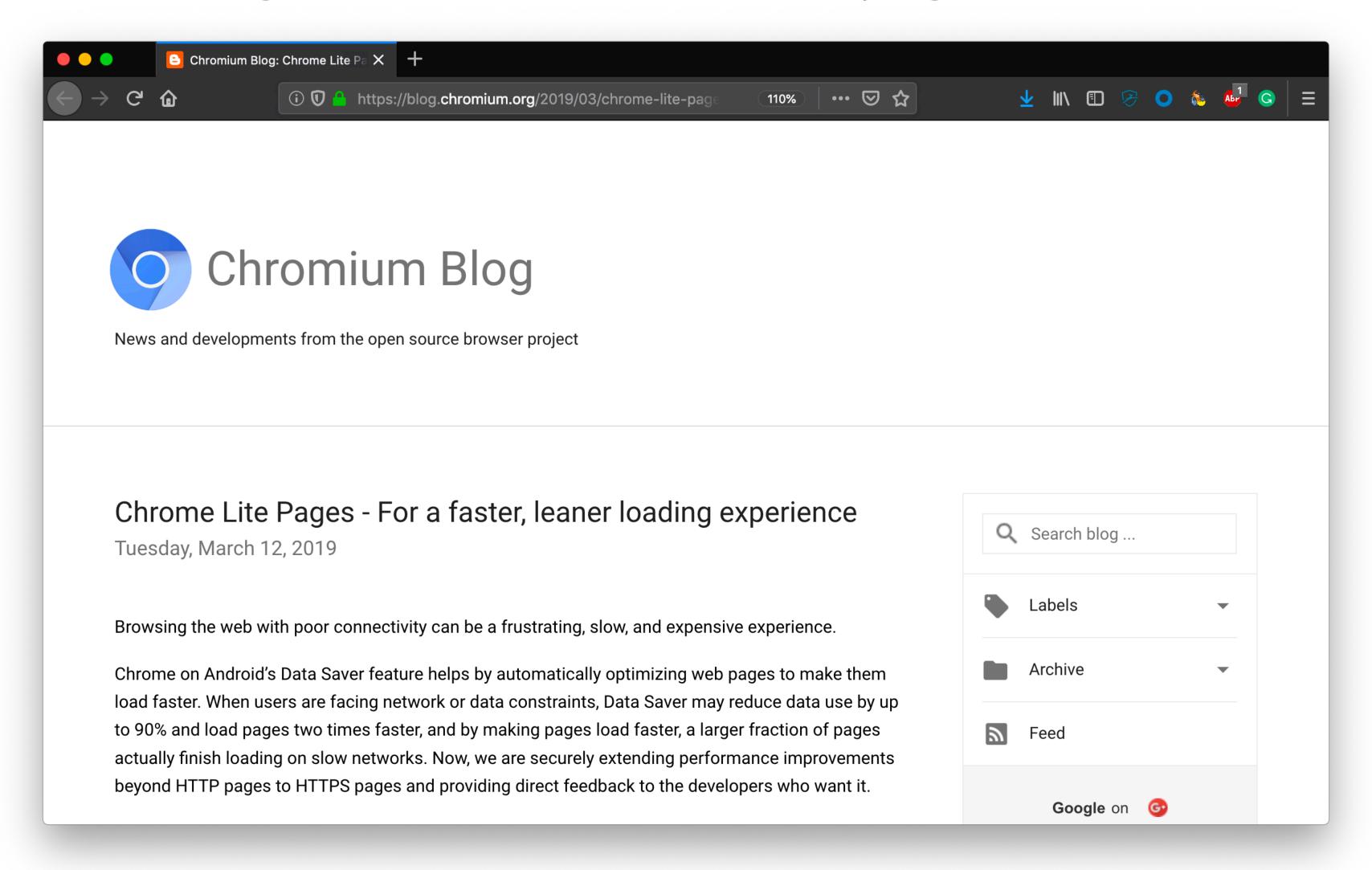
Prefer a dark Prefer reduced motion?

Save data?



All these settings should be easily accessible all the time!

blog.chromium.org/2019/03/chrome-lite-pages-for-faster-leaner.html



blog.chromium.org/2019/03/chrome-lite-pages-for-faster-leaner.html





Cache-Control:

max-age=31536000, public, <u>no-transform</u>



Be aware of CDNs and proxies – use vary





Brendan Abbott @brend0

@tkadlec shopify.com is now Save-Data aware. About a 13% reduction in page weight, webpagetest.org/video /compare....

 \vee

Early data shows 20% of Indian/Brazilian requests contain this header so happy days #webperf

Tweet übersetzen







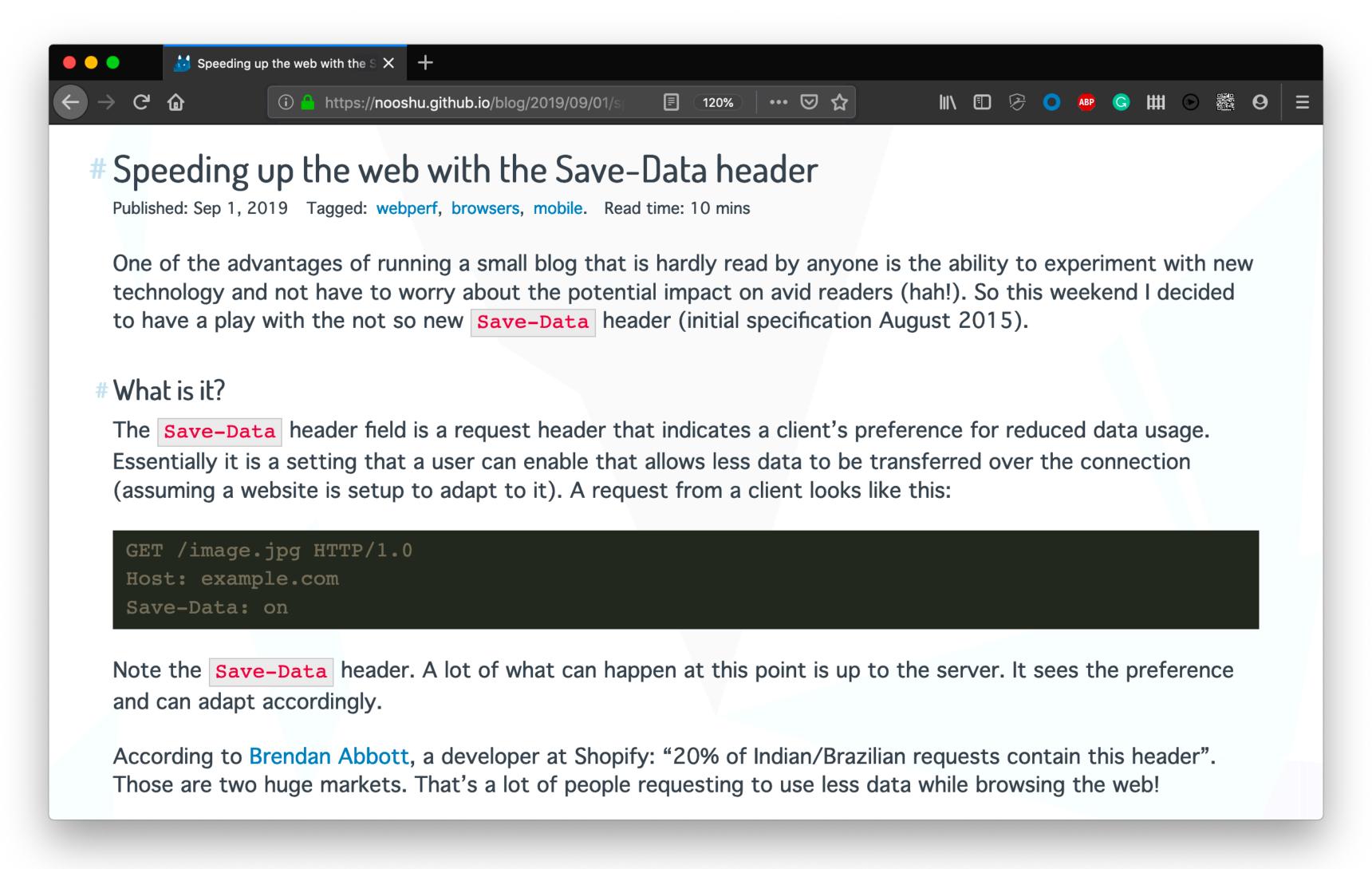
@tkadlec shopify.com is now Save-Data aware. About a 13% reduction in page weight, webpagetest.org/video

Early data shows 20% of Indian/Brazilian requests contain

20% of requests...



https://nooshu.github.io/blog/2019/09/01/speeding-up-the-web-with-save-data-header/

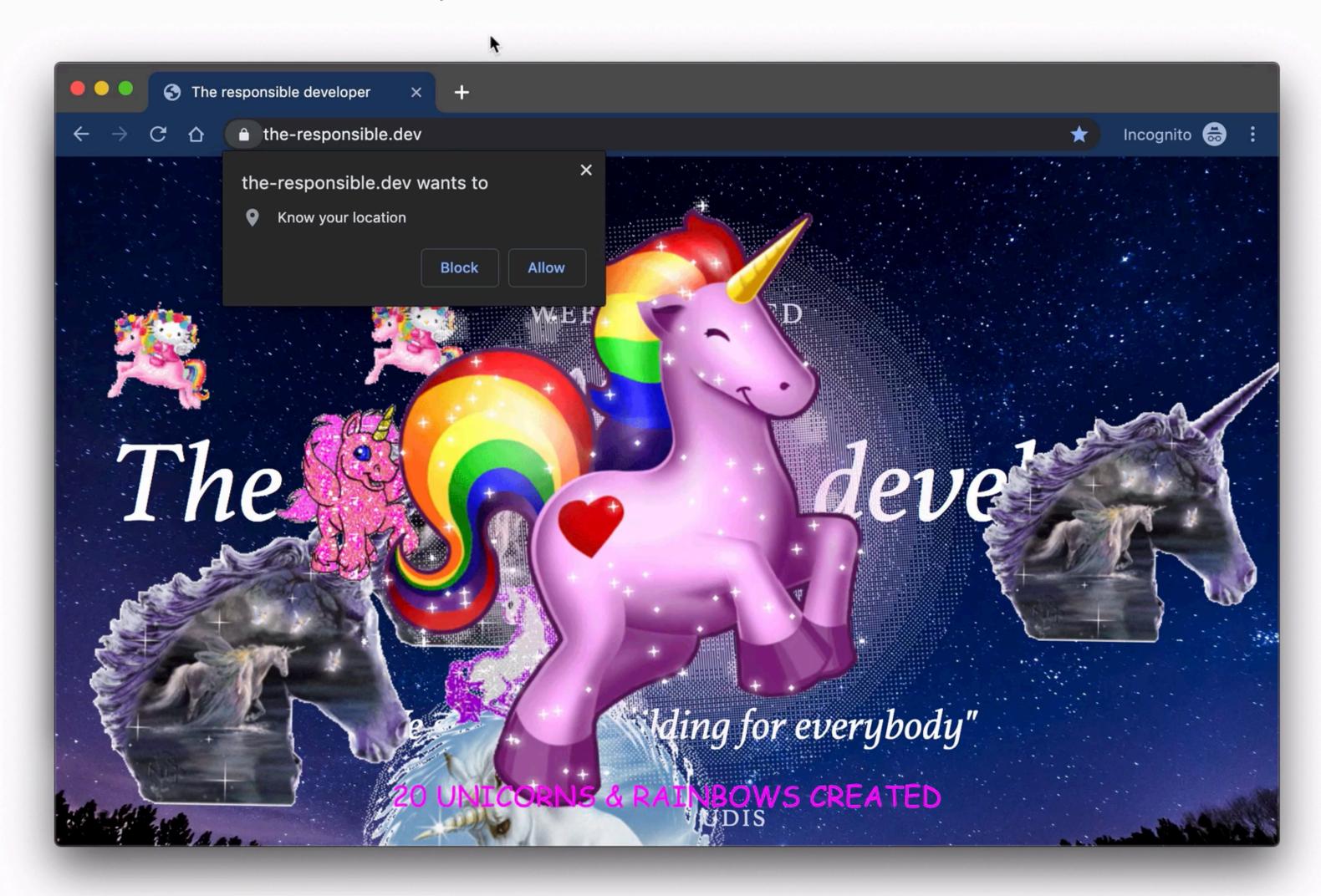




Less Data Doesn't Mean a Lesser Experience

@tkadlec

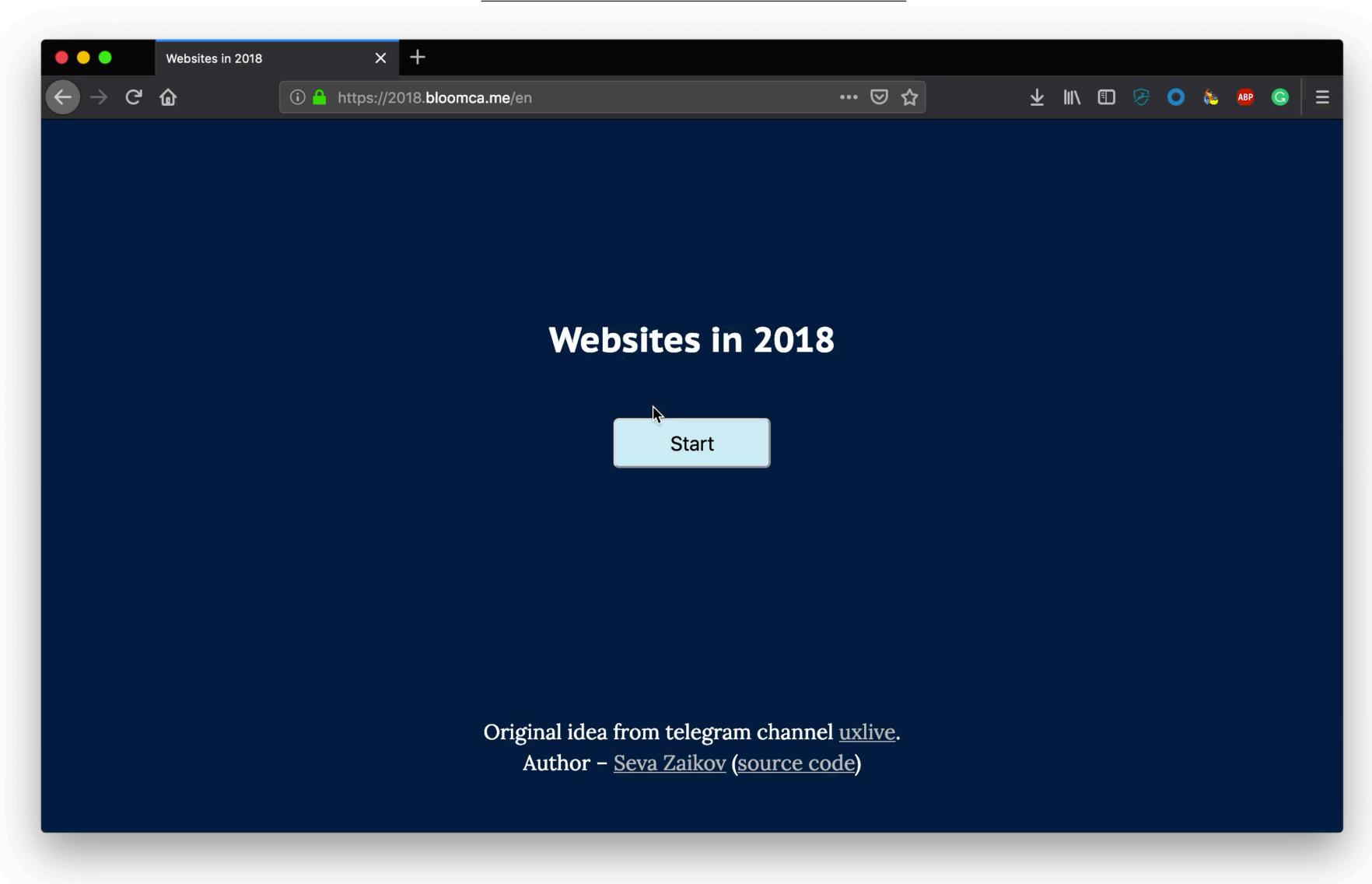
the-responsible.dev/affordable/





The web is with us every day

2018.bloomca.me





It has to be respectful!



Get stuff "down" as quickly as possible



<link rel="preload" href="/unleashed.jpg" as="image">

Link:

</unleashed.jpg>; rel=preload; as=image



<link rel="preload" href="/unleashed.jpg" as="image">

Link:

</unleashed.jpg>; rel=preload; as=image; no-push



<link rel="preload" href="/unleashed.jpg" as="image">

This is great to speed up critical resources

caniuse.com/#feat=link-rel-preload

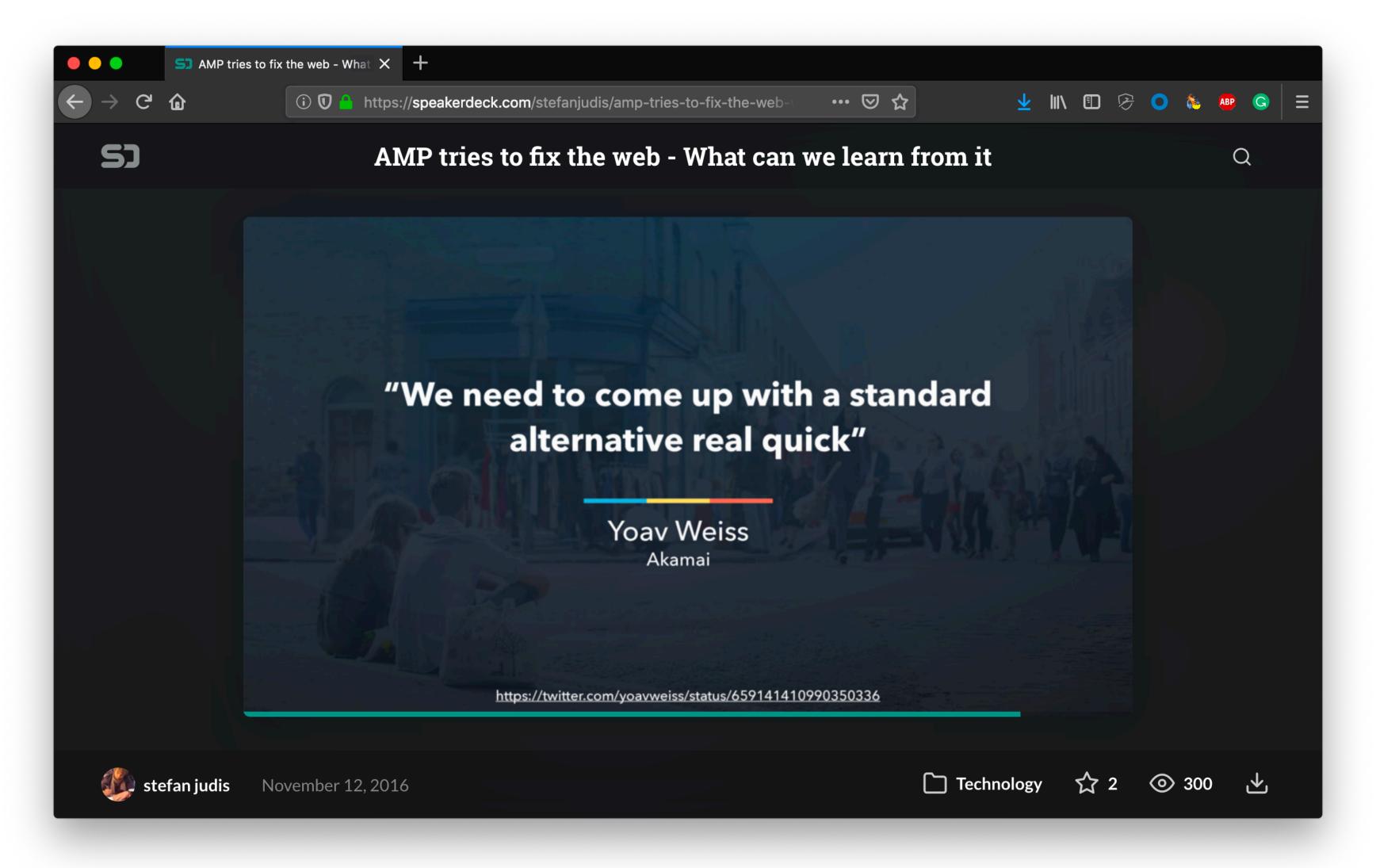


* behind a flag



Don't annoy the user (aka. the AMP reaction)

speakerdeck.com/stefanjudis/amp-tries-to-fix-the-web-what-can-we-learn-from-it?slide=112





Feature-Policy: vibrate 'none'; geolocation 'none'

developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Feature-Policy

accelerometer gyroscope picture-in-picture

ambient-light-sensor legacy-image-formats speaker

autoplay layout-animations sync-xhr

camera magnetometer unoptimized-images

document-domain microphone unsized-media

encrypted-media midi usb

fullscreen oversized-images vibrate

geolocation payment vr

developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Feature-Policy

accelerometer 🛴 ambient-light-sensor autoplay 🛴 camera document-domain 🛴 encrypted-media fullscreen ___ geolocation 🙏

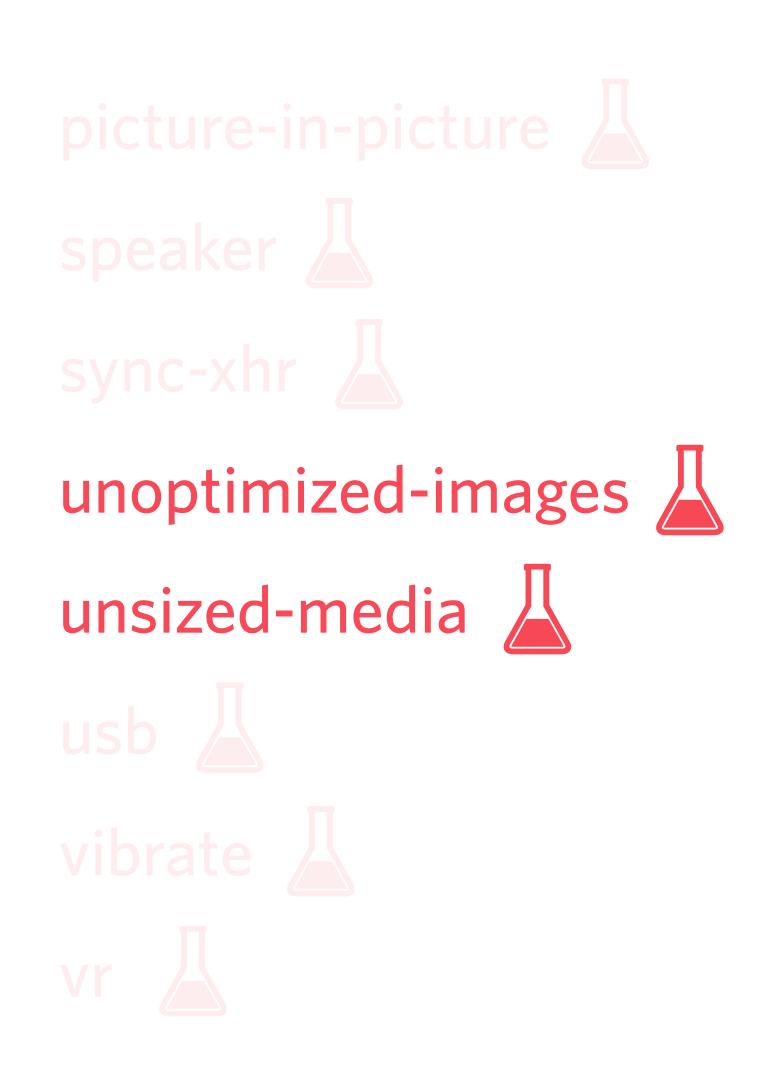
gyroscope 🛴 legacy-image-formats magnetometer 🛴 microphone 🛴 midi 🙏 oversized-images payment

picture-in-picture speaker 🛴 sync-xhr unoptimized-images unsized-media usb vibrate 🗸

developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Feature-Policy









feature-policy: accelerometer 'none'; camera 'none'; geolocation 'none'; gyroscope 'none'; magnetometer 'none'; microphone 'none'; payment 'none'; usb 'none'

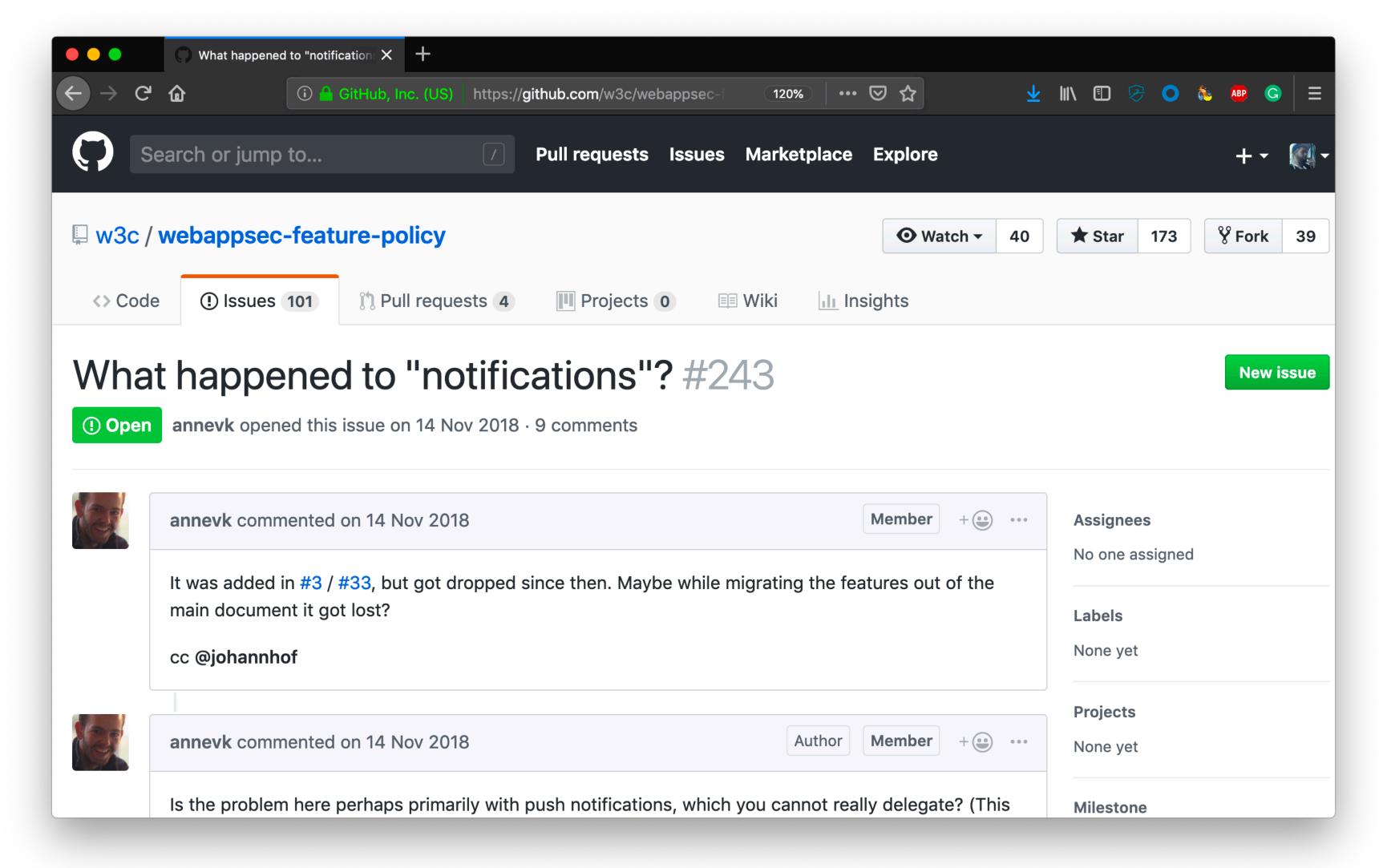
```
O
```

```
<iframe allow="camera 'none'; microphone 'none'">
          document.featurePolicy.allowedFeatures();
          // → ["geolocation", "midi", ...]
    document.featurePolicy.allowsFeature('geolocation');
    // → true
document.featurePolicy.getAllowlistForFeature('geolocation');
// → ["https://example.com"]
```



What happened to the most annoying one?

https://github.com/w3c/webappsec-feature-policy/issues/243



caniuse.com/#feat=feature-policy

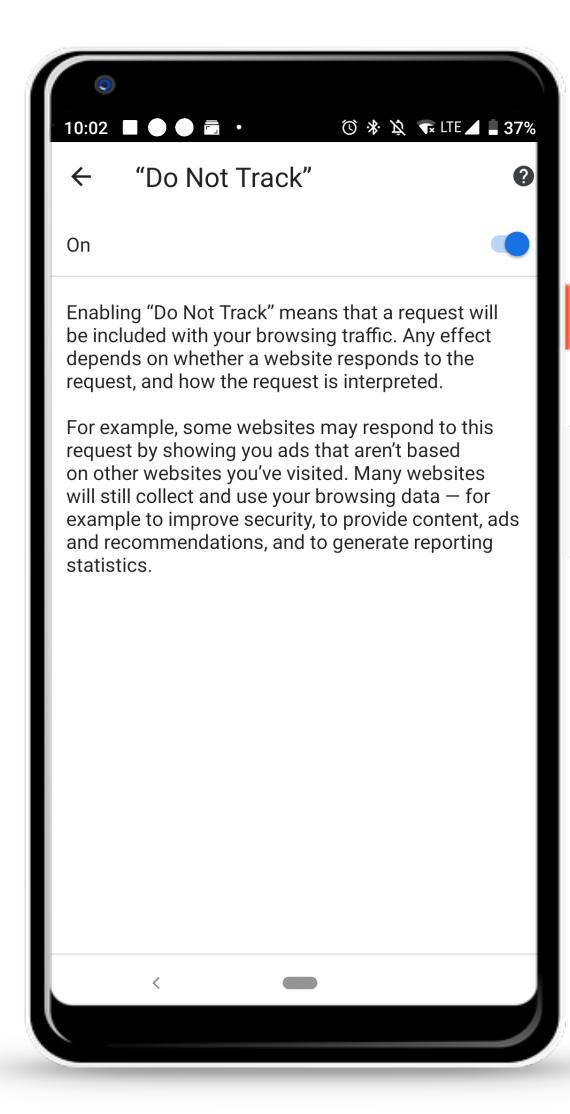


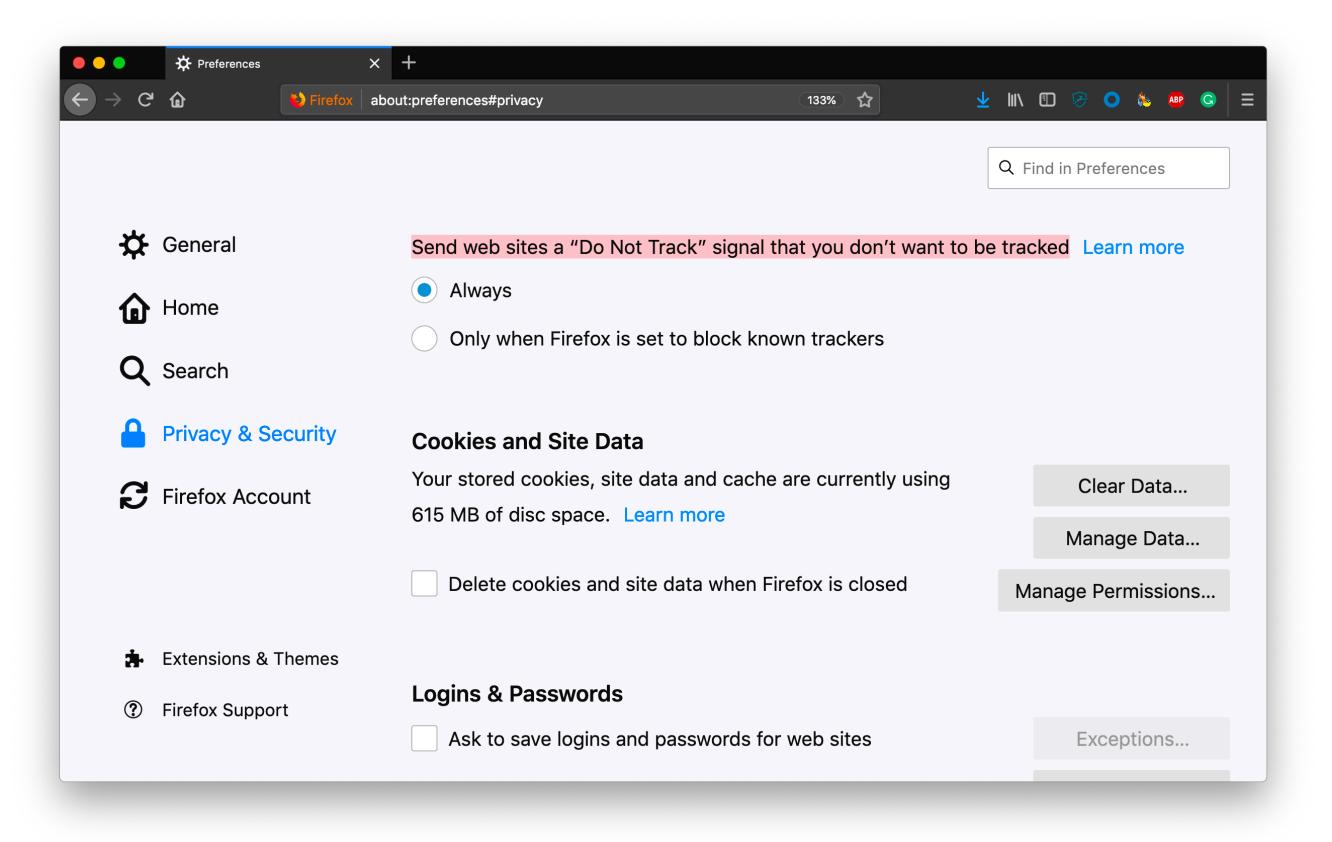
- * support for Feature-Policy header, allow on iframes, and JS API behind a flag
- ** support only for allow on iframes



Respect privacy



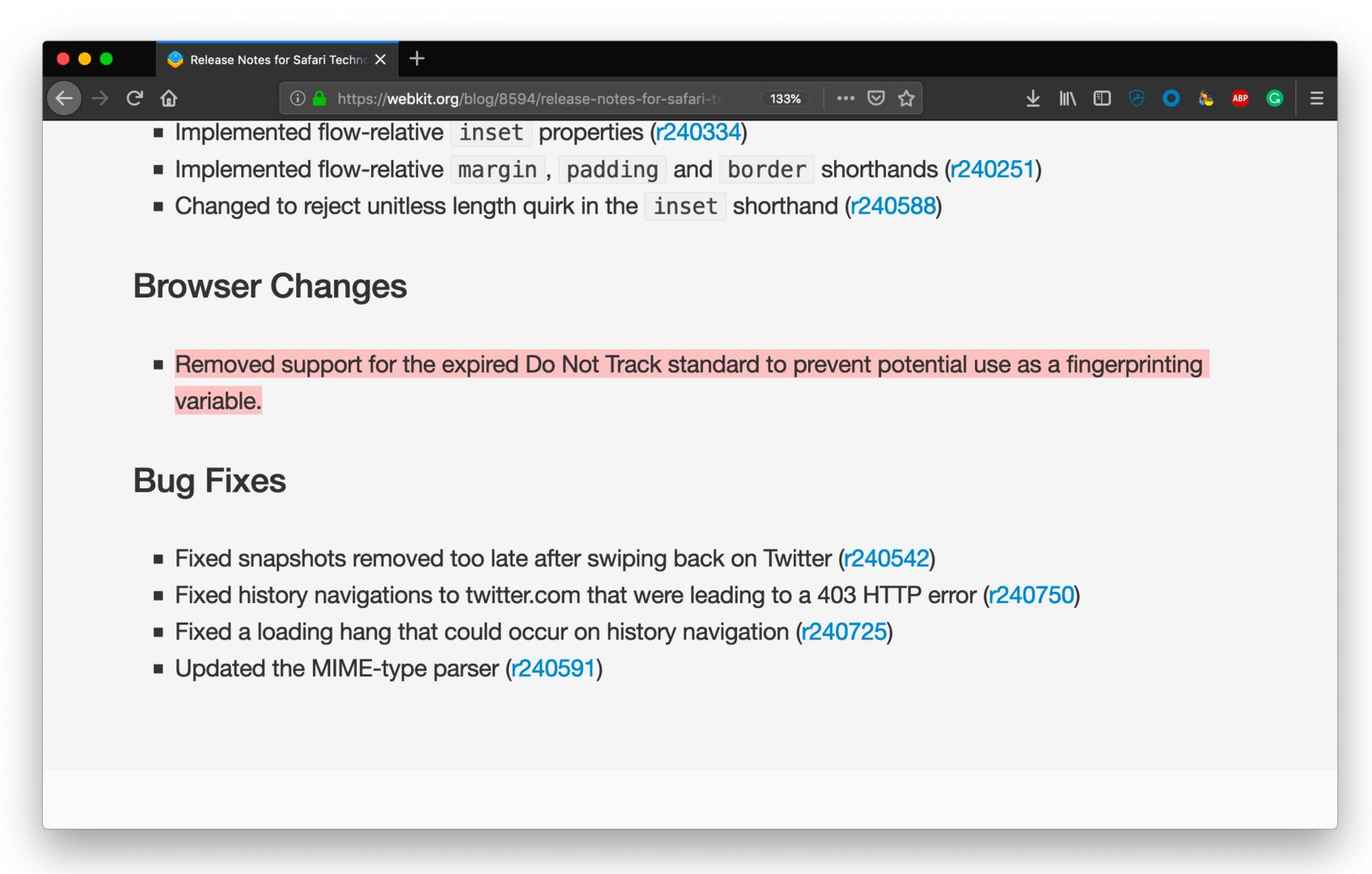




caniuse.com/#feat=do-not-track



webkit.org/blog/8594/release-notes-for-safari-technology-preview-75/

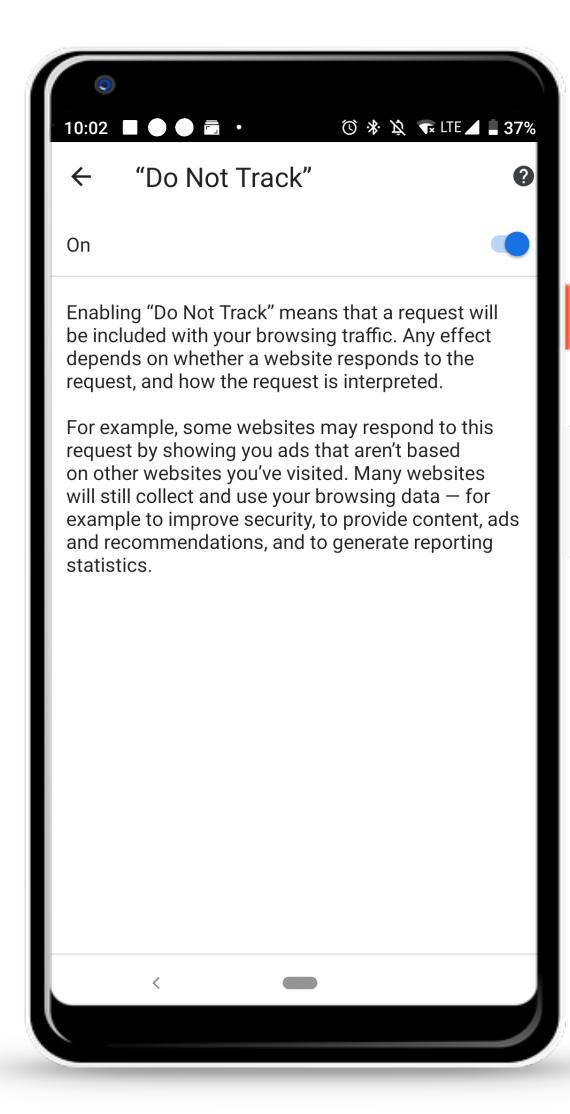


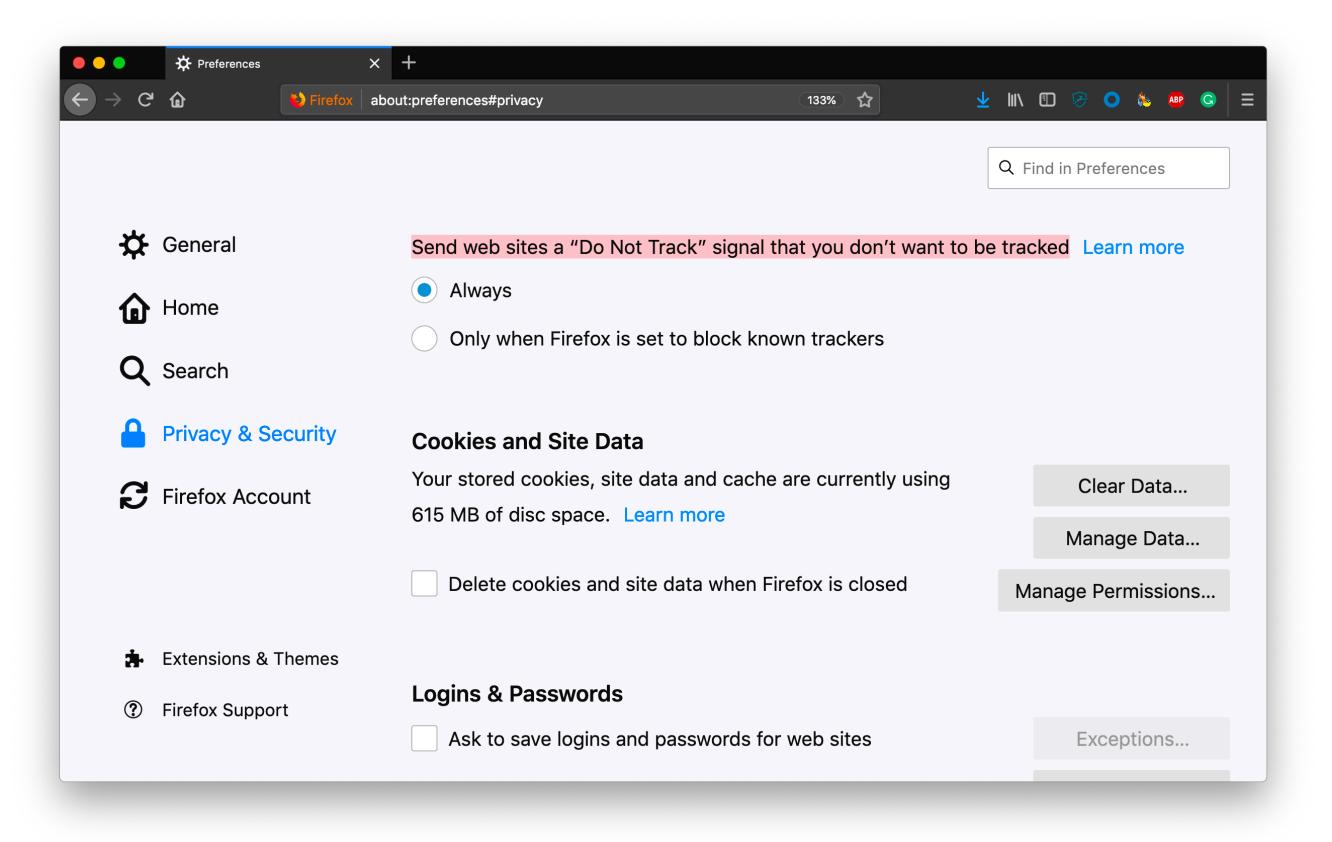
caniuse.com/#feat=do-not-track



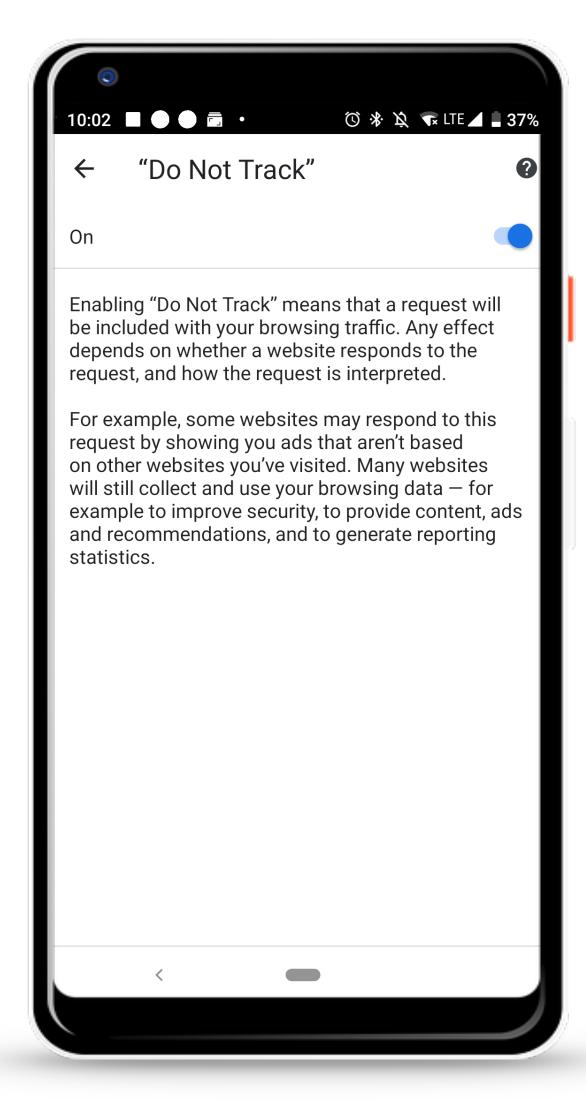
lt was a nice try, but I don't really see that happening...

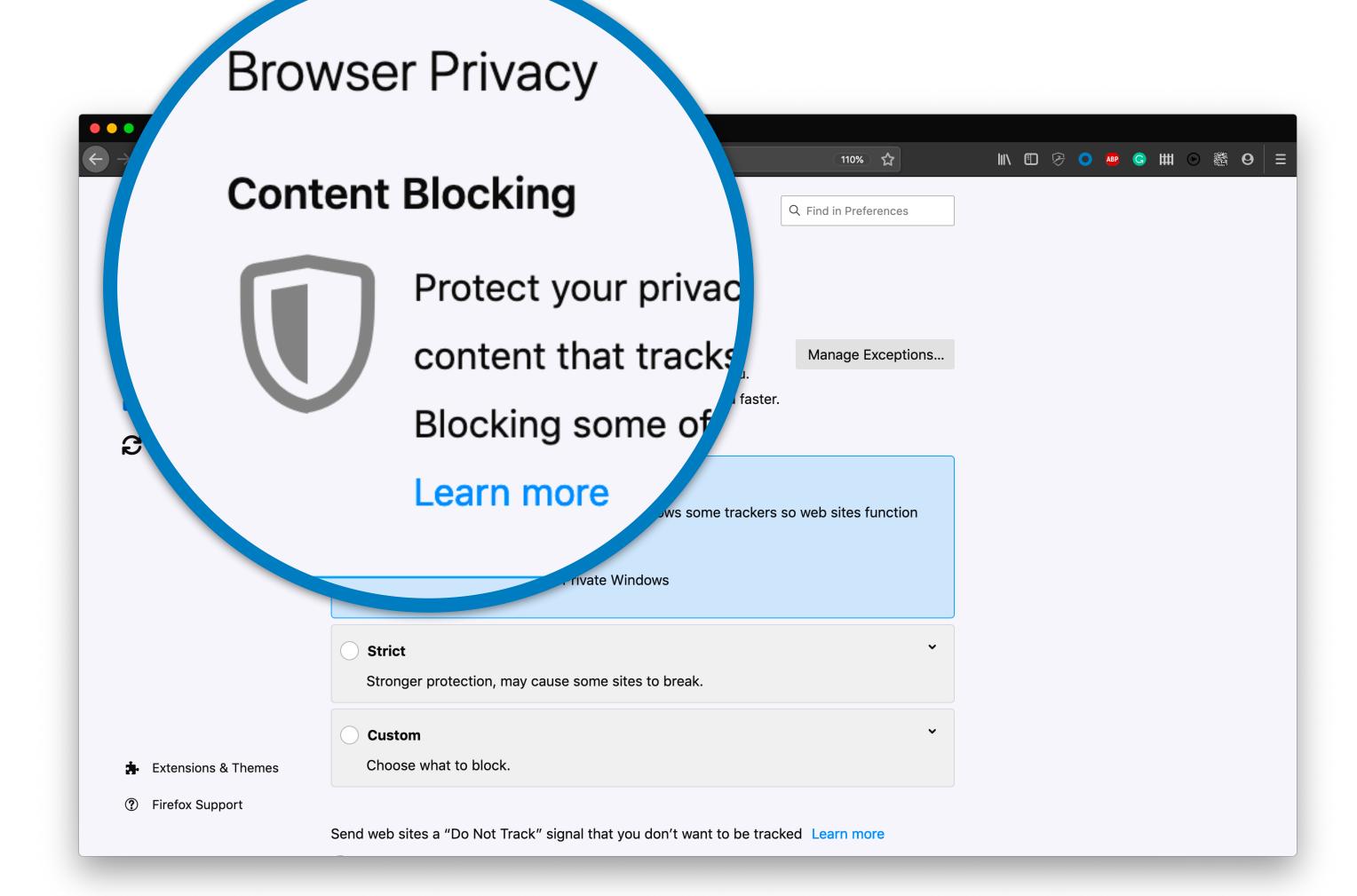




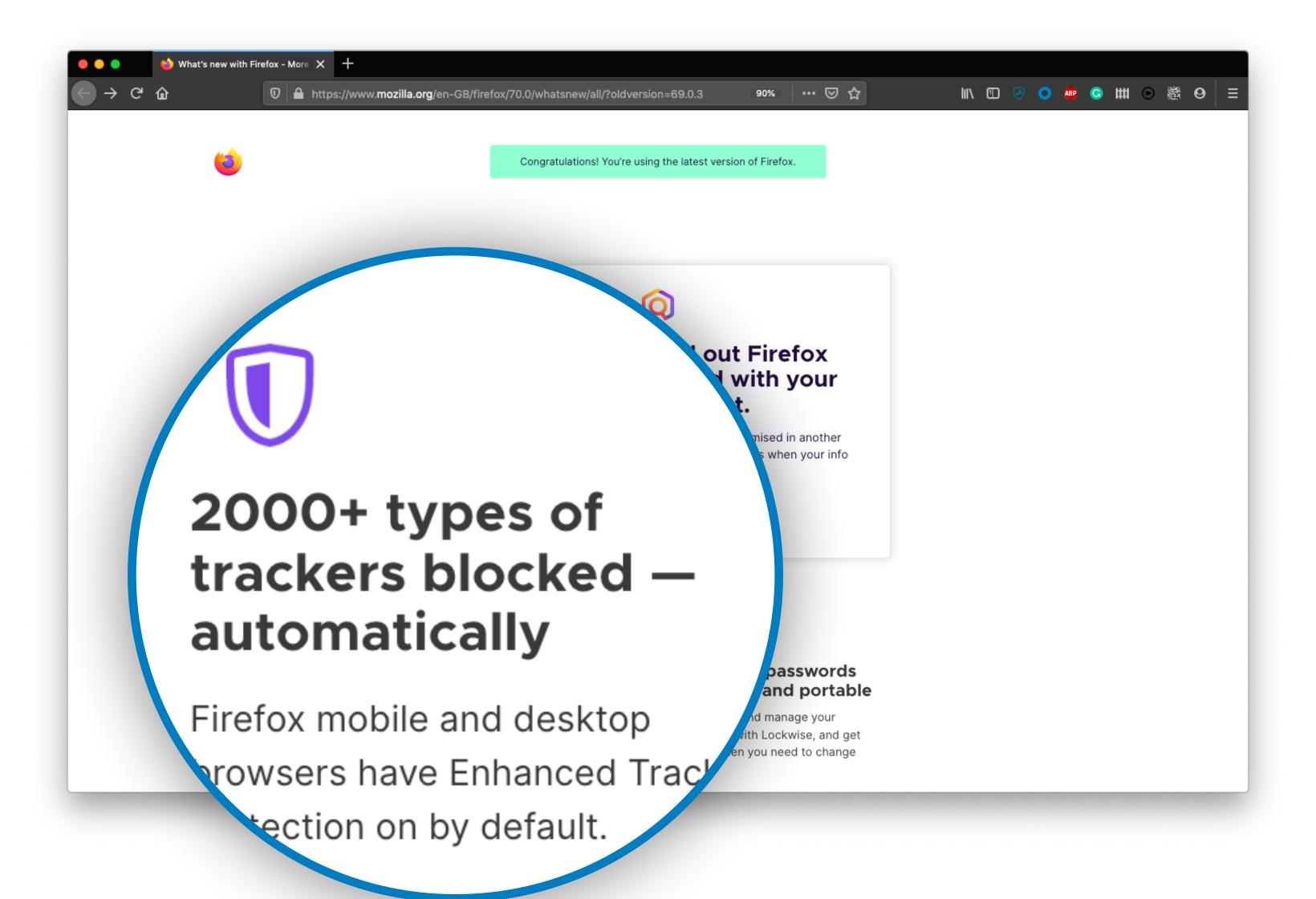




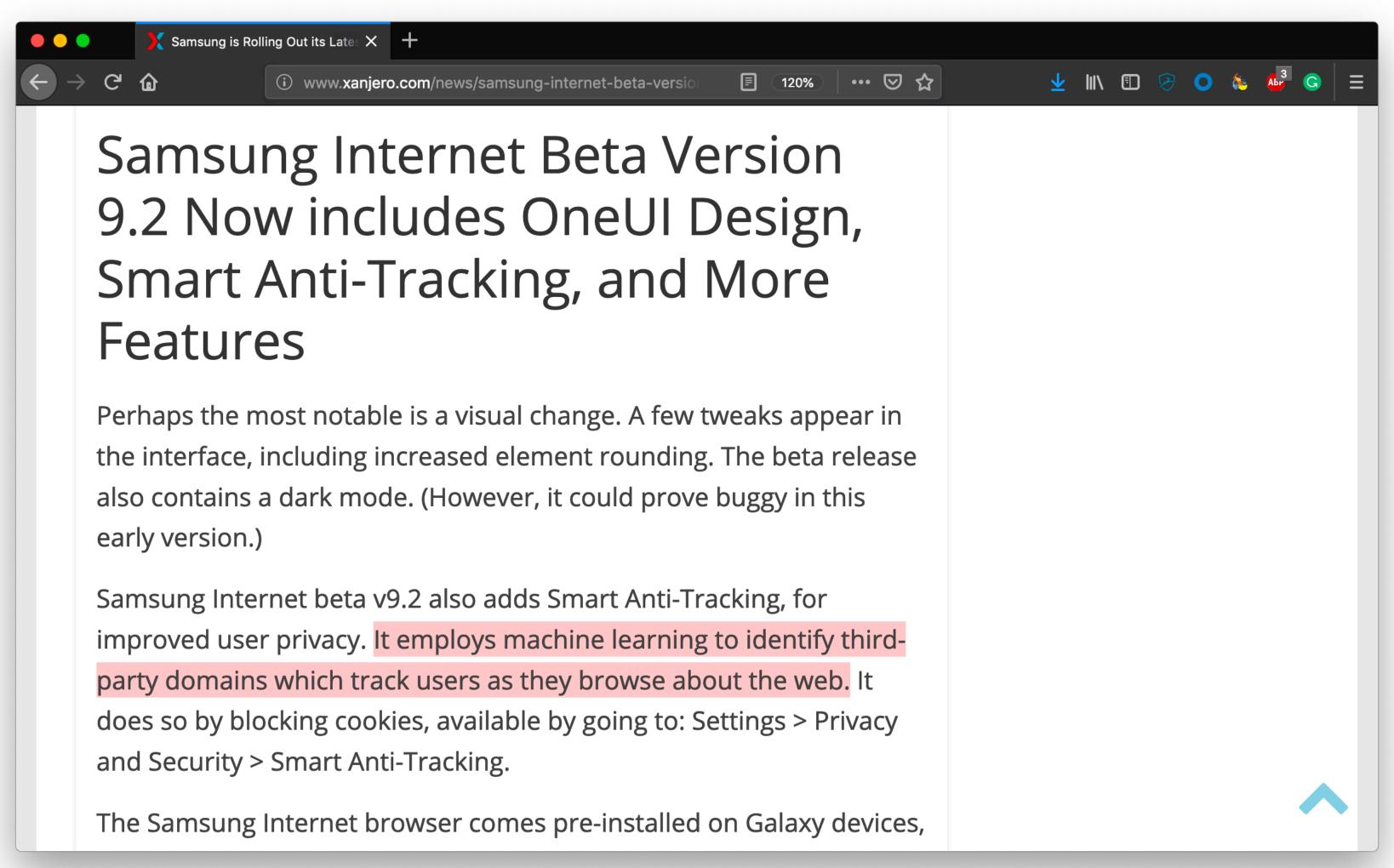




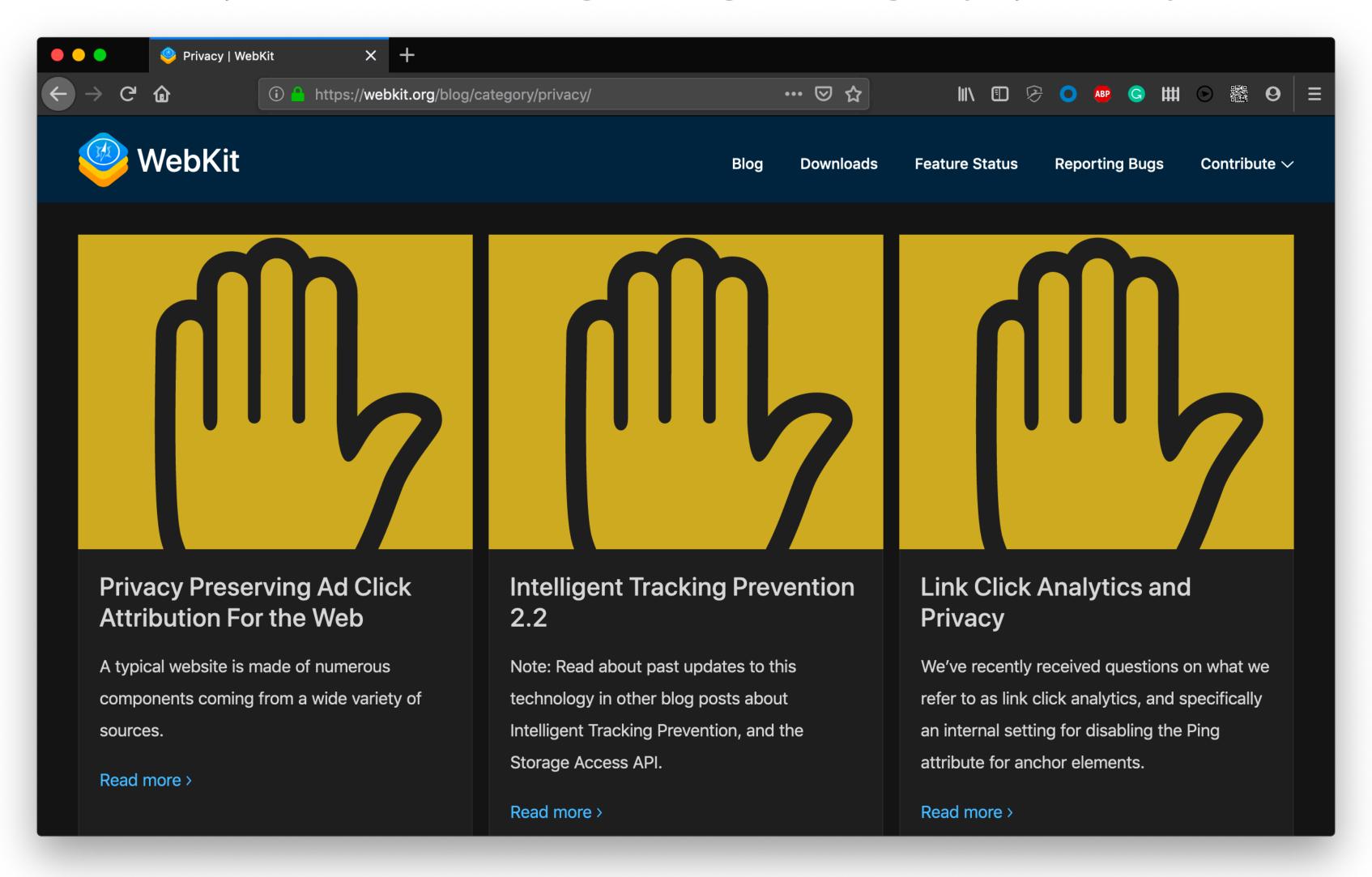




www.xanjero.com/news/samsung-internet-beta-version-9-2-now-includes-oneui-design-smartanti-tracking-and-more-features/



https://webkit.org/blog/category/privacy/





The next browser war is on its way...

the-responsible.dev/respectful/





Building for the web is very hard







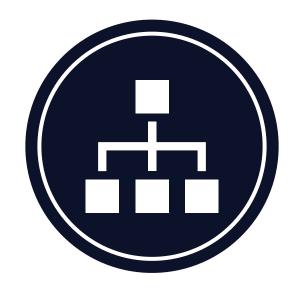


Content

Performance Accessibility





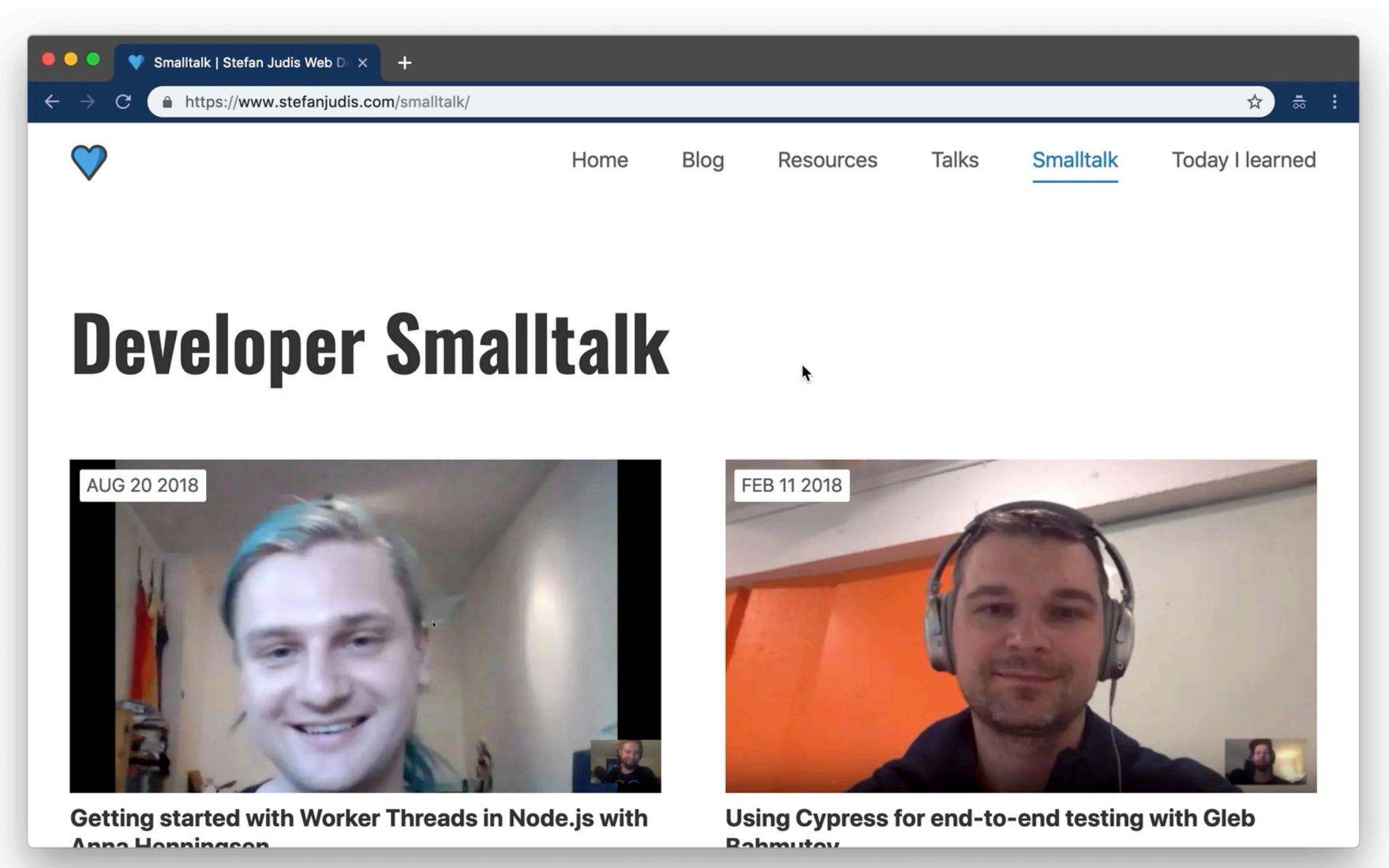


Network

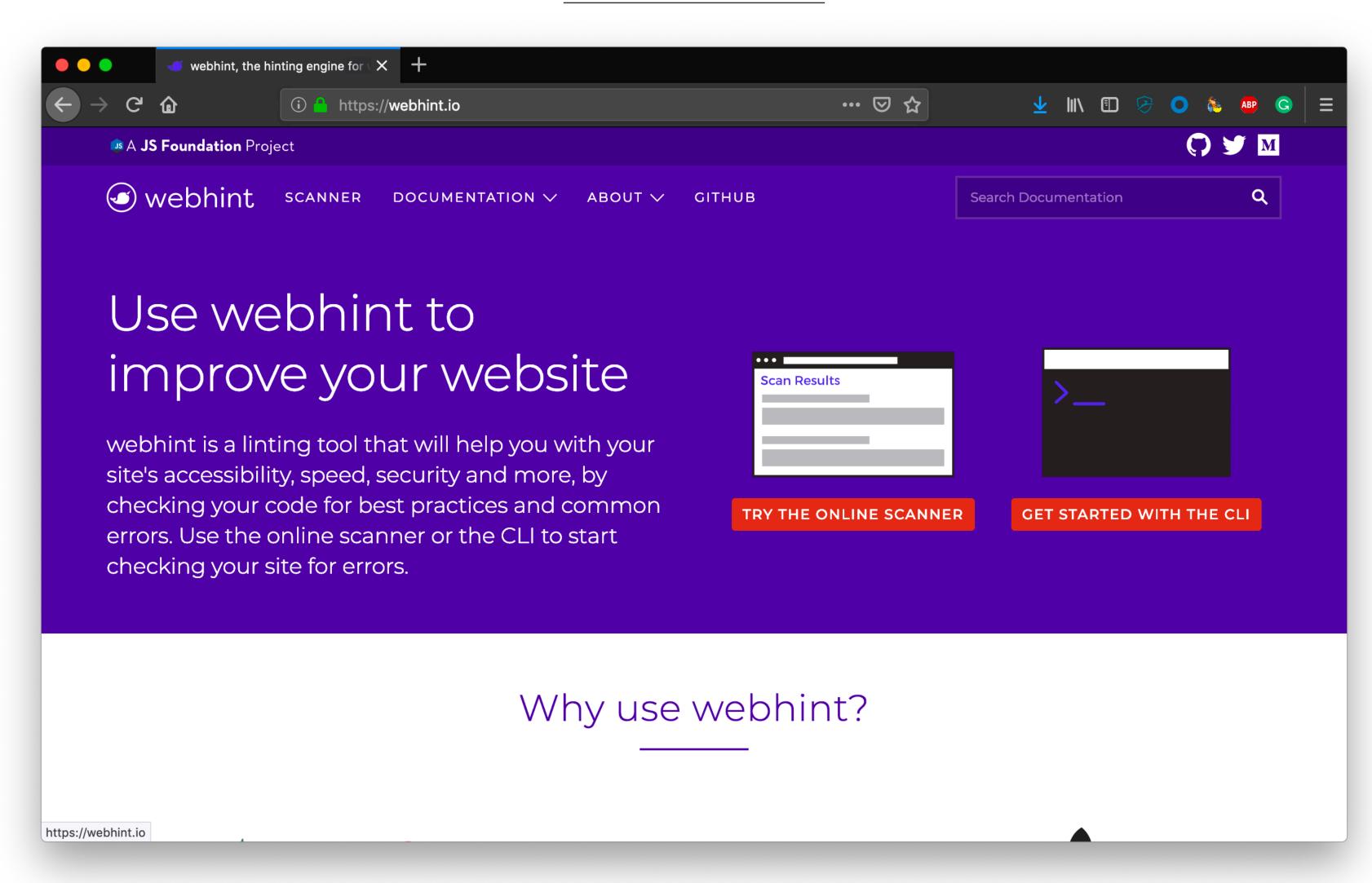


Devices

Lighthouse



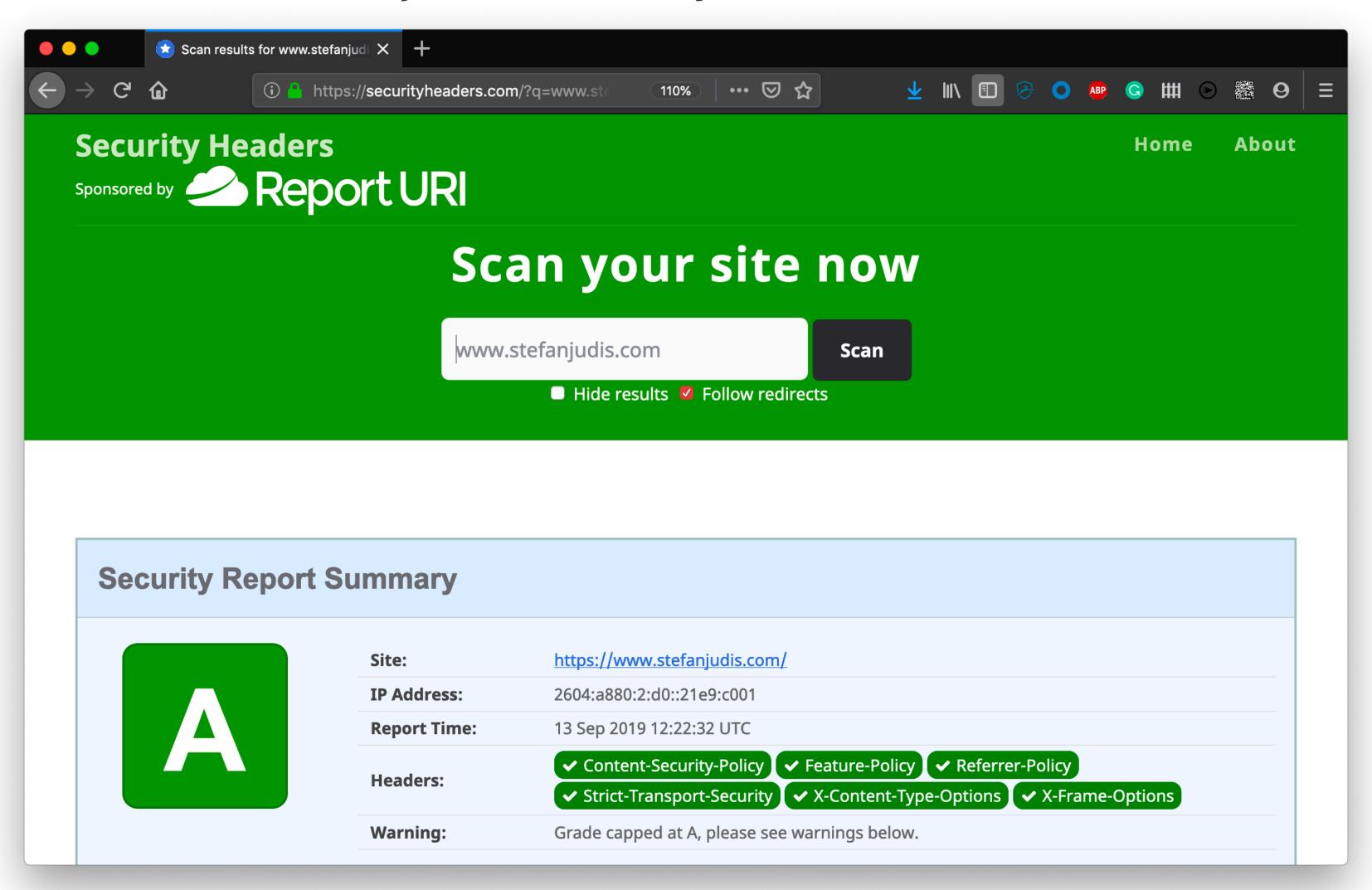
webhint.io



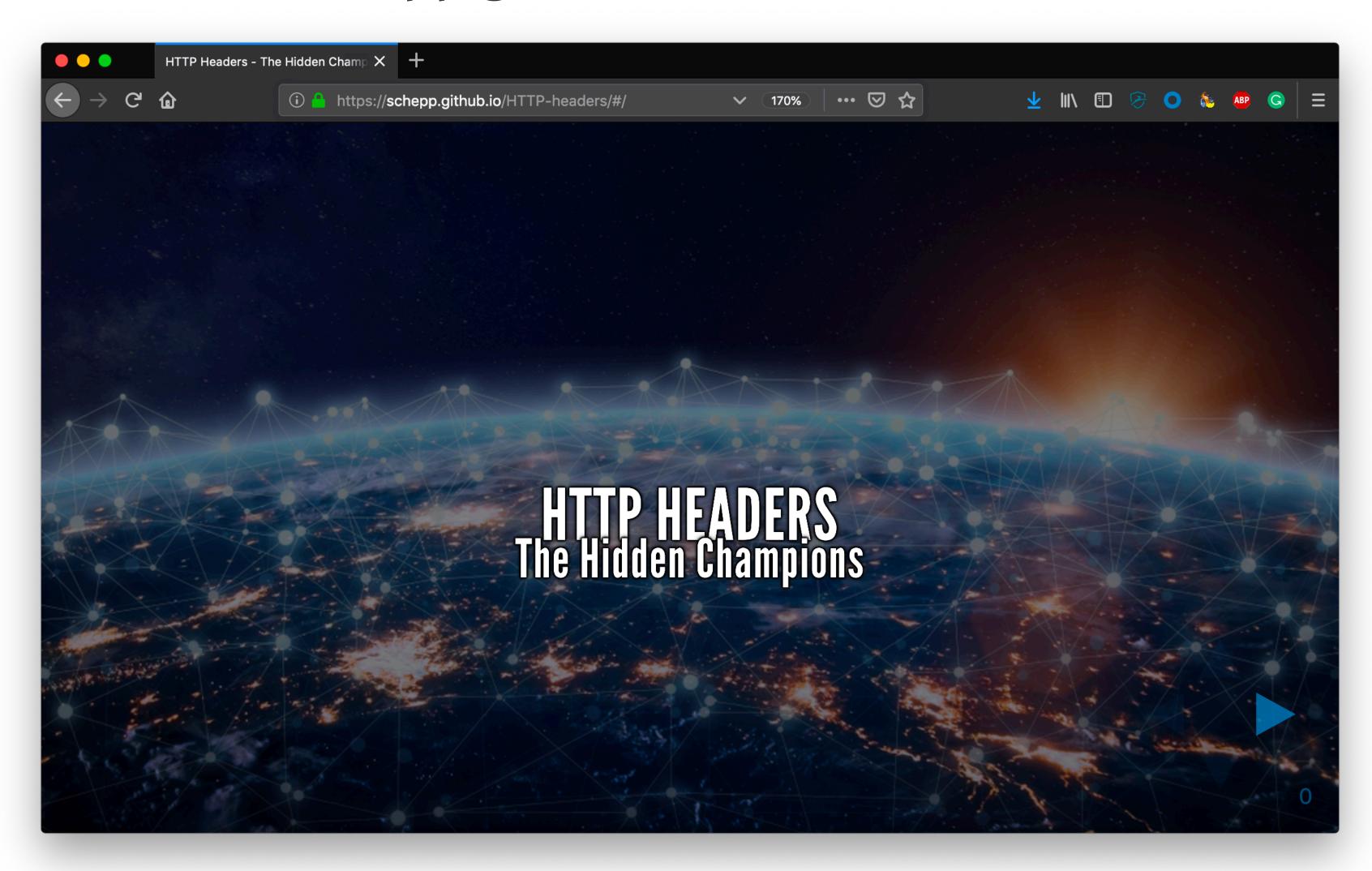


If you want to get a more complete overview...

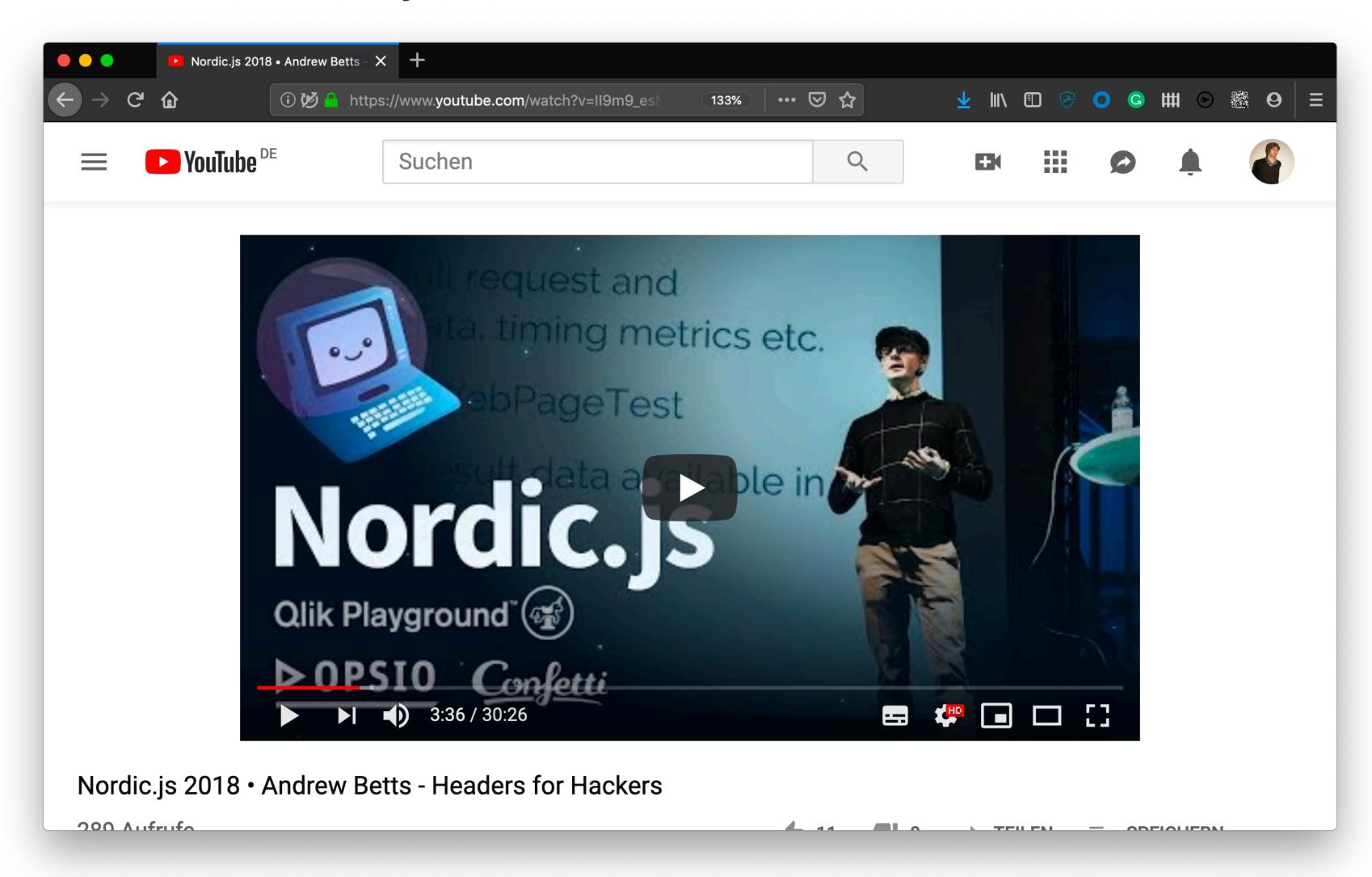
https://securityheaders.com



schepp.github.io/HTTP-headers



youtu.be/II9m9_esNZc





The web has to be safe...



The web has to be safe, affordable...



The web has to be safe, affordable and respectful...



... so that it really is for everybody!



Thanks.

@stefanjudis www.stefanjudis.com

Slides:

my-links.online/the-responsible-dev



