



Lessons from the Adoption and Deprecation of the Privacy Sandbox Web APIs

Yohan Beugin, Paul Barford, Patrick McDaniel - University of Wisconsin-Madison



MADS&P

MOTIVATION

Privacy Sandbox

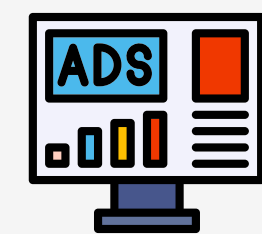
- Initiative from Google (Aug'19 - Jan'26).
- To reduce "cross-site and cross-app tracking while helping to keep online content and services free for all".



Third-party cookies



Fingerprinting



Ad (re)targeting

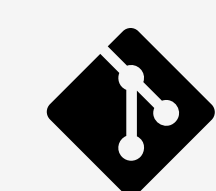
Largest experiment on deploying web privacy techniques in recent years

METHODOLOGY

Longitudinal measurement study (13 APIs)



- Chrome telemetry.
- 131 features (Jan'20 - Apr'26).
- Monthly crawls (Mar'21 - Apr'26).
- 10.6B responses headers, 174M body (~ 45TB).



- chromium attestation component edits.
- RWS repository submissions.

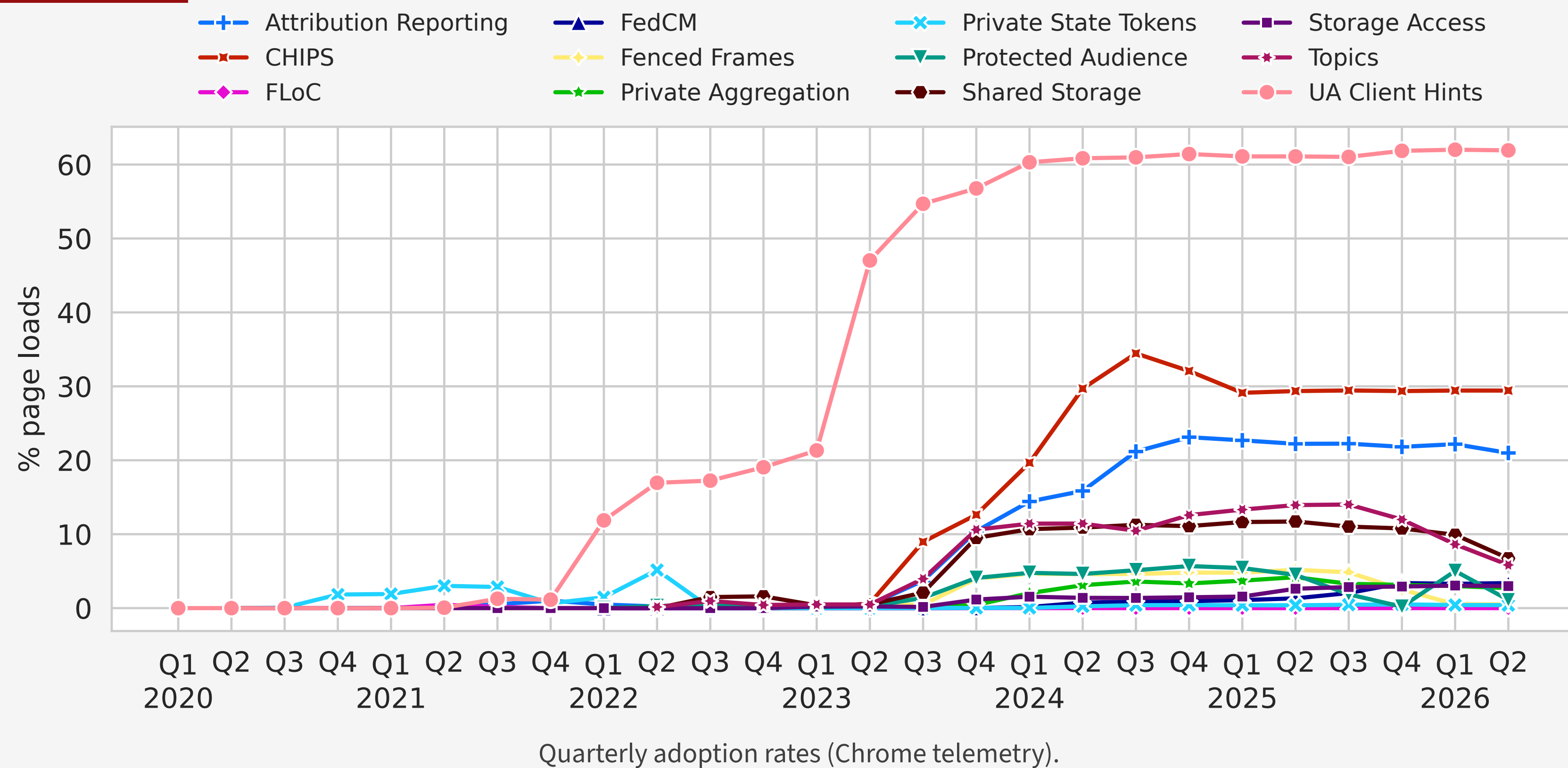
Unique view into how the ecosystem used and abandoned the proposed changes

RESULTS OVERVIEW

Finding	Metric	Recommendation
Adoption API adoption is highly uneven. Adoption rose after introduction of APIs, but peaked and stagnated by Q3 2024.	5 only > 11.7% page loads. See adoption figure and rates.	Future efforts should clearly articulate API use cases. Need to address the fact that the community will be reluctant to adopt Google's future privacy proposals.
Adopters The majority of adopters were active starting in the early days of the project.	295 attestations, 73 RWS sets, top adopters consistent years apart.	The value of proposals should be demonstrated upfront to secure long term commitment from early adopters.
Supported APIs Most supported APIs have low usage. CHIPS adoption is driven by actors with large coverage of the web. UA Client Hints is being abused for browser fingerprinting.	<ul style="list-style-type: none"> ≤ 5.2% of page loads. ~ 34.5% of page loads, but only 6.7% of TPC on average. > 62% of page loads. 	<ul style="list-style-type: none"> Other external incentives from Google will be needed to encourage further adoption of the supported APIs. Continuing use of UA Client Hints should be justified and controls to disable the API must be provided to users.

Recommendations for future generation of web privacy proposals

ADOPTION



SUPPORTED APIS

API	Max	Q3'25	Q4'25	Q1'26
CHIPS	34.45	29.44	29.36	29.43
FedCM	3.39	2.04	3.39	3.28
Fenced Frames	5.19	4.84	2.51	0.53
Private State Tokens	5.16	0.46	0.50	0.42
Storage Access	3.05	2.85	2.92	3.05
UA Client Hints	62.01	61.04	61.86	62.01

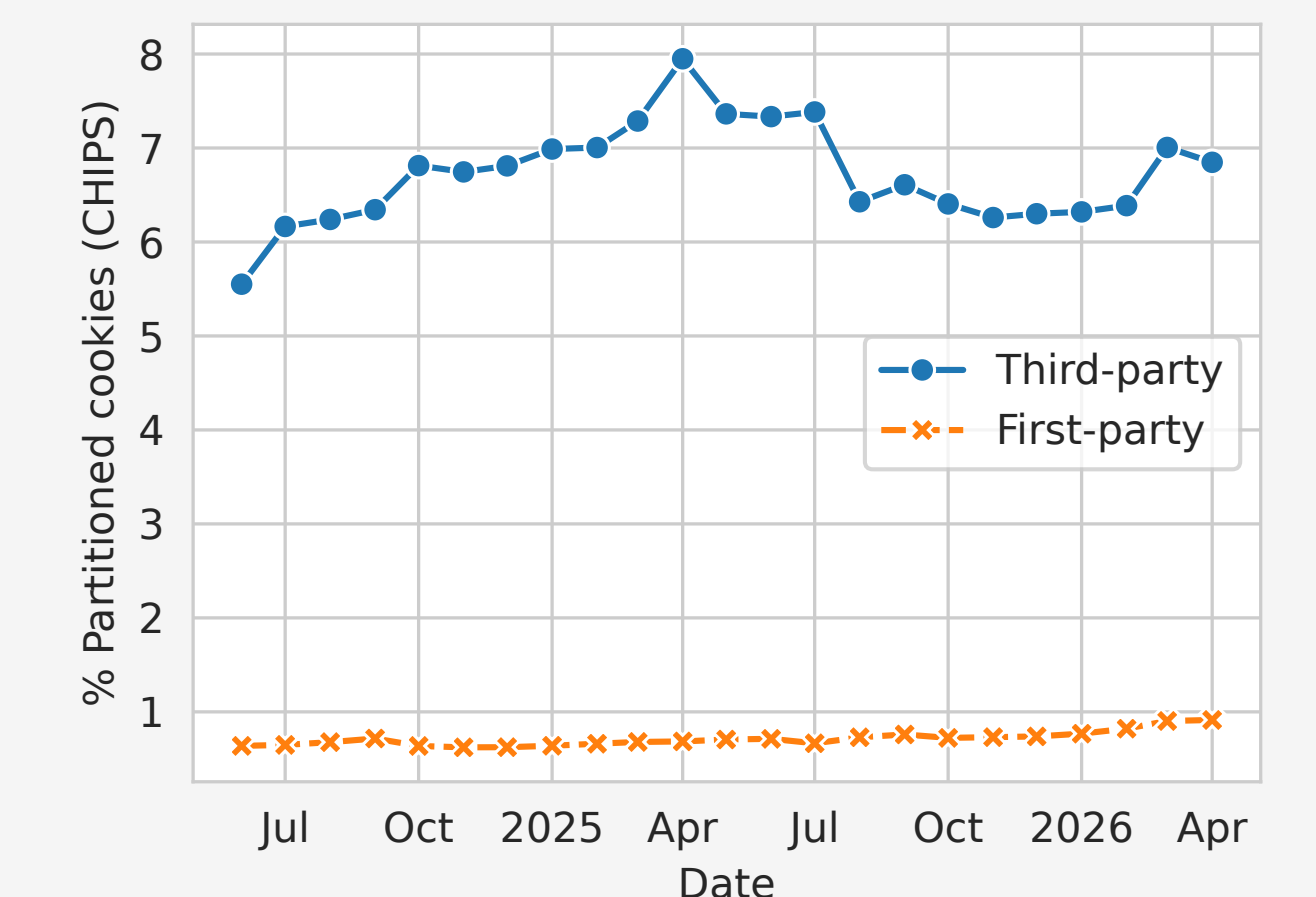
Max and recent rates (% page loads)

Rank	Cookie (name - domain)	%
1	cto_bundle - .criteo.com	43.91
2	audit_p - .rubiconproject.com	34.32
3	khaos_p - .rubiconproject.com	34.32
4	receive-cookie-deprecation - .rubiconproject.com	29.88
5	ts - .creativecdn.com	29.02

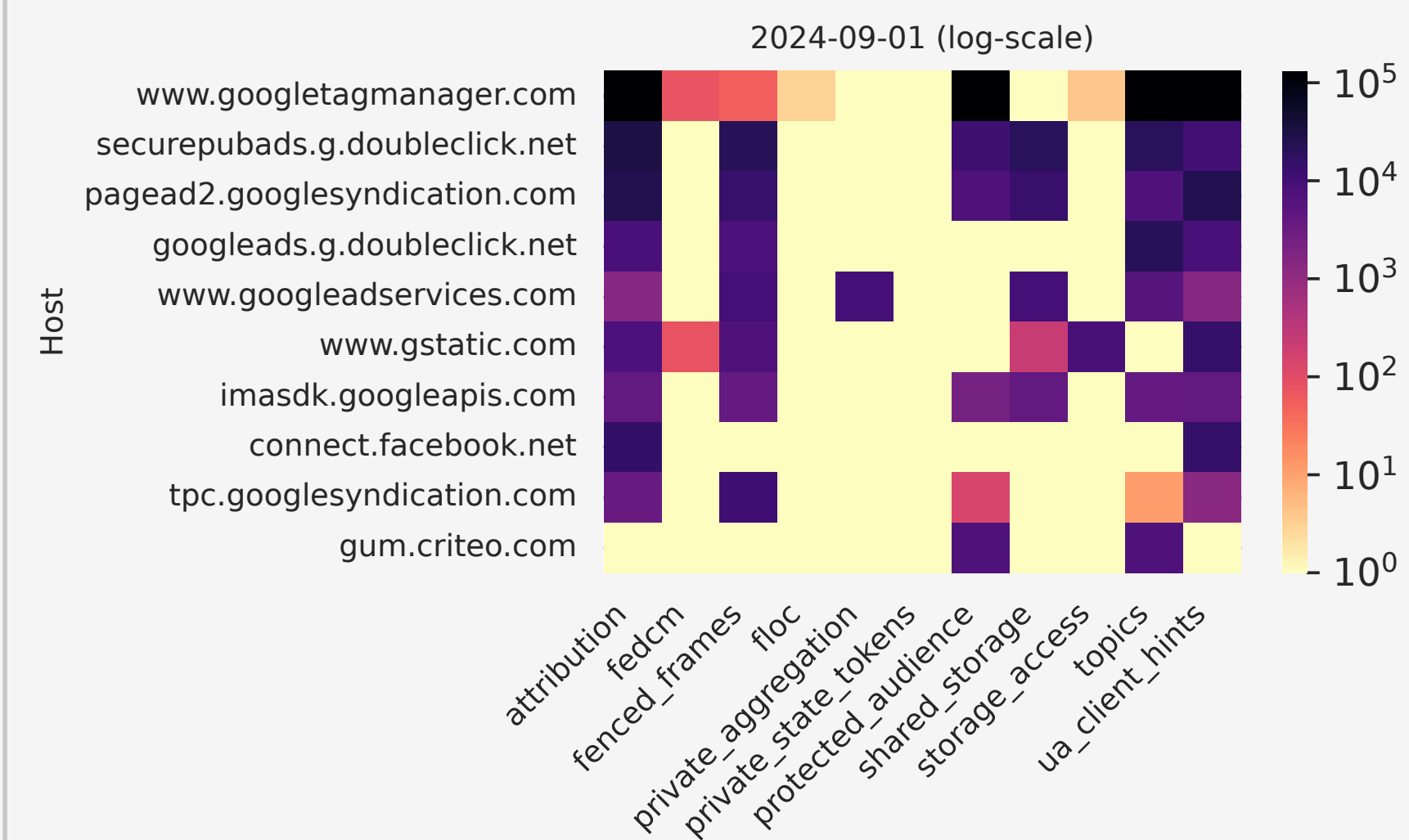
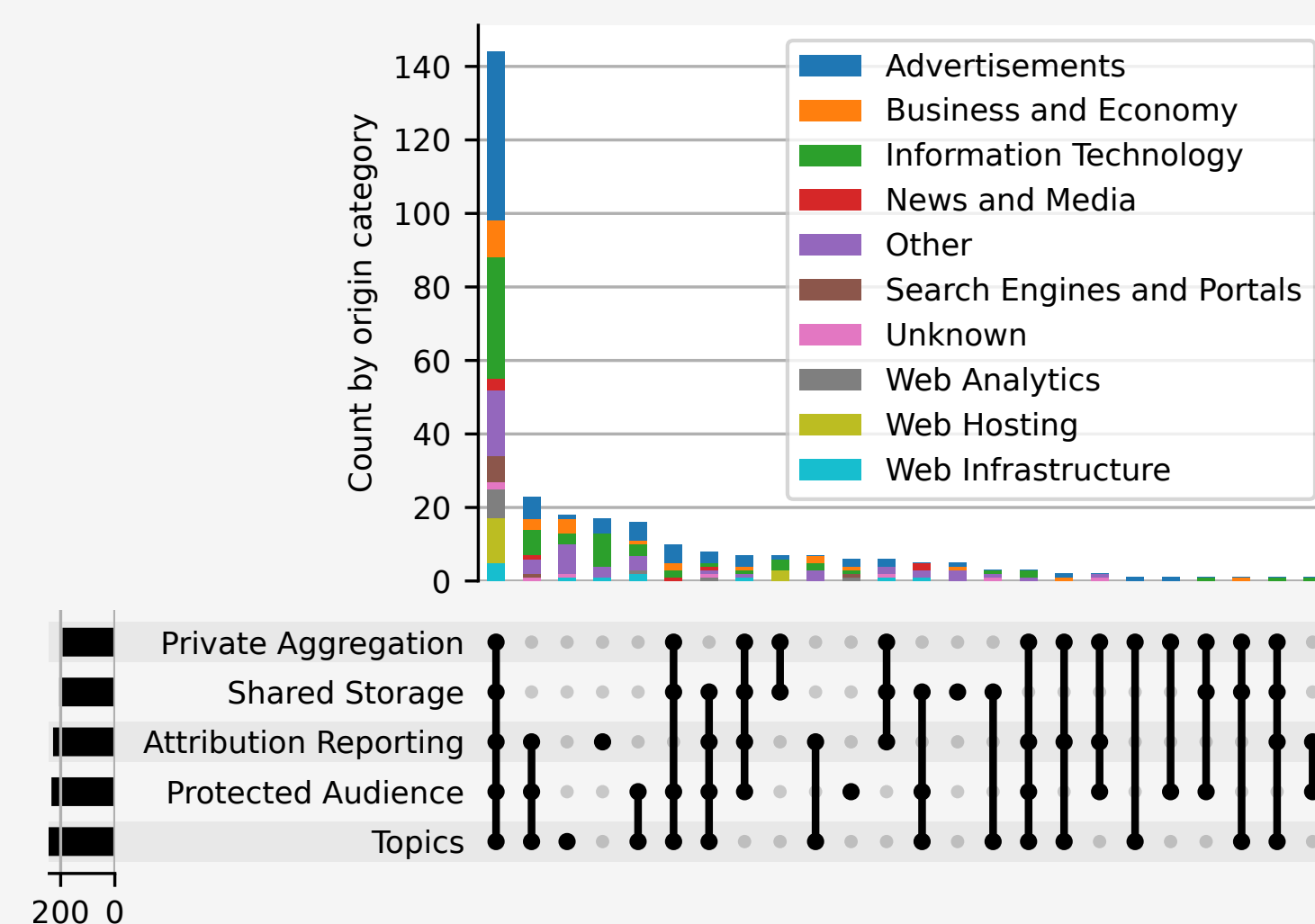
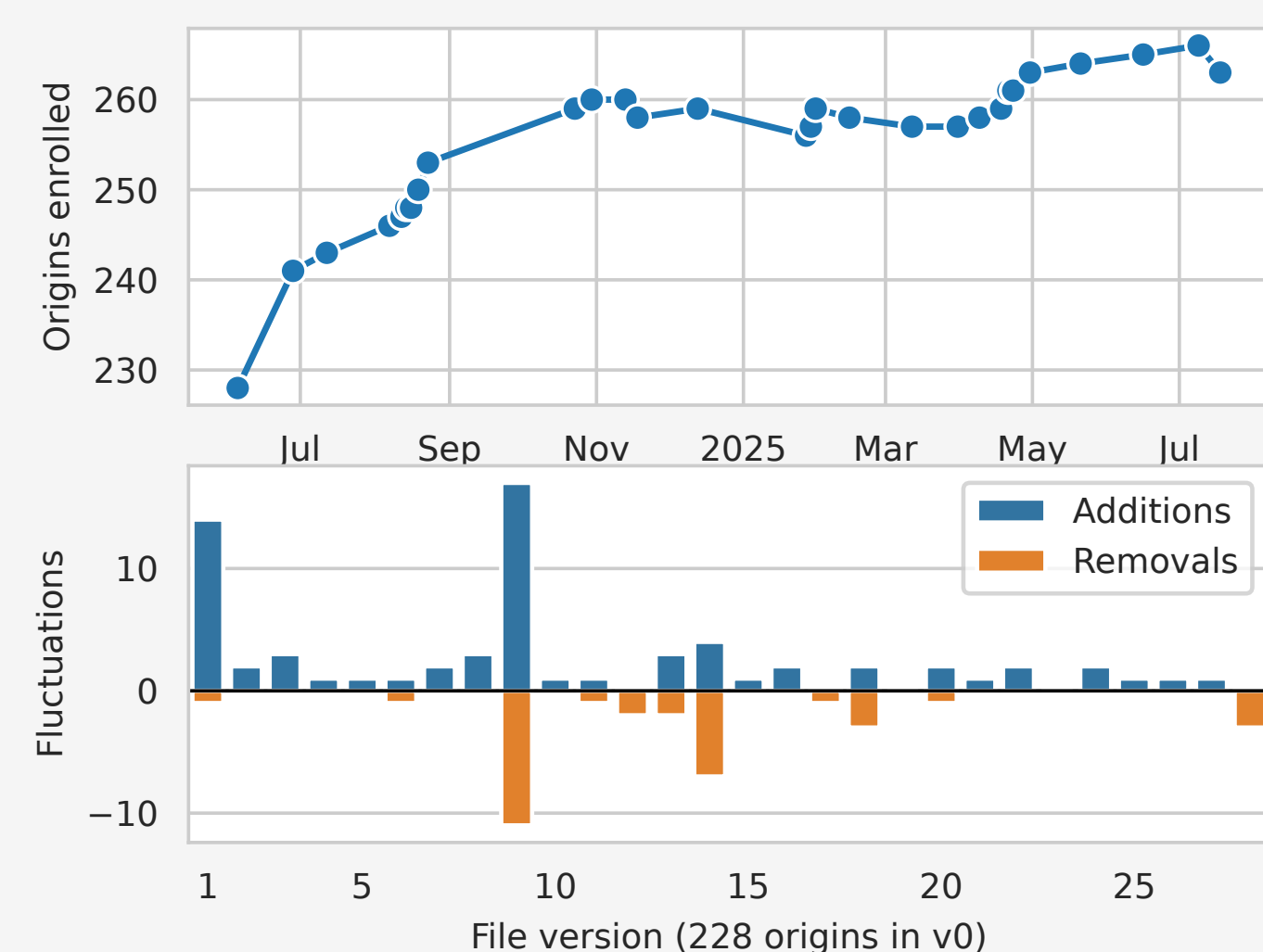
Top CHIPS third-party cookies (Apr'26).

Rank	Host	Script	% Pages	Use Case
1	www.googletagmanager.com	js	68.23	Google tracking tag management
2	www.googletagmanager.com	gtm.js	40.24	Google tracking tag management
3	connect.facebook.net	fbevents.js	23.78	Meta tracking pixel
4	securepubads.g.doubleclick.net	gpt.js	15.11	Google ad serving library
5	pagead2.googlesyndication.com	ufs_web_display.js	12.29	Google ad serving library

Top UA Client Hints implementers through JS (Apr'26).



ADOPTERS



TAKEAWAYS

Limited and uneven adoption

- A few actors willing to experiment with new web privacy proposals.
- Mainly focused on (re)targeted advertising or conversion use cases.
- Cat-and-mouse game: continuing abuse of UA Client Hints.
- Browsers disparities: opt-in on Chrome, default on Brave, Firefox, Safari.



Explore more on our online dashboard

<https://privacysandstorm.com>



<https://yohan.beugin.org>



[yohhaan](https://github.com/yohhaan)



yohan@beugin.org