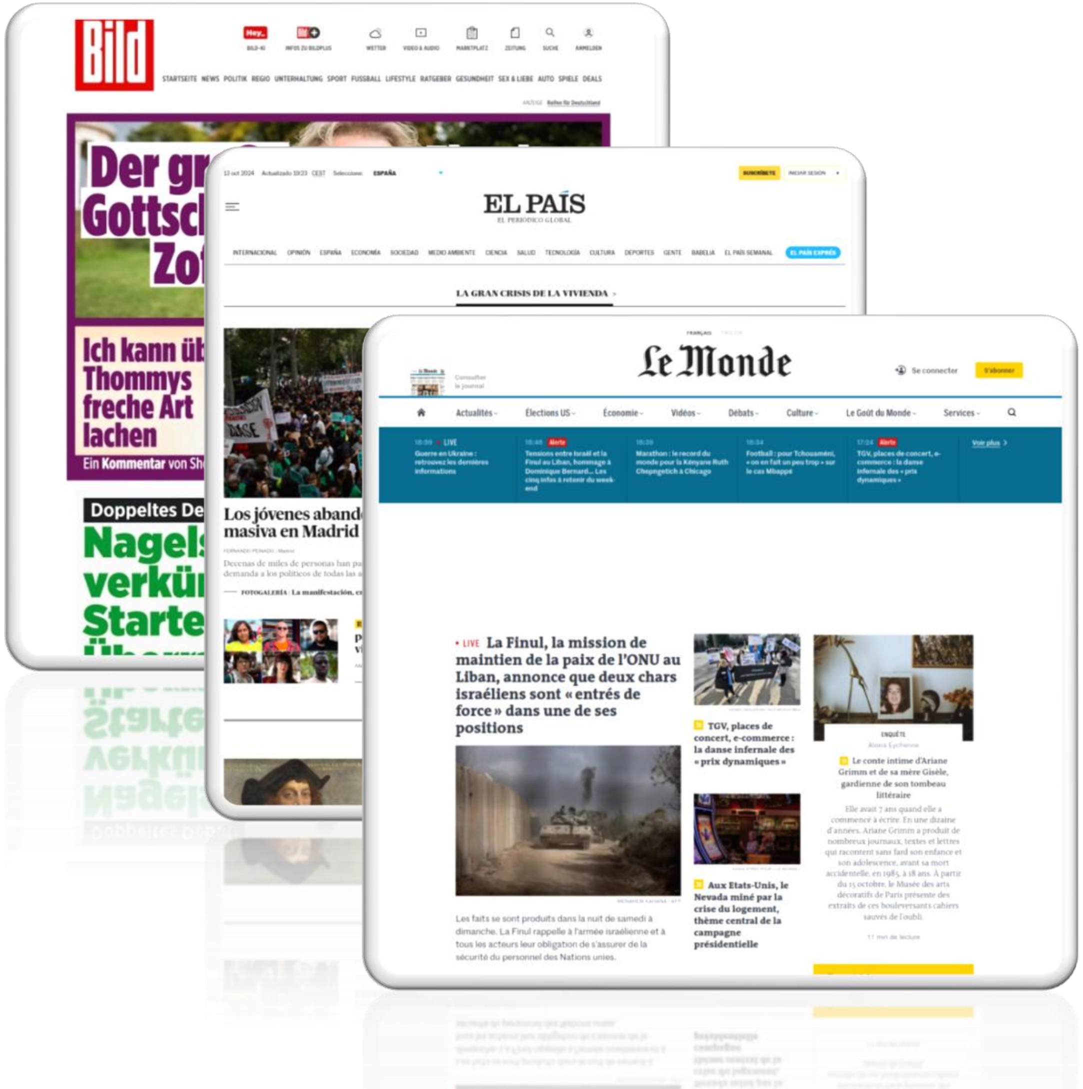
GuardXP
From data privacy to improved cybersecurity

Pere Barlet & Ismael Castell
Universitat Politècnica de Catalunya (UPC)
In collaboration with: Consorci de Serveis Universitaris de Catalunya (CSUC)

ESNOG 34 – Barcelona, 30 Oct. 2025

This project is sponsored by RIPE NCC (Community Projects Fund)

The problem



Der gr… Gottsch… Zo…

Ich kann üb… Thommys freche Art lachen

Ein Kommentar von Sh…

Doppeltes De…

Nagels… verkün… Starte…

LA GRAN CRISIS DE LA VIVIENDA

Los jóvenes aband… masiva en Madrid

Decenas de miles de personas han pa… demanda a los políticos de todas las a…

FOTOGALERÍA | La manifestación, c…

LIVE Guerre en Ukraine : retrouvez les dernières informations

Alerte Tensions entre Israël et la Finul au Liban, hommage à Dominique Bernard… Les cinq infos à retenir du week-end

Marathon : le record du monde pour la Kényane Ruth Chepngetich à Chicago

Football : pour Tchouaméni, « on en fait un peu trop » sur le cas Mbappé

Alerte TGV, places de concert, e-commerce : la danse infernale des « prix dynamiques »

LIVE La Finul, la mission de maintien de la paix de l'ONU au Liban, annonce que deux chars israéliens sont « entrés de force » dans une de ses positions

Les faits se sont produits dans la nuit de samedi à dimanche. La Finul rappelle à l'armée israélienne et à tous les acteurs leur obligation de s'assurer de la sécurité du personnel des Nations unies.

TGV, places de concert, e-commerce : la danse infernale des « prix dynamiques »

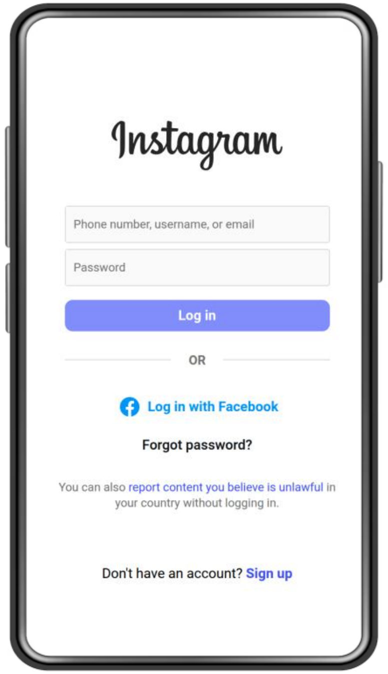
Aux Etats-Unis, le Nevada miné par la crise du logement, thème central de la campagne présidentielle

ENQUÊTE

Le conte intime d'Ariane Grimm et de sa mère Gisèle, gardienne de son tombeau littéraire

Elle avait 7 ans quand elle a commencé à écrire. En une dizaine d'années, Ariane Grimm a produit de nombreux journaux, textes et lettres qui racontent sans fard son enfance et son adolescence, avant sa mort accidentelle, en 1985, à 18 ans. A partir du 15 octobre, le Musée des arts décoratifs de Paris présente des extraits de ces bouleversants cahiers sauvés de l'oubli.

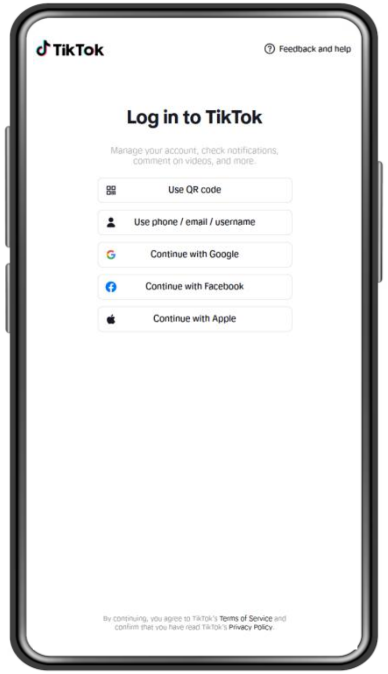
11 min de lecture



Forgot password?

You can also report content you believe is unlawful in your country without logging in.

Don't have an account? Sign up

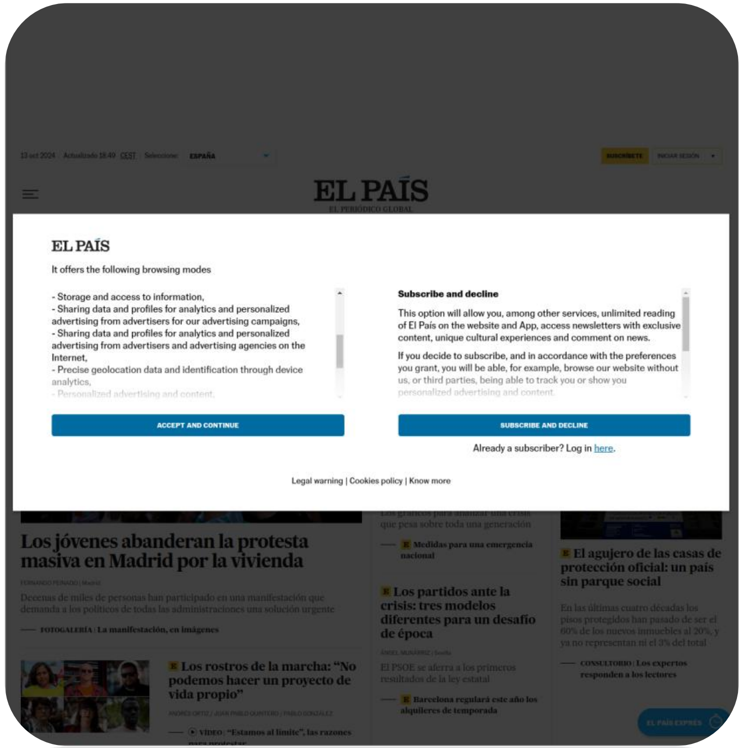


Log in to TikTok

Manage your account, check notifications, comment on videos, and more.

By continuing, you agree to TikTok's Terms of Service and confirm that you have read TikTok's Privacy Policy.

Consent managers



EL PAÍS

It offers the following browsing modes

- Storage and access to information,
- Sharing data and profiles for analytics and personalized advertising from advertisers for our advertising campaigns,
- Sharing data and profiles for analytics and personalized advertising from advertisers and advertising agencies on the Internet,
- Precise geolocation data and identification through device analytics,
- Personalized advertising and content,

Subscribe and decline

This option will allow you, among other services, unlimited reading of El País on the website and App, access newsletters with exclusive content, unique cultural experiences and comment on news.

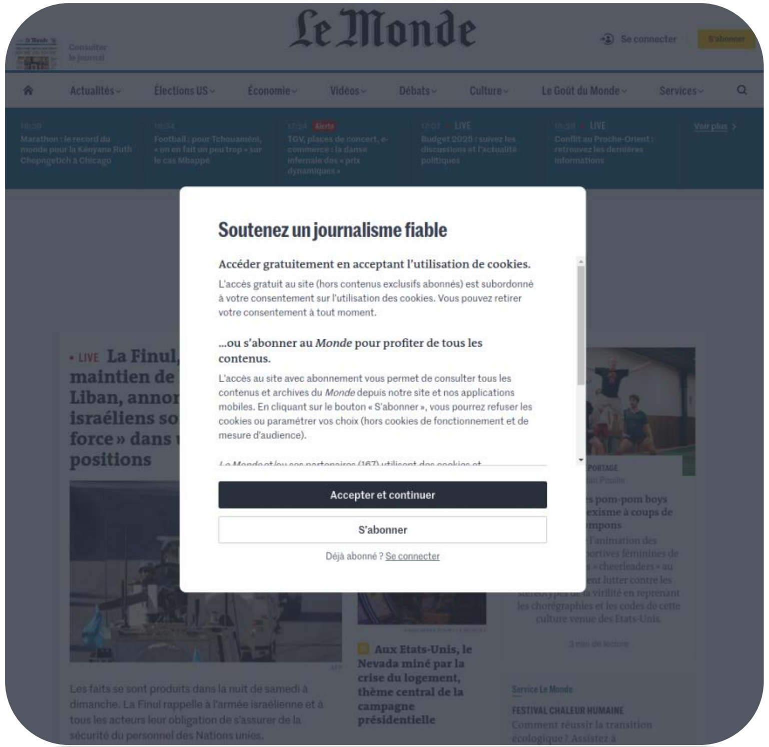
If you decide to subscribe, and in accordance with the preferences you grant, you will be able, for example, browse our website without us, or third parties, being able to track you or show you personalized advertising and content.

ACCEPT AND CONTINUE

SUBSCRIBE AND DECLINE

Already a subscriber? Log in here.

Legal warning | Cookies policy | Know more



Soutenez un journalisme fiable

Accéder gratuitement en acceptant l'utilisation de cookies.

L'accès gratuit au site (hors contenus exclusifs abonnés) est subordonné à votre consentement sur l'utilisation des cookies. Vous pouvez retirer votre consentement à tout moment.

…ou s'abonner au *Monde* pour profiter de tous les contenus.

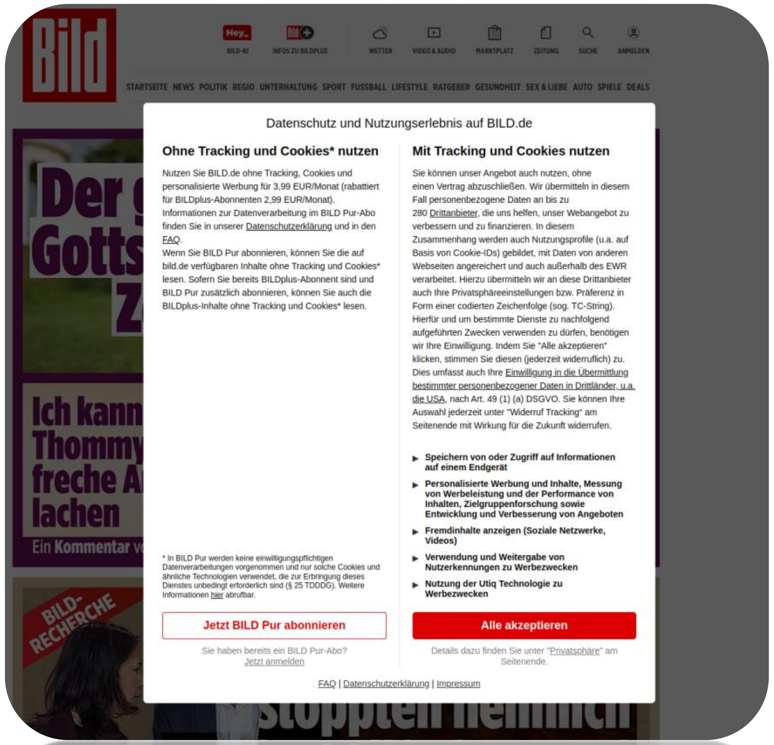
L'accès au site avec abonnement vous permet de consulter tous les contenus et archives du *Monde* depuis notre site et nos applications mobiles. En cliquant sur le bouton « S'abonner », vous pourrez refuser les cookies ou paramétrer vos choix (hors cookies de fonctionnement et de mesure d'audience).

Le Monde et/ou ses partenaires (167) utilisent des cookies et

Accepter et continuer

S'abonner

Déjà abonné ? Se connecter



Datenschutz und Nutzungserlebnis auf BILD.de

Ohne Tracking und Cookies* nutzen

Nutzen Sie BILD.de ohne Tracking, Cookies und personalisierte Werbung für 3,99 EUR/Monat (rabattiert für BILDplus-Abonnenten 2,99 EUR/Monat).
Informationen zur Datenverarbeitung im BILD Pur-Abo finden Sie in unserer Datenschutzerklärung und in den FAQ.
Wenn Sie BILD Pur abonnieren, können Sie die auf bild.de verfügbaren Inhalte ohne Tracking und Cookies* lesen. Sofern Sie bereits BILDplus-Abonnent sind und BILD Pur zusätzlich abonnieren, können Sie auch die BILDplus-Inhalte ohne Tracking und Cookies* lesen.

* In BILD Pur werden keine einwilligungspflichtigen Datenverarbeitungen vorgenommen und nur solche Cookies und ähnliche Technologien verwendet, die zur Erbringung dieses Dienstes unbedingt erforderlich sind (§ 25 TDDDG). Weitere Informationen hier abrufbar.

Jetzt BILD Pur abonnieren

Sie haben bereits ein BILD Pur-Abo?
Jetzt anmelden

Mit Tracking und Cookies nutzen

Sie können unser Angebot auch nutzen, ohne einen Vertrag abzuschließen. Wir übermitteln in diesem Fall personenbezogene Daten an bis zu 280 Drittanbieter, die uns helfen, unser Webangebot zu verbessern und zu finanzieren. In diesem Zusammenhang werden auch Nutzungsprofile (u.a. auf Basis von Cookie-IDs) gebildet, mit Daten von anderen Webseiten angereichert und auch außerhalb des EWR verarbeitet. Hierzu übermitteln wir an diese Drittanbieter auch Ihre Privatsphäreeinstellungen bzw. Präferenz in Form einer codierten Zeichenfolge (sog. TC-String). Hierfür und um bestimmte Dienste zu nachfolgend aufgeführten Zwecken verwenden zu dürfen, benötigen wir Ihre Einwilligung. Indem Sie "Alle akzeptieren" klicken, stimmen Sie diesen (jederzeit widerruflich) zu. Dies umfasst auch Ihre Einwilligung in die Übermittlung bestimmter personenbezogener Daten in Drittländer, u.a. die USA, nach Art. 49 (1) (a) DSGVO. Sie können Ihre Auswahl jederzeit unter "Widerruf Tracking" am Seitenende mit Wirkung für die Zukunft widerrufen.

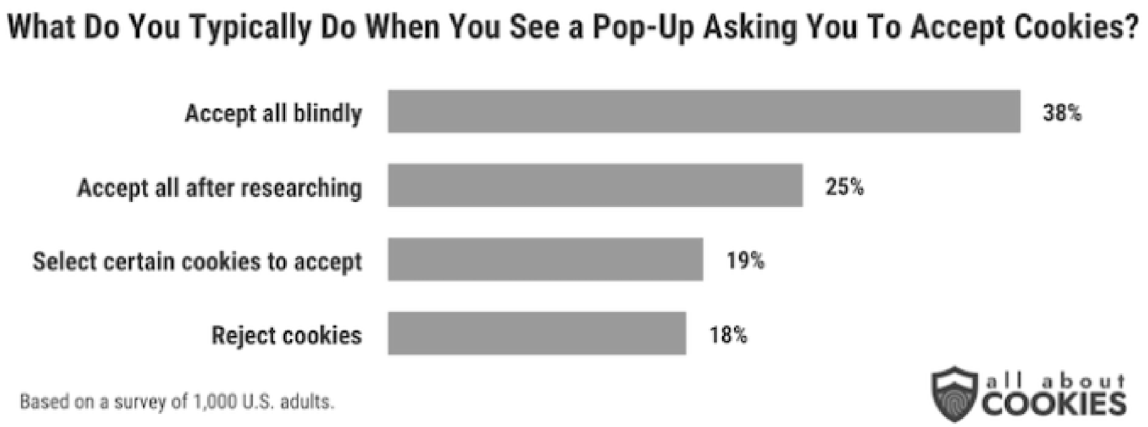
- ▶ **Speichern von oder Zugriff auf Informationen auf einem Endgerät**
- ▶ **Personalisierte Werbung und Inhalte, Messung von Werbeleistung und der Performance von Inhalten, Zielgruppenforschung sowie Entwicklung und Verbesserung von Angeboten**
- ▶ **Fremdinhalte anzeigen (Soziale Netzwerke, Videos)**
- ▶ **Verwendung und Weitergabe von Nutzerkennungen zu Werbezwecken**
- ▶ **Nutzung der Utiq Technologie zu Werbezwecken**

Alle akzeptieren

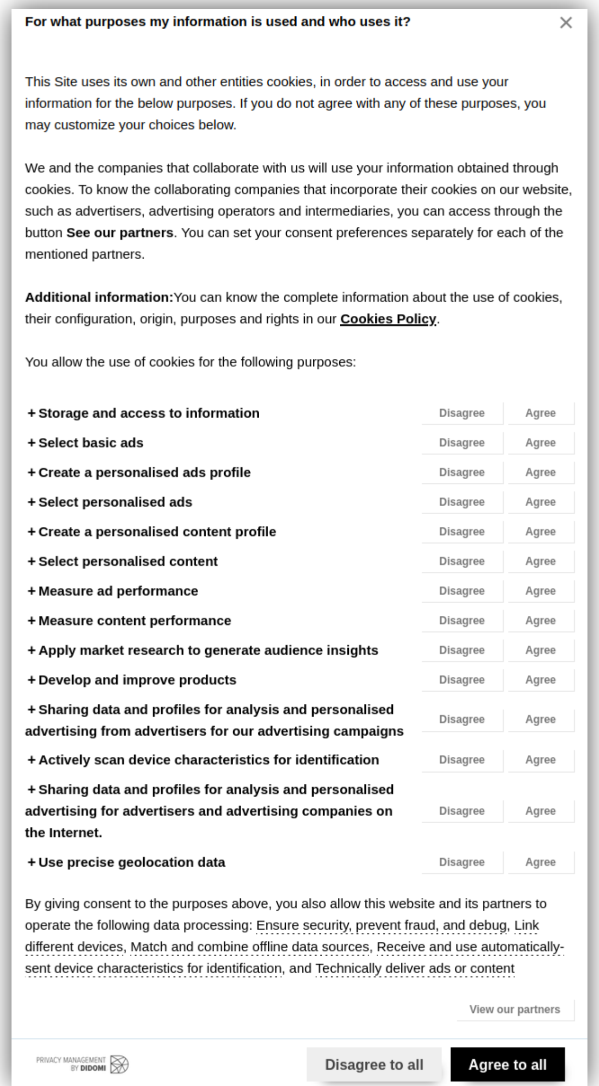
Details dazu finden Sie unter "Privatsphäre" am Seitenende.

FAQ | Datenschutzerklärung | Impressum

The privacy paradox



Second-party trackers



For what purposes my information is used and who uses it? ✕

This Site uses its own and other entities cookies, in order to access and use your information for the below purposes. If you do not agree with any of these purposes, you may customize your choices below.

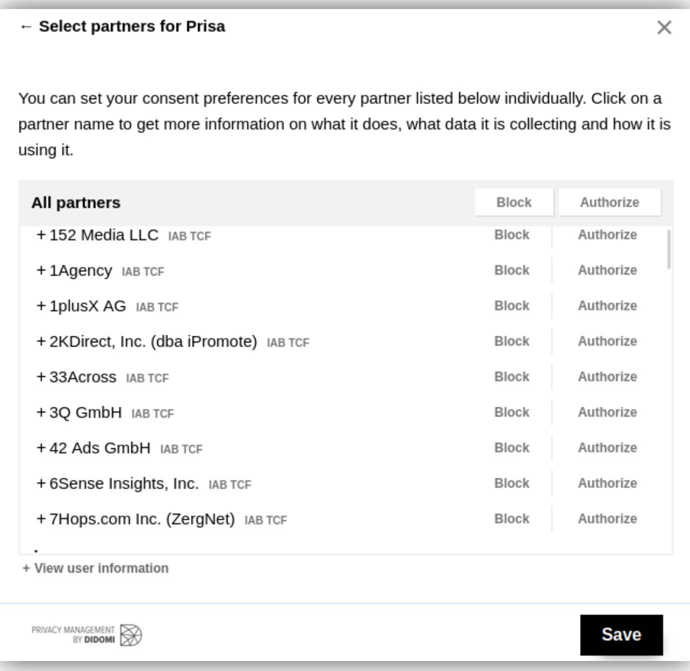
We and the companies that collaborate with us will use your information obtained through cookies. To know the collaborating companies that incorporate their cookies on our website, such as advertisers, advertising operators and intermediaries, you can access through the button **See our partners**. You can set your consent preferences separately for each of the mentioned partners.

Additional information: You can know the complete information about the use of cookies, their configuration, origin, purposes and rights in our **Cookies Policy**.

You allow the use of cookies for the following purposes:

+ Storage and access to information	Disagree	Agree
+ Select basic ads	Disagree	Agree
+ Create a personalised ads profile	Disagree	Agree
+ Select personalised ads	Disagree	Agree
+ Create a personalised content profile	Disagree	Agree
+ Select personalised content	Disagree	Agree
+ Measure ad performance	Disagree	Agree
+ Measure content performance	Disagree	Agree
+ Apply market research to generate audience insights	Disagree	Agree
+ Develop and improve products	Disagree	Agree
+ Sharing data and profiles for analysis and personalised advertising from advertisers for our advertising campaigns	Disagree	Agree
+ Actively scan device characteristics for identification	Disagree	Agree
+ Sharing data and profiles for analysis and personalised advertising for advertisers and advertising companies on the Internet.	Disagree	Agree
+ Use precise geolocation data	Disagree	Agree

By giving consent to the purposes above, you also allow this website and its partners to operate the following data processing: Ensure security, prevent fraud, and debug, Link different devices, Match and combine offline data sources, Receive and use automatically-sent device characteristics for identification, and Technically deliver ads or content



← Select partners for Prisa ✕

You can set your consent preferences for every partner listed below individually. Click on a partner name to get more information on what it does, what data it is collecting and how it is using it.

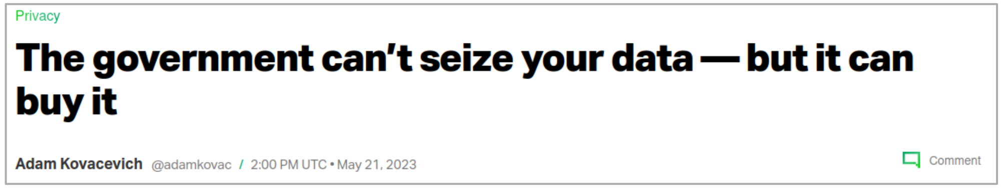
All partners	Block	Authorize
+ 152 Media LLC IAB TCF	Block	Authorize
+ 1Agency IAB TCF	Block	Authorize
+ 1plusX AG IAB TCF	Block	Authorize
+ 2KDirect, Inc. (dba iPromote) IAB TCF	Block	Authorize
+ 33Across IAB TCF	Block	Authorize
+ 3Q GmbH IAB TCF	Block	Authorize
+ 42 Ads GmbH IAB TCF	Block	Authorize
+ 6Sense Insights, Inc. IAB TCF	Block	Authorize
+ 7Hops.com Inc. (ZergNet) IAB TCF	Block	Authorize

943 “partners” 😱

Why should we care about that?

- Data brokers: Companies whose primary source of revenue is selling user personal information in data market places [1]

- Dangers for the user
  - Profiles may be (most surely) incorrect
  - There is no easy way to discover and correct it (despite GDPR)
  - There is no easy way to know to whom our info was sold to [2,3]
  - There is no easy way to know how this is impacting us!!

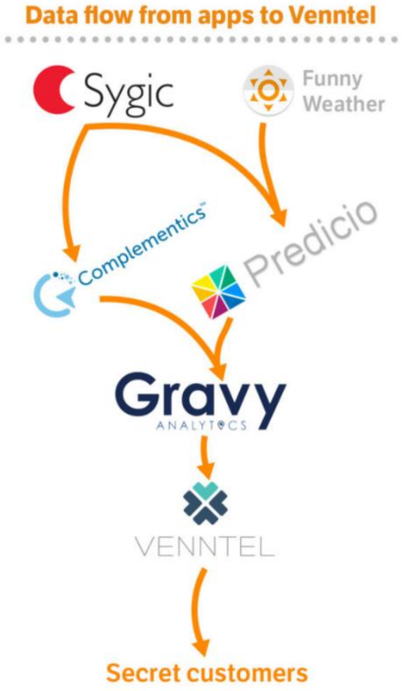


Privacy

The government can't seize your data — but it can buy it

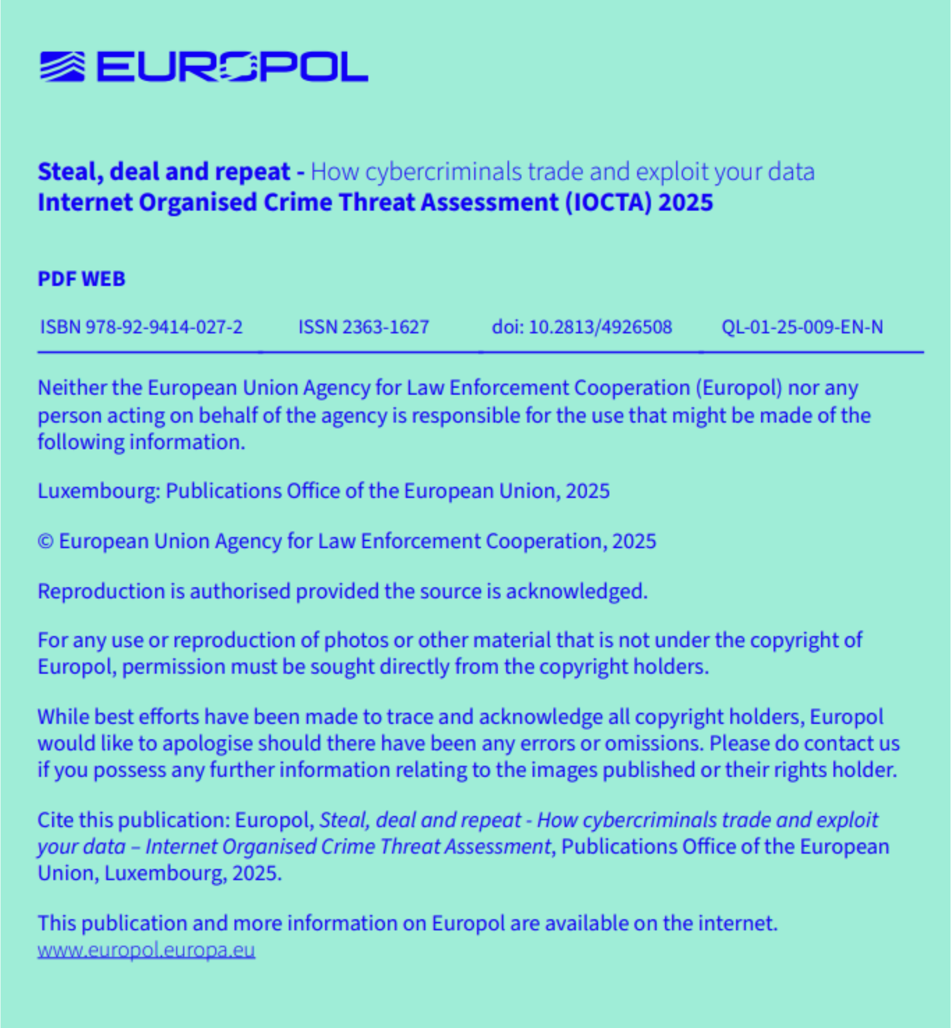
Adam Kovacevich @adamkovac / 2:00 PM UTC • May 21, 2023

Comment



[1] A. Rieke, H. Yu, D. Robinson, and J. van Hoboken, "Data Brokers in an Open Society", Open Society Foundations 2016
[2] https://nrkbeta.no/2020/12/03/my-phone-was-spying-on-me-so-i-tracked-down-the-surveillants/
[3] https://techcrunch.com/2023/05/21/the-government-cant-seize-your-data-but-it-can-buy-it/

Security implications



EUROPOL

Steal, deal and repeat - How cybercriminals trade and exploit your data
Internet Organised Crime Threat Assessment (IOCTA) 2025

PDF WEB

ISBN 978-92-9414-027-2 ISSN 2363-1627 doi: 10.2813/4926508 QL-01-25-009-EN-N

Neither the European Union Agency for Law Enforcement Cooperation (Europol) nor any person acting on behalf of the agency is responsible for the use that might be made of the following information.

Luxembourg: Publications Office of the European Union, 2025

© European Union Agency for Law Enforcement Cooperation, 2025

Reproduction is authorised provided the source is acknowledged.

For any use or reproduction of photos or other material that is not under the copyright of Europol, permission must be sought directly from the copyright holders.

While best efforts have been made to trace and acknowledge all copyright holders, Europol would like to apologise should there have been any errors or omissions. Please do contact us if you possess any further information relating to the images published or their rights holder.

Cite this publication: Europol, *Steal, deal and repeat - How cybercriminals trade and exploit your data – Internet Organised Crime Threat Assessment*, Publications Office of the European Union, Luxembourg, 2025.

This publication and more information on Europol are available on the internet.
www.europol.europa.eu

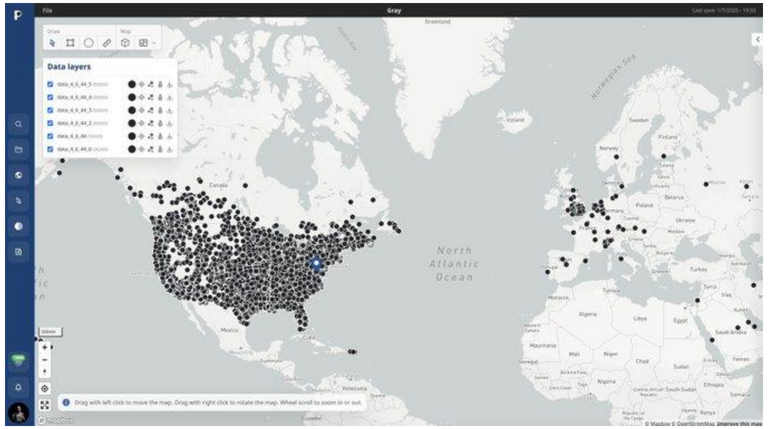
Key findings

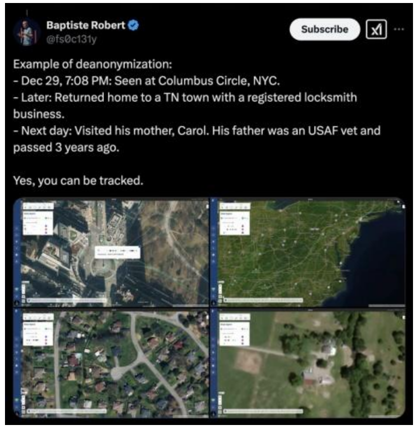
Personal data is bought and leveraged by cybercriminals to orchestrate attacks, including phishing and ransomware

LLM and generative AI are effectively used by cybercriminals to increase CTR, and to automate and scale up processes

Information security

- The case of Gravy Analytics leak (location data-broker)
  - 30 million location data points leaked (the hacker claimed 200B records)
  - Mobile apps, ad networks, analytics systems, telecom operators, smarthome devices, connected cars, etc.
  - List of 3455 Android apps (Tinder, FlightRadar, Weather Channel, etc.) [6]
  - Linked to advertisement IDs → Very easy to deanonymize!





Baptiste Robert
@fs0c131y

Example of deanonymization:
- Dec 29, 7:08 PM: Seen at Columbus Circle, NYC.
- Later: Returned home to a TN town with a registered locksmith business.
- Next day: Visited his mother, Carol. His father was an USAF vet and passed 3 years ago.

Yes, you can be tracked.

[6] https://gist.github.com/fs0c131y/f498b21cba9ee23956fc7d7629262e9d

UPC technology

- We addresses two main problems of AdBlockers
  - Limitations of blacklists (hard to maintain and easy to evade)
  - Functionality loss (block less than they should)

- Based on two algorithms developed by UPC:
  - TrackSign: For discovering new tracking methods (IEEE INFOCOM 2021) [7]
  - ASTrack: For selectively blocking tracking code (IEEE INFOCOM 2023) [8]

TrackSign: Guided Web Tracking Discovery

Ismael Castell-Uroz
Universitat Politècnica de Catalunya
Barcelona, Spain

Josep Solé-Pareta
Universitat Politècnica de Catalunya
Barcelona, Spain

Pere Barlet-Ros
Universitat Politècnica de Catalunya
Barcelona, Spain

ASTrack: Automatic Detection and Removal of Web Tracking Code with Minimal Functionality Loss

Ismael Castell-Uroz
Universitat Politècnica de Catalunya
Barcelona, Spain

Kensuke Fukuda
National Institute of Informatics
Tokyo, Japan

Pere Barlet-Ros
Universitat Politècnica de Catalunya
Barcelona, Spain

[7] TrackSign: Guided Web Tracking Discovery: https://personals.ac.upc.edu/pbarlet/papers/TrackSign.Infocom2021.pdf
[8] ASTrack: Automatic Detection and Removal of Web Tracking Code with Minimal Functionality Loss: https://arxiv.org/pdf/2301.10895.pdf

GuardXP project objectives

- Integrate TrackSign + ASTrack into actual tools that can be used by individual users and companies to protect their <u>privacy</u> and <u>security</u>

- Individual user: Browser plugin
  - Cleans tracking code from user browser activity
  - Main challenges: Online operation + Browser limitations
  - Firefox-based browsers

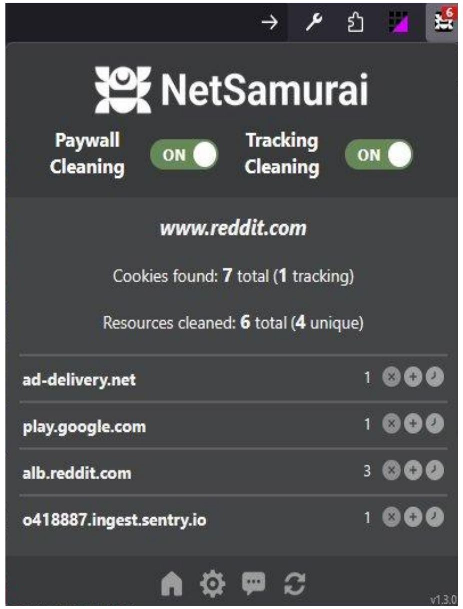
- Companies: Web proxy
  - Clean tracking code from company’s web traffic by intercepting all web connections
  - Main challenges: Online operation + SSL / HTTPS
  - Offered as cloud-based SaaS or on-premise

netSamurai desktop

1) netSamurai Plugin

- Cleans tracking code from user browser activity
- Main challenges: Online operation + Browser limitations
- Firefox-based browsers

https://addons.mozilla.org/en-US/firefox/addon/netsamurai



NetSamurai

Paywall Cleaning ON

Tracking Cleaning ON

www.reddit.com

Cookies found: 7 total (1 tracking)

Resources cleaned: 6 total (4 unique)

ad-delivery.net	1
play.google.com	1
alb.reddit.com	3
o418887.ingest.sentry.io	1

v1.3.0

netSamurai mobile

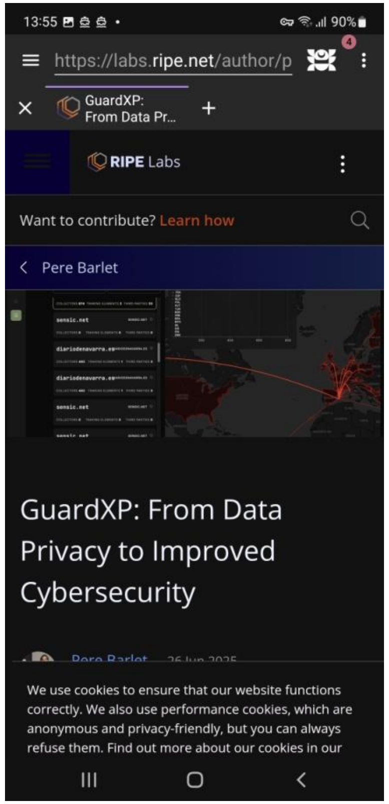
2) netSamurai Browser

- GuardXP protection for Android
- Available at Play Store

https://play.google.com/store/apps/details?id=com.ikusa.netsamurai

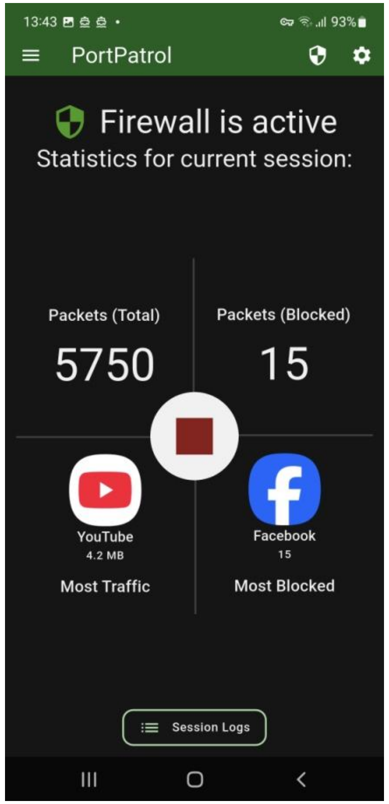
3) netSamurai Firewall

- Protection for mobile apps
- Blocks privacy-invasive connections
- Currently under development



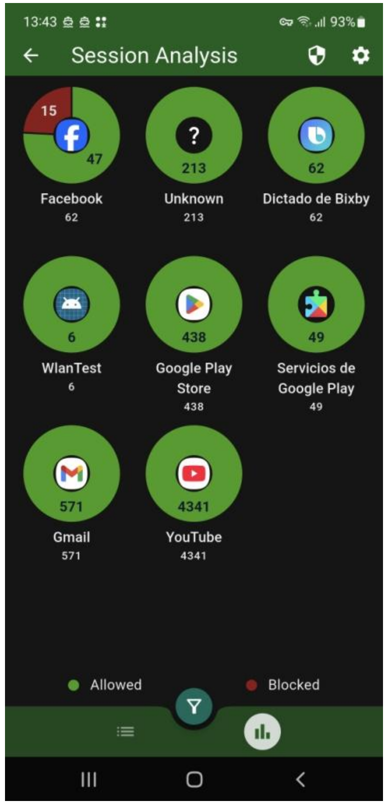
GuardXP: From Data Privacy to Improved Cybersecurity

We use cookies to ensure that our website functions correctly. We also use performance cookies, which are anonymous and privacy-friendly, but you can always refuse them. Find out more about our cookies in our



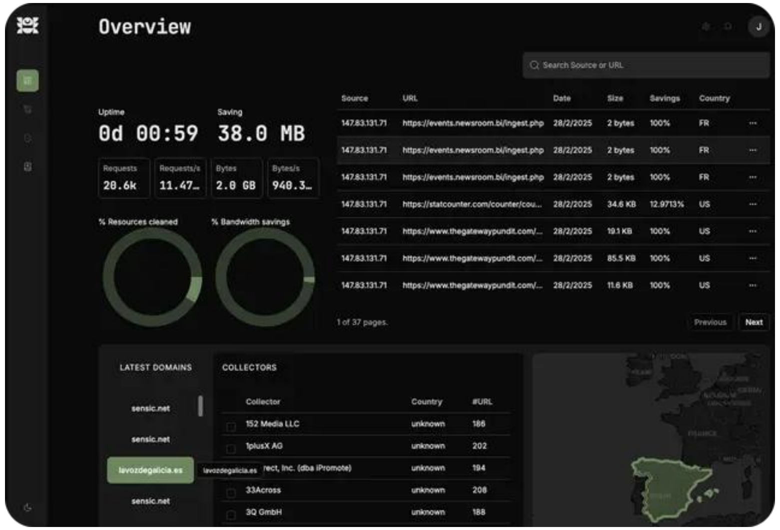
Firewall is active
Statistics for current session:

Packets (Total)	Packets (Blocked)
5750	15
YouTube 4.2 MB	Facebook 15
Most Traffic	Most Blocked



4) netSamurai Proxy

- Clean tracking code from company’s web traffic by intercepting all web connections
- Main challenges: Online operation + SSL / HTTPS
- Offered as cloud-based SaaS or on-premise



Overview

Search Source or URL

Uptime
0d 00:59

Saving
38.0 MB

Requests	Requests/s	Bytes	Bytes/s
20.6k	11.47…	2.0 GB	940.3…

% Resources cleaned

% Bandwidth savings

Source	URL	Date	Size	Savings	Country	
147.83.131.71	https://events.newsroom.bi/ingest.php	28/2/2025	2 bytes	100%	FR	···
147.83.131.71	https://events.newsroom.bi/ingest.php	28/2/2025	2 bytes	100%	FR	···
147.83.131.71	https://events.newsroom.bi/ingest.php	28/2/2025	2 bytes	100%	FR	···
147.83.131.71	https://statcounter.com/counter/cou...	28/2/2025	34.6 KB	12.9713%	US	···
147.83.131.71	https://www.thegatewaypundit.com/...	28/2/2025	19.1 KB	100%	US	···
147.83.131.71	https://www.thegatewaypundit.com/...	28/2/2025	85.5 KB	100%	US	···
147.83.131.71	https://www.thegatewaypundit.com/...	28/2/2025	11.6 KB	100%	US	···

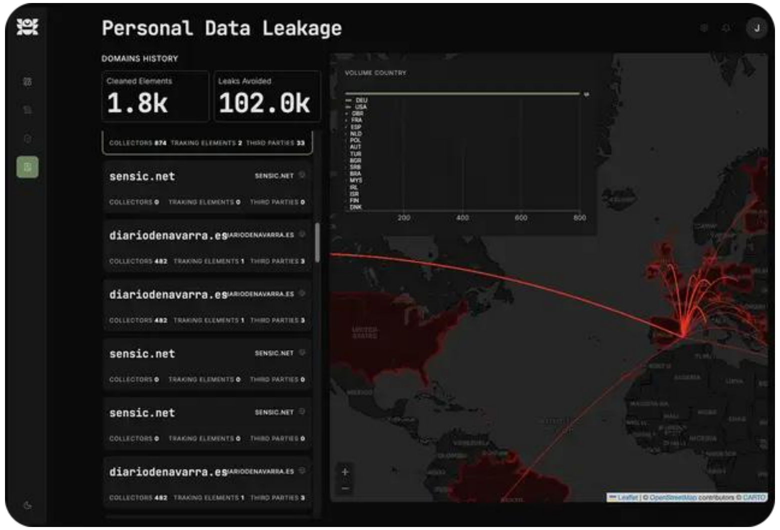
1 of 37 pages.

LATEST DOMAINS

sensic.net
sensic.net
lavozdegalicia.es
sensic.net

COLLECTORS

	Collector	Country	#URL
□	152 Media LLC	unknown	186
□	1plusX AG	unknown	202
	rect, Inc. (dba iPromote)	unknown	194
□	33Across	unknown	208
□	3Q GmbH	unknown	188



Personal Data Leakage

DOMAINS HISTORY

Cleaned Elements
1.8k

Leaks Avoided
102.0k

COLLECTORS 874 TRAKING ELEMENTS 2 THIRD PARTIES 33

sensic.net SENSIC.NET
COLLECTORS 0 TRAKING ELEMENTS 0 THIRD PARTIES 0

diariodenavarra.es DIARIODENAVARRA.ES
COLLECTORS 482 TRAKING ELEMENTS 1 THIRD PARTIES 3

diariodenavarra.es DIARIODENAVARRA.ES
COLLECTORS 482 TRAKING ELEMENTS 1 THIRD PARTIES 3

sensic.net SENSIC.NET
COLLECTORS 0 TRAKING ELEMENTS 0 THIRD PARTIES 0

sensic.net SENSIC.NET
COLLECTORS 0 TRAKING ELEMENTS 0 THIRD PARTIES 0

diariodenavarra.es DIARIODENAVARRA.ES
COLLECTORS 482 TRAKING ELEMENTS 1 THIRD PARTIES 3

GuardXP
From data privacy to improved cybersecurity

- **RIPE Labs post:** https://labs.ripe.net/author/pbarlet/guardxp-from-data-privacy-to-improved-cybersecurity
- **Plugin:** https://addons.mozilla.org/en-US/firefox/addon/netsamurai
- **Browser:** https://play.google.com/store/apps/details?id=com.ikusa.netsamurai
- **Proxy and firewall:** https://ikusa.tech

This project is sponsored by RIPE NCC (Community Projects Fund)