

How to win against AdBlockers

Simon Frey

Matomo Camp 2024

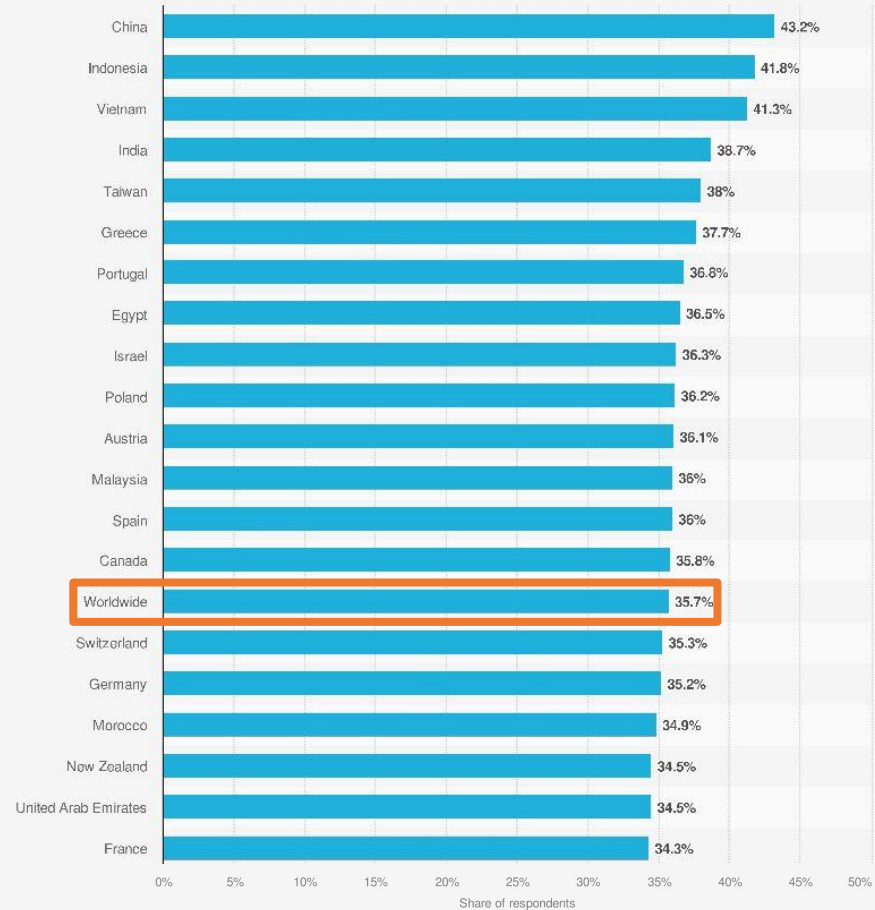


The problem:

**More and more users
install AdBlockers**



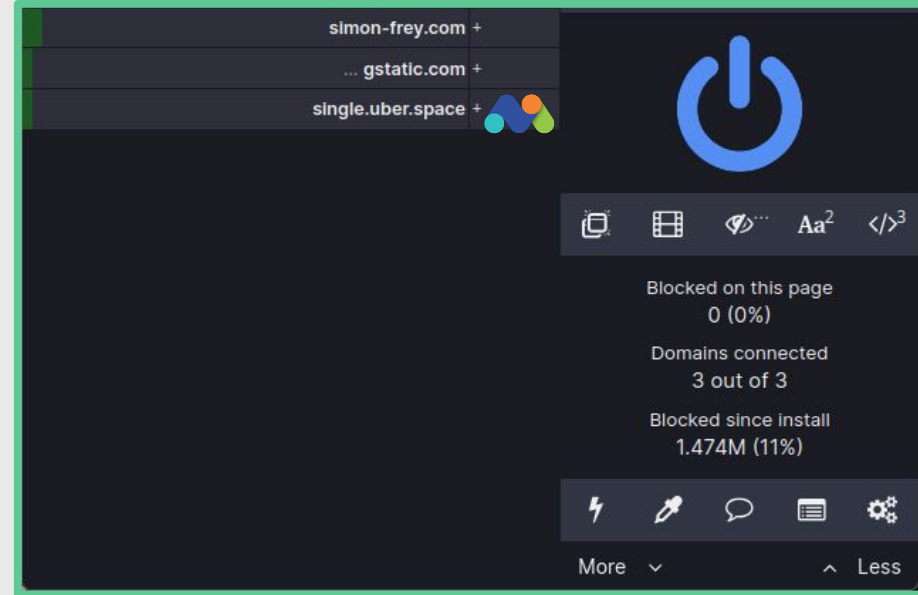
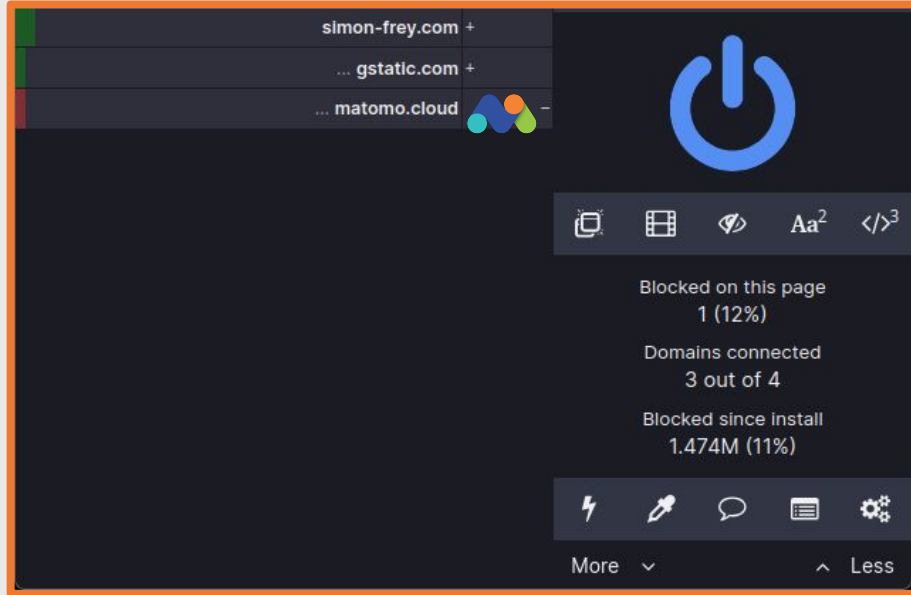
Adblocking penetration rate in selected countries/territories worldwide as of 3rd quarter 2022



Sources
We Are Social; DataReportal; GWI; Meltwater
© Statista 2024

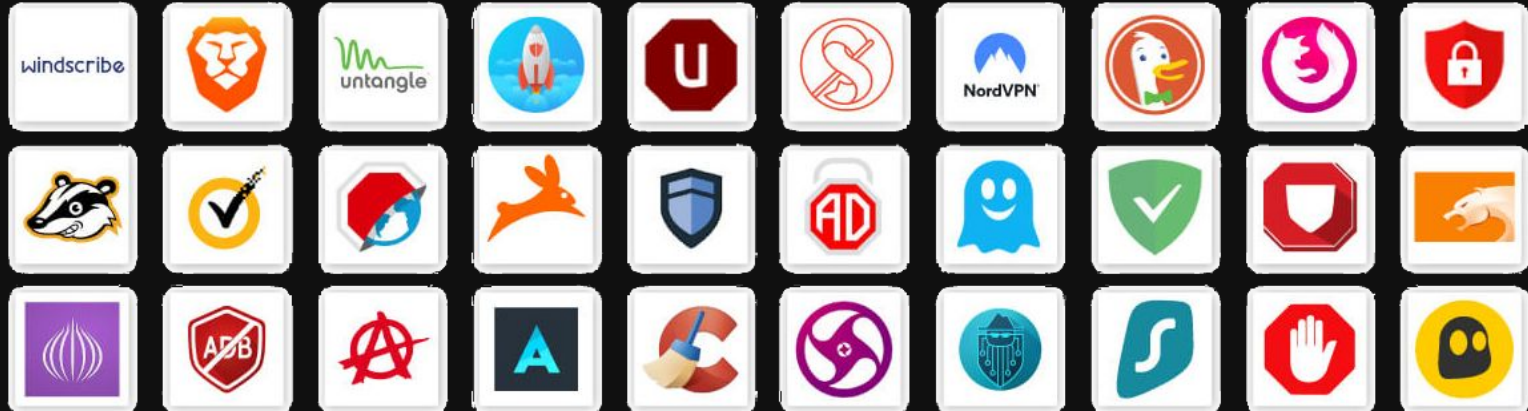
Additional Information:
Worldwide; GWI; DataReportal; Meltwater; Q3 2022; among internet users;
Online survey

Today in this talk



From **blocked events** to **100% event coverage**

Along the way: How do AdBlockers work?





But...
isn't this highly unethical?
Illegal?

Others are doing this as well, so we as the good guys with matomo should not shy away from it.



GDPR & Cookie Consent still apply.

Let users opt-out of tracking

Matomo is dedicated to providing privacy on the Internet. To provide your visitors with the choice of opting-out of Matomo Web Analytics, you can add the following HTML code on one of your website page, for example in a Privacy Policy page. [Read this to learn more.](#)

Customize the Opt-out iframe

Font Color: Background Color: Font Size: 16 Font Family: Arial

Support Do Not Track preference

You are currently respecting your users Privacy, Bravo!

When users have set their web browser to "I do not want to be tracked" (DoNotTrack is enabled) then Matomo will not track these visits.

Enable Do Not Track support

Do Not Track is a technology policy proposal that enables users to opt out of tracking by websites they do visit, including analytics services, advertising networks, and social platforms.

Cookie Einstellungen

Auf unserer Website verwenden wir Cookies, um bestimmte Funktionen zu ermöglichen, relevantere Informationen für Sie bereitzustellen und um Ihre Erfahrung auf unserer Website zu optimieren.

Bitte prüfen Sie unsere [Datenschutzerklärung](#) für alle Informationen.

Alle ablehnen

Cookie Einstellungen

Alles akzeptieren

Simon Frey

- Building things on the web **for over 14 years**
- Job
 - Past: Build & maintained huge cloud infrastructure (>50 MAU) as **Head of Infrastructure @JustWatch** with a small team of SREs
 - Now: **Founder & CTO @beansandbytes**, an AI Development Shop for SMBs in Europe (core market: Germany)



Why I am here?

Built the best (only?) AdBlock circumvention for Matomo 5 years ago.

 simon.red/mcab





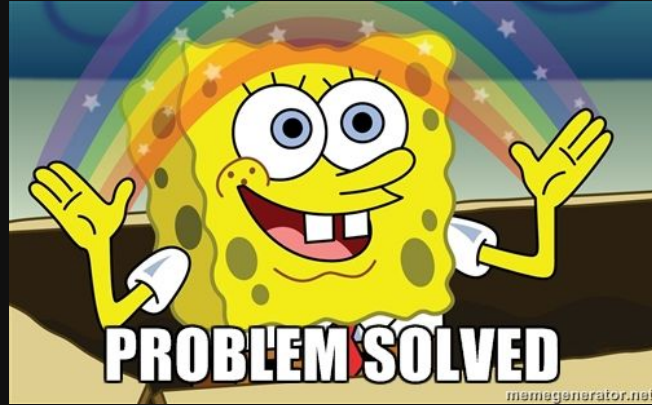
This is a technical talk.



I solve problems like this for money

If you are not-technical and just want this problem solved:
Skip this talk and **pay me to get your tracking pixel unblocked.**

 meet@simon-frey.com



We are blocked by 35% of all users



simon frey

Software exists to create business value

Let's solve real problems for your customers at simplicity over tech-porn.

Need help with your cloud infrastructure? You are your **Site Reliability Engineer** or **Fractional CTO**.

A few of the companies I worked with:



simon-frey.com

Blocked on this page
1 (12%)

Domains connected
3 out of 4

Blocked since install
1.474M (11%)

| Status | Method | Domain | File | Initiator | Type | Size |
|--------|--------|-------------------|--------------------------------------|---------------------------------|--------------------------|-------------|
| 384 | GET | simon-frey.com | / | document | html | Transferred |
| 200 | GET | simon-frey.com | email-decode.min.js | script | js | cached |
| 200 | GET | single.uberspace | script.js | script | js | 1.23 KB |
| 200 | GET | fonts.gstatic.com | NGSw5HMAFg6tUgIBNMjxLsH8aq_worf2 | font | worf2 | cached |
| 200 | GET | fonts.gstatic.com | NGSyy5HMAFg6tUgIBNMjxLsCwaps9A_worf2 | font | worf2 | cached |
| 200 | GET | cdn.matomo.cloud | matomo.js | script (script) | Blocked By uBlock Origin | |
| 200 | POST | single.uberspace | event | script (xhr) | plain | 392 B |
| 200 | GET | simon-frey.com | favicon.ico | Favicon-loader.js:mjs:175 (img) | vnd.microsoft.icon | cached |

We are blocked by 35% of all users



simon frey

Software exists to create business value

Let's solve real problems for your customers with simplicity over tech-porn.

Need help with your cloud infrastructure? You're our **Site Reliability Engineer** or **Fractional CTO**.

A few of the companies I worked with:



| Status | Method | Domain | File | Initiator | Type | Blocked |
|--------|--------|-------------------|--------------------------------------|---------------|-------|--------------------------|
| 304 | GET | simon-frey.com | / | document | html | cached |
| 200 | GET | simon-frey.com | email-decode.min.js | script | js | cached |
| 200 | GET | single.uberspace | script.js | script | js | 1.23 KB |
| 200 | GET | fonts.gstatic.com | NG0ww5HMAFg6tUgIBNMjxLsH8aq_worf2 | font | worf2 | cached |
| 200 | GET | fonts.gstatic.com | NG5yy5HMAFg6tUgIBNMjxLsCwap3RA_worf2 | font | worf2 | cached |
| 0 | GET | cdn.matomo.cloud | matomo.js | 2:88 (script) | | Blocked by uBlock Origin |

cdn.matomo.cloud

Blocked By uBlock Origin

Sample size: 115 million users



AdBlocker
ULTIMATE

AdBlocker
Ultimate

3m users



Adblock
Plus

45m users



uBlock
Origin

50m users



Privacy
badger

2m users



AdGuard
AdBlocker

15m users

Sample size: 115 million users

Disclaimer: I only tested Firefox



**AdBlocker
ULTIMATE**

**AdBlocker
Ultimate**

3m users



**Adblock
Plus**

45m users



**uBlock
Origin**

50m users



**Privacy
badger**

2m users



**AdGuard
AdBlocker**

15m users

Status Quo: Default matomo pixel

JavaScript Tracking Code

EMAIL THESE INSTRUCTIONS

Click on the button to copy the code snippet and paste it immediately before the closing </head> tag (recommended)

```
<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u="https://simonfrey.matomo.cloud/";
    _paq.push(['setTrackerUrl', u+'matomo.php']);
    _paq.push(['setSiteId', '1']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src='https://cdn.matomo.cloud/simonfrey.matomo.cloud/matomo.js'; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 55 million users

Blocks tracking script



Blocks event



Problem: "matomo.cloud" is a know tracking host


Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | | |
|----------|-------------------|----|----------------|---|------|--------|---|
| 08:49:03 | | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 08:49:03 | | | simon-frey.com | 3 | post | xhr | https://single.uber.space/api/event |
| 08:49:03 | matomo.cloud^\$3p | -- | simon-frey.com | 3 | get | script | https://cdn.matomo.cloud/simonfrey.matomo.cloud/matomo.js |

How do we know why something is blocked? uBlock Origin logger

simon-frey.com



Blocked on this page
1 (4%)

Domains connected
4 out of 4

Blocked since install
1.503M (11%)

More ^ Less

Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Practic

filter logger content

| | | | | | | |
|----------|------------|----------------|----------------|------|--------|--|
| 10:04:23 | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 10:04:23 | | simon-frey.com | 3 | post | xhr | https://single.uber.space/api/event |
| 10:04:23 | *\$ping,3p | -- | simon-frey.com | 3 | post | beacon https://single.uber.space/matomo_talk/rev/no.phpmatomo... |
| 10:04:23 | | simon-frey.com | 3 | get | script | https://single.uber.space/matomo_talk/freedom.js |
| 10:04:23 | | simon-frey.com | 3 | get | script | https://single.uber.space/js/script.js |
| 10:04:23 | | simon-frey.com | 3 | get | script | https://single.uber.space/matomo_talk/freedom.js |
| 10:04:23 | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/v7/NGSyv5HMAFg6lu... |
| 10:04:23 | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/v7/NGSwv5HMAFg6lu... |
| 10:04:23 | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/v7/NGSyv5HMAFg6lu... |
| 10:04:23 | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/v7/NGSwv5HMAFg6lu... |
| 10:04:23 | | simon-frey.com | 3 | get | script | https://single.uber.space/js/script.js |
| 10:04:23 | | simon-frey.com | 1 | get | script | https://simon-frey.com/cdn-cgi/scripts/5c5dd728/cloudflar... |
| 10:04:23 | | simon-frey.com | 1 | get | doc | https://simon-frey.com/ |
| 10:04:23 | | | | | | https://simon-frey.com/ |

How do they know what to block?

“Most relevant” adblock-lists:

- easylist.to
- gitlab.com/malware-filter/urlhaus-filter
- pgl.yoyo.org/adserver

```
[Adblock Plus 2.0]
! Version: 20241120853
! Title: Easylist
! Last modified: 12 Nov 2024 08:53 UTC
! Expires: 4 days (update frequency)
! *** easylist:template_header.txt ***
!
! Please report any unblocked adverts or problems
! in the forums (https://forums.lanik.us/)
! or via e-mail (easylist@protonmail.com).
!
! Homepage: https://easylist.to/
! Licence: https://easylist.to/page/licence.html
! GitHub issues: https://github.com/easylist/easylist/issues
! GitHub pull requests: https://github.com/easylist/easylist/pulls
```

```
! Title: Malicious URL
! Updated: 2024-11-12T09:11:00Z
! Expires: 1 day (update frequency)
! Homepage: https://gitlab.com/malware-filter/urlhaus-filter
! License: https://gitlab.com/malware-filter/urlhaus-filter/-/blob/main/LICENSE
! Source: https://urlhaus-filter.gitlab.io/
059879e5-b2e8-4f58-aa46-ad-bottom-
059879e5-b2e8-4f58-aa46-ad-manager/$-stylesheet
@wdrive.com-ad-right.
@wdrive.com-ad-sidebar.
1.0x@04.top-ad-unit.
1.10.146.175-ad-util.
1.10.209.219-ad.jpg;pagespeed.
1.117.232.76-ad-banner.
1.117.68.18-ad-bottom.
1.117.62.81-ad-manager/$domain=wordpress.org
1.12.232.192-ad-manager/$domain=web-ads.org
1.12.242.190-ad/assets/$script,domain=web-ads.org
1.13.255.117-assets/ads.$-script
1.14.123.191-ad-auto-ads.
1.14.134.205-ad-banner-ad.
1.14.205.72-ad-banner-ad-$-stylesheet
1.14.67.242-contrib-ads.$-stylesheet
1.14.69.16-display-ads.
1.14.92.34-footerads.
1.145.217.248-housead.
1.15.247.249-page-ad.
1.15.248.225-page-pee1.
1.171.77.109-PcmModule-Taboola.
1.179.62.255-pee1-ads.
1.179.63.129-popexit.
1.179.63.130-popunder.
1.179.63.145-
1.179.63.146-
1.189.10.5-
1.189.180.32-
1.189.12.130-
1.189.86.82-
1.190.161.142-
1.190.163.228-
1.198.182.67-
1.196.78.202-
1.205.225.58-
```

View the list in a different format

blocklist last updated: 2024-11-12T09:11:00Z
listing ad servers added after 2024-11-12T09:11:00Z
format list is displayed in: text
total entries: 1.205.225.58

Hide this header, view the list

```
[Adblock]
* 1-lads.com
1-lads.com
* 101com.com
101com.com
* 180hits.de
180hits.de
* 180searchassistant.com
180searchassistant.com
* 1link2020.com
1link2020.com
* 1rx.io
1rx.io
* 207.net
207.net
* 247media.com
247media.com
* 24log.com
24log.com
* 24pm-affiliation.com
24pm-affiliation.com
* 2dnw.net
```

Problem: "matomo.cloud" is a know tracking host

Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | |
|----------|-------------------|----------------|---|------|--------|---|
| 08:49:03 | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 08:49:03 | | simon-frey.com | 3 | post | xhr | https://single.uber.space/api/event |
| 08:49:03 | matomo.cloud^\$3p | -- | 3 | get | script | https://cdn.matomo.cloud/simonfrey.matomo.cloud/matomo.js |

Idea 1: Self-host matomo.js

```
<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u="https://simonfrey.matomo.cloud/";
    _paq.push(['setTrackerUrl', u+"matomo.php"]);
    _paq.push(['setSiteId', '1']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src=https://single.uber.space/matomo\_talk/matomo.js; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 55 million users

Blocks tracking script



Blocks event



Problem: "matomo.js" is a known tracker file

rrrent tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | | | |
|-------|------------------------------|----|--|----------------|---|------|--------|---|
| 52:13 | | | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 52:13 | | | | simon-frey.com | 3 | post | xhr | https://single.uber.space/api/event |
| 52:13 | /matomo.js\$from=~github.com | -- | | simon-frey.com | 3 | get | script | https://single.uber.space/matomo_talk/matomo.js |

Idea 2: Rename matomo.js ⇒ freedom.js

```
<script defer data-domain="simon-frey.com" src="https://single.uber.space/js/script.js"></script>

<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u="https://simonfrey.matomo.cloud/";
    _paq.push(['setTrackerUrl', u+'matomo.php']);
    _paq.push(['setSiteId', '1']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src='https://single.uber.space/matomo_talk/freedom.js'; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 55 million users

Blocks tracking script



Blocks event



Problem: "matomo.cloud" STILL is a known tracking host

Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | | |
|----------|-------------------|----|----------------|---|------|--------|---|
| 08:53:41 | | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 08:53:40 | | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/ |
| 08:53:40 | | | simon-frey.com | 3 | get | font | https://fonts.gstatic.com/s/intertight/ |
| 08:53:40 | matomo.cloud^\$3p | -- | simon-frey.com | 3 | post | beacon | https://simonfrey.matomo.cloud/mat |

Idea 3: Self-host/proxy backend

```
<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u='https://single.uber.space/matomo_talk/rev/matomo.php';
    _paq.push(['setTrackerUrl', u]);
    _paq.push(['setSiteId', '1']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src='https://single.uber.space/matomo_talk/freedom.js'; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 53 million users

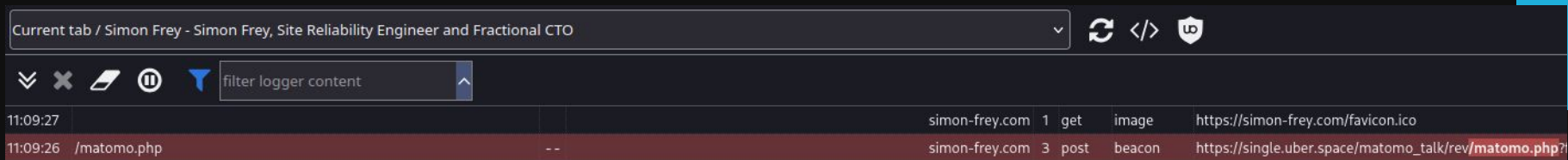
Blocks tracking script



Blocks event



Problem: "matomo.php" is a known path



The screenshot shows a web browser's developer console. The top bar indicates the current tab is "Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO". The console has a search filter set to "filter logger content". The log shows two entries:

| Time | Message | Source | Type | Method | URL | |
|----------|-------------|----------------|------|--------|--------|---|
| 11:09:27 | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 11:09:26 | /matomo.php | -- | 3 | post | beacon | https://single.uber.space/matomo_talk/rev/matomo.php? |

Idea 4: Rename known tracking path

```
<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u="https://single.uber.space/matomo_talk/rev/no.php";
    _paq.push(['setTrackerUrl', u]);
    _paq.push(['setSiteId', '1']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src='https://single.uber.space/matomo_talk/freedom.js'; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 50 million users

Blocks tracking script



Blocks event



Problem: "action_name" is a known tracking parameter

Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | |
|----------|-------------------|----------------|---|------|--------|---|
| 08:56:10 | | simon-frey.com | 1 | get | image | https://simon-frey.com/favicon.ico |
| 08:56:10 | .php?action_name= | -- | 3 | post | beacon | https://single.uber.space/matomo_talk/rev/no.phpmatomo.php?action_name=Simon Frey |

Idea 4: Rename known tracking query parameter



In matomo/freedom.js

```
var dL=cL("freedomaction_name"+u(aq(dM|bu)),d0,"log");if(bd&&!bs){dL=aI(dL)}bS(dL,bW,dN)}function
```

In reverse proxy (no.php)

```
$_GET['action_name'] = $_GET['freedomaction_name'];
```

We miss out on 50 million users

Blocks tracking script 
Blocks event 

Problem: 99% of all beacon-requests are trackers

Current tab / Simon Frey - Simon Frey, Site Reliability Engineer and Fractional CTO

filter logger content

| | | | | | | | |
|----------|------------|----|--|----------------|---|------|--------|
| 09:01:10 | | | | simon-frey.com | 1 | get | image |
| 09:01:10 | *\$ping,3p | -- | | simon-frey.com | 3 | post | beacon |

What the hell is a “beacon-request”?

```
document.addEventListener("visibilitychange", function logData() {
  if (document.visibilityState === "hidden") {
    navigator.sendBeacon("/matomo.php", {"event":"user_left_page"});
  }
});
```

The Beacon API is used to send an asynchronous and non-blocking request to a web server. [...] the browser guarantees to initiate beacon requests before the page is unloaded and to run them to completion. [...] The main use case for the Beacon API is to send analytics [...]

Source: developer.mozilla.org

Why beacon?



```
document.addEventListener("unload", function logData() {  
  const request = new XMLHttpRequest();  
  request.open("POST", "/matomo.php", false); // `false` makes the request synchronous  
  request.send({"event": "user_left_page"});  
});
```

Before: **Tracking requests broke browser responsiveness**

Idea 5: Disable "ping" request

```
<!-- Matomo -->
<script>
  var _paq = window._paq = window._paq || [];
  /* tracker methods like "setCustomDimension" should be called before "trackPageView" */
  _paq.push(['trackPageView']);
  _paq.push(['enableLinkTracking']);
  (function() {
    var u="https://single.uber.space/matomo_talk/rev/no.php";
    _paq.push(['setTrackerUrl', u]);
    _paq.push(['setSiteId', '1']);
    _paq.push(['disableAlwaysUseSendBeacon', 'true']);
    var d=document, g=d.createElement('script'), s=d.getElementsByTagName('script')[0];
    g.async=true; g.src='https://single.uber.space/matomo_talk/freedom.js'; s.parentNode.insertBefore(g,s);
  })();
</script>
<!-- End Matomo Code -->
```

We miss out on 0 users 🎉

Blocks tracking script



Blocks event







We are in an everlasting cat and mouse game. Are we?



Also our new host will get known at some point.

Every host will land on a block list when it gets **popular enough**.

Two options against this:

- **Rotate the domain** of the reverse proxy every X day

Also our new host will get known at some point.

Every host will land on a block list when it gets **popular enough**.

Two options against this:

- **Rotate the domain** of the reverse proxy every X day
- Host the **reverse proxy on the same domain** as the main website, hence you then can't block the host anymore

Also our “freedom.js” “no.php” paths will get known

Every path will land on a block list when it gets popular enough.

Two options against this:

- **Rotate the path** every X days

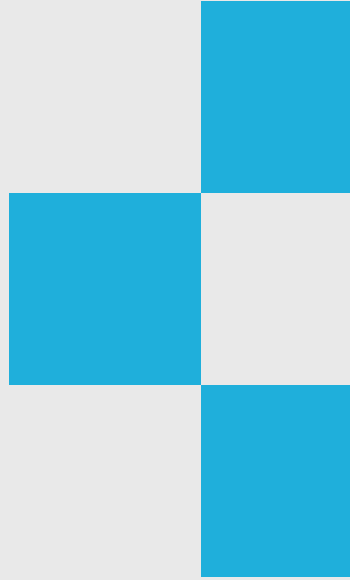
Also our “freedom.js” “no.php” paths will get known

Every path will land on a block list when it gets popular enough.

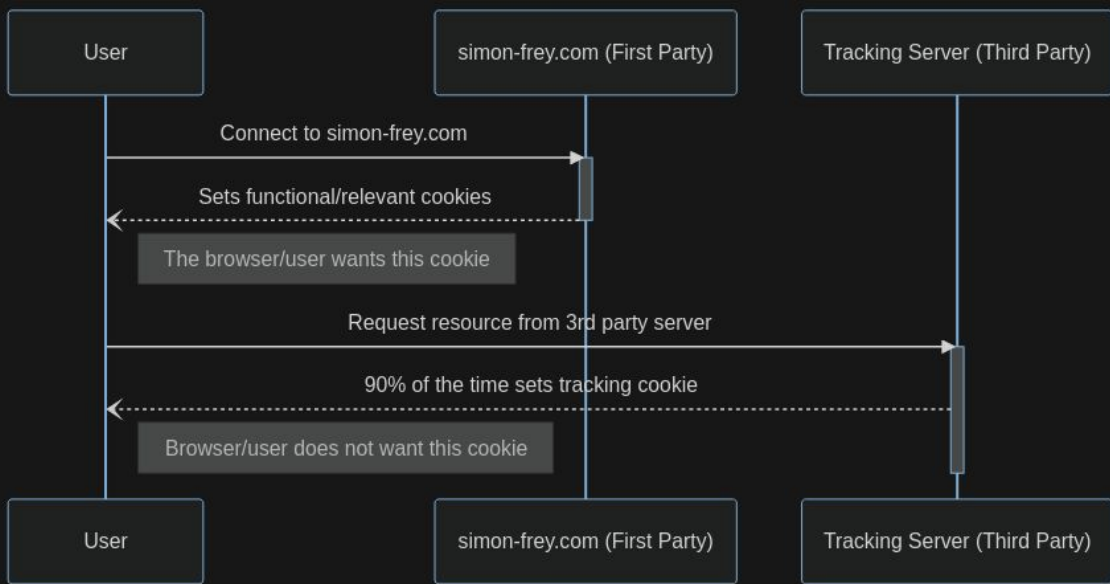
Two options against this:

- **Rotate the path** every X days
- Use the **path of a common known dependency** (“jquery.js”) as if AdBlockers block that they break the internet and users uninstall them

One last thing: Cookiegeddon



No more 3rd party cookies



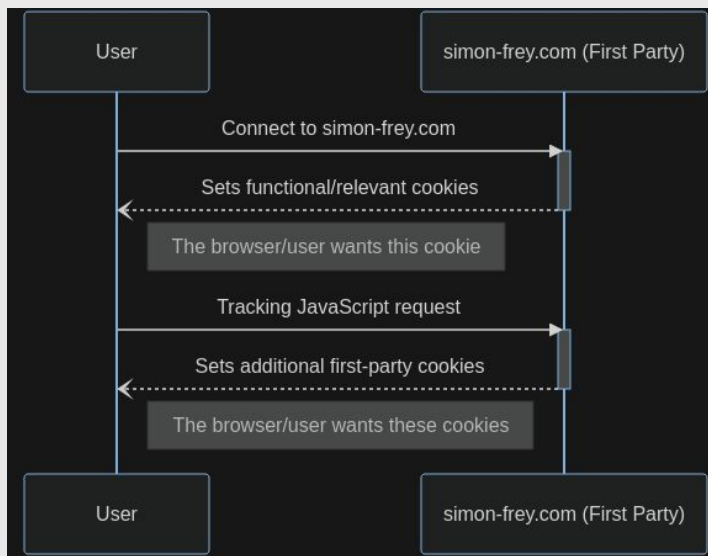
3rd party cookies will be blocked "soon"
(already delayed for 3-4 times by Chrome)

Why do we need 3rd party cookies?



You need 3rd party cookies, to track users across different websites.

Great news: We only need first party cookies



Matomo as being privacy first, does this by default

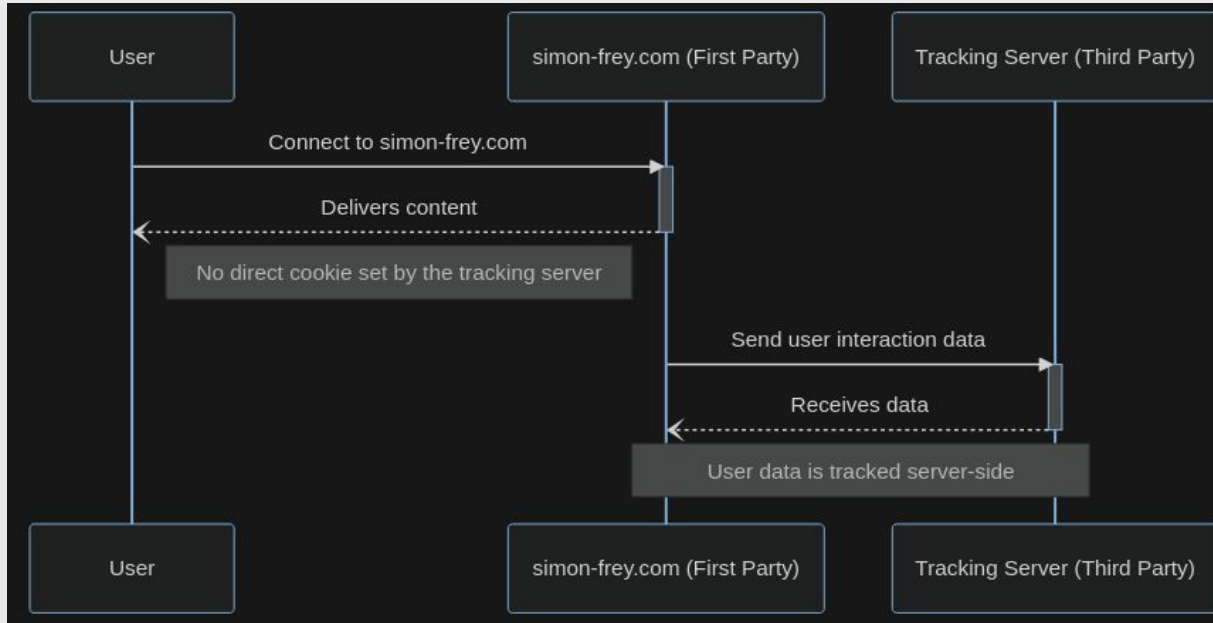
The default Matomo Tracking code uses first-party cookies [...]

Source: matomo.org

The solution for all problems in this talk



Server-side tracking



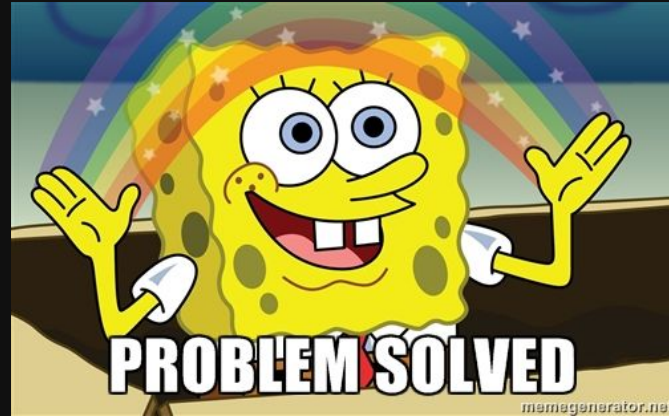
If the tracking is directly done on the server, the browser can't block it.

I solve problems like this for money

If you need help applying what you learned in this talk:

Pay me to get your tracking pixel unblocked/server side tracking implemented.

 meet@simon-frey.com





Contact me:

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Slides, Links & Recording:
👉 simon.red/matomo-camp-24