

Block Me If You Can A Large-Scale Study of Tracker-Blocking Tools

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Problem & Motivation

Third-party Services

- ▶ Websites and mobile applications rely on third-party services, like advertisements, analytics, social integration widgets, or CDN-residing JavaScript libraries.
- ▶ Benefits for developers are clear, but can have impact on users:
 - ▷ Increased tracking of users (third-parties are included in lots of different pages)
 - ▷ Direct attacks (like malware distribution through services)

Third-party Service Distribution

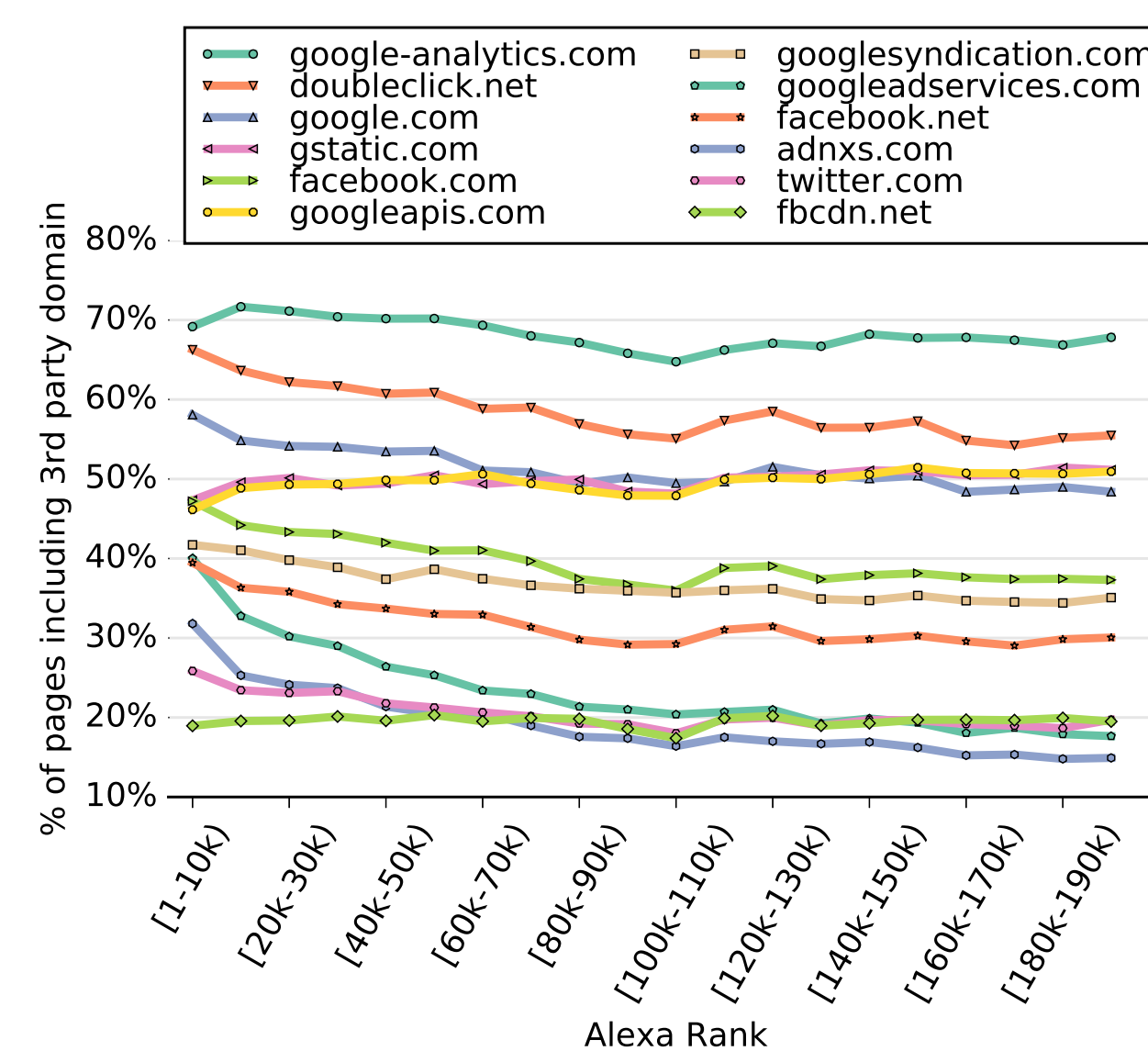


Figure 1: Distribution of the most popular third-party domains (TLD+1) in Alexa Top 200,000 websites in 10,000-intervals.

Third-party Blocking Analysis

- ▶ Various extensions exist to block third-party content
- ▶ Several Questions are still left open, e.g.:
 - ▷ What do they block?
 - ▷ What are their limits?

Browser Extension	Filter-Rules	Firefox Users	Chrome Users
AdBlock Plus (ABP)	ABP	18,689,656	10,000,000+
AdBlock	ABP	NA	10,000,000+
Ghostery	custom (proprietary)	1,337,831	2,348,209
uBlock (Origin)	ABP	1,243,409	3,852,990
AdBlock Edge	ABP	408,410	NA
Disconnect	custom (GPL)	265,773	797,097
Blur	custom (proprietary)	176,027	329,446
Privacy Badger	algorithmic	80,291	324,062

Figure 2: Common browser extensions to block online trackers, installations, and underlying filter rules (Aug. 2016).

Third-Party Reach

Webpages with Third-Party Inclusions per Company

	Desktop							Mobile					
	plain	AdBlock	Plus	Disconnect	Ghostery	Privacy Badger	Ublock	Origin	all combined	plain	EasyList	AdAway	MoaAB
Google	97	93	80	66	93	69	60	74	74	57	54		
Facebook	47	44	5	2	4	39	0	6	6	6	6		
Amazon	25	21	21	13	20	13	10	8	8	8	7		
Twitter	24	21	6	1	19	19	1	1	1	1	1		
Yahoo	18	6	4	2	3	2	1	14	14	14	0		
AddThis	15	14	8	0	0	0	0	0	0	0	0		
ComScor	14	10	1	0	1	0	0	2	2	0	0		
AOL	11	0	1	0	1	0	0	0	0	0	0		
Adobe	10	5	0	0	0	0	0	0	0	0	0		
Quantcast	9	5	1	0	0	0	0	0	0	0	0		
Conversant(ValueClick)	8	1	0	0	1	0	0	0	0	0	0		
RadiumOne	6	1	0	0	0	0	0	0	0	0	0		
Baidu	6	6	6	2	0	1	0	2	2	2	2		
AudienceScience	5	0	0	0	0	0	0	0	0	0	0		
Sizmek	5	0	0	0	1	0	0	0	0	0	0		

Figure 3: Percentage of websites and Android applications reached by the Top 15 companies that provide third-party services. The results show the total reach (plain) as well as the reach after the application of each blocking solution.

Third-Party Inclusions not Blocked per Plugin

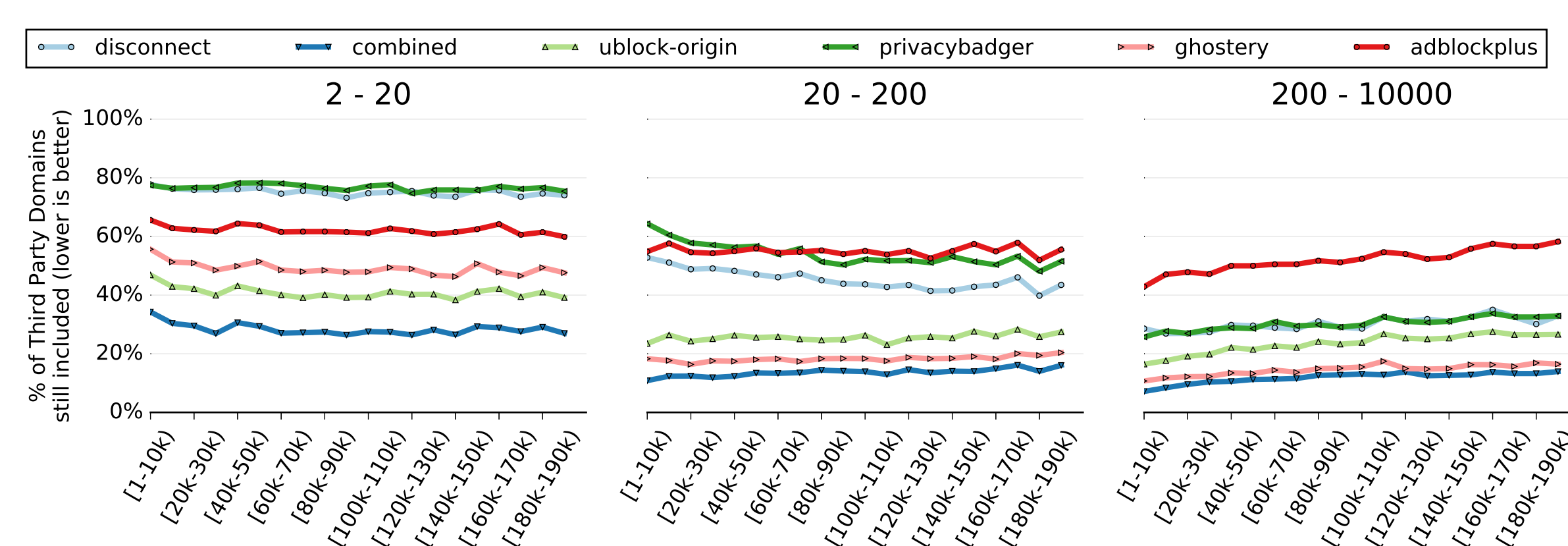


Figure 4: Sum of included third-party domains with 2-20/20-200/200-10,000 inclusions which are not blocked by a specific browser extension in relation to the plain profile. In all graphs: the lower an extension is on the y-axis, the better (i.e., less third-parties remaining).

Content-Blocking Capabilities

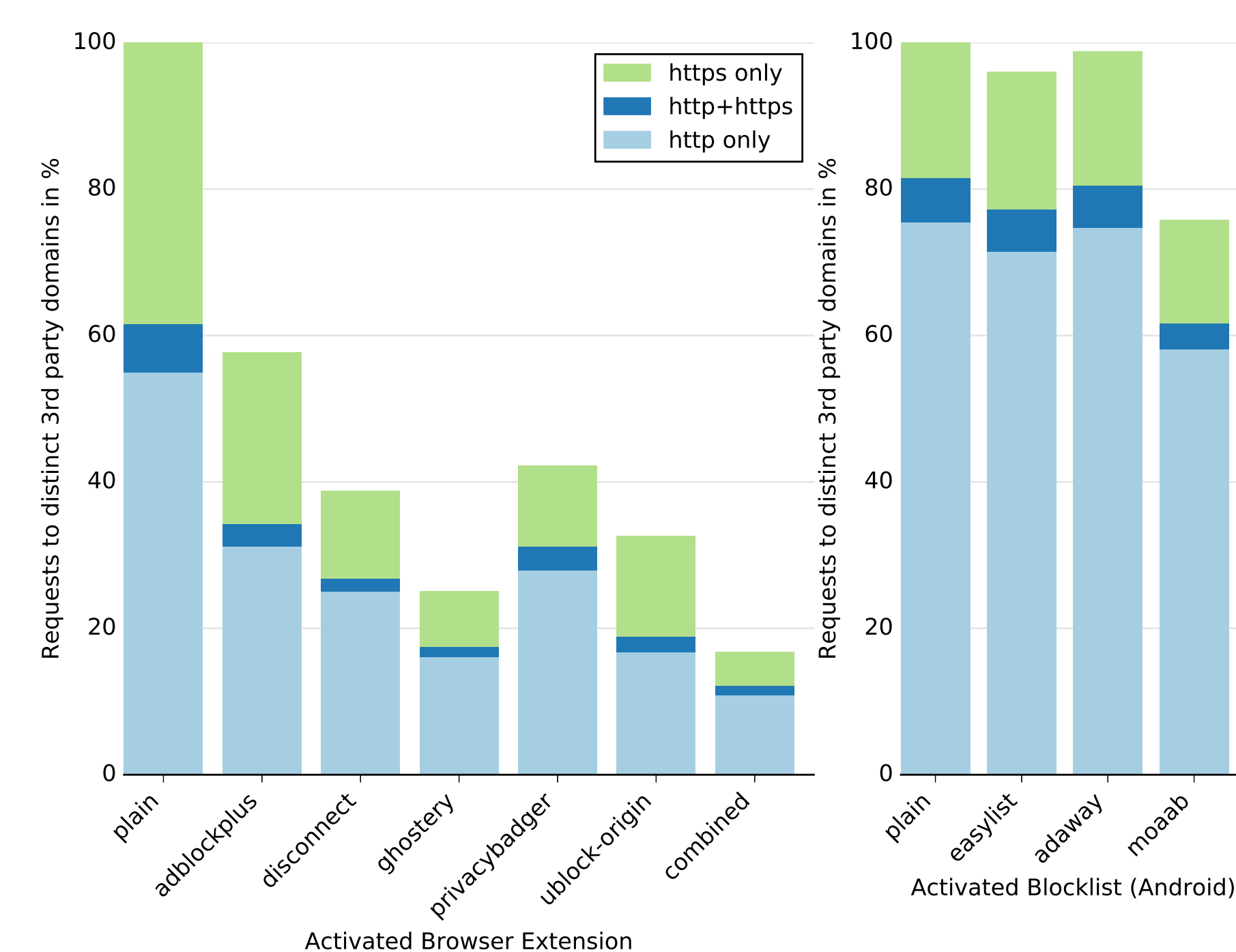


Figure 5: Protocols used for requests to distinct third-party domains.

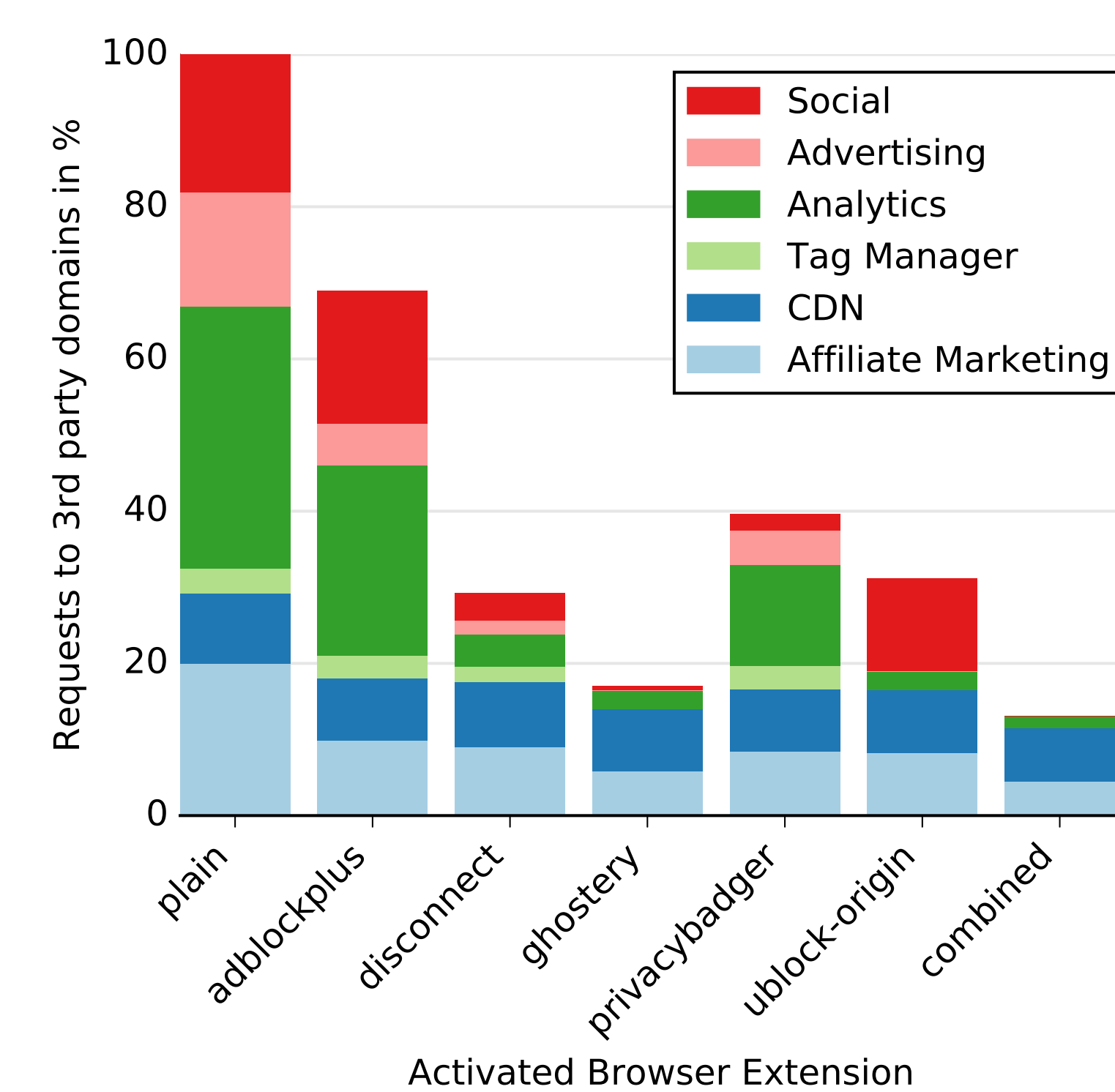


Figure 6: Categories blocked by different extensions, and all extensions combined. The data shows the categorized and aggregated numbers of the 30 most popular third-party services in our sample of 123,876 websites.

Conclusion

- ▶ A lot of traffic is still distributed through insecure channels (HTTP instead of HTTPS).
- ▶ Blocking tools differ greatly in performance and can have blind spots (e.g., not blocking smaller third parties).
- ▶ Third-party inclusions pose unique challenges on mobile devices (e.g., rooting of devices needed for blocking).