



Google Analytics.. illegal?

User tracking · data protection · privacy (from scratch!)

+ Exploring Matomo

60 minutes free webinar

by Valerio Bozzolan



It's me! Valerio Bozzolan

- **Italian Linux Society** board director
- Wikimedia and OpenStreetMap contributor
- FLOSS software developer
- GNU/Linux sysadmin
- Member of
 - Free Software Foundation
 - Free Software Foundation Europe
 - Border Radio
 - InformAzioni.wiki + WMI



gnu@linux.it



Again...

I'm not Illuminati / investor in
Matomo / etc.

I just love **software freedom**,
privacy and **data protection** <3

Statistics in real life



Problem 1:

«How many visits?»

Statistics in real life



Problem 1:

«How many visits?»

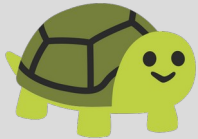


Statistics in real life



Problem 1:

«How many visits?»



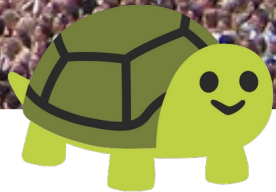
Privacy friendly
proposal:



Image in CC0 by Rocher at Czech Wikipedia
<https://commons.wikimedia.org/wiki/File:Click1.jpg>
https://commons.wikimedia.org/wiki/File:Noto_Emoji_Oreo_2714.svg



OK 67.. 68..





1.. 2..



5.. 6..



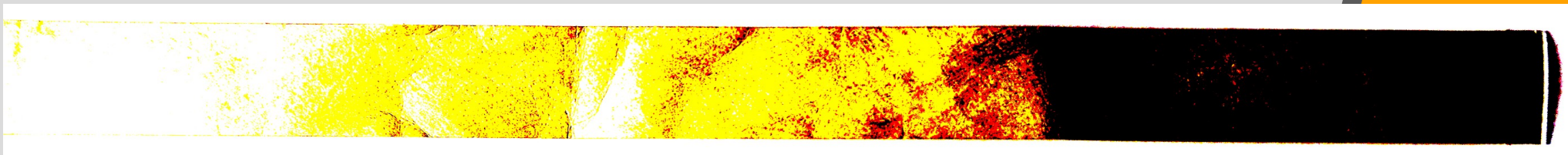
3.. 4..



Problem 2: «How many **unique** visits?»



Problem 2: «How many **unique** visits?»



↑ Guess the solution

Problem 2: «How many **unique** visits?»

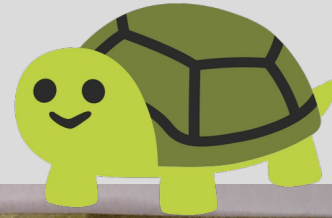


Image by C. Suthorn in CC BY-SA-4.0

[https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_(cropped).jpg)

Problem 2: «How many **unique** visits?»

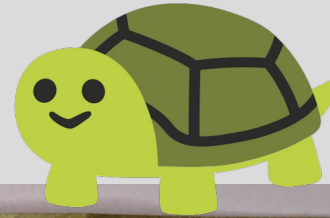


Image by C. Suthorn in CC BY-SA-4.0

[https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_(cropped).jpg)



Image by Whoisjohngalt in CC BY 2.0

[https://commons.wikimedia.org/wiki/File:%Eg%8A%AD%E6%B9%AF%Eg%8D%B5_\(45556488112\).jpg](https://commons.wikimedia.org/wiki/File:%Eg%8A%AD%E6%B9%AF%Eg%8D%B5_(45556488112).jpg)



Image by Whoisjohngalt in CC BY-SA-4.0

https://commons.wikimedia.org/wiki/File:Wrist_Identification_Band.jpg

«How many unique visits?»

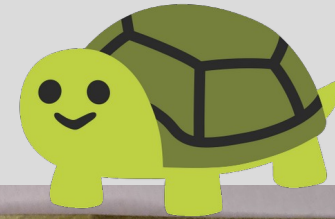


Image by C. Suthorn in CC BY-SA-4.0

[https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_\(cropped\).jpg](https://commons.wikimedia.org/wiki/File:Christmas_Market_at_Berlin_Breitscheidplatz_during_Covid-19_2021-11-20_16_(cropped).jpg)



Image by Whoisjohngalt in CC BY 2.0

[https://commons.wikimedia.org/wiki/File:%Eg%8A%AD%E6%B9%AF%Eg%8D%B5_\(45556488112\).jpg](https://commons.wikimedia.org/wiki/File:%Eg%8A%AD%E6%B9%AF%Eg%8D%B5_(45556488112).jpg)



Why?

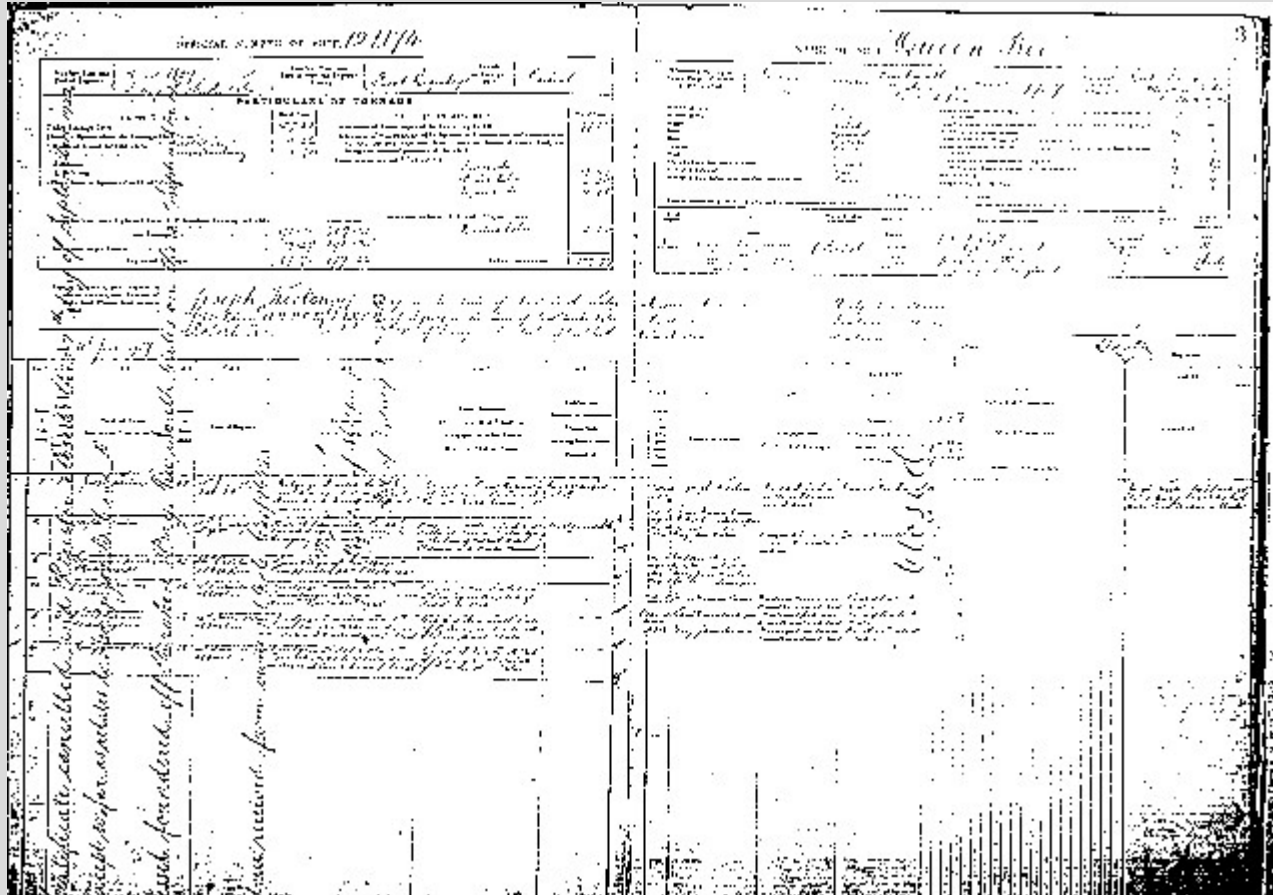
Image by Whoisjohngalt in CC BY-SA-4.0

https://commons.wikimedia.org/wiki/File:Wrist_Identification_Band.jpg

«How many visits **yesterday** after 18:12 and 18:52 UTC+2?

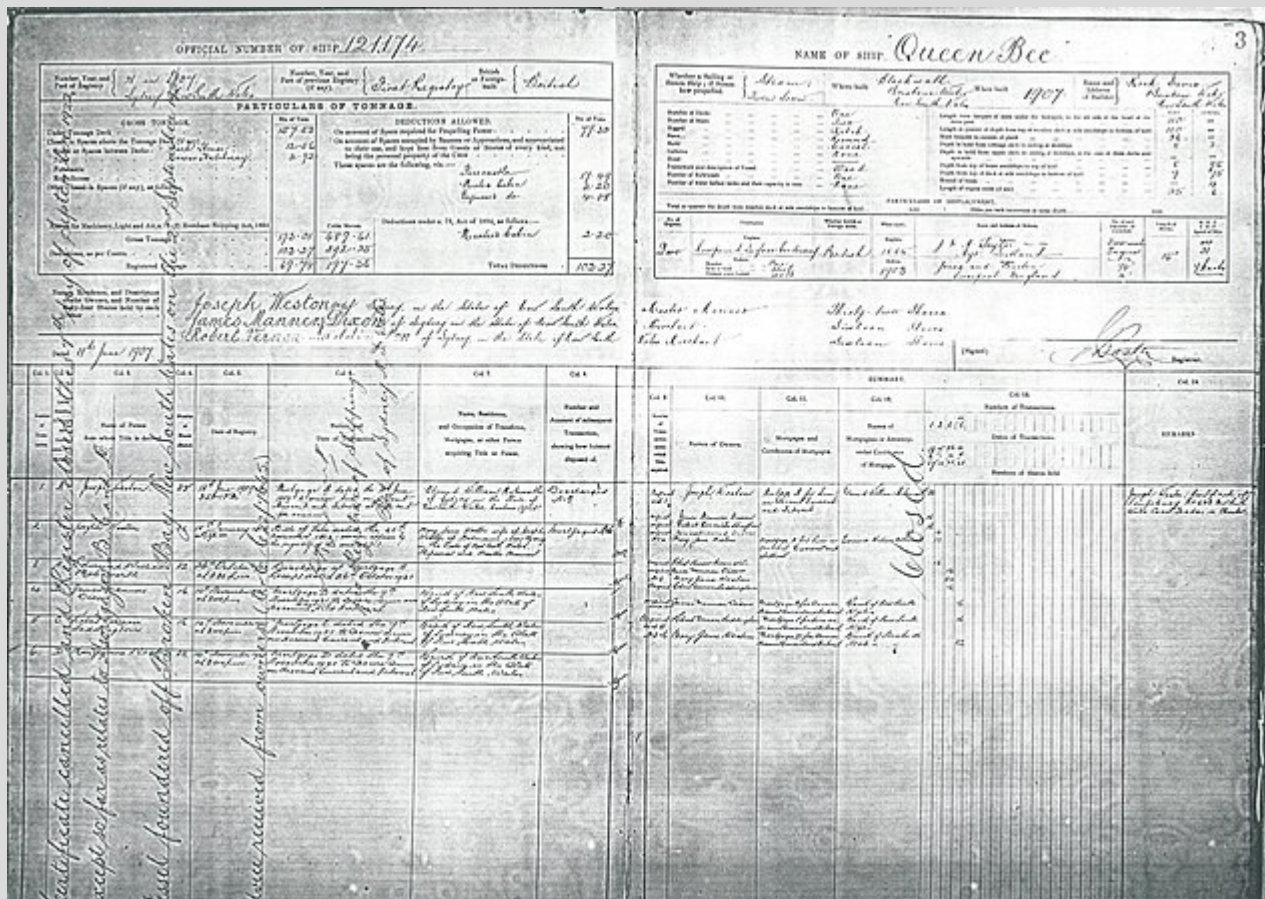


«How many visits yesterday after 18:12 and 18:52 UTC+2?



????????????????????

«How many visits yesterday after 18:12 and 18:52 UTC+2?»



File:Queen Bee Registry.jpg in public domain
https://commons.wikimedia.org/wiki/File:Queen_Bee_Registry.jpg

Back to the Web



You (client)



`https://www.example.com/home/`

«The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents.»

https://commons.wikimedia.org/wiki/File:Firefox_logo._2017.svg

Victor Grigas/Wikimedia Foundation
https://commons.wikimedia.org/wiki/File:Wikimedia_Foundation_Servers_2015-63.jpg

Linux.it- ILS.org

Back to the Web - URL



`https://www.example.com/home/`

Protocol

Domain

Pathname

https://commons.wikimedia.org/wiki/File:Firefox_logo._2017.svg

Victor Grigas/Wikimedia Foundation
https://commons.wikimedia.org/wiki/File:Wikimedia_Foundation_Servers_2015-63.jpg

Linux.it- ILS.org

HTTP in 1990



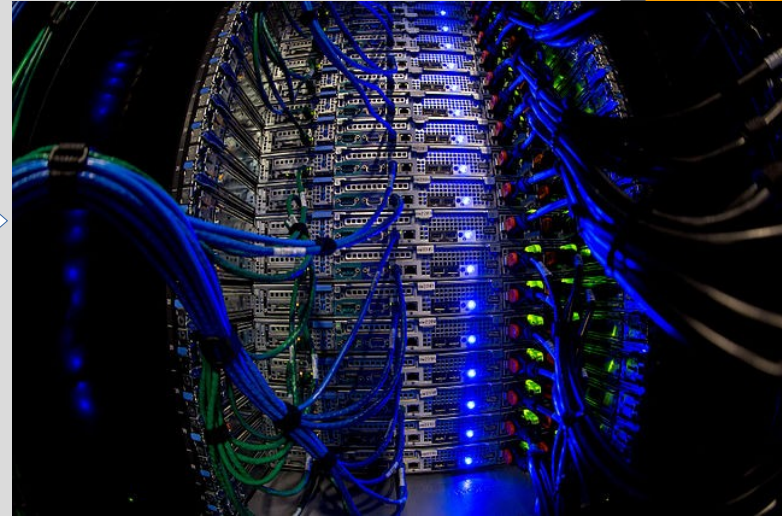
You (client)



<https://example.org/home/>

web page (HTML)

Rendering ↓



A server process the request

HTTP in 1995



Rendering ↓

<https://www.example.com/home/>

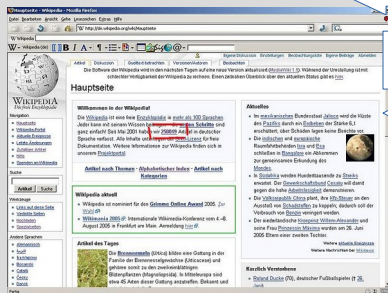
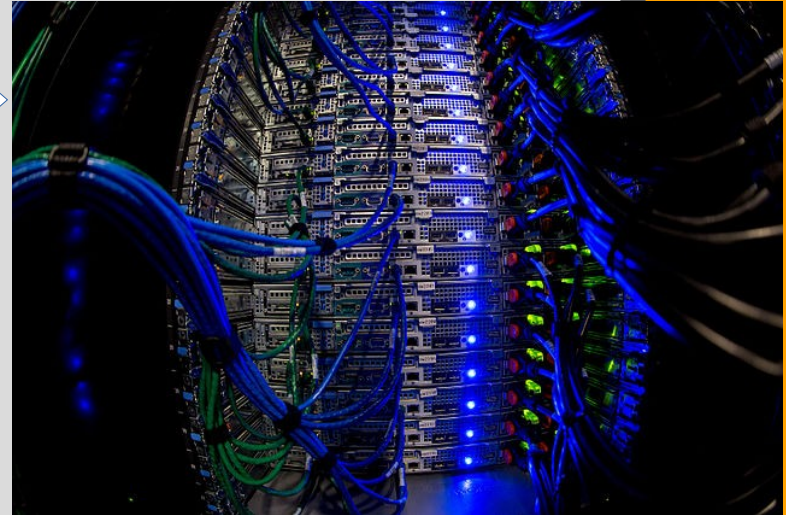
[.../image1.png](https://www.example.com/.../image1.png)

[../my-style.css](https://www.example.com/..../my-style.css)

[https://../animations.js](https://www.example.com/https://../animations.js)

[https://.../logo.png](https://www.example.com/https://.../logo.png)

[https://../icon2.png](https://www.example.com/https://../icon2.png)



https://commons.wikimedia.org/wiki/File:Firefox_logo._2017.svg
https://commons.wikimedia.org/wiki/File:250019_artikel_in_de.jpg (2005)
https://commons.wikimedia.org/wiki/File:Wikimedia_Foundation_Servers_2015-63.jpg

(Wikipedia in 2005...)



The screenshot shows the German Wikipedia homepage in a Mozilla Firefox browser window. The address bar displays 'http://de.wikipedia.org/wiki/Hauptseite'. The page features a navigation menu with options like 'Artikel', 'Diskussion', and 'Quelltext betrachten'. A prominent announcement states that the software is being updated to MediaWiki 1.5. The main content area is divided into several sections: 'Willkommen in der Wikipedia!' with a welcome message and a link to 'die ersten Schritte'; 'Aktuelles' with a list of recent news items including an earthquake in Jalisco, the Indian and European space agencies, and a strike in South Africa; 'Wikipedia aktuell' with news about the Grimme Online Award and Wikimania 2005; and 'Artikel des Tages' featuring Brennesseln (Urtica).

https://commons.wikimedia.org/wiki/File:Firefox_logo._2017.svg

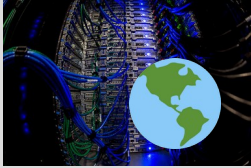
https://commons.wikimedia.org/wiki/File:250019_artikel_in_de.jpg (2005)

https://commons.wikimedia.org/wiki/File:Wikimedia_Foundation_Servers_2015-63.jpg

Web in 2022



https://ansa.it/
https://../
https://../
https://../
https://../
https://../
https://../
Twitter
embed



Facebook pixel
https://../
https://../
https://../
Google Maps



Google fonts
https://../
https://../
style.css
GAnalytics
https://../
https://../
image4.png



Web in 2022 — dev console



ANSA.it - Chromium

ANSA.it

ansa.it

Dimensions: Responsive 1560 x 151 100% No throttling

EDIZIONI > Mediterraneo Europa-Ue NuovaEuropa America Latina Brasil English Podcast ANSAcheck

Fai la ricerca Vai al Meteo ABBONATI Accedi o Registrati

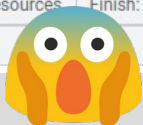
Cronaca Politica Economia Regioni + Mondo Cultura Tecnologia Sport FOTO VIDEO Tutte le sezioni +

Name	Url	Status	Type	Initiator	Size	Time	Wait
387e5615789...	https://www.ansa.it/webimages/img_300x200/2019/6/24/387e561578931757d292564e2994de0d.jpg	200	jpeg	<anonymous>:1		4 ms	
76aecb3f7f9c...	https://www.ansa.it/webimages/img_141x127/2022/6/22/76aecb3f7f9c03f9282e4f5965b506cf.jpg	200	jpeg	jquery-3.5.1.min.js:2		1 ms	
favicon.ico	https://www.ansa.it/sito/img/ico/favicon.ico	200	x-icon	Other	4.5 kB	21 ms	
cast_sender.js	https://www.gstatic.com/cv/js/sender/v1/cast_sender.js	200	script	base.js:1858	2.6 kB	78 ms	
generate_204...	https://www.youtube.com/generate_204?83rHsw	204	text/plain	<anonymous>:1	9 B	11 ms	
cast_sender.js	https://www.gstatic.com/eureka/clank/103/cast_sender.js	200	script	www.gstatic.com/cv/j...	15.1 kB	33 ms	
GenerateIT	https://jnn-pa.googleapis.com/\$rpc/google.internal.waa.v1.Waa/GenerateIT	200	preflight	Preflight	0 B	21 ms	
GenerateIT	https://jnn-pa.googleapis.com/\$rpc/google.internal.waa.v1.Waa/GenerateIT	200	xhr	base.js:6370	142 B	29 ms	
log_event?alt=...	https://www.youtube.com/youtuvei/v1/log_event?alt=json&key=AlzaSyAO_FJ2SlqU8Q4STEHLGCilw_Y9_...	200	xhr	base.js:1381	50 B	29 ms	

1 / 848 requests 18.7 kB / 10.2 MB transferred 146 kB / 38.2 MB resources Finish: 52.12 s DOMContentLoaded: 8.54 s Load: 14.14 s

Console Changes Issues

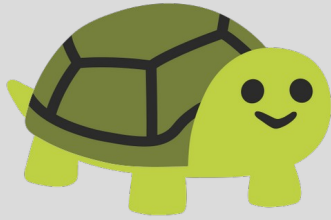
↑ ~848 HTTP requests



Understood Wristband... Understanding cookies!



Visitor



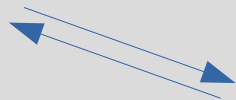
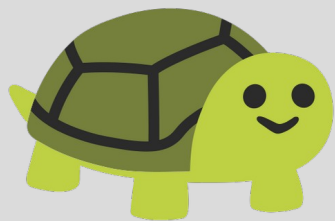
Website



Understood Wristband... Understanding cookies!



Visitor



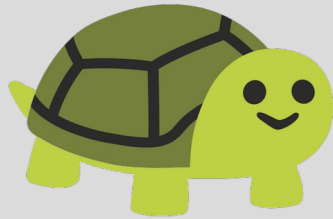
Website



Understood Wristband... Understanding cookies!



Visitor



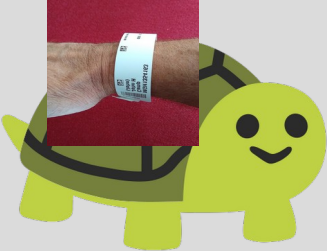
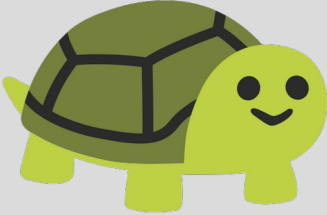
Website



Understood Wristband... Understanding cookies!



Visitor



Website



Third parties cookies



Visitor



Exercise: track in real life!



https://commons.wikimedia.org/wiki/File:Mumac_-_Ricostruzione_di_un_bancone.jpg

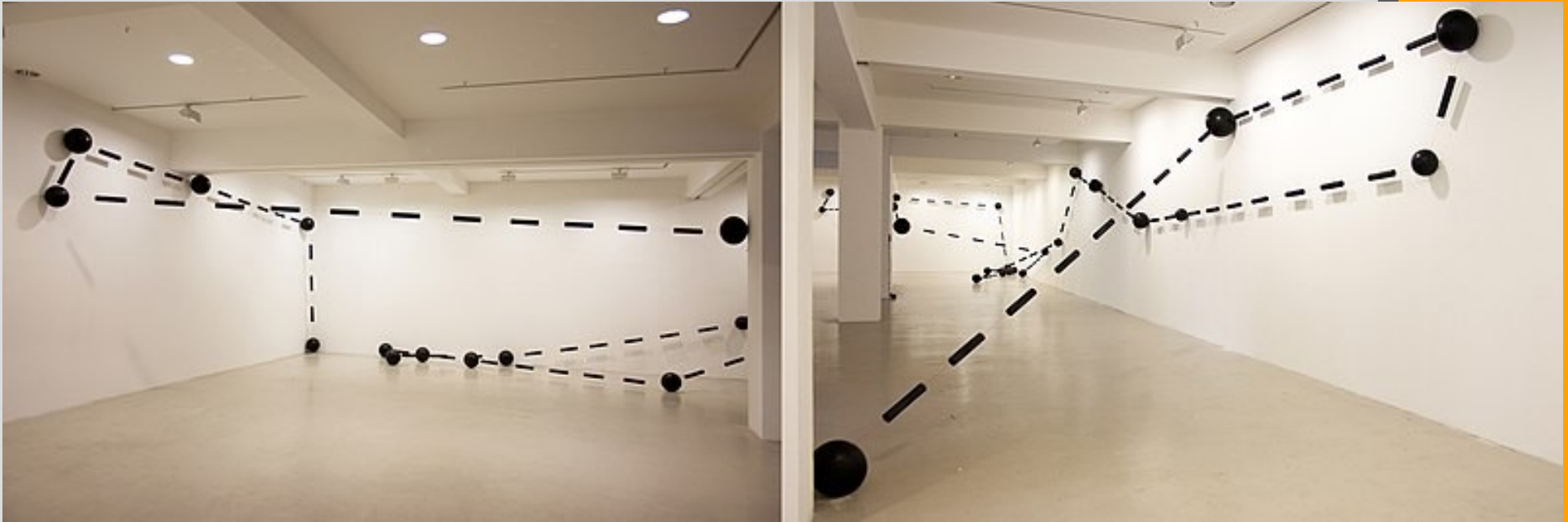
«Hi, I want this sandwich.»

ring ring
Good morning Google,
I'm the barman,
Yes, a customer came, tall: 1.57M,
with an Android with Google Play
Store and an Apple watch, brown
hair, looked at the sandwich for 4.12
seconds then bought it and came
out speaking Italian, I saw its red
car license plate AB123CB
Goodbye!
click

ring ring
Good morning Facebook,
I'm the barman,
An Italian customer came, 5'7"
tall, brown hair, looked at the
fridge for 6.13 seconds then
bought a sandwich and used
a VISA card, looked at the
liquor for 0.2 seconds, then
walked out..
He said he's now going to the
pharmacy, by car, plate
AB123CB.
click

(150 subsequent calls later...)

Exercise: track in real life



https://commons.wikimedia.org/wiki/File:Auswahl_CRW_0757_0771_Kombi_A6.jpg

Exercise: your web in real life



Your bar (usually) do **not** compromise its professional confidentiality.

Let's do the same on the web.

Whatever web tracking



ext. position

HTTP referrer

operating system version

Last visits

Number of unique visits

Visit duration

Country origin

Clicks

Page scroll

IPs

Logged-in data match

Wake up

Zoom

keypresses

Cookies

Hot zones

Attention hours

Pref. languages

Most viewed

Entry / exit pages

interests

LocalStorage

precise browser version

Give me Tech+legal details



Monitora PA project!

[https://monitora-pa.it/2022/06/22/
Allegato-Tecnico.pdf](https://monitora-pa.it/2022/06/22/Allegato-Tecnico.pdf)

Web don't(s)



- 1. Don't embed:** download locally
(images, fonts, etc.)
(e.g. download legally from OpenStreetMap)
- 2. Adopt** Free/Libre Open Source client-side
and server-side
(e.g. Matomo)

What about Matomo?



- Free/Libre and Open Source
- Self-hosted (100% data ownership) or as a service
- With consultants or not (official / unofficial / local)
- License: **GNU General Public License v3**



▼ PIPPO BLOG

📅 FROM 2022-05-24 TO 2022-06-22

👤 ALL VISITS

▼ DASHBOARD

NEW UPDATE: MATOMO 4.10.1 📢



☰ Dashboard

Dashboard

👤 Visitors

🔔 Behaviour

📅 Acquisition

🎯 Goals

Visits in Real-time

DATE	VISITS	ACTIONS
Last 24 hours	5	11
Last 30 minutes	0	0

Thursday, June 23, - 00:26:51 (16 min 4s) 🇮🇹 📱 🖥️ 📺

🌐 Google

Actions: 📁 📄 📄 📄 📄 📄 📄

Wednesday, June 22, - 23:46:38 🇮🇹 📱 🖥️ 📺

Social network: [Twitter](#)

Actions: 📁

Wednesday, June 22, - 21:42:15 🇮🇹 📱 🖥️ 📺

Social network: [Twitter](#)

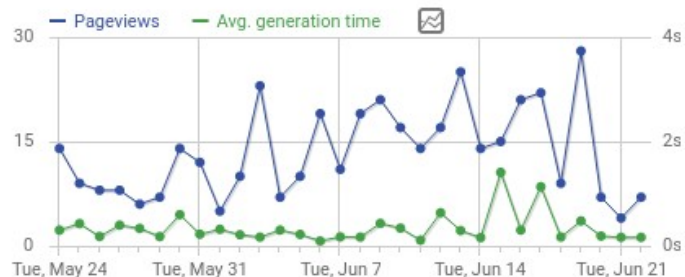
Actions: 📁

Wednesday, June 22, - 16:57:28 🇳🇴 📱 🖥️ 📺

🌐 Google

Actions: 📁

Visits Over Time



Visitor Map



🌐 Countries

Search Engines

SEARCH ENGINE	VISITS
🔍 Google	109
🔍 Bing	14
🔍 DuckDuckGo	5
🔍 Yandex	5
🔍 Baidu	3

Browsers

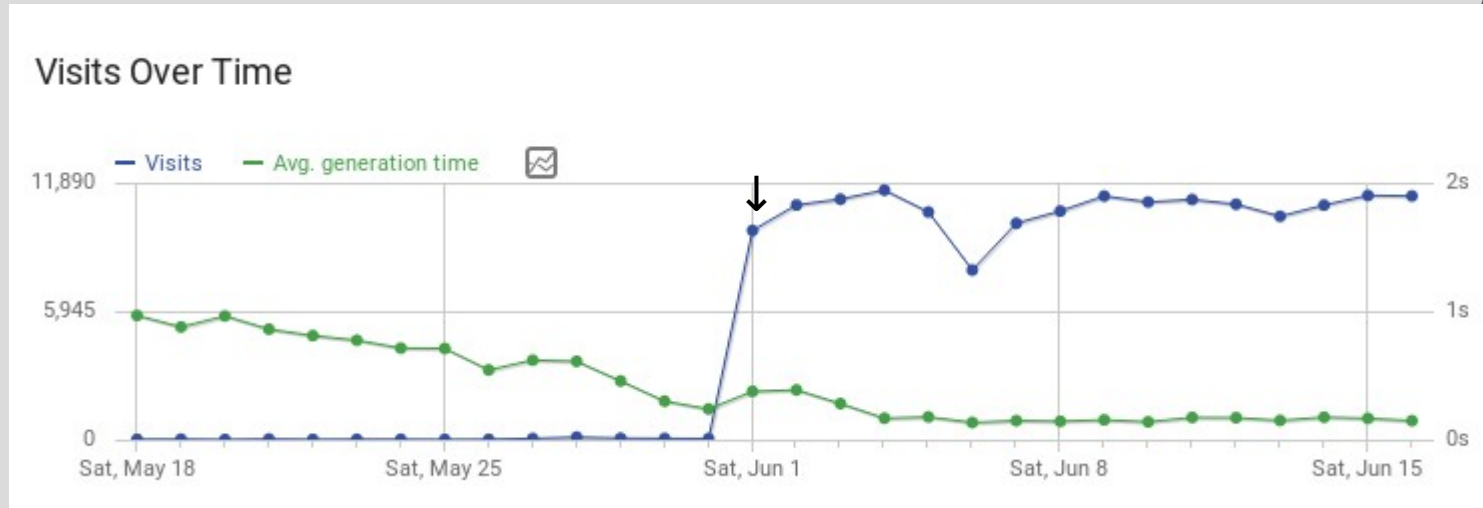
BROWSER

🌐 Chrome
🌐 Firefox
🌐 Chrome Mobile
🌐 Mobile Safari

Matomo Visits/Generation

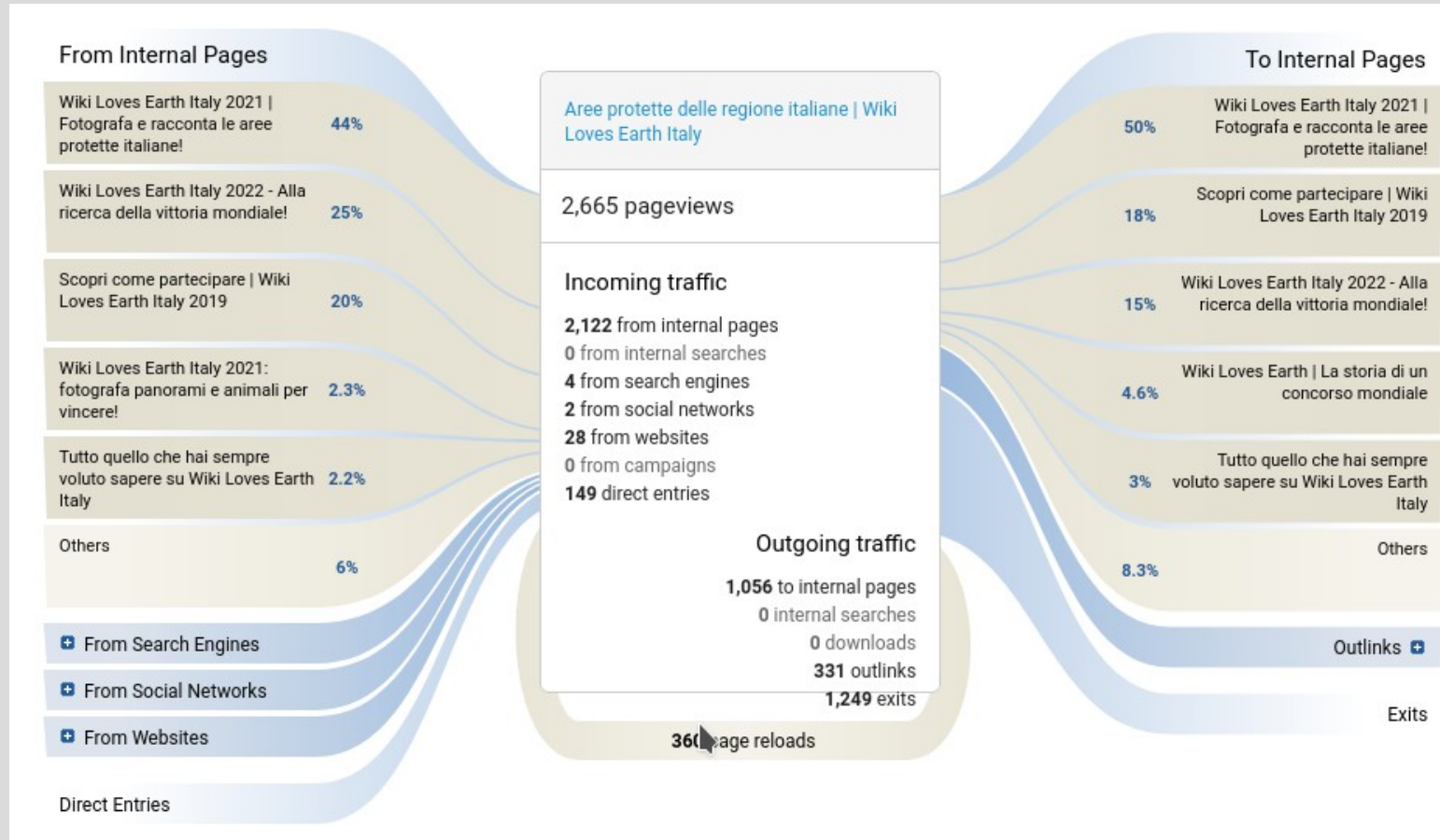


(Context: tomorrow Wikipedia puts a banner to your site)



<https://blog.reyboz.it/2019/06/17/come-ottimizzare-un-sito-in-wordpress-ad-alto-traffico-senza-cloudflare-la-guida-definitiva1/>

Matomo Page titles



Matomo Visits Overview




Visits Overview



320 visits



43s average visit duration



76% visits have bounced (left the website after one page)




1.7 actions (page views, downloads, outlinks and internal site searches) per visit



0.34s average generation time



403 pageviews, 351 unique pageviews




5 total searches on your website, **3 unique keywords**



16 downloads, 15 unique downloads



117 outlinks, 93 unique outlinks









15 max actions in one visit

Matomo Real-time Map



Matomo Device Pivot











Device type					
TYPE	▼ VISITS	ACTIONS	ACTIONS PER VISIT	AVG. TIME ON WEBSITE	BOUNCE RATE
 Smartphone	52,771	98,076	1.9	45s	76%
 Desktop	3,939	9,163	2.3	1 min 3s	75%
 Phablet	2,268	4,043	1.8	44s	78%
 Tablet	1,097	1,785	1.6	46s	77%
Unknown	92	181	2	27s	72%
 Tv	20	30	1.5	23s	75%
 Portable media...	8	19	2.4	39s	88%

1-7 of 7

Matomo Visits by Browser



Browsers











BROWSER	VISITS
 Firefox Mobile	64,000
 Chrome Mobile	32,206
 Mobile Safari	19,252
 Chrome	3,366
 Chrome Mobile iOS	1,472
 Samsung Browser	1,032
 Safari	969
 MIUI Browser	335



Matomo Plugins inspector



Browser Plugins

PLUGIN	▼ % VISITS	VISITS
 Cookie	100%	59,987
 Pdf	6%	3,635
 Java	0%	194
 Flash	0%	25
 Silverlight	0%	4
 Realplayer	0%	1
 Director	0%	-
 Gears	0%	-
 Quicktime	0%	-
 Windowsmedia	0%	-

Matomo Attention stats



Matomo plugins



Installed plugins

Origin [All](#) (57) | [Core](#) (57) | [Official](#) (0) | [Third-party](#) (0) Status [All](#) (57) | [Active](#) (35) | [Inactive](#) (22)

Plugin	Description	Status	Action
Actions (Core)	<p>Reports about the page views and page titles. Lets you measure your internal website's search engine. Automatically tracks clicks on external links and file downloads.</p> <p>By Matomo. GPL v3+</p>	Active	Deactivate
Annotations (Core)	<p>Allows you to attach notes to different days to mark changes made to your website, save analyses you make regarding your data and share your thoughts with your colleagues. By annotating your data, you will make sure you remember why your data looks the way it does.</p> <p>By Matomo. GPL v3+</p>	Active	Deactivate
BulkTracking (Core)	<p>Provides ability to send several Tracking API requests in one bulk request. Makes importing a lot of data in Matomo faster.</p> <p>By Matomo. GPL v3+</p>	Active	Deactivate

Matomo True Anonimization



Anonymize Tracking Data

Anonymize Visitors' IP addresses

Select how many bytes of the visitors' IPs should be masked.

- 1 byte(s) - e.g. 192.168.100.xxx
- 2 byte(s) - e.g. 192.168.xxx.xxx (*Recommended*)
- 3 byte(s) - e.g. 192.xxx.xxx.xxx

Also use the Anonymized IP addresses when enriching visits.

- Yes (*Recommended for privacy*)
- No

Replace User ID with a pseudonym

Matomo GDPR Tools



GDPR Tools

This page has been designed in order for you to exercise data subject rights.

Here you can exercise the rights of your users with our GDPR-friendly procedures:

1. the right of access to all of their data (and the right to data portability),
2. the right to erase some or all of their data (and the right to rectification).

In case you do not know what GDPR is, please refer to the [GDPR overview](#).

Search for a data subject

Select a website

▼ ALL WEBSITES

Find data subjects by

User ID	▼	Is	▼	Value	×
OR					
+Add OR condition					

Matomo cookie-less



Administration -> Privacy -> Anonymize data
> Force tracking without cookies

Be nice in your website!



→ Drop Google Fonts
(Serve them locally)

→ Drop Google Analytics
(and then try Matomo!)

→ Drop Facebook Pixel

→ Say "Tested in
Firefox and
Chromium"

LibreJS

Free JavaScript in your browser

(↑ Trust me, it's possible to have 100% libre JavaScript on your website)

→ Drop Google Maps
(Adopt Leaflet + OpenStreetMap, ...)
(local resources are the best – e.g. OSM export)

Thank you for your time!



Questions?
Valerio Bozzolan
gnu@linux.it

Or start a public tread!
<https://forum.linux.it/>