Spring 2015

Are They Worth Reading? An In-Depth Analysis of Online Trackers' Privacy Policies

Candice Hoke
Cleveland State University, s.hoke@csuohio.edu

Lorrie Faith Cranor
Carnegie Mellon University, lorrie@andrew.cmu.edu

Pedro Giovanni Leon
Carnegie Mellon University, pgl@andrew.cmu.edu

Alyssa Au
University of Pittsburgh - Main Campus, apa25@pitt.edu

Are They Worth Reading? An In-Depth Analysis of Online Trackers' Privacy Policies

Lorrie Faith Cranor,[†] Candice Hoke,[†] Pedro Giovanni Leon,[†] and Alyssa Au[∗]

[†]Carnegie Mellon University   [∗]University of Pittsburgh
{lorrie,choke,pgl}@andrew.cmu.edu   apa25@pitt.edu

ABSTRACT

We analyzed the privacy policies of 75 online tracking companies with the goal of assessing whether they contain information relevant for users to make privacy decisions. We compared privacy policies from large companies, companies that are members of self-regulatory organizations, and non-member companies and found that many of them are silent with regard to important consumer-relevant practices including the collection and use of sensitive information and linkage of tracking data with personally-identifiable information. We evaluated these policies against self-regulatory guidelines and found that many policies are not fully compliant. Furthermore, the overly general requirements established in those guidelines allow companies to have compliant practices without providing transparency to users. Few companies disclose their data retention times or offer users the opportunity to access the information collected about them. The lack of consistent terminology to refer to affiliate and non-affiliate partners, and the mix of practices for first-party and third-party contexts make it challenging for users to clearly assess the risks associated with online tracking. We discuss options to improve the transparency of online tracking companies' privacy practices.

Keywords

Online tracking, behavioral advertising, self-regulation, privacy policies, notice and choice

1. INTRODUCTION

Online Behavioral Advertising (OBA) is the practice of tracking Internet users' online activities to deliver ads that are more likely to be relevant to them. In response to concerns about privacy, the advertising industry has introduced self-regulatory guidelines, an icon, opt-out mechanism, and auditing and compliance program. Nonetheless, Internet users, policy makers, and privacy scholars continue to raised concerns about the lack of transparency and user control [18, 22, 39].

In the current self-regulatory regime, OBA companies are directed to publish privacy policies to provide consumer notice and offer opt-out choices [3, 29]. Privacy polices have been shown to be ineffective from a users' perspective [7,19]; however, they are important for providing transparency, enabling privacy experts to understand companies' data practices and call attention to practices that may raise concerns. Tools are being developed that summarize privacy policies for users based on automated natural language processing (NLP) [33,43] and crowd sourcing [32,36]. These efforts will succeed only if privacy policies contain relevant information.

We analyzed 75 online tracking companies' privacy policies, looking for 59 distinct practices relevant to users. We also gathered data about the proportion of members of ad industry self-regulatory programs and the prevalence of disclosures related to the most consumer-relevant practices and consumer choices.

We found that only 20% of the 2,750 online tracking companies identified by Ghostery,[1] a marketing technology company, listed affiliations with the Digital Advertising Alliance (DAA) or the Network Advertising Initiative (NAI), the two predominant advertising self-regulatory organizations in the US. We also found important differences among the evaluated policies, both with respect to disclosed practices and clarity. Large companies and ad industry self-regulatory association members exhibit relatively more comprehensive privacy policies.

Information sharing is unsurprisingly common, but companies tend to conceal their sharing partners' usage of that information. Half of the evaluated companies do not specify their data retention period. Moreover, most companies do not provide options to stop data collection and less than a third provide opportunities to opt out of targeted ads directly in their privacy policies. Most companies do not provide any access to collected information. Further, most companies are unclear or silent about collection and use of non-PII considered sensitive such as income range or health conditions. We show that the current state of online advertising self-regulation does not provide the level of transparency and control that users demand. In addition to unusable privacy policies, the combination of advertising companies functioning as third-parties (i.e., not user-facing), and the widespread sharing of information among tracking companies creates additional transparency challenges. We conclude by discussing policy and technology options to improve

---

[1]We downloaded this list of companies in January 2014 from: ghosteryenterprise.com/company-database/

the transparency and usability of online tracking companies' privacy policies.

2. BACKGROUND AND RELATED WORK

We first introduce current practices and concerns related to OBA and efforts to protect users' privacy. We then discuss previous investigations of privacy policies of first-party websites in different domains. Finally, we discuss users' expectations of OBA.

2.1 OBA Practices and Self Regulation

In an attempt to make advertising more effective, online advertising companies track Internet users' online activities and show them ads based on their inferred interests. However, the advertising industry has been criticized for targeting ads based on sensitive or personal information [16], discriminating against users [37], or even manipulating users' purchasing intentions [6]. Privacy scholars have argued that the lack of transparency about consumer scores that online tracking companies create can lead to problems of abuse and discrimination as the lack of transparency about credit scores did before the enactment of the Fair Credit Reporting Act [9]. Online tracking companies collect and share users' tracking data in a way that allows data aggregators to create accurate profiles of users' interests and behaviors [2]. Large data aggregators are able to combine interest data with users' personal information and then sell that information to marketers [1]. In March 2013 Facebook announced a partnership with data aggregators to match ads based on users' online and offline behaviors [34] and other offline companies are already tying users' identities with their online activities [40].

The U.S. Government has relied on industry self-regulation with special emphasis on the principles of notice and choice to protect users' privacy [12]. Advertising self-regulatory organizations require members to follow guidelines that include education, transparency, user control, use limitation and security practices [3, 29]. However, research has shown that users are unable to make decisions using transparency and user control tools provided by the ad industry and that member companies do not always comply with self-regulation transparency requirements [21, 22, 23].

Recognizing the problems with existing self-regulation and aiming to protect online privacy beyond OBA, the White House has asked companies to develop enforceable codes of conduct [42] and the Federal Trade Commission (FTC) recommended legislation to provide greater transparency and control over the practices of information brokers [14]. In December 2010 the FTC released a first report supporting Do-Not-Track as a mechanism to allow users to signal that they do not want to be tracked online [13]. To technically support the concept of Do-Not-Track, the World Wide Web Consortium established the tracking protection working group to design a web standard for it; however this effort did not succeed as not agreement was reached between the different stakeholders in the group regarding the meaning of Do-Not-Track [41]. Finally, the California Online Privacy Protection Act of 2003 (CalOPPA) was amended in 2013 to require websites to state how they respond to Do-Not-Track signals. Accordingly, the California's Attorney General has issued a set of recommendations to improve the usability of privacy policies [17].

2.2 Evaluation of Privacy Policies

There is a consensus that privacy policies have been ineffective at informing individuals about companies' privacy practices [7]. Cranor argues that privacy policies, and more generally notice and consent mechanisms, are meaningless unless users are empowered with usable and enforceable choice mechanisms [8]. An analysis of the usability of 64 privacy policies from both popular and health-related websites found that both types of websites had policies that were difficult for average Internet users to access and understand [20]. Research has also found that the content of healthcare websites' privacy policies does not match users' needs [10], and that in order to understand those privacy policies users would need reading skills levels that most Americans don't have [15]. A longitudinal evaluation of 312 popular websites' privacy policies found that the average number of words increased and their readability has decreased over time [27].

Researchers have also assessed the impact of government regulations on the content of privacy policies. An evaluation of health-related organizations' websites before and after the enactment of HIPAA found that transparency of practices increased, but policies became more difficult to understand and users' choices did not improve [4]. Similarly, a longitudinal study of 50 financial institutions' privacy policies found that although privacy policies contained more detailed information about sharing practices after the implementation of the GLB Act, the amount of sharing among affiliates and non-affiliates increased [35].

In general, users don't like reading privacy policies, they don't understand them [26], and they misunderstand their purposes [19]. Furthermore, it has been estimated that if Internet users read website privacy policies it would represent an annual cost of more then $700 billion dollars, which is higher than the cost of accessing the Internet itself [25].

We present the first detailed analysis of online tracking companies' privacy policies. Our work does not focus on readability of those policies, but their actual content. While difficult-to-read policies may be rewritten by experts or interpreted for users by automated tools or through crowd sourcing, incomplete policies do not contain sufficient information to allow for the extraction of useful information. Therefore, we assess the level of transparency of online tracking companies, which will impact the extent to which it may be possible to extract information from these policies [33, 36, 43].

2.3 Users' OBA Privacy Expectations

Surveys of Internet users have found high levels of concern about online tracking. Turow et al. found that 87% of telephone survey respondents would not allow advertisers to track them online if given a choice [38]. A more recent Pew telephone survey found that 68% of respondents did not like targeted ads because they didn't like having their online behavior tracked [31]. Qualitative research has found that users are not completely against targeted ads, but they are concerned about the lack of transparency and control that they have over the tracking that enables it [39]. Apart from tracking, transparency, and choice concerns, users have also expressed concerns about the type of targeted ads that they might see, which might lead to embarrassment [5]. In a study in which OBA companies' practices were shown to users, users relied most on OBA companies' sharing and

retention practices to decide what types of information they would disclose for the purpose of receiving targeted ads [24].

3. METHODOLOGY

In January 2014 we retrieved a comprehensive list of tracking companies from Evidon's online database.[2] This list had 2,750 companies under various non-mutually exclusive categories including, ad networks, ad servers, ad exchanges, analytics, optimizers, supply-side and demand-side platforms, data management platforms, publishers, among others. It also included the affiliations (if any) that these companies had with self-regulatory organizations. We also obtained a list of the 36 largest tracking companies [11].

3.1 Selection of Companies

We began our analysis with three sets of 36 companies: The 36 largest companies; 36 member companies randomly selected from the set of companies that Evidon reported were affiliated with either the Network Advertising Initiative (NAI) or Digital Advertising Alliance (DAA) programs as of January 2014; and 36 companies randomly selected from the set of non-member companies.

During the initial analysis process the size of the sets changed. The large set grew from 36 to 37 companies after we realized that one of the large companies, Adobe, had separate privacy policies for its analytics unit and its advertising unit. Therefore we decided to treat these units as separate companies. In addition, we eliminated three companies from the member set that were already included in the large set, thus reducing the size of the member set to 33 companies. Thus we analyzed policies for 37 large, 33 member, and 36 non-member companies.

In June 2014, after we completed the coding process, we found discrepancies between membership lists on the DAA, IAB, and NAI websites and the affiliations listed by Evidon in January 2014. Note that we looked at the IAB website because while IAB members are part of the DAA self-regulatory program, we found that many IAB members were not listed in the DAA website. After verifying membership, we found that 5 companies with listed affiliations in Evidon's database were not included as members in the DAA, IAB, or NAI websites. We also found that according to these websites, 24 of the large companies were members. We decided to consider a company as a member only if it appeared in the DAA, IAB or NAI websites and to compare practices of member and non-member companies as well as practices of large and random companies.

Therefore, we compared practices of companies in each of the following sets: large companies that were DAA, IAB, or NAI members, hereafter referred as *large members*, non large companies that were DAA, DAI, or NAI members, hereafter referred as *random members*, large companies that were not members, hereafter referred as *large non-members*, and random companies that were non-members. hereafter referred as *random non-members*.

In Section 4, we focus on comparing practices of members and non-members and we discuss specific differences between large and random companies if those differences exist.

3.2 Investigated Practices

We investigated 59 practices pertaining to collection, sharing, use, retention, user consent, access, contact, special provisions for children and European residents, security, and user education. We selected these practices based on self-regulatory principles, FTC notice requirements, our knowledge of current practices in which advertising companies engage, as well as users' privacy expectations discussed in the research literature. Table 1 shows the specific practices that we attempted to extract from these privacy policies.

3.3 Policy Coding

Privacy policies are difficult to read and understand due to the use of legalistic and sometimes ambiguous language. To reduce the number of potential coding inaccuracies, we followed a collaborative and iterative process. There were two stages: development of codes and coding the policies. Three researchers were involved in the first stage and two in the second stage. To develop the appropriate set of codes for each evaluated practice, researcher 1 reviewed 10 policies from the set of large companies and proposed a preliminary set of codes for each practice. Then, researchers 2 and 3 analyzed the same subset of large companies and applied the proposed codes to extract these companies' practices. Third, the three researchers discussed the preliminary extraction results and identified an improved set of codes. Table 4 in the Appendix lists the original codes associated with the groups of practices shown in Table 1. Collected data types in Table 1 include personally identifiable (C4) and anonymous data (C1, C2, C3, C5, and C6). Hereafter, we refer to the anonymous data types as "anonymous tracking data."

Next, researcher 2 coded all the policies. Following the same agreed criteria, researcher 1 coded a subset of 15 policies (20% of each set). We compared the coding of these 15 policies and discussed instances were codes were different. Disagreement occurred due to either factual or interpretation errors. After fixing the factual errors, we conducted an inter-rater reliability test achieving an agreement of at least 80% on each investigated aspect. Then, researcher 1 revisited the rest of the policies to correct similar factual errors.

Interpretation errors happened due to missing or unclear information. For example, if the policy did not mention choices to limit collection of non-PII tracking data, one researcher selected "User cannot limit this practice," while another researcher selected "The policy doesn't mention this." We revised our coding criteria for user consent practices and decided to use "The policy doesn't mention this" unless it was explicitly stated in the policy that the user could not limit the practice. Similarly, one researcher selected "Information is collected" if it was either explicitly mentioned or could be inferred that the company was collecting a given data type, while the other researcher selected "Information is inferred." We revised our coding criteria for collection practices and decided to reduce the granularity of the codes by grouping "Information is inferred," "Information is collected," and "Information is collected and inferred" as "Information is collected." We further grouped "Unclear" and "Policy does not mention" codes as "Don't mention." The final used codes are shown in Table 5 in the Appendix. After specifying the new coding criteria we achieved full coding agreement for the subset of 15 coded policies. Researcher 1 then revisited the rest of the policies and applied the new criteria.

Information collected or inferred	Entities with which info may be shared	Retention and Access
C1: Computers information (e.g., device ID, IP address, OS, cookies, web beacons)	S1: Affiliates	R1: Retention of non-PII
C2: Non-sensitive non-PII (e.g., gender, age, non-sensitive interests)	S2: Non-affiliates (in general)	R2: Retention of PII
C3: Sensitive non-PII (e.g., race, religion, sexual orientation, health conditions, income bracket, credit score)	S3: Non-affiliates (web publishers)	A1: Access (e.g., authenticated or anonymous access)
C4: Personally identifiable information (PII) (e.g., name and contact information)	S4: Non-affiliates (ad companies)	A2: Access format (profiles data, raw non-PII, and PII)
C5: Sensitive PII (e.g., financial information, Government ID)	S5: Non-affiliates that can link received information with users' offline activities	A3: Access options (e.g., view, edit)
C6: Geolocation data (e.g., GPS coordinates or WiFi approximate location)	S6: Non-affiliates that can link received information with users' PII	A4: Data portability and deletion
	S7: Law enforcement	
	S8: Other non-affiliates	

Purposes	Consent Model (Can users limit?)	Choice method
P1: Targeted ads	CS1: Use of non-PII for targeted ads	CH1: DAA/NAI Home page link
P2: Marketing (e.g., use contact information to offer products)	CS2: Use of sensitive non-PII for targeted ads	CH2: DAA/NAI Opt-out page link
P3: User analytics (e.g., understand how users interact with websites)	CS3: Use of PII for targeted ads	CH3: Opt-out button in policy
P4: Ad analytics (e.g., measure performance of ad campaigns)	CS4: Collection of non-PII	CH4: Opt-out button elsewhere
P5: Website customization or optimization	CS5: Use of PII for other purposes	CH5: Other choice method
P6: Enforcement of terms of services	CS6: Retrospective merging of PII and non-PII	
P7: Other uses specified	CS7: Prospective merging of PII and non-PII	
P8: Other uses unspecified	CS8: Online and offline information merging	
	CS9: Merging of information across devices	

Security and other practices	Contact, Mergers, and Policy Changes	Affiliates and Affiliations
SO1: Mention EU provisions	CT1: Contact address	AF1: Define affiliates
SO2: Mention children provisions	CT2: Contact recipient	AF2: Define non-affiliates
SO3: Mask IP Address	PC1: Policy change notices	AF3: DAA/NAI affiliations claimed
SO4: Store data encrypted	PC2: Policy update date	AF4: Actual NAI/DAI Affiliation
SO5: Mention how tracking works	M1: Mergers/Acquisitions notices and choices	
SO6: Mention information sources		
SO7: Link to educational material		
SO8: Suggest browser settings		

Table 1: 59 practices we looked for in online tracking companies' privacy policies.

3.4 Policy Retrieval

Evidon's database included a URL that was supposed to link to each company's privacy policy. However, sometimes Evidon's links did not take us to the company's privacy policy. For example, sometimes Evidon's links pointed to the company's home page when Evidon had determined that the company did not have a policy, while other times the links took us to nonexistent web pages. When the URL did not link to a company's privacy policy, we visited that company's home page and looked for the privacy policy link (usually found at the bottom of the page). On most occasions, when Evidon's link was not functional we found that the company did not have a privacy policy. The exceptions were when the company had changed its name, or was merged with or acquired by another company. In those few cases, we used the Google search engine to determine the name of the new company and find its website and then its privacy policy if it existed. Some of the companies' privacy policies, mainly from the large category, included several links to other related pages. When that happened, we followed all available links to try to extract the practices of interest.

3.5 Limitations

The results we present in the next section offer a somewhat representative snapshot of OBA privacy policies in early 2014. We tried to ensure a diverse set of companies by selecting both large companies and a sampling of random companies. Due to discrepancies between the information from Evidon and from the self-regulatory organizations that we were unaware of until after we completed coding the policies, we had to regroup our samples after we coded them. Thus our two random groups represent a mix of the two original random samples, and not a random sampling of the non-member and member groups.

While we observed that OBA companies do not change their privacy policies frequently, it is likely that a small number of companies changed their policies over the period of several weeks during which our coding took place, and more may have changed their policies since then.

Finally, while we attempted to code the policies as objectively as possible, privacy policies are often ambiguous, silent, and difficult to understand. Therefore, the codes selected for some of the stated practices are subject to researchers' interpretation.

4. RESULTS

There were important differences among the evaluated policies both with respect to disclosed practices and clarity. We organize the remaining results as follows. First, we report on the number of companies that did not have privacy policies for tracked users or that had websites written in languages other than English. Second, we report self-regulation affiliation rates. Third, we discuss important practices that are not disclosed or unclear. Fourth, we present disclosed practices that we consider problematic as well as those that we deem more privacy respectful. We then categorize online tracking companies into five groups according to the level of

privacy risks involved. Finally, we discuss hurdles that make privacy policies of online tracking companies challenging to understand.

4.1 Tracked User Policies

We attempted to analyze privacy polices from 106 online tracking companies; however, only 75 of those companies had privacy policies written in English with relevant content for tracked users. As shown in Table 2, we found that many companies either did not have an online privacy policy, had a privacy policy that was not intended for tracked Internet users, or had websites written in a language other than English. Specifically, 11 companies did not have an English-language website and we did not check for the existence of a privacy policy among these websites.[3] Languages in which these websites were written included Russian (4), German (2), Swedish (1), French (1), Persian (1), and Portuguese (1). From the 95 companies with English-language websites, 84 had a privacy policy. However, nine of those privacy policies discussed practices that apply to audiences different than tracked users. Those audiences include visitors of those companies' websites as well as those companies' customers such as advertising companies, web publishers, and web developers. While the lack of privacy policies was more salient among random non-member companies, there were also large non-member companies that did not have privacy policies written in English with relevant content for tracked users.

4.2 Low Self-Regulation Adoption

Only a small fraction (30%) of tracking companies in Evidon's online database listed affiliations with self-regulatory organizations, and a smaller fraction (20%) listed affiliations with any of the major self-regulatory organizations in the US. Furthermore, only 24 (65%) of 37 large companies and 28 (41%) of 69 random companies in our sample were DAA, IAB, or NAI members.

Regardless of whether the company was listed as member in either the DAA or NAI websites, we looked for any mention of affiliations with self-regulatory organizations made in the privacy policies themselves. Table 14 in the Appendix shows which companies claimed affiliations with any self-regulatory organization. All member companies included statements regarding their affiliations with self-regulatory organizations; however, we also found that one non-member company (`sojern.com`) claimed affiliation with the DAA, but was not listed as a member on the DAA website (although it was listed as a member of the IAB). We emailed the DAA on June 24 and June 30 of 2014 informing them about this situation, but we did not receive any response.

4.3 Silent and Unclear Practices

In this section, we show that non-member companies were less transparent than member companies across all practices; however, a large fraction of member companies were also silent with respect to important practices including, data collection, sharing, purpose of use, retention, and user consent.

4.3.1 Collection

While most companies do not explicitly mention the collection of non-PII such as anonymous demographic or interest data, most of them mention the logging of page visits or inferring users' interests. Therefore, whenever a company mentioned anything related to logging page views or making inferences about users' interests, we coded that as collection of non-sensitive non-PII. Unsurprisingly, Figure 1a shows that most of the companies state they collect non-PII. In fact, as shown in Table 6 in the Appendix, only two non-members (one large and one random) did not mention the collection of non-PII.

However, Figure 1b shows that a very large fraction (89%) of non-member companies and more than half (57%) of member companies do not explicitly disclose whether or not they collect sensitive non-PII, being non-members more likely to not disclose the collection of this information than members ($p = 0.008$, Fisher's exact test).

While we could have assumed that the lack of disclosure meant "no collection," we decided to differentiate between those companies that explicitly state they do not collect such information and those that are silent about it. Making a clear statement about the collection of sensitive non-PII is particularly important as research has shown that users are not comfortable disclosing sensitive information such as health or income related information [24], and many companies do not exhaustively list the information they collect, commonly stating that collection is "not limited to" a given list of data types.

As shown in Figure 1d, many of the companies were also silent about the collection of geolocation data, where a large fraction of both non-member (54%) and member (35%) companies did not include any statements regarding collection of this data type.

4.3.2 Sharing

Sharing practices are particularly important because an uncontrolled transfer of information could lead to unclear, if not unintended, uses against users' expectations. We investigated sharing practices with both affiliates and non-affiliates. We considered as affiliates those companies under the same ownership, or those companies that receive information to provide a service to the company under analysis and that are contractually obliged to only use such information to provide the requested service. Here we discuss non-affiliate sharing. As shown in Figure 2a, most of the companies share only non-PII with non-affiliates. However, a considerable fraction of companies (17%) are silent about non-affiliate sharing.

We further investigated whether companies disclose more specifically with whom they share. Unsurprisingly, as shown in Figure 2, companies were more silent as we looked into more specific types of sharing. Specifically, Figure 2b shows that non-member (65%) are more silent than members (18%) about sharing with other ad companies ($p < 0.001$, Fisher's exact test).

Particularly important is the sharing with non-affiliates that can link received data with users' offline behavior or otherwise with PII. However, as shown in Figures 2c and 2d, most companies are silent about these practices. Again, we could have assumed that the silence regarding these practices meant that they do not happen. Nevertheless, merging tracking data with PII and offline data is not an uncommon practice. Data brokers, which are often recipients of

---

[3]One company had gone out of business by the time we attempted to visit its website.

	Members		Non-members		
	Large (#, % of sample)	Random (#, % of sample)	Large (#, % of sample)	Random (#, % of sample)	Total
Initial sample size	24	28	13	41	106
With English-language website	24 (100%)	28 (100%)	11 (84%)	32 (78%)	95 (90%)
With English-language privacy policy	24 (100%)	27 (96%)	11 (84%)	23 (56%)	84 (79%)
With English-language tracked user privacy policy	24 (100%)	25 (89%)	9 (69%)	17 (41%)	75 (71%)

Table 2: Tracked user privacy policies written in English. All large member companies have English-written policies with relevant content for tracked users; however, four large companies and many randomly selected non-member companies do not have user-relevant privacy policies.
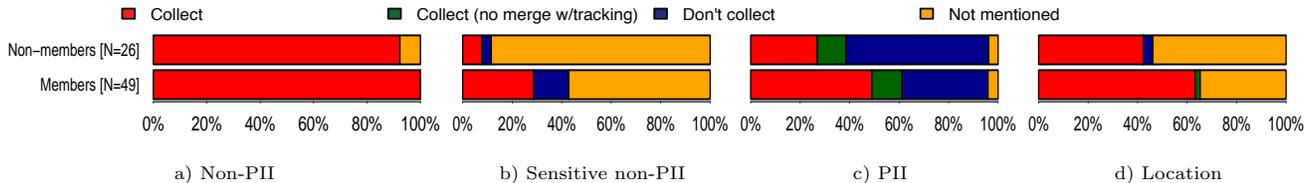

Figure 1: Four of the investigated collection practices. A large fraction of member and non-member companies are silent about collection (or inference) of sensitive non-PII and location.

information sold by online tracking companies, often merge individuals' PII with their interest data collected via other methods. In addition, companies do not assume responsibility for non-affiliate recipients' practices. Therefore, we consider it important for companies to disclose explicitly whether they share information under these circumstances.

The NAI code of conduct and DAA self-regulatory principles require member companies to provide a notice indicating how collected data will be used, "including transfer, if any, to a third party." This generic notice requirement makes it easy for companies to be compliant, however, it does not allow users to assess the risk of those data transfers. In particular, self-regulatory principles do not require companies to disclose with which specific non-affiliates they share users' information or how the information shared may be used by the recipients.

Furthermore, while the NAI requires members who transfer non-PII to non-affiliates to require those recipients to "not attempt to merge such non-PII with PII" unless the user opts in [29], opt-in methods are also usually unclear and often users who voluntarily provide PII to other third-parties (usually in a different context) are implicitly opting it for such merging. Interestingly, the DAA principles also have a similar transfer limitation requirement, but that requirement only applies to service providers, not third-party trackers [3].

Finally, the NAI code of conduct only requires companies to offer an opt-out choice if they want to merge non-PII collected in the future (as opposed to previously) with PII [29].

4.3.3 Use

We attempted to extract statements related to various use practices including, ad targeting, marketing, user and ad analytics, website customization, enforcement of terms, and "other purposes." Here we limit our discussion to the first four. Table 8 in the Appendix shows detailed use practices for each company.

The types of information used for targeted ads are shown in Figure 3a. Most companies (81%) explicitly state that they use either non-PII or both non-PII and PII for targeted advertising; however, there are "analytics" providers, "ad servers," and other ad related companies, which are not explicit about their engagement (or lack of) in targeted ads. Specifically, Figure 3a shows that non-member companies (39%) are more silent than member companies (8%) about this practice ($p = 0.003$, Fisher's exact test).

While we could have assumed that analytics providers would not engage in targeted ads and ad servers would, we found a handful of analytics companies that state that they engage in targeted ads and some ad servers that were silent about the practice. For example, Table 8 in the Appendix shows that three non-member companies (`userreport.com`, `foreseeresults.com` and `twelvefold.com`), explicitly state that they do not engage in targeted ads. The first two are classified in Evidon's database as analytics providers, hence it is not surprising that they do not engage in targeted ads. However, `twelvefold.com` is categorized as ad server in addition to analytics provider, yet it does not mention advertising purposes in its policy. Furthermore, there were other companies categorized as analytics providers that state they engage in delivering targeted ads (e.g., `whos.amung.us`, `advanseads.com`). Therefore the categorization of a company cannot be used to infer its data use practices when the company does not explicitly state those practices.

Figure 3b shows marketing (e.g., use of contact information for marketing purposes practices.) More than half (53%) of companies do not engage in marketing practices and (23%) explicitly state that they perform marketing. However, a considerable fraction of member (20%) and non-member (31%) companies who collect PII do not disclose whether or not they use this information for direct marketing purposes.

"User analytics" is defined as the practice of analyzing users' actions on first party websites and "ad analytics" is defined as the practice of evaluating the performance of advertisement everywhere they are shown. Both of these are common practices among online tracking companies; however, as shown in Figures 3c and 3d, a large fraction of com-
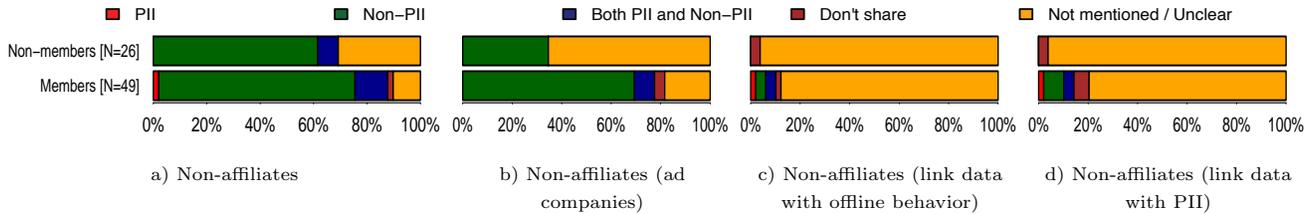
Figure 2: Sharing with different types of non-affiliates. Colors represent different data types (if any) that are shared.

a) Non-affiliates
b) Non-affiliates (ad companies)
c) Non-affiliates (link data with offline behavior)
d) Non-affiliates (link data with PII)
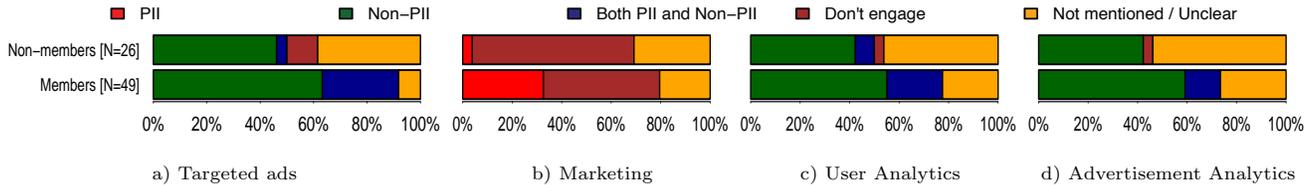
Figure 3: Summary of purposes. Colors represent different data types (if any) used for each those purposes.

a) Targeted ads
b) Marketing
c) User Analytics
d) Advertisement Analytics

panies do not disclose whether or not they engage in these practices.

4.3.4 Retention and Access

Both the DAA and NAI allow retention "as long as necessary to fulfill a legitimate business need, or as required by law" [29]. We found that many companies use similar language to obscure their retention periods. While it is reasonable that companies need to keep information to fulfill their business needs, this vague requirement should not prevent them from establishing a retention period. We are also unaware of any laws that require these companies to keep tracking data and believe that adding the phrase "as required by law" in this context is misleading. Figure 4a shows that a large faction of non-member companies (81%) and a smaller fraction of member companies (47%) do not disclose (or are unclear about) the retention period of collected non-PII ($p = 0.006$, Fisher's exact test).

Figure 4b shows that many companies (67%) do not mention any opportunity for users to access information they collect about or infer from users' online activities. Only a quarter (16%) of member and a small fraction (4%) of non-member companies offer "anonymous" or both "anonymous" and "authenticated" access. Therefore, in general very few companies provide access to this information. Table 9 in the Appendix shows detailed retention and access practices of each company.

4.3.5 Consent Mechanisms

We investigated consent mechanisms to both determine the extent to which companies comply with NAI and DAA requirements and assess the salience of the choices offered. The NAI code of conduct establishes various user consent practices. It requires collection of users' opt-in consent before 1) merging PII with previously collected non-PII, a practice the NAI calls "retrospective merger," 2) use of precise geolocation data for targeted ads, and 3) use of sensitive data for targeted ads. It further requires offering of opt-out choices for collection of information for targeted ads (but not collection for other purposes) [29]. The DAA establishes more lax consent requirements as it only requires companies to offer the opportunity to opt out of collection

a) Retention period for Non-PII
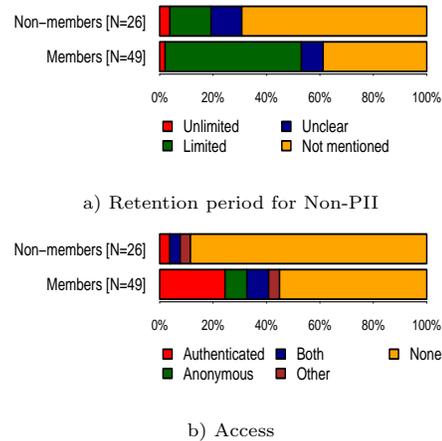
b) Access

Figure 4: Retention and Access Practices

and use of data for targeted ads (but not collection for other purposes) [3].

Many companies offer opportunities to opt out of targeted ads (see Figure 5a), however the opportunities to stop the collection of information for other purposes are often not mentioned (see Figure 5c). Also, while most companies do not engage in merging non-PII with PII (59%) or with offline (53%) data, the majority that can engage do not specify consent options for any of those practices (see Figures 5d and 5e). Specifically, a third of member (31%) and a smaller fraction of non-member (15%) companies do not mention any choices to limit merging of PII and non-PII, although their polices suggest that such merging is possible.

Furthermore, Figure 5f shows that none of the companies that mention tracking across devices offer any options for users to limit it. Overall, while many companies offer opt-out choices for targeted ads, only very few offer choices for data collection, and almost none offer explicit choices to prevent merging of PII with non-PII.

4.4 Disclosed Practices

There were several companies with more transparent and
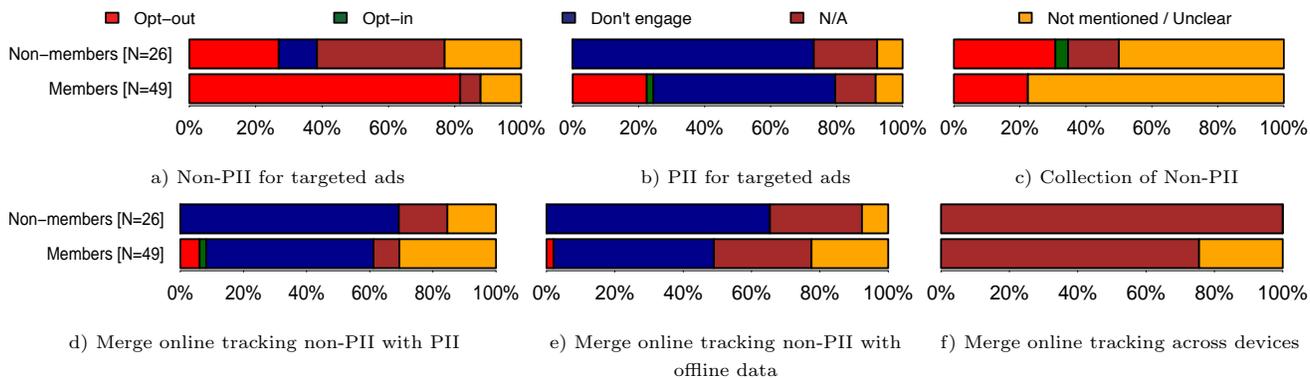
Figure 5: User Consent Practices. "N/A" denotes many companies that were not clear or explicit about engaging in the given practice and hence they do not offer related choice options. "Don't engage" denotes companies that explicitly stated that they do not do the given practice.

explicit practices. We first discuss companies with more privacy-respectful practices and then those with more questionable practices.

4.4.1 Privacy-friendly practices

Seven (14%) member and one (4%) non-member companies explicitly mention that they do not collect sensitive non-PII (see Table 6 in the Appendix for details). Furthermore, a large fraction of both member (35%) and non-member (58%) companies state that they do not collect information that personally identifies users.

Remarkably, one random member (`rocketfuel.com`), one large member (`adadvisor.net`), one random member (`visbrands.com`), and one random non-member (`foreseeresults.com`) companies explicitly state that they do not share with entities that can link received data with PII. Moreover, the latter two companies also state that they do not share with entities that can link received data with offline data.

A handful of both member and non-member companies state specific and limited retention periods for tracking data, which range from 20 days to 2 years.

In addition, while many companies only offered the opportunity to opt-out of targeted ads, but not the opportunity to opt out of being tracked, we found 11 (22%) members and 8 (31%) non-member companies (see Table 10 in the Appendix) using language that suggests that users can actually limit online tracking when they opt out.

Finally, as shown in Table 14 in the Appendix, one large member and two large non-members indicate that they take measures to anonymize IP addresses. The large member (`quantcast.com`) indicates, "we do not store full IP addresses." One non-member (`histats.com`) states, "In order to ensure better privacy protection, Histats anonymize all IP addresses: the last three digits of the IPv4 are deleted immediately, and last 64 bits on IPv6." The second non-member company (`gemius.com`) refers to location information as "geographic location on the basis of anonymized IP address."

4.4.2 Privacy-concerning practices

A large fraction of members (29%) and a small fraction of non-members (8%) collect or infer sensitive non-PII ($p = 0.04$, Fisher's exact test). Similarly, a large fraction of both members (49%) and non-members (27%) collect PII without mentioning any use restrictions, and many member and non-member companies were silent about user choices to limit merging of non-PII with PII.

Moreover, small fractions of member (14%) and non-member (8%) companies share PII or both PII and non-PII with non affiliates. Similarly, a small fractions of member (14%) companies also state that they can share with non-affiliate companies that can link non-PII with PII.

While many companies do not disclose or are unclear about their retention period for online tracking data, one large non-member (`optimizely.com`) discloses unlimited retention period. It states that "Non-personally identifiable information may be stored indefinitely."

4.5 Opt-Out implementation

All member companies that engage in targeted ads offer opt-outs and, interestingly, a large fraction (46%) of non-member companies also claim to offer the opportunity to opt out of targeted ads using at least one of the opt-out methods shown in Figure 6.

The most popular opt-out methods among member companies are either a link to the DAA/NAI opt-out pages (59%) or DAA/NAI home pages (51%). Surprisingly, we found that a considerable fraction of non-member companies also include links to the DAA/NAI opt-out pages (12%) or DAA/NAI home pages (4%), even though those pages are only useful for opting out of targeted ads from members.

A large fraction of member companies (43%) compared with non-member (12%) companies use opt-out pages, where companies explain with somewhat more detail how targeted ads work, and provide an opt-out button as well as links to the DAA and NAI websites. Less than half of member companies (29%) and a smaller fraction of non-member companies (23%) include an opt-out button directly in the privacy policy.

As shown in Figure 6, other choice methods include the opportunity to access and edit anonymous profiles (e.g., `bluekai.com/registry`), edit personal profiles (`adobe.com`), opt out from participating in research surveys (`voicefive.com`), opt out from a partner company (`optimizely.com`), establish preferences to receive text alerts for ads based on location (`att.com`), adjust account settings (`digg.com`), among many other specify ones. Overall, we found that many companies offer opt-out choices for targeted ads and marketing communications. However, user choices for other

purposes such as collection of anonymous tracking data, merging of anonymous tracking data with PII, or tracking across devices are rather limited.

4.6 Other disclosures

We investigated several other types of disclosures made in tracking companies' privacy policies, including educational material, companies' contact information, policy change notifications, mergers and acquisitions notifications, whether or not special provisions for European residents and children are mentioned, as well as data security practices. Tables 12 through 14 in the Appendix show the details for each company.

4.6.1 Educational material

Both the NAI and DAA establish requirements to educate users. A large fraction of companies refer to cookies, web beacons, tags, pixels, or "pieces of code" to describe how they track users' online activities. However, describing how tracking works is arguably not very educational as users often do not understand the technology jargon used to describe it. Therefore, we searched for other educational material (or pointers to it) in the privacy policy. Figure 7 shows the fraction of companies making statements to describe online tracking and providing educational statements or links. We found two main types of educational material: suggestions to configure web browser cookies settings and pointers to the website `http://www.allaboutcookies.org/`. A few companies also provided a link to the DAA consumers' page `http://www.aboutads.info/consumers`. However, neither of these two websites provide useful recommendations to protect online privacy, but mostly talk about the benefits of cookies and online advertising. A large fraction of both member (84%) and non-member (54%) companies include these kinds of educational material in their privacy policies.

4.6.2 Information providers

The NAI requires companies to be diligent about receiving data for OBA purposes "from reliable sources that provide users with appropriate levels of notice and choice" [29]. Nevertheless, we found that while 78% of member companies mention that they receive information from third-parties, they do not indicate that those sources provide "appropriate levels of notice and choice," being reliable or otherwise accountable for handling user information responsibly. Examples of statements used include, "at times may also use Non-PII data from third parties," or "we may combine Non-Personal Information with data collected from other sources." Notably, the remaining 22% of member companies do not even mention whether or not they receive information from other entities.

4.6.3 Europeans and children's provisions

We looked at whether privacy policies included any particular statements for children or Europeans. As shown in Figure 7, a large fraction of member (55%) and a smaller fraction of non-member (23%) companies include statements for Europeans. These statements were shown more often when the company collected PII and they usually cited the US-EU and US-Swiss Safe Harbor Frameworks. Some companies also cited European regulations or European self-regulation organizations such as `youronlinechoices.com/uk`. Similarly, more than half of member (67%) and more than a

third of non-member (39%) companies include statements regarding children under 13. However, we did not find any company mentioning the self-regulatory program for children's advertising [28].
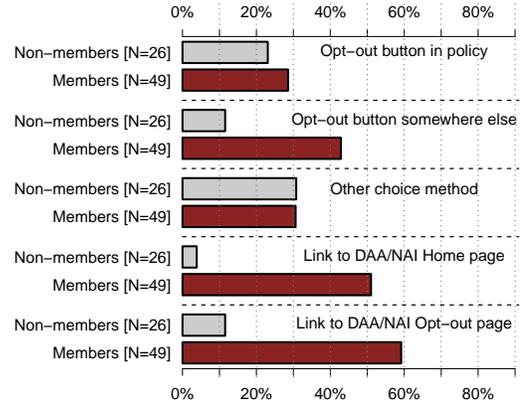
Figure 6: Opt-out implementation. Only 23% of non-member and 29% of member companies provide an opt-out button directly in their policies.

4.6.4 Self-regulation affiliation claims

Most member (74%) and a small fraction of non-member (8%) companies mention affiliations with self-regulatory organizations. However, not all of these mention affiliations to the NAI or DAA. In particular, two large member (`facebook.com` and `disqus.com`), and four random member (`tapjoy.com`, `apple.com`, `att.com`, and `verizon.com`) companies mention affiliations with TRUSTe. Furthermore, one large non-member (`gemius.com`) and one random non-member (`userreport.com`) companies mention adherence to ESOMAR (`esomar.org`), an European organization.

4.6.5 Security provisions

We found that most of the companies include boilerplate security statements, which we did not code. Instead, we looked at whether the companies stated that they encrypted the collected data. Notably, one large member named Neustar (`adadvisor.net`) states that "the contents of AdAdvisor Cookies are encrypted, and can't be read without the encryption key." We also found that one large member (`addthis.com`) and one random member (`tapjoy.com`) use exactly the same sentence to indicate that they use encryption, "We take reasonable security measures to protect against unauthorized access to or unauthorized alteration, disclosure or destruction of data. These include firewalls and encryption." Other companies also mention encryption, but were not specific about which data was encrypted, for example a random member company named SET Media (`www.set.tv`) mentions, "to maintain the security of its network and the data we collect. We use various technologies, including, in certain instances, encryption."

4.6.6 Policy changes and updates

We found that a large fraction of companies do not include a statement explaining how users will be informed if the privacy policies changed. Many non-member (58%) and member (25%) companies do not provide policy-change notifications to users ($p = 0.005$, Fisher's exact test). However,

there were also companies (41%) across both sets that explicitly state that a notice would be provided in the policy when it changed. A small fraction (23%) of the companies who collect contact information further indicate that they would both provide a notice in the policy and email customers if their policies changed.
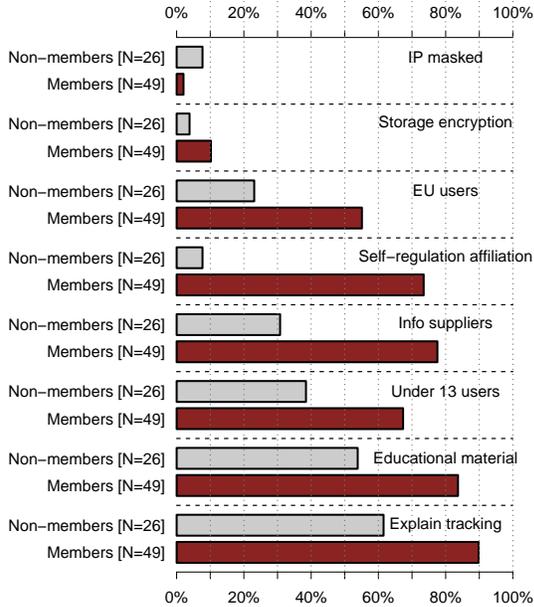
Figure 7: Fraction of companies mentioning each of the shown practices. Only three quarters of member (74%) and a small fraction of non-member (8%) companies mention affiliations with self-regulatory organizations.

4.6.7 Mergers and Acquisitions

During our evaluation period, we noticed that mergers and acquisitions among tracking companies are common. Notably, one large member company (`bluekai.com`) was acquired by Oracle, and a few small companies were merged with larger or other small companies. Therefore, we looked into provisions related to how users would be informed and what options would be offered to them in case of mergers or acquisitions. Unsurprisingly, given the silence with respect to other practices, many companies (28%) across both sets were silent about this practice. Furthermore, a large fraction of companies (63%) across both sets mention that they may share users' information in case of mergers, yet do not mention any notification for users or any user choices. However, we also found four member (8%) and two non-member (8%) companies mentioning that some form of notice would be provided, two of them (one member and one non-member) indicating that users would be able to opt out of the sharing of their personal information.

4.7 Categorization of Companies

We have found that users have difficulties making privacy decisions with respect to online tracking using tools that require them to make those decisions on a per-company basis [22]. We could however help users by providing them with more usable notices that summarize relevant information about online tracking companies in a concise and consistent manner. The first step towards these usable notices

is to be able to group online tracking companies in a few number of categories that users can act upon. Using the collected data, Table 3 shows a possible way to categorize online tracking companies based on a subset of 11 of the 59 evaluated practices.

As noted before, a large fraction of companies were silent about several practices, including the collection of sensitive non-PII (see Figure 1b) and sharing with non-affiliates that can link received data with PII or with offline data (see Figures 2c and 2b). To determine the number of companies in our data set that would fit into each of the proposed five categories we assumed that the companies that are silent about these practices do not engage in them. Nevertheless, had we assumed that silent companies engage in these practices, almost all the companies would have fallen into the most privacy-invasive category (unrestricted tracking). Therefore, we believe that companies should explicitly include in their privacy policies whether or not they engage in the practices that we have investigated in our analysis. It is important to mention that while most of the companies (41) in our data set fall into the most privacy-invasive (unrestricted tracking) category and none into the less privacy-invasive (analytics) category, a large fraction of these companies could be placed into less privacy-invasive categories if they included in their polices three relatively easy-to-meet requirements: limited retention period, contact information to submit privacy inquires, and policy change notifications.

4.8 Understandability Hurdles

Here we discuss identified aspects that make these privacy policies difficult to understand and act upon.

4.8.1 Mixed Practices

Online tracking companies normally have many "partners," which may include advertisers, publishers, other advertising or tracking companies, etc. We found that often privacy policies are unclear about who the intended audience for their policies is, often mixing practices that apply to their partners, their websites' visitors, and tracked Internet users. In very rare cases privacy policies are designed to exclusively inform tracked users and more often policies include paragraphs or sentences that could apply to both partners and tracked users, making it very difficult to disentangle the practices that apply exclusively to tracked users.

Among both member and non-member companies we observed several companies that are both service providers in first-party contexts as well as online tracking companies. These include both large (e.g., Adobe, Verizon, CBS, etc.) and smaller (e.g., Tapjoy, WildTangent Games, Traffiq, etc.) companies. Although large companies are clear about some of the different practices that apply to direct customers and general audience of tracked users, smaller companies are often less clear. There are often situations were it is impossible to determine whether a given practice applies to direct customers, tracked users, or both. A typical example of this situation is when a company collects personal information from a first-party relationship as well as tracking data. In this case, many companies are not explicit about linking or not tracking data with personal information. The situation is worse with other practices such as uses, sharing, access, and retention period, where it is often impossible to differentiate between practices that apply to information collected in first-party and third-party contexts.

	Requirements	Analytics	Targeting	Sensitive non-identified targeting	Identified targeting	Unrestricted tracking
Collection	Does not collect anonymous sensitive information (race, religion, sexual orientation, health conditions, income bracket, credit score)	✓	✓			
	Does not collect personally identifiable information (name, address, telephone number, email address)	✓	✓	✓		
Sharing	Does not share personally identifiable information with non-affiliates (may share non-PII)	✓	✓	✓	✓	
	Does not share non-PII with non-affiliates that have the ability to link data with PII or offline activities	✓	✓	✓	✓	
Use	Does not use PII to target ads	✓	✓	✓		
	Does not use non-PII to target ads	✓				
	Does not use information for direct marketing (i.e., contact user to offer products)	✓	✓	✓		
	Does not use information for unspecified purposes	✓	✓	✓	✓	
Retention	Specifies a limited retention period	✓	✓	✓	✓	
Contact	Specifies a way to contact company with privacy-related inquires	✓	✓	✓	✓	
Policy changes	Provides notice if policy changes	✓	✓	✓	✓	
	Number of companies that meet all requirements in this category	0	16	14	4	41
	Number of companies that only meet collection, sharing, and use requirements in this category	8	19	5	16	27

Table 3: Five proposed tracking categories. A substantial number of companies could fit into less privacy-invasive tracking categories if they included a limited retention period, contact information to submit privacy inquires, and policy change notice requirements in their privacy policies. A ✓ indicates companies in that category need to meet the listed requirement

4.8.2 Terminology

Given that sharing practices are common among advertising companies, we investigated how these companies define the affiliates and non-affiliates with whom users' information is shared. Many companies do not mention affiliates or non-affiliates, and those who do mention them, do not provide a clear definition, mentioning them vaguely. For example, privacy policies include sentences like, "may use or share the information we collect with our affiliates and third parties, such as our service providers, data processors, business partners and other third parties," "may share with advertisers and their service providers and partners," "may share with interested third parties," or "may use or share the information we collect with our affiliates and third parties, such as our service providers, data processors, business partners and other third parties," "may share with our partners like publishers, advertisers or connected sites."

While it is understandable that tracking companies may have different partnerships, from a users' perspective, it is very difficult to accurately determine which of those may or may not follow the same practices as the company under scrutiny. A consistent definition of affiliates and non-affiliates that tracking companies can use to refer to companies that follow or not their same practices would help users to better understand sharing and other practices and then be in a better position to assess the associated risks.

Companies also have different definitions of sensitive data. While for some companies income bracket is considered sensitive, for many others it is not. Similarly, for some companies over-the-counter medications are not sensitive data while others do not specify whether or not such data is sensitive. Also, geo-location is considered sensitive information by a small number, but not by many others. Without a clear definition of what constitutes sensitive data as well as a clear separation between sensitive and non-sensitive tracking data, Internet users cannot be certain whether advertising companies' practices infringe their privacy.

5. DISCUSSION

OBA self-regulation is not providing effective privacy protections. Participation in self-regulation is voluntary and we found that only 20% of 2,750 companies in a public database of online tracking companies listed affiliations with the DAA or NAI, the two main online advertising self-regulation programs in the U.S. The discrepancies between affiliations included in Evidon's database as of January of 2014 and members listed in the DAA and NAI websites as of June 2014 suggest that membership may be dynamic and companies might join and leave at will. Interestingly, we also found that a handful of non-member companies suggested that users could opt out from OBA by visiting the DAA or NAI opt-out pages, which offer opt-outs only from their members.

We also found that the NAI code of conduct and DAA self-regulatory principles allow member companies to be compliant without offering significantly better protections than non-member companies. Further, the NAI limited definition of sensitive data allows member companies to collect or infer information that research has shown users are not willing to share with online advertisers. Also, while member companies are more likely to have a privacy policy, both member and non-member companies have privacy policies that are silent about practices that impact users' privacy.

The DAA and NAI limitations for sharing with third-parties and merging PII and non-PII are not protective. Tracking companies that collect PII in first-party contexts can freely merge it with tracking data. Member companies who share with third parties are not required to mention the purpose of sharing. The end result is that information about users' online activities is often freely shared and such information can be linked with PII.

5.1 Improving notices for users

Transparency and usable choices for users are necessary for a self-regulated market to function. However, we have found that online tracking companies are not transparent and do not offer meaningful choices to users. User consent is often implied when the user visits a website with tracking. The NAI code of conduct requires companies to collect opt-in consent before using sensitive data or location for targeted ads, but it is unclear how to obtain opt-in consent in third-party contexts. The third-party nature of tracking in combination with the lack of transparency makes user consent meaningless.

Efforts are being made to use natural language processing (NLP) techniques to interpret privacy policies [33, 43]; however, if the problems we identified are not fixed, those efforts will be fruitless. For example, if companies are silent or have mixed practices, neither humans nor automatic algorithms will be able to make good use of them. We have compiled a list of 59 aspects that online tracking companies could use as a guide to assess the content of their privacy policies.

We found many companies with more privacy-respectful practices; however, the current status of notices don't allow them to stand out from less protective companies or enable users to use that information to make privacy choices. We believe that finding ways to standardize terminology and structure of policies will benefit both users and those companies with more privacy-respectful practices.

We identified several factors that make online tracking companies' privacy policies very hard to evaluate and understand. The lack of, affiliates and non-affiliates definitions, agreement about sensitive and non-sensitive data, clarity about practices that apply for information collected in first- and third-party contexts, and clarity about the merging of non-PII with PII, makes it challenging to differentiate what kinds of information are shared with whom and assess privacy risks for users. Including a policy section that consistently defines affiliates and non-affiliates, collected or inferred data types, and data uses can improve these policies. We then could imagine a tabular section similar to either a privacy nutrition label [26] or a standardized financial notice [30] that summarizes the most relevant privacy practices in a more understandable manner.

While traditional standardized privacy policies are necessary to make companies accountable for their practices and improve transparency in general, more usable privacy notices can be used to truly empower users. In particular, from a users' perspective, we recommend requiring advertising companies and websites to implement three levels of interactive privacy notices: privacy icons, privacy summaries, and privacy choices.

Privacy Icon. A conspicuous privacy notice in the form of a meaningful icon could be provided on websites. The icon would convey the type of online tracking (if any) in the visited website, using for example the five categories

described in our results. Specifically, such icon could inform about six tracking situations:

- No tracking exists on the website

- Tracking exists only for website customization and user analytics without involving users' personal information or sensitive data types, and with limitations on sharing, and retention period

- Tracking exists for advertising purposes without involving users' personal information or sensitive data types, and with limitations on sharing, and retention period

- Tracking exists for advertising purposes without involving users' personal information (may use sensitive data types), and with limitations on sharing, and retention periods

- Tracking exists for advertising and marketing purposes (may involve users' personal information and sensitive data types), but limitations on sharing, and retention periods exist

- Tracking exists for other unspecified purposes, without explicit data types, sharing, and retention limitations

Importantly, it would be necessary to use a standard definition of these icons and terms. Furthermore, such an icon would need to be placed in a consistent and salient place (e.g., at the top of the webpage) and have an appropriate size and shape, allowing users to notice the icon and realize they can click on it. Furthermore, the icon should not be placed in the boundaries or inside ads as not all tracking is necessary related to advertisement and it could also mislead users into thinking that the icon is part of the ad (as previous research has shown [23]). A tooltip could be added to the icon, succinctly explaining its purpose and encouraging users to click on it to learn details. Consistent icon location and shape across websites are important to educate users gradually about its purpose and benefit.

Privacy Summaries. When applicable (i.e., when tracking exists on the website), this notice may be linked from the privacy icon and should contain a concise summary to make it easy for users to quickly assess the risks and determine if they want to take any action. Based on previous research [24], the privacy summaries could inform about the following: what the purpose of tracking is; whether or not sensitive information (e.g., health conditions, income range, location, etc.) is being collected or inferred from users' activities; whether or not the information used or collected for tracking purposes can be linked to users' identity; whether or not that information is shared with non-affiliates; and whether or not those non-affiliates can link received information with users' identity. In addition, this notice could provide a link to a webpage where users could exercise their privacy choices. Such link could be labeled properly to communicate that users can benefit from clicking on it. For example, the label can say, "Change your privacy settings here." As in the case of the icons, it is also important for the design of privacy summaries to be standardized to gradually educate users about their purpose and benefit, and to facilitate comparison of websites' practices.

Interactive Notice with Choices. When applicable (i.e., when tracking exists on the website), a third notice

linked from the privacy summary could provide detailed information regarding what has been collected or inferred about the user. This third notice could also provide choice mechanisms to allow users to remove whatever information they don't want advertising companies to know about their online activities; provide the opportunity to express a preference to not be tracked at all; and provide the opportunity to express a preference to collect only certain information or make certain inferences, but not others. Providing users with access to the information collected or inferred about them is also important because it enables users to visualize the effect of data aggregation, enabling them to assess the risks more realistically.

5.2 Creating incentives for companies

We found important differences between companies, with a handful of companies disclosing better privacy practices for consumers. Companies with more privacy-protective practices could benefit if current blocking tools[4] allowed users to block tracking companies with practices that do not align with users' privacy expectations. This strategy would be similar to what the ad blocking tool called Adblock Plus is currently considering to let "acceptable" ads unblocked[5] and to what the Privacy Badger tool uses to decide whether or not to block third-party cookies.[6]

In addition, tool blocking defaults could be selected to allow companies with a minimum set of privacy requirements (e.g., no use of PII, no use of sensitive data, limited retention and sharing, etc.) and block those tracking companies with less privacy-protective practices or those that do not disclose relevant practices. Overtime, we believe that this strategy could be fruitful to lead the online tracking industry to adopt more privacy-respectful practices.

6. CONCLUSION

We used Evidon's public list of 2,750 online tracking companies and Evidon's 2013 global report to draw a sample of 106 of these companies, including large companies, companies that are members of self-regulatory organizations, and non-member companies. Only 75 of these companies had English-language privacy policies with content relevant for tracked users, which we analyzed thoroughly. We found that most of these companies are silent with regard to important consumer-relevant practices including the collection and use of sensitive information and linkage of tracking data with personally-identifiable information. Policies lacked a clear and consistent definition of non-affiliates with whom online tracking companies share user information. Policies also mixed practices that apply to information collected in first- and third-party context, and they are rarely intended only for tracked users, but more often intended for different audiences simultaneously (e.g., partners, website visitors, and tracked users). These facts would make it very difficult and sometimes impossible for users to determine what practices apply to them and be able to properly assess the associated privacy risks. Unless these problems are fixed, ongoing efforts to use natural language processing (NLP) techniques and crowd sourcing to interpret privacy policies will not be

---

[4]For example: ghostery.com/en/,abine.com/donottrackme.html

[5]adblockplus.org/en/acceptable-ads

[6]eff.org/privacybadger

able to improve transparency and empower users to protect their privacy in the context of OBA.

We also evaluated these policies against self-regulatory guidelines and found that many policies are not fully compliant. Furthermore, while member companies are more likely to offer the opportunity to opt out of targeted ads, previous research has shown that users are concerned about online tracking and interested in controlling data collection, an option that companies are not offering. We have provided recommendations to improve clarity and usability of online tracking companies' privacy policies.

7. ACKNOWLEDGEMENTS

8. REFERENCES

[1] Experian list services catalog. *Experian Marketing Services*, 2012.

[2] Little blue book: A buyers guide. *Bluekai*, 2013.

[3] AAAA, ANA, BBB, DNA, and IAB. *Self-Regulatory Principles for Online Behavioral Advertising*. Digital Advertising Alliance, July 2009.

[4] A. I. Antón et al. HIPAA's effect on web site privacy policies. *Security & Privacy, IEEE*, 2007.

[5] L. Awarwal et al. Do not embarrass: re-examining user concerns for online tracking and advertising. In *Proc. SOUPS '13*. ACM, 2013.

[6] R. Calo. Digital market manipulation. *George Washington Law Review, Forthcoming*, 2013.

[7] F. H. Cate. The failure of fair information practice principles. *Consumer protection in the age of the information economy*, 2006.

[8] L. F. Cranor. Necessary But Not Sufficient: Standardized Mechanisms for Privacy Notice and Choice. *J. of Telecomm. and High Tech. Law*, 2012.

[9] P. Dixon and R. Gellman. The scoring of America: How secret consumer scores threaten your privacy and your future. World Privacy Forum, April 2014.

[10] J. B. Earp et al. Examining internet privacy policies within the context of user privacy values. *Engineering Management, IEEE Transactions on*, 2005.

[11] Evidon, Inc. Evidon global tracker report. 2013. `http://www.evidon.com/research`.

[12] Federal Trade Commission. FTC staff report: Self-regulatory principles for online behavioral advertising, February 2009.

[13] Federal Trade Commission. Protecting consumer privacy in an era of rapid change. a proposed framework for business and policy makers. preliminary ftc staff report. `http://www.ftc.gov/sites/default/files/documents/reports/federal-trade-commission-bureau-consumer-protection-preliminary-ftc-staff-report-protecting-consumer/101201privacyreport.pdf`, December 2010.

[14] Federal Trade Commission. Protecting consumer privacy in an era of rapid change. `http://www.ftc.gov/os/2012/03/120326privacyreport.pdf`, March 2012.

[15] M. A. Graber et al. Reading level of privacy policies on internet health web sites. *Journal of Family Practice*, 51(7):642–642, 2002.

[16] S. Greengard. Advertising gets personal. *Communications of the ACM*, 55(8):18–20, 2012.

[17] K. D. Harris. *Making Your Privacy Practices Public*. California Department of Justice, May 2014.

[18] C. Hoofnagle, A. Soltani, N. Good, D. Wambach, and M. Ayenson. Behavioral advertising: The offer you cannot refuse. 2012.

[19] C. J. Hoofnagle and J. King. What Californians understand about privacy online. *Available at SSRN 1262130*, 2008.

[20] C. Jensen and C. Potts. Privacy policies as decision-making tools: an evaluation of online privacy notices. In *Proc. CHI*, 2004.

[21] S. Komanduri et al. AdChoices? Compliance with online behavioral advertising notice and choice requirements. *ISJLP*, 7:603–721, 2012.

[22] P. Leon, B. Ur, R. Shay, Y. Wang, R. Balebako, and L. Cranor. Why Johnny can't opt out: A usability evaluation of tools to limit online behavioral advertising. In *Proc. CHI*, 2012.

[23] P. G. Leon et al. What do online behavioral advertising disclosures communicate to users? In *Proc. WPES*, 2012.

[24] P. G. Leon et al. What matters to users?: Factors that affect users' willingness to share information with online advertisers. In *Proc. SOUPS '13*, page 7. ACM, 2013.

[25] A. McDonald and L. Cranor. The cost of reading privacy policies. *ISJLP*, 4:543–897, 2009.

[26] A. McDonald et al. A comparative study of online privacy policies and formats. In *Privacy enhancing technologies*, pages 37–55. Springer, 2009.

[27] G. R. Milne, M. J. Culnan, and H. Greene. A longitudinal assessment of online privacy notice readability. *Journal of Public Policy & Marketing*, 25(2):238–249, 2006.

[28] National Advertising Review Council. Self-Regulatory Program for Children's advertising. Technical report, Council of Better Business Bureaus, Inc., 2009.

[29] Network Advertising Initiative. 2013 NAI code of conduct. `http://www.networkadvertising.org/2013_Principles.pdf`, 2013.

[30] OCC, Federal Reserve System, FDIC, OTS, NCUA, FTC, CFTC, and SEC. Final model privacy form under the Gramm-Leach-Bliley Act. *Federal Register*, 74:62890–62994, December 1, 2009.

[31] K. Purcell, J. Brenner, and L. Rainie. Search engine use 2012. Technical report, March 2012.

[32] J. Reidenberg, T. D. Breaux, L. F. Cranor, B. French, A. Grannis, J. T. Graves, F. Liu, A. McDonald, T. B. Norton, R. Ramanath, C. Rusell, N. Sadeh, and F. Schaub. Disagreeable privacy policies: Mismatches between meaning and users' understanding. *Berkeley Technology Law Journal*, 30, Forthcoming 2015.

[33] N. Sadeh, A. Acquisti, T. D. Breaux, L. F. Cranor, A. M. McDonald, J. Reidenberg, N. Smith, F. Liu, N. C. Rusell, F. Schaub, and S. Wilson. The usable privacy policy project: Combining crowdsourcing, machine learning and natural language processing to semi-automatically answers those privacy questions users care about. Technical report, Carnegie Mellon University, 2013.

[34] S. Sengupta. Facebook refines ad targeting, April 2013. `http://bits.blogs.nytimes.com/2013/04/10/facebook-refines-ad-targeting/`.

[35] X. Sheng and L. F. Cranor. An evaluation of the effect of us financial privacy legislation through the analysis of privacy policies. *ISJLP*, 2:943, 2005.

[36] Terms of Service; Didn't Read. `http://tosdr.org/`.

[37] J. Turow. *The daily you: How the new advertising industry is defining your identity and your worth*. Yale University Press, 2012.

[38] J. Turow et al. Americans reject tailored advertising and three activities that enable it. *SSRN eLibrary*, 2009.

[39] B. Ur et al. Smart, useful, scary, creepy: Perceptions of online behavioral advertising. In *Proc. SOUPS*, 2012.

[40] J. Valentino-Devries. They know what you're shopping for, December 2012. `wsj.com/news/articles/SB10001424127887324784404578143144132736214`.

[41] W3C. Tracking Protection Working Group, 2013. http://www.w3.org/2011/tracking-protection/.

[42] White House. Consumer data privacy in a networked world: A framework for protecting privacy and promoting innovation in the global digital economy. `http://www.whitehouse.gov/sites/default/files/privacy-final.pdf`, Feb. 2012.

[43] S. Zimmeck and S. M. Bellovin. Privee: An architecture for automatically analyzing web privacy policies. *USENIX Security*, 2014.

APPENDIX

A. DEVELOPED CODES

Collection (C1-C6)	Sharing (S1-S8)	Retention (R1-R2)
I: Information is collected II: Information is inferred III: Information is collected and inferred IV: The policy doesn't mention this V: Information is explicitly not collected or inferred VI: Information is collected or inferred, but not merged with anonymous tracking data VII: Unclear if collected	I: Non-PII (only non-sensitive) II: Non-PII (sensitive and non-sensitive) III: PII IV: Both PII and non-PII V: Information is shared (not clear which) VI: Information is explicitly not shared VII: The policy doesn't mention this VIII: Unclear if shared	0: Company doesn't collect this information I: Limited retention period II: Unlimited retention period III: As required by law IV: The policy doesn't mention this V: Unclear
Purposes (P1-P8)	**Consent Model - Can users limit? (CS1-CS9)**	**Policy Changes (PC1-PC2)**
0: Company doesn't engage in this practice I: Non-PII (non-sensitive) is used II: Non-PII (sensitive and non-sensitive) III: PII is used IV: Both PII and non-PII V: Information is used, but not clear which VI: The policy doesn't mention this VII: Unclear if it does	0: Company doesn't engage in this practice I: User cannot limit this practice II: Opt-out III: Opt-in IV: The policy doesn't mention this V: This use is not mentioned in policy, hence choices don't apply	I: No notice will be provided II: Notice will be posted in the policy III: Notice will be posted in the policy if major changes IV: Notice will be posted in the policy and email sent if major changes
Mergers and Acquisitions (M1)	**Contact means (CT1)**	**Contact recipient (CT2)**
I: Notice given (no user choices mentioned) II: Notice is not given (no user choices mentioned) III: Notice is given (user choices mentioned) IV: Notice is not given (user choices mentioned) V: The policy doesn't mention this VI: Unclear	I: Email II: Telephone III: Postal address IV: Web form V: Email and telephone VI: Email and postal address VII: Telephone and postal address VIII: Web form and other IX: More than two of the above X: None	0: No contact information provided I: CPO or similar II: Company customer service or similar III: Legal department IV: Industry organization (e.g., BBB, NAI, DAA, TRUSTe) V: Government entity (e.g., FTC) VI: Other VII: Unclear
Access (A1)	**Access options (A3)**	**Portability and deletion (A4)**
I: Authentication-required website II: Anonymous website III: Both anonymous and authenticated website IV: Other V: No access is provided	0: No access is provided I: View II: View and edit	0: No access is provided I: User data can be exported II: User data can be wiped out from company's databases III: User data can be exported and wiped out from company's databases IV: No portability or deletion options mentioned
Security and other practices exist (SO1 - SO8)	**Choice method exist (CH1 - CH5)**	**Affiliates and Non-affiliates (AF1-AF2)**
I: Yes II: No	I: Yes II: No	I: Mentioned and defined II: Mentioned, but not defined III: Not mentioned

Table 4: The original answer choices for each group of practices we investigated. The codes in parentheses refer to the practices in Table 1 to which the codes in each group apply.

Collection (C1-C6)	Sharing (S1-S8)	Retention (R1-R2)
I: Information is collected II: Information is explicitly not collected III: Information is collected, but not merged with anonymous tracking data IV: The policy doesn't mention this	I: Non-PII (sensitive and non-sensitive) II: PII (sensitive and non-sensitive) III: Both PII and non-PII IV: Information is shared (not clear which) V: Information is explicitly not shared VI: The policy doesn't mention this	0: Company doesn't collect this information I: Limited retention period II: Unlimited retention period III: The policy doesn't mention this IV: Unclear
Purposes (P1-P8)	**Consent Model - Can users limit? (CS1-CS9)**	**Policy Changes (PC1-PC2)**
0: Company doesn't engage in this practice I: Non-PII (non-sensitive or sensitive) is used II: PII is used III: Both PII and non-PII IV: Information is used, but not clear which V: The policy doesn't mention this VI: Unclear if it does	0: Company doesn't engage in this practice I: Opt-out II: Opt-in III: The policy doesn't mention this IV: This use is not mentioned in policy, hence choices don't apply	I: No notice will be provided II: Notice will be posted in the policy III: Notice will be posted in the policy and email sent if major changes
Mergers and Acquisitions (M1)	**Contact means (CT1)**	**Contact recipient (CT2)**
I: Notice given (no user choices mentioned) II: Notice is not given (no user choices mentioned) III: Notice is given (user choices mentioned) IV: The policy doesn't mention this	I: Email II: Postal address III: Web form IV: Email and telephone V: Email and postal address VI: Web form and other VII: More than two VIII: None	0: No contact information provided I: Privacy team II: Company customer service or similar III: Legal department IV: Other V: Unclear
Access (A1)	**Access options (A3)**	**Portability and deletion (A4)**
I: Authentication-required website II: Anonymous website III: Both anonymous and authenticated website IV: Other V: No access is provided	0: No access is provided I: View II: View and edit	0: No access is provided I: User data can be wiped out from company's databases II: User data can be exported and wiped out from company's databases III: No portability or deletion options mentioned
Security and other practices exist (SO1 - SO8)	**Choice method exist (CH1 - CH5)**	**Affiliates and Non-affiliates (AF1-AF2)**
I: Yes II: No	I: Yes II: No	I: Mentioned and defined II: Mentioned, but not defined III: Not mentioned

Table 5: To increase inter-coder agreement, we reduced the granularity of the originally developed answer choices. These are the final answer choices for each group of practices we investigated. The codes in parentheses refer to the practices in Table 1 to which the codes in each group apply.

B. COLLECTION DISCLOSURES

Company	Type of Business	Collect Non-PII (Non-sensitive)	Collect Non-PII (Sensitive)	Collect PII (Non-sensitive)	Collect PII (Sensitive)	Collect Location
Large Members						
AddThis	Analytics Provider, Data Aggregator/Supplier, Social Media	Collect	Collect	Collect, no merge	Don't mention	Collect
Adobe Advertising	Advertiser, Analytics Provider, Marketing Solutions	Collect	Don't mention	Collect	Don't mention	Collect
Adobe Analytics	Analytics Provider, Tag Manager	Collect	Don't mention	Collect	Don't mention	Collect
AppNexus	Ad Exchange, Data Management Platform	Collect	Don't mention	Don't collect	Don't mention	Collect
Atlas	Ad Network, Ad Server	Collect	Don't mention	Collect, no merge	Don't mention	Collect
Audience Science	Data Management Platform, Demand Side Platform	Collect	Collect	Collect, no merge	Don't mention	Collect
BlueKai	Data Aggregator/Supplier, Data Management Platform	Collect	Collect	Don't collect	Don't collect	Don't mention
Chango	Data Aggregator/Supplier, Retargeter	Collect	Don't collect	Collect, no merge	Don't mention	Don't mention
Criteo	Ad Network, Retargeter	Collect	Don't collect	Don't collect	Don't collect	Collect
Disqus	Social Media	Collect	Don't mention	Collect	Don't mention	Don't mention
eXelate	Data Aggregator/Supplier, Data Management Platform	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Facebook Exchange	Ad Exchange, Social Media	Collect	Collect	Collect	Collect	Collect
Google AdSense	Supply Side Platform	Collect	Don't collect	Collect	Don't mention	Collect
Lotame	Analytics Provider, Data Management Platform	Collect	Don't mention	Don't collect	Don't collect	Collect
Neustar	Data Aggregator/Supplier	Collect	Collect	Collect	Don't collect	Collect, no merge
Nielsen	Analytics Provider, Optimizer, Research Provider	Collect	Don't mention	Don't collect	Don't mention	Collect
OpenX	Ad Exchange	Collect	Don't mention	Don't mention	Don't mention	Collect
Quantcast	Data Management Platform	Collect	Don't collect	Collect, no merge	Don't mention	Collect
Right Media	Ad Exchange, Ad Server	Collect	Don't mention	Don't collect	Don't mention	Collect
Rubicon	Ad Exchange, Supply Side Platform	Collect	Don't mention	Don't collect	Don't mention	Collect
ShareThis	Social Media	Collect	Collect	Collect	Don't mention	Collect
Twitter	Publisher, Social Media	Collect	Don't mention	Collect	Don't mention	Collect
ValueClick Mediaplex	Ad Network, Ad Server	Collect	Collect	Don't collect	Don't collect	Don't mention
Xaxis	Ad Network	Collect	Collect	Don't collect	Don't mention	Don't mention
Large Non-members						
Gemius	Ad Server, Analytics Provider	Collect	Don't mention	Don't collect	Don't mention	Collect
Histats	Analytics Provider	Collect	Don't mention	Don't collect	Don't mention	Collect
Optimizely	Website Optimization	Collect	Don't mention	Don't collect	Don't mention	Collect
Statcounter	Analytics Provider	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Tynt	Analytics Provider, Website Optimization	Collect	Don't mention	Don't collect	Don't mention	Don't mention
VoiceFive	Business Intelligence, Data Aggregator/Supplier	Unclear	Don't mention	Collect	Don't mention	Don't mention
whos.amung.us	Analytics Provider	Collect	Don't collect	Don't collect	Don't mention	Collect
WordPress	Other	Collect	Don't mention	Collect, no merge	Don't mention	Don't mention
Yandex	Ad Network, Publisher, Website Optimization	Collect	Don't mention	Don't collect	Don't mention	Collect
Random Members						
Acxiom	Data Aggregator/Supplier	Collect	Collect	Collect	Collect	Don't mention
AOL	Ad Network, Ad Server	Collect	Don't mention	Collect	Collect	Collect
Apple	Ad Network, Advertiser, Mobile, Publisher	Collect	Don't mention	Collect	Collect	Collect
APT from Yahoo!	Ad Exchange	Collect	Collect	Collect	Collect	Collect
AT&T AdWorks	Ad Network, Data Management Platform	Collect	Don't mention	Collect	Collect	Collect
Bazaarvoice	Ad Network	Collect	Don't mention	Collect	Don't mention	Don't mention
CBS Interactive	Ad Network, Publisher	Collect	Don't mention	Collect	Collect	Collect
Dow Jones	Advertiser, Research Provider	Collect	Don't collect	Collect	Collect	Collect
Media Innovation Group	Marketing Solutions	Collect	Don't collect	Don't collect	Don't mention	Collect
News Distribution Network	Ad Network	Collect	Collect	Collect	Don't mention	Collect
Pulsepoint Audience	Data Management Platform	Collect	Collect	Don't collect	Don't mention	Collect
RGM Alliance	Ad Network	Collect	Don't mention	Don't collect	Don't collect	Don't mention
Rocket Fuel	Ad Network	Collect	Collect	Don't collect	Don't collect	Don't mention
SET Media	Ad Server, Analytics Provider	Collect	Don't collect	Don't collect	Don't collect	Don't mention
Sizmek	Ad Server, Optimizer	Collect	Don't mention	Collect, no merge	Don't mention	Collect
Smowtion	Ad Network	Collect	Don't mention	Collect	Don't mention	Don't mention
Sojern	Data Aggregator/Supplier	Collect	Don't mention	Don't collect	Don't collect	Don't mention
Specific Media	Ad Network	Collect	Collect	Collect	Collect	Collect
Star Media	Ad Network	Collect	Don't mention	Collect	Don't mention	Collect
Tapjoy	Creative/Ad Format Technology, Mobile	Collect	Don't mention	Collect	Don't mention	Collect
Traffiq	Agency	Collect	Don't mention	Collect	Collect	Don't mention
Verizon	Advertiser, Mobile, Publisher	Collect	Don't mention	Collect	Collect	Collect
Vibrant Media	Ad Network, Ad Server	Collect	Don't mention	Don't collect	Don't mention	Don't mention
VisibleBrands	Ad Network	Collect	Don't mention	Don't mention	Don't mention	Don't mention
WildTangent Games	Ad Network	Collect	Don't mention	Collect	Don't mention	Don't mention
Random Non-members						
Ad Magnet	Ad Network, Ad Server	Collect	Collect	Collect, no merge	Don't mention	Collect
AdGear	Ad Server, Ad Exchange, Analytics Provider	Collect	Don't mention	Don't collect	Don't mention	Collect
Advanse	Analytics Provider	Collect	Don't mention	Don't mention	Don't mention	Don't mention
ChineseAN	Ad Network	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Digg	Social Media	Collect	Don't mention	Collect	Don't mention	Collect
Essence	Agency	Don't mention	Don't mention	Don't collect	Don't mention	Don't mention
ForeSee Results	Analytics Provider, Research Provider	Collect	Collect	Collect	Don't mention	Don't collect
Gay Ad Network	Ad Network	Collect	Don't mention	Collect	Don't mention	Don't mention
Httpool	Ad Network	Collect	Don't mention	Collect	Collect	Collect
MdotM	Ad Network, Demand Side Platform, Mobile	Collect	Don't mention	Don't collect	Don't mention	Collect
Open Amplify	Data Aggregator/Supplier, Data Management Platform	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Red Loop Media	Ad Network, Mobile	Collect	Don't mention	Collect	Don't mention	Don't mention
SymphonyAM	Analytics Provider, Research Provider	Collect	Don't mention	Collect	Don't mention	Collect
Twelvefold Media	Ad Server, Analytics Provider, Optimizer	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Unite	Agency	Collect	Don't mention	Don't collect	Don't mention	Don't mention
Usability Sciences	Analytics Provider, Website Optimization	Collect	Don't mention	Collect, no merge	Don't mention	Don't mention
UserReport	Analytics Provider	Collect	Don't mention	Don't collect	Don't mention	Don't mention

Table 6: Collection practices by companies that have an English-language privacy policy for tracked users. While most of the companies mention collection of device identifiers and general non-PII, they don't explicitly mention the collection (or lack of) of sensitive non-PII (e.g., race, religion, sexual orientation, health conditions, income bracket, or credit score). A small number of companies that collect PII also indicate that they don't link PII with tracking data.

C. SHARING DISCLOSURES

Company	Affiliates	Non affiliates	Web Publishers	Ad companies	Entity that links with offline	Entity that links with PII	Law Enforce-ment
Large Members							
AddThis	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention	Yes
Adobe Advertising	PII	Shared-not clear which	Don't mention	Don't mention	Non-PII and PII	Non-PII and PII	Yes
Adobe Analytics	PII	Don't mention	Don't mention	Don't mention	Non-PII and PII	Non-PII and PII	Yes
AppNexus	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Atlas	Non-PII	Non-PII	Unclear	Non-PII	Don't mention	Don't mention	Yes
Audience Science	Don't mention	Non-PII	Non-PII	Non-PII	Non-PII	Non-PII	Yes
BlueKai	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Chango	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Criteo	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention
Disqus	Non-PII and PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
eXelate	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Facebook Exchange	Non-PII and PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Google AdSense	PII	Non-PII	Non-PII	Non-PII	Unclear	Unclear	Yes
Lotame	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Neustar	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't share	Yes
Nielsen	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
OpenX	Don't mention	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention
Quantcast	Non-PII and PII	Non-PII	Non-PII	Non-PII	Unclear	Unclear	Yes
Right Media	Non-PII	Non-PII	Non-PII	Non-PII	Unclear	Unclear	Yes
Rubicon	Unclear	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
ShareThis	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Twitter	Don't mention	Non-PII	Don't mention	Non-PII	Don't mention	Non-PII	Yes
ValueClick Mediaplex	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Xaxis	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Large Non-members							
Gemius	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Histats	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
Optimizely	Don't mention	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Statcounter	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
Tynt	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
VoiceFive	PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Yes
whos.amung.us	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention
WordPress	PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Yandex	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Random Members							
Acxiom	Non-PII and PII	Non-PII and PII	Don't mention	Non-PII and PII	Unclear	Unclear	Yes
AOL	Non-PII and PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Apple	PII	Don't mention	Don't mention	Don't share	Don't mention	Don't mention	Yes
APT from Yahoo!	PII	Shared-not clear which	Don't mention	Non-PII	Don't mention	Don't mention	Yes
AT&T AdWorks	PII	Non-PII and PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Bazaarvoice	Non-PII and PII	Non-PII and PII	Don't mention	Non-PII and PII	Don't mention	Don't mention	Yes
CBS Interactive	Non-PII and PII	Non-PII and PII	Don't mention	Non-PII and PII	Don't mention	Don't mention	Yes
Dow Jones	PII	PII	Don't mention	Don't mention	PII	PII	Yes
Media Innovation Group	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
News Distribution Network	Non-PII and PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Pulsepoint Audience	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
RGM Alliance	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Rocket Fuel	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't share	Yes
SET Media	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Sizmek	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Non-PII	Don't mention
Smowtion	Don't mention	Non-PII	Non-PII	Non-PII	Non-PII	Non-PII	Yes
Sojern	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Specific Media	Non-PII and PII	Non-PII and PII	Non-PII and PII	Non-PII and PII	Don't mention	Don't mention	Yes
Star Media	Non-PII and PII	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Tapjoy	PII	Non-PII and PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Traffiq	PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Verizon	Non-PII and PII	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Vibrant Media	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
VisibleBrands	Don't mention	Don't share	Don't share	Don't share	Don't share	Don't share	Yes
WildTangent Games	PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
Random Non-members							
Ad Magnet	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Yes
AdGear	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
Advanse	Non-PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
ChineseAN	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention
Digg	PII	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Essence	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
ForeSee Results	PII	Non-PII	Don't mention	Don't mention	Don't share	Don't share	Yes
Gay Ad Network	Don't mention	Non-PII	Don't mention	Non-PII	Don't mention	Don't mention	Yes
Httpool	Non-PII and PII	Non-PII and PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
MdotM	Non-PII and PII	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Open Amplify	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Red Loop Media	Non-PII and PII	Non-PII and PII	Unclear	Don't mention	Don't mention	Don't mention	Yes
SymphonyAM	PII	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
Twelvefold Media	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
Unite	Don't mention	Non-PII	Non-PII	Non-PII	Don't mention	Don't mention	Yes
Usability Sciences	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes
UserReport	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes

Table 7: Sharing practices by companies that have an English-language privacy policy for tracked users. The cells show the types of information shared with each of the listed entities. Companies share extensively non-PII with non-affiliates, but they don't mention with which particular non-affiliates the information is shared with. Most companies are particularly silent about sharing information with entities that can link online tracking data with offline data or PII. Only four companies (Neustar, VisibleBrands, RocketFuel, and ForeSee Results) explicitly say they don't share with entities that can link online tracking data with PII.

D. PURPOSE DISCLOSURES

Company	Targeted Ads	Marketing	User Analytics	Ad Analytics	Customize content	Enforcement	Other purposes
Large Members							
AddThis	Non-PII	Don't engage	Non-PII	Don't mention	Non-PII	Yes	Non-PII
Adobe Advertising	Non-PII and PII	PII	Non-PII and PII	Non-PII and PII	Don't mention	Yes	Non-PII and PII
Adobe Analytics	Don't mention	PII	Non-PII and PII	Don't mention	Non-PII and PII	Yes	Non-PII
AppNexus	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Don't mention	Non-PII
Atlas	Non-PII	PII	Non-PII	Non-PII	Don't mention	Yes	Don't mention
Audience Science	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Yes	Don't mention
BlueKai	Non-PII	Don't engage	Non-PII	Don't mention	Don't mention	Don't mention	Non-PII
Chango	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Don't mention
Criteo	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Don't mention
Disqus	Non-PII	PII	Non-PII	Don't mention	PII	Yes	Non-PII
eXelate	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Facebook Exchange	Non-PII and PII	Don't mention	Don't mention	Non-PII	Non-PII and PII	Yes	Non-PII and PII
Google AdSense	Non-PII and PII	Don't mention	Non-PII and PII	Don't mention	Non-PII and PII	Yes	PII
Lotame	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Don't mention	Non-PII
Neustar	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Nielsen	Don't mention	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
OpenX	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	Non-PII
Quantcast	Non-PII	PII	Non-PII	Don't mention	Don't mention	Yes	Non-PII
Right Media	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Rubicon	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
ShareThis	Non-PII	PII	Non-PII	Non-PII	Non-PII and PII	Yes	Non-PII and PII
Twitter	Non-PII and PII	Don't mention	Non-PII and PII	Non-PII and PII	Non-PII and PII	Yes	Don't mention
ValueClick Mediaplex	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Xaxis	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Yes	Don't mention
Large Non-members							
Gemius	Don't mention	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Don't mention
Histats	Don't mention	Don't engage	Non-PII	Don't mention	Don't mention	Don't mention	Non-PII
Optimizely	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Statcounter	Don't mention	Don't engage	Don't mention	Don't mention	Don't mention	Don't mention	Non-PII
Tynt	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
VoiceFive	Unclear if engage	Don't engage	Don't mention	Don't mention	Don't mention	Don't mention	Unclear which info
whos.amung.us	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Don't mention	Don't mention
WordPress	Don't mention	Don't engage	Non-PII	Don't mention	Don't mention	Yes	Don't mention
Yandex	Non-PII	Don't engage	Unclear if engage	Unclear if engage	Non-PII	Yes	Non-PII
Random Members							
Acxiom	Non-PII and PII	Unclear if it does	Non-PII and PII	Non-PII	Non-PII and PII	Don't mention	Non-PII and PII
AOL	Non-PII and PII	PII	Non-PII and PII	Non-PII and PII	Non-PII and PII	Yes	Non-PII and PII
Apple	Non-PII	PII	Non-PII and PII	Non-PII and PII	PII	Yes	Non-PII and PII
APT from Yahoo!	Non-PII and PII	Don't mention	Don't mention	Don't mention	Don't mention	Yes	Non-PII and PII
AT&T AdWorks	Non-PII and PII	PII	Non-PII and PII	Non-PII and PII	Non-PII and PII	Yes	Non-PII and PII
Bazaarvoice	Non-PII	PII	Non-PII	Non-PII	Non-PII	Yes	Don't mention
CBS Interactive	Non-PII and PII	PII	Non-PII	Non-PII and PII	Non-PII and PII	Yes	Non-PII and PII
Dow Jones	Non-PII and PII	PII	Don't mention	Don't mention	Non-PII and PII	Yes	Non-PII and PII
Media Innovation Group	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Don't mention
News Distribution Network	Non-PII and PII	PII	Non-PII	Non-PII	Non-PII and PII	Yes	Non-PII and PII
Pulsepoint Audience	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Don't mention
RGM Alliance	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Rocket Fuel	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Yes	Non-PII
SET Media	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
Sizmek	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention
Smowtion	Non-PII and PII	Don't mention	Non-PII and PII	Don't mention	Don't mention	Yes	Non-PII and PII
Sojern	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Yes	Non-PII
Specific Media	Non-PII and PII	Don't mention	Non-PII and PII	Non-PII and PII	Don't mention	Yes	Non-PII and PII
Star Media	Non-PII	Don't mention	Non-PII	Non-PII	Don't mention	Yes	Don't mention
Tapjoy	Unclear which info	PII	Don't mention	Don't mention	Don't mention	Yes	PII
Traffiq	Non-PII and PII	PII	Non-PII and PII	Unclear if engage	Don't mention	Yes	Non-PII and PII
Verizon	Non-PII	PII	Non-PII	Non-PII	Don't mention	Yes	Non-PII and PII
Vibrant Media	Non-PII	Don't engage	Non-PII	Non-PII	Don't mention	Yes	Non-PII
VisibleBrands	Don't mention	Don't engage	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention
WildTangent Games	Non-PII	Don't mention	Non-PII	Non-PII	Don't mention	Don't mention	Unclear which info
Random Non-members							
Ad Magnet	Non-PII	Don't mention	Non-PII	Non-PII	Don't mention	Yes	Don't mention
AdGear	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention
Advanse	Non-PII	Don't mention	Don't mention	Non-PII	Non-PII	Don't mention	Don't mention
ChineseAN	Don't mention	Don't engage	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention
Digg	Don't mention	Don't mention	Non-PII	Don't mention	Don't mention	Yes	PII
Essence	Non-PII	Don't engage	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention
ForeSee Results	Don't engage	Don't mention	Non-PII and PII	Don't engage	Don't engage	Yes	Don't engage
Gay Ad Network	Non-PII	PII	Don't mention	Non-PII	Non-PII	Don't mention	Don't mention
Httpool	Non-PII and PII	Don't mention	Don't mention	Don't mention	Don't mention	Don't mention	PII
MdotM	Non-PII	Don't mention	Don't mention	Don't mention	Non-PII	Yes	Non-PII
Open Amplify	Don't mention	Don't mention	Unclear if engage	Don't mention	Don't mention	Yes	Non-PII
Red Loop Media	Non-PII	Don't engage	Don't engage	Unclear if engage	Don't engage	Don't mention	Don't mention
SymphonyAM	Don't mention	Don't engage	Non-PII and PII	Don't mention	Don't mention	Yes	PII
Twelvefold Media	Don't engage	Don't engage	Non-PII	Non-PII	Non-PII	Don't mention	Non-PII
Unite	Non-PII	Don't engage	Don't mention	Non-PII	Don't mention	Yes	Non-PII
Usability Sciences	Don't mention	Don't mention	Non-PII	Don't mention	Don't mention	Don't mention	Don't mention
UserReport	Don't engage	Don't engage	Non-PII	Don't mention	Don't mention	Yes	Non-PII

Table 8: Uses by companies that have an English-language privacy policy for tracked users. Cells show the types of information used for the listed purposes. Most of the companies use non-PII to deliver targeted ads. We defined "Marketing" as the practice of using contact information to offer products. "Don't engage" means the company explicitly say it does not use information for that practice, with the exception of marketing where we entered "Don't engage" if the company either explicitly says so or it does not collect PII.

E. RETENTION AND ACCESS DISCLOSURES

Company	Retention of Non PII	Retention of PII	Type of Access	Data Format (if access provided)	Options (if access provided)	Portability and Data Deletion
Large Members						
AddThis	Limited	Unspecified	No Access	No Access	No Access	No Access
Adobe Advertising	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Adobe Analytics	Unspecified	Unspecified	No Access	No Access	No Access	No Access
AppNexus	Limited	Don't collect	No Access	No Access	No Access	No Access
Atlas	Limited	Unspecified	No Access	No Access	No Access	No Access
Audience Science	Limited	Don't collect	No Access	No Access	No Access	No Access
BlueKai	Limited	Don't collect	Anonymous Access	Profile	View and Edit	Delete
Chango	Limited	Don't collect	No Access	No Access	No Access	None
Criteo	Limited	Don't collect	No Access	No Access	No Access	None
Disqus	Unspecified	Unclear	Authenticated Access	Profile and PII	View and Edit	Delete
eXelate	Limited	Don't collect	Anonymous Access	Profile	View and Edit	None
Facebook Exchange	Limited	Limited	No Access	No Access	No Access	Delete
Google AdSense	Unspecified	Unspecified	Both Anonymous and auntheticated Access	Profile	View and Edit	Export and Delete
Lotame	Limited	Don't collect	Anonymous Access	Profile	View and Edit	None
Neustar	Unclear	Unspecified	Anonymous Access	Profile	View and Edit	None
Nielsen	Unclear	Don't collect	No Access	No Access	No Access	No Access
OpenX	Unspecified	Don't collect	No Access	No Access	No Access	No Access
Quantcast	Limited	Unspecified	Both Anonymous and auntheticated Access	Profile	View and Edit	Delete
Right Media	Unspecified	Don't collect	No Access	No Access	No Access	None
Rubicon	Limited	Don't collect	No Access	No Access	No Access	No Access
ShareThis	Limited	Limited	No Access	No Access	No Access	No Access
Twitter	Unspecified	Limited	Authenticated Access	Profile and PII	View and Edit	Delete
ValueClick Mediaplex	Limited	Don't collect	No Access	No Access	No Access	No Access
Xaxis	Limited	Don't collect	No Access	No Access	No Access	No Access
Large Non-members						
Gemius	Unclear	Don't collect	No Access	No Access	No Access	No Access
Histats	Unspecified	Don't collect	No Access	No Access	No Access	No Access
Optimizely	Unlimited	Don't collect	No Access	No Access	No Access	None
Statcounter	Unspecified	Don't collect	No Access	No Access	No Access	No Access
Tynt	Limited	Don't collect	No Access	No Access	No Access	No Access
VoiceFive	Unspecified	Unspecified	No Access	Unspecified	No Access	No Access
whos.amung.us	Limited	Don't collect	No Access	No Access	No Access	No Access
WordPress	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Yandex	Unspecified	Don't collect	No Access	No Access	No Access	No Access
Random Members						
Acxiom	Unspecified	Unspecified	Authenticated Access	Profile and PII	View and Edit	None
AOL	Unspecified	Unspecified	Authenticated Access	Unspecified	View and Edit	None
Apple	Unspecified	Unclear	Authenticated Access	Unspecified	View and Edit	Delete
APT from Yahoo!	Unclear	Unclear	Both Anonymous and auntheticated Access	Profile and PII	View and Edit	Delete
AT&T AdWorks	Unspecified	Unclear	Authenticated Access	Unspecified	View and Edit	None
Bazaarvoice	Limited	Unclear	Other Access	Unspecified	View and Edit	None
CBS Interactive	Unspecified	Unspecified	Authenticated Access	PII	View and Edit	Delete
Dow Jones	Unspecified	Unspecified	Both Anonymous and auntheticated Access	Profile	View and Edit	None
Media Innovation Group	Limited	Don't collect	No Access	No Access	No Access	No Access
News Distribution Network	Unspecified	Unspecified	Other Access	Unspecified	View and Edit	None
Pulsepoint Audience	Limited	Don't collect	No Access	No Access	No Access	No Access
RGM Alliance	Unclear	Don't collect	No Access	No Access	No Access	No Access
Rocket Fuel	Limited	Don't collect	No Access	No Access	No Access	No Access
SET Media	Limited	Don't collect	No Access	No Access	No Access	No Access
Sizmek	Limited	Unclear	No Access	No Access	No Access	No Access
Smowtion	Unlimited	Unspecified	Authenticated Access	Unspecified	View and Edit	Delete
Sojern	Limited	Don't collect	No Access	No Access	No Access	No Access
Specific Media	Limited	Unspecified	No Access	No Access	No Access	No Access
Star Media	Limited	Unclear	No Access	No Access	No Access	None
Tapjoy	Unspecified	Unspecified	Authenticated Access	PII	View and Edit	Delete
Traffiq	Unspecified	Unspecified	Authenticated Access	Unspecified	View and Edit	None
Verizon	Unspecified	Unclear	Authenticated Access	PII	View and Edit	None
Vibrant Media	Limited	Don't collect	No Access	No Access	No Access	No Access
VisibleBrands	Unspecified	Unspecified	No Access	No Access	No Access	No Access
WildTangent Games	Unspecified	Unspecified	Authenticated Access	PII	View and Edit	None
Random Non-members						
Ad Magnet	Unclear	Unclear	No Access	No Access	No Access	No Access
AdGear	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Advanse	Limited	Don't collect	No Access	No Access	No Access	No Access
ChineseAN	Unspecified	Don't collect	No Access	No Access	No Access	No Access
Digg	Unspecified	Unspecified	Both Anonymous and auntheticated Access	Profile	View and Edit	Delete
Essence	Unspecified	Don't collect	No Access	No Access	No Access	No Access
ForeSee Results	Unclear	Unclear	Other Access	Unspecified	View	None
Gay Ad Network	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Httpool	Unspecified	Unspecified	No Access	No Access	No Access	No Access
MdotM	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Open Amplify	Unspecified	Unspecified	Authenticated Access	Unspecified	View and Edit	None
Red Loop Media	Unspecified	Unspecified	No Access	No Access	No Access	No Access
SymphonyAM	Unspecified	Unspecified	No Access	No Access	No Access	No Access
Twelvefold Media	Unspecified	Don't collect	No Access	No Access	No Access	None
Unite	Limited	Don't collect	No Access	No Access	No Access	No Access
Usability Sciences	Unspecified	Unspecified	No Access	No Access	No Access	No Access
UserReport	Unspecified	Don't collect	No Access	No Access	No Access	No Access

Table 9: Retention and access practices by companies that have an English-language privacy policy for tracked users. A large fraction of companies don't disclose the retention period of either non-PII or PII. Disclosed retention periods ranged from 20 days (whos.amung.us) to 2 years (Sojern). Only 28% of the companies offered access to collected data. ForeSee Results requires users to send a written request for access.

F. CHOICE OPTIONS

Company	Non-PII for ads	Sensitive non-PII for ads	PII for ads	Collection of non-PII	Merge of non-PII w/PII	Merge w/Offline	Merge Across devices
Large Members							
AddThis	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Adobe Advertising	Opt-out	N/A	Opt-out	Unspecified	Unspecified	Unspecified	Unspecified
Adobe Analytics	N/A	N/A	N/A	Opt-out	Unspecified	N/A	N/A
AppNexus	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Atlas	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Audience Science	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
BlueKai	Opt-out	Opt-out	Don't engage	Opt-out	Don't engage	Don't engage	Unspecified
Chango	Opt-out	Don't engage	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Criteo	Opt-out	Don't engage	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Disqus	Unspecified	N/A	Don't engage	Unspecified	Unspecified	Unspecified	N/A
eXelate	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Facebook Exchange	Opt-out	Opt-out	Opt-out	Unspecified	Unspecified	Unspecified	Unspecified
Google AdSense	Opt-out	Don't engage	Opt-out	Unspecified	Opt-in	N/A	Unspecified
Lotame	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Neustar	Opt-out	Don't engage	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Nielsen	N/A	N/A	Don't engage	Opt-out	Don't engage	Unspecified	N/A
OpenX	Opt-out	N/A	N/A	Unspecified	Unspecified	Unspecified	N/A
Quantcast	Opt-out	N/A	Don't engage	Opt-out	Don't engage	Don't engage	Unspecified
Right Media	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Rubicon	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
ShareThis	Opt-out	Opt-in	Don't engage	Opt-out	Opt-out	N/A	N/A
Twitter	Opt-out	N/A	Opt-out	Unspecified	Opt-out	Unspecified	Unspecified
ValueClick Mediaplex	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Xaxis	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Large Non-members							
Gemius	N/A	N/A	Don't engage	Opt-out	Don't engage	Don't engage	N/A
Histats	N/A	N/A	Don't engage	Opt-out	Don't engage	Don't engage	N/A
Optimizely	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Statcounter	N/A	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Tynt	Opt-out	N/A	Don't engage	Opt-out	Don't engage	Don't engage	N/A
VoiceFive	N/A	N/A	N/A	Opt-out	N/A	N/A	N/A
whos.amung.us	Opt-out	Don't engage	Don't engage	Opt-out	Don't engage	Don't engage	N/A
WordPress	N/A	N/A	Don't engage	N/A	N/A	N/A	N/A
Yandex	Unspecified	N/A	Unspecified	Unspecified	Don't engage	Don't engage	N/A
Random Members							
Acxiom	Opt-out	Opt-in	Opt-out	Opt-out	Unspecified	Unspecified	Unspecified
AOL	Opt-out	N/A	Opt-out	Unspecified	Unspecified	Unspecified	N/A
Apple	Opt-out	N/A	Unspecified	Unspecified	Unspecified	Unspecified	Unspecified
APT from Yahoo!	Opt-out	Opt-out	Opt-out	Opt-out	Unspecified	N/A	N/A
AT&T AdWorks	Opt-out	N/A	Opt-out	Opt-out	Unspecified	N/A	N/A
Bazaarvoice	Opt-out	N/A	N/A	Opt-out	Don't engage	Don't engage	N/A
CBS Interactive	Opt-out	N/A	Opt-out	Unspecified	N/A	N/A	Unspecified
Dow Jones	Unspecified	Don't engage	Unspecified	Unspecified	Unspecified	Unspecified	N/A
Media Innovation Group	Opt-out	Don't engage	Don't engage	Opt-out	Don't engage	Don't engage	N/A
News Distribution Network	Opt-out	Opt-out	Unspecified	Unspecified	N/A	N/A	Unspecified
Pulsepoint Audience	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
RGM Alliance	Opt-out	N/A	Don't engage	Unspecified	Don't engage	N/A	N/A
Rocket Fuel	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
SET Media	Opt-out	Don't engage	Don't engage	Opt-out	Don't engage	Don't engage	N/A
Sizmek	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Smowtion	Opt-out	N/A	Opt-out	Unspecified	Opt-out	Opt-out	N/A
Sojern	Unspecified	Unspecified	Don't engage	Unspecified	Don't engage	N/A	N/A
Specific Media	Opt-out	Opt-out	Opt-out	Unspecified	Unspecified	Unspecified	Unspecified
Star Media	Unspecified	N/A	Don't engage	Unspecified	N/A	N/A	N/A
Tapjoy	Opt-out	N/A	N/A	Unspecified	Unspecified	N/A	N/A
Traffiq	Unspecified	N/A	Unspecified	Unspecified	Unspecified	N/A	N/A
Verizon	Opt-out	N/A	Opt-in	Unspecified	N/A	N/A	Unspecified
Vibrant Media	Opt-out	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
VisibleBrands	N/A	N/A	N/A	Unspecified	Don't engage	Don't engage	N/A
WildTangent Games	Unspecified	N/A	Don't engage	Unspecified	Unspecified	N/A	N/A
Random Non-members							
Ad Magnet	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
AdGear	Opt-out	N/A	Don't engage	N/A	Don't engage	Don't engage	N/A
Advanse	Unspecified	N/A	N/A	Unspecified	Don't engage	Don't engage	N/A
ChineseAN	N/A	N/A	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Digg	N/A	N/A	N/A	Unspecified	Unspecified	N/A	N/A
Essence	Opt-out	N/A	Don't engage	N/A	Don't engage	Don't engage	N/A
ForeSee Results	Don't engage	Don't engage	Don't engage	Opt-in	Unspecified	Unspecified	N/A
Gay Ad Network	Unspecified	N/A	Unspecified	Unspecified	Unspecified	Unspecified	N/A
Httpool	Unspecified	N/A	Unspecified	Unspecified	Unspecified	N/A	N/A
MdotM	Unspecified	N/A	Don't engage	Unspecified	Don't engage	N/A	N/A
Open Amplify	N/A	N/A	N/A	Unspecified	Don't engage	Don't engage	N/A
Red Loop Media	Unspecified	N/A	N/A	N/A	N/A	N/A	N/A
SymphonyAM	N/A	N/A	Don't engage	Unspecified	N/A	N/A	N/A
Twelvefold Media	Don't engage	Don't engage	Don't engage	Opt-out	Don't engage	Don't engage	N/A
Unite	Opt-out	Opt-out	Don't engage	Unspecified	Don't engage	Don't engage	N/A
Usability Sciences	N/A	N/A	Don't engage	Opt-out	Don't engage	Don't engage	N/A
UserReport	Don't engage	Don't engage	Don't engage	Opt-out	Don't engage	Don't engage	N/A

Table 10: User consent practices by companies that have an English-language privacy policy for tracked users. Cells show the choices offered to users for each of the listed data uses. "N/A" means the company does not mention that practice (i.e., we don't know if it does it or not) and therefore no consent options are applicable. While most of the companies offer the opportunity to opt out of targeted ads they don't mention any options to limit online tracking. Nevertheless, there are 18 companies (Gemius, BlueKai, Tynt, Adobe Analytics, VoiceFive, Nielsen, Histats, ShareThis, whos.amung.us, Axciom, Yahoo, Bazaarvoice, Media Innovation Group, AT&T AdWorks, Twelvefold Media, SET Media, Usability Sciences, and UserReport) that state users can opt out of online tracking. The reason why ForSee results says "opt-in" for collection of non-PII is because users voluntarily participate in online surveys implemented by this company. This company also doesn't link data across surveys in a way that survey takers are uniquely identified. While most companies don't engage in merging non-PII with PII or off-line data, those that do engage don't specify consent options for that practice. None of the companies that mention tracking across devices offer any options to limit it.

G. CHOICE METHODS AND AFFILIATIONS

Company	Link to DAI/NAI home page	Link to DAA/NAI opt-out page	Opt-out button in policy	Opt-out button somewhere else	Other choice method	Membership with DAA/NAI?*
Large Members						
AddThis	Yes	Yes	No	Yes	No	Y/ Y
Adobe Advertising	No	Yes	No	Yes	Yes	Y/ N
Adobe Analytics	No	Yes	No	Yes	No	Y/ N
AppNexus	Yes	Yes	Yes	No	Yes	N/ Y
Atlas	Yes	Yes	No	No	No	Y/ Y
Audience Science	Yes	Yes	Yes	No	No	Y/ Y
BlueKai	Yes	Yes	No	Yes	Yes	Y/ Y
Chango	No	No	No	Yes	No	Y/ Y
Criteo	Yes	Yes	Yes	Yes	No	Y/ Y
Disqus	No	No	No	No	Yes	N/ N
eXelate	Yes	Yes	No	Yes	No	Y/ Y
Facebook Exchange	Yes	Yes	No	Yes	Yes	Y/ N
Google AdSense	No	No	No	Yes	No	Y/ Y
Lotame	Yes	Yes	Yes	No	No	Y/ Y
Neustar	Yes	No	No	Yes	No	Y/ Y
Nielsen	No	No	Yes	No	No	N/ N
OpenX	No	Yes	No	Yes	No	N/ N
Quantcast	Yes	Yes	No	Yes	No	Y/ Y
Right Media	No	No	Yes	No	No	N/ N
Rubicon	Yes	Yes	No	No	No	Y/ Y
ShareThis	Yes	Yes	Yes	No	No	Y/ Y
Twitter	No	No	No	Yes	No	N/ N
ValueClick Mediaplex	Yes	No	No	Yes	No	Y/ Y
Xaxis	No	No	Yes	No	No	Y/ Y
Large Non-members						
Gemius	No	No	No	Yes	No	N/ N
Histats	No	No	No	Yes	No	N/ N
Optimizely	No	No	Yes	No	Yes	N/ N
Statcounter	No	No	No	No	No	N/ N
Tynt	No	No	No	Yes	No	N/ N
VoiceFive	No	No	Yes	No	Yes	N/ N
whos.amung.us	No	Yes	Yes	No	No	N/ N
WordPress	No	No	No	No	No	N/ N
Yandex	No	No	No	No	Yes	N/ N
Random Members						
Acxiom	Yes	No	No	Yes	No	Y/ N
AOL	Yes	Yes	No	No	Yes	Y/ Y
Apple	No	No	No	Yes	Yes	N/ N
APT from Yahoo!	Yes	Yes	No	Yes	No	Y/ Y
AT&T AdWorks	No	Yes	No	Yes	Yes	N/ N
Bazaarvoice	Yes	Yes	Yes	No	Yes	Y/ Y
CBS Interactive	No	Yes	No	No	Yes	N/ N
Dow Jones	No	No	No	No	No	N/ N
Media Innovation Group	Yes	Yes	Yes	No	No	Y/ Y
News Distribution Network	No	Yes	No	No	No	N/ N
Pulsepoint Audience	No	Yes	Yes	No	Yes	Y/ Y
RGM Alliance	No	Yes	No	No	No	N/ N
Rocket Fuel	Yes	Yes	Yes	No	No	Y/ Y
SET Media	No	Yes	No	Yes	No	N/ N
Sizmek	Yes	Yes	Yes	No	No	Y/ Y
Smowtion	No	No	No	Yes	No	N/ N
Sojern	Yes	No	No	No	No	N/ N
Specific Media	Yes	No	Yes	No	Yes	Y/ Y
Star Media	No	No	No	No	No	N/ N
Tapjoy	No	No	No	No	Yes	N/ N
Traffiq	No	No	No	No	Yes	N/ N
Verizon	Yes	No	No	No	Yes	N/ N
Vibrant Media	Yes	Yes	No	Yes	No	Y/ Y
VisibleBrands	No	No	No	No	No	N/ N
WildTangent Games	No	Yes	No	No	No	N/ N
Random Non-Members						
Ad Magnet	No	No	Yes	No	No	N/ N
AdGear	No	No	Yes	No	No	N/ N
Advanse	Yes	No	No	No	No	N/ N
ChineseAN	No	No	No	No	No	N/ N
Digg	No	No	No	No	Yes	N/ N
Essence	No	No	No	No	Yes	N/ N
ForeSee Results	No	No	No	No	No	N/ N
Gay Ad Network	No	Yes	No	No	No	N/ N
Httpool	No	No	No	No	No	N/ N
MdotM	No	No	No	No	No	N/ N
Open Amplify	No	No	No	No	No	N/ N
Red Loop Media	No	No	No	No	No	N/ N
SymphonyAM	No	No	No	No	Yes	N/ N
Twelvefold Media	No	Yes	No	No	No	N/ N
Unite	No	No	No	No	No	N/ N
Usability Sciences	No	No	No	No	Yes	N/ N
UserReport	No	No	Yes	No	Yes	N/ N

Table 11: Choice Methods by companies that have an English-language privacy policy for tracked users. The most popular way to implement an opt-out choice is to provide a link to the DAA or NAI opt-out pages. *Last column indicates whether the DAA or NAI websites list the company as member as of June 2014.

H. CONTACT METHODS

Company	Contact Method	Contact Name
Large Members		
AddThis	Email and Postal	Privacy team
Adobe Advertising	Web form	Unclear
Adobe Analytics	Web Form and other	Unclear
AppNexus	Web form	Unclear
Atlas	Email	Unclear
Audience Science	Email	Privacy team
BlueKai	Email and Postal	Privacy team
Chango	Web Form and other	Unclear
Criteo	Email and Postal	Unclear
Disqus	Email	Privacy team
eXelate	More than two	Privacy team
Facebook Exchange	Web Form and other	Unclear
Google AdSense	Web Form and other	Customer Service
Lotame	Email and Postal	Privacy team
Neustar	Email and Postal	Privacy team
Nielsen	Web form	Unclear
OpenX	Web Form and other	Privacy team
Quantcast	Email and Postal	Legal Department
Right Media	Postal	Privacy team
Rubicon	More than two	Other
ShareThis	Postal	Privacy team
Twitter	Email	Privacy team
ValueClick Mediaplex	Web Form and other	Privacy team
Xaxis	Email and Postal	Legal Department
Large Non-members		
Gemius	More than two	Privacy team
Histats	Email	Unclear
Optimizely	Email and Postal	Unclear
Statcounter	More than two	Unclear
Tynt	Email and Postal	Privacy team
VoiceFive	Email and Postal	Privacy team
whos.amung.us	Web form	Unclear
WordPress	None	No contact (NA)
Yandex	Web form	Unclear
Random Members		
Acxiom	Email and Phone	Customer Service
AOL	Email	Privacy team
Apple	Web Form and other	Customer Service
APT from Yahoo!	Web Form and other	Customer Service
AT&T AdWorks	Email and Postal	Privacy team
Bazaarvoice	Email and Postal	Privacy team
CBS Interactive	Web Form and other	Legal Department
Dow Jones	Email	Privacy team
Media Innovation Group	Email and Postal	Legal Department
News Distribution Network	Email	Customer Service
Pulsepoint Audience	Email	Privacy team
RGM Alliance	Email and Postal	Privacy team
Rocket Fuel	Email and Postal	Privacy team
SET Media	Email	Unclear
Sizmek	Web Form and other	Customer Service
Smowtion	Email and Postal	Unclear
Sojern	More than two	Unclear
Specific Media	Email and Postal	Privacy team
Star Media	Email	Unclear
Tapjoy	More than two	Privacy team
Traffiq	More than two	Legal Department
Verizon	Email and Postal	Privacy team
Vibrant Media	Web Form and other	Unclear
VisibleBrands	Web Form and other	Unclear
WildTangent Games	Web Form and other	Privacy team
Random Non-members		
Ad Magnet	Email	Unclear
AdGear	Email and Phone	Customer Service
Advanse	None	No contact (NA)
ChineseAN	None	No contact (NA)
Digg	Email	Unclear
Essence	Email and Phone	Unclear
ForeSee Results	More than two	Unclear
Gay Ad Network	Postal	Privacy team
Httpool	None	No contact (NA)
MdotM	Email	Unclear
Open Amplify	More than two	Customer Service
Red Loop Media	Email	Privacy team
SymphonyAM	More than two	Unclear
Twelvefold Media	Postal	Unclear
Unite	Email and Postal	Privacy team
Usability Sciences	More than two	Unclear
UserReport	Email and Postal	Unclear

Table 12: Contact details by companies that have an English-language privacy policy for tracked users. "Privacy team" is used when a company provides an email with the word "privacy" in it or otherwise gives an indication that a privacy-related person (e.g., CPO or similar) is the recipient of the communication.

I. POLICY UPDATES, MERGERS, AND DEFINITIONS

Company	How Company Informs of Policy Changes	Last Policy Update	Merge and Acquisition	Define Affiliates	Define Non-affiliates
Large Members					
AddThis	No notice	4/7/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Adobe Advertising	Notice	12/20/13	No notice (No choices mentioned)	Mentioned	Mentioned and defined
Adobe Analytics	Notice	Don't mention	Not mentioned	Mentioned	Mentioned and defined
AppNexus	No notice	2/21/14	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
Atlas	No notice	2/6/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned
Audience Science	Notice	12/4/13	Not mentioned	Not mentioned	Mentioned and defined
BlueKai	Notice	2/27/14	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
Chango	No notice	8/1/11	No notice (No choices mentioned)	Mentioned	Mentioned
Criteo	Notice	11/29/13	Not mentioned	Mentioned	Mentioned
Disqus	No notice	6/5/12	No notice (No choices mentioned)	Mentioned	Mentioned and defined
eXelate	No notice	6/15/13	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
Facebook Exchange	Notice	11/15/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Google AdSense	Notice + Email	12/20/13	Notice (No choices mentioned)	Mentioned	Mentioned
Lotame	Notice	1/1/12	No notice (No choices mentioned)	Mentioned	Mentioned and defined
Neustar	Notice	10/1/13	No notice (No choices mentioned)	Mentioned	Mentioned
Nielsen	Notice	3/2/12	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
OpenX	Notice	Don't mention	Not mentioned	Not mentioned	Mentioned and defined
Quantcast	Notice + Email	2/7/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Right Media	No notice	11/21/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Rubicon	Notice	10/28/13	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
ShareThis	Notice + Email	9/20/13	Notice (No choices mentioned)	Not mentioned	Mentioned and defined
Twitter	Notice + Email	10/21/13	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
ValueClick Mediaplex	Notice	8/12/13	No notice (No choices mentioned)	Mentioned	Mentioned
Xaxis	Notice	1/21/14	No notice (No choices mentioned)	Not mentioned	Mentioned
Large Non-members					
Gemius	Notice	10/19/11	No notice (No choices mentioned)	Mentioned	Not mentioned
Histats	No notice	Don't mention	Not mentioned	Not mentioned	Mentioned and defined
Optimizely	Notice + Email	12/16/13	Notice (No choices mentioned)	Not mentioned	Mentioned
Statcounter	No notice	Don't mention	Not mentioned	Not mentioned	Not mentioned
Tynt	No notice	8/8/12	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
VoiceFive	No notice	12/19/13	Not mentioned	Mentioned	Mentioned
whos.amung.us	Notice	12/12/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
WordPress	No notice	Don't mention	Not mentioned	Mentioned and defined	Not mentioned
Yandex	Notice	9/18/12	Not mentioned	Mentioned	Mentioned and defined
Random Members					
Acxiom	Notice	9/24/13	No notice (No choices mentioned)	Mentioned	Mentioned
AOL	Notice	6/28/13	Notice (opt-out offered)	Mentioned	Mentioned and defined
Apple	Notice	3/1/14	No notice (No choices mentioned)	Mentioned	Mentioned
APT from Yahoo!	Notice + Email	1/7/13	Notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
AT&T AdWorks	Notice	9/16/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Bazaarvoice	Notice + Email	1/23/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned
CBS Interactive	Notice + Email	1/2/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Dow Jones	Notice	10/26/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Media Innovation Group	Notice	9/6/11	No notice (No choices mentioned)	Mentioned	Mentioned
News Distribution Network	Notice + Email	9/6/13	No notice (No choices mentioned)	Mentioned and defined	Mentioned
Pulsepoint Audience	Notice	4/3/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned
RGM Alliance	Notice	6/28/13	No notice (No choices mentioned)	Mentioned	Mentioned and defined
Rocket Fuel	Notice	11/3/12	No notice (No choices mentioned)	Not mentioned	Mentioned
SET Media	Notice	2/12/13	No notice (No choices mentioned)	Mentioned	Mentioned and defined
Sizmek	No notice	Don't mention	Not mentioned	Not mentioned	Mentioned and defined
Smowtion	Notice + Email	10/17/13	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
Sojern	Notice	Don't mention	No notice (No choices mentioned)	Not mentioned	Mentioned
Specific Media	Notice	11/4/13	No notice (No choices mentioned)	Mentioned	Mentioned
Star Media	No notice	Don't mention	Not mentioned	Mentioned	Mentioned and defined
Tapjoy	Notice + Email	2/18/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned and defined
Traffiq	Notice + Email	Don't mention	No notice (No choices mentioned)	Mentioned	Mentioned
Verizon	Notice + Email	1/1/14	No notice (No choices mentioned)	Mentioned and defined	Mentioned
Vibrant Media	No notice	4/24/14	No notice (No choices mentioned)	Not mentioned	Mentioned
VisibleBrands	No notice	Don't mention	Not mentioned	Not mentioned	Not mentioned
WildTangent Games	No notice	Don't mention	Not mentioned	Not mentioned	Not mentioned
Random Non-members					
Ad Magnet	Notice	Don't mention	No notice (No choices mentioned)	Not mentioned	Mentioned
AdGear	No notice	Don't mention	Not mentioned	Not mentioned	Not mentioned
Advanse	No notice	Don't mention	Not mentioned	Mentioned	Mentioned and defined
ChineseAN	No notice	Don't mention	Not mentioned	Not mentioned	Mentioned and defined
Digg	Notice + Email	6/25/13	No notice (No choices mentioned)	Mentioned	Mentioned
Essence	No notice	Don't mention	Not mentioned	Not mentioned	Not mentioned
ForeSee Results	Notice + Email	5/15/13	No notice (No choices mentioned)	Mentioned	Mentioned
Gay Ad Network	No notice	7/24/12	No notice (No choices mentioned)	Not mentioned	Mentioned and defined
Httpool	No notice	Don't mention	Not mentioned	Mentioned	Mentioned
MdotM	Notice	1/16/11	No notice (opt-out offered)	Not mentioned	Mentioned
Open Amplify	No notice	Don't mention	Not mentioned	Mentioned	Mentioned
Red Loop Media	No notice	Don't mention	No notice (No choices mentioned)	Mentioned	Mentioned
SymphonyAM	Notice + Email	2/5/14	No notice (No choices mentioned)	Mentioned	Mentioned
Twelvefold Media	No notice	11/3/11	Not mentioned	Not mentioned	Not mentioned
Unite	Notice	7/1/12	No notice (No choices mentioned)	Mentioned	Mentioned and defined
Usability Sciences	Notice + Email	Don't mention	Not mentioned	Not mentioned	Mentioned
UserReport	No notice	Don't mention	Notice (opt-out offered)	Mentioned	Mentioned

Table 13: For policy updates, "Notice" means the company indicates that it will post a notice in the privacy policy indicating that it has changed. While several companies mention and define affiliates and non-affiliates, those definitions are vague and not consistent across companies.

J. OTHER DISCLOSURES

Company	Mention EU provisions	Mention children's provisions	Claim self-regulation affiliation*	Mask IP Address	Stores data anonymized	Stores data encrypted	Mention how tracking works	Mention third-party information sources	Link to educational material	Suggests browser's privacy settings
Large Members										
AddThis	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No
Adobe Advertising	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes
Adobe Analytics	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes
AppNexus	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Atlas	No	Yes	Yes	No	Yes	No	No	Yes	No	Yes
Audience Science	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
BlueKai	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Chango	No	No	Yes	No	Yes	No	Yes	Yes	No	Yes
Criteo	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
Disqus	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
eXelate	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Facebook Exchange	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes
Google AdSense	Yes	No	Yes	No	No	No	Yes	No	No	Yes
Lotame	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes
Neustar	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Nielsen	No	No	No	No	Yes	No	Yes	Yes	No	Yes
OpenX	No	No	No	No	No	No	No	Yes	No	No
Quantcast	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
Right Media	No	No	No	No	Yes	No	Yes	Yes	No	Yes
Rubicon	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
ShareThis	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Twitter	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes
ValueClick Mediaplex	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Xaxis	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Large Non-members										
Gemius	Yes	No	Yes	Yes	Yes	No	Yes	No	No	Yes
Histats	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No
Optimizely	Yes	Yes	No	No	No	No	Yes	No	No	Yes
Statcounter	No	No	No	No	No	No	Yes	Yes	No	No
Tynt	No	Yes	No	No	Yes	Yes	No	No	No	No
VoiceFive	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes
whos.amung.us	No	Yes	No	No	Yes	No	Yes	No	No	Yes
WordPress	No	No	No	No	No	No	Yes	No	No	Yes
Yandex	No	No	No	No	No	No	Yes	No	No	Yes
Random Members										
Acxiom	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
AOL	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Apple	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes
APT from Yahoo!	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No
AT&T AdWorks	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Bazaarvoice	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
CBS Interactive	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Dow Jones	No	Yes	No	No	No	No	Yes	Yes	No	Yes
Media Innovation Group	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
News Distribution Network	Yes	Yes	No	No	No	No	No	Yes	No	Yes
Pulsepoint Audience	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No
RGM Alliance	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No
Rocket Fuel	No	No	Yes	No	No	No	No	Yes	No	No
SET Media	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Sizmek	Yes	No	Yes	No	Yes	No	Yes	No	No	No
Smowtion	No	Yes	No	No	No	No	Yes	Yes	No	Yes
Sojern	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Specific Media	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No
Star Media	Yes	No	No	No	No	No	Yes	No	No	Yes
Tapjoy	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
Traffiq	No	Yes	No	No	Yes	No	Yes	No	No	Yes
Verizon	No	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
Vibrant Media	No	No	Yes	No	Yes	No	Yes	Yes	No	No
VisibleBrands	No	No	No	No	No	No	Yes	No	No	Yes
WildTangent Games	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes
Random Non-members										
Ad Magnet	No	No	No	No	Yes	No	Yes	Yes	No	Yes
AdGear	No	No	No	No	No	No	Yes	No	No	No
Advanse	No	No	No	No	No	No	No	No	No	Yes
ChineseAN	No	No	No	No	Yes	No	No	No	No	No
Digg	No	No	No	No	Yes	No	Yes	Yes	No	No
Essence	No	No	No	No	No	No	No	No	No	No
ForeSee Results	Yes	Yes	No	No	No	No	No	Yes	No	Yes
Gay Ad Network	Yes	No	No	No	No	No	No	No	No	Yes
Httpool	No	No	No	No	Yes	No	Yes	No	No	No
MdotM	No	Yes	No	No	No	No	Yes	Yes	No	Yes
Open Amplify	No	No	No	No	No	No	No	No	No	No
Red Loop Media	No	No	No	No	No	No	No	No	No	No
SymphonyAM	No	Yes	No	No	Yes	No	Yes	Yes	No	No
Twelvefold Media	No	No	No	No	No	No	No	No	No	Yes
Unite	No	Yes	No	No	Yes	No	No	Yes	Yes	No
Usability Sciences	Yes	Yes	No	No	Yes	No	Yes	No	No	No
UserReport	No	No	Yes	No	No	No	Yes	No	No	No

Table 14: Other stated practices by companies that have an English-language privacy policy for tracked users. We coded the practice as "Yes," when the practice was explicitly mentioned, a "No" code means the practice was not mentioned. Three companies notably mention that they mask IP addresses. A large fraction of companies (38.7%) don't mention whether or not they receive information from third-parties, and those who do mention it, don't explicitly indicate who those third parties are. *Affiliation with any self-regulatory organization, not only DAA or NAI