



How Do Online Ads Work?

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Summary

Online ads support the vast array of free apps and content on the Internet. Advertisers can use ad networks to deliver relevant ads to users through two primary methods:

1. **Contextual Ads:** Advertisers use ad networks to place ads based on the content or keywords on specific web pages. For example, an online retailer that sells a certain pair of boots might pay a search engine to show ads to users who search for that product online. Likewise, a company selling kitchen appliances may pay an ad network to show ads on news articles about food and cooking.
2. **Personalized Ads:** Advertisers use ad networks to target ads to users based on characteristics such as their online behavior, physical location, or demographics. Behavioral targeting shows ads to users based on their online activity, such as past searches or browsing history. Location-based ads target users based on where they live or when they visit a specific location, such as a stadium or shopping center. Demographic targeting shows ads to users based on specific social categories like race, gender, income, or age. Some ad networks also allow advertisers to target ads to custom audiences, such as previous customers. Ad networks collect data about users to enable these personalized ads, as well as to measure their efficacy, but they generally do not share personal information with advertisers.

Contextual ads are not a substitute for personalized ads. Advertisers marketing niche products and services may struggle to find appropriate sites to use for contextual ads and many publishers will earn less revenue from contextual ads than targeted ads.

Why Now?

Targeted advertising became possible with the advent of cookies in 1994. Cookies are small text files placed by websites in a user's browser. By allowing websites to remember users across multiple sessions, cookies not only facilitated the rise of e-commerce, but they also enabled targeted online advertising. Some ad networks also use other data or tracking methods, such as IP addresses or device fingerprinting (whereby an ad network recognizes devices based on their unique properties), to create profiles about users over time. Online advertising continues to grow every year, with advertisers spending \$139.8 billion globally on online ads in 2020. These funds support the vast array of free and low-cost apps and services online that many take for granted.

Online advertising is rapidly changing. Google has announced that it will retire the use of third-party cookies in its popular web browser by 2023. Instead, it plans to build a "Privacy Sandbox"—a set of open web standards to restrict online tracking, prevent online fraud, and measure digital ad effectiveness, while still enabling relevant content and ads. Similarly, with the iOS 14 update, Apple requires all apps to ask users for permission to collect and share IDFA data, which is a unique identifier for mobile devices used by advertisers to measure ad effectiveness and target users. Facebook, another critical platform for advertising, is rebuilding its core advertising technology to use techniques like differential privacy and multi-party computation, which intentionally obscure individual identities and encrypt data about users before it reaches ad tech companies. Some of these changes may decrease the overall revenue available to support the free app and service ecosystem.

Prospects for Advancement

Advertising platforms are investing in new technologies to improve consumer privacy, deliver more relevant ads, and prevent ad fraud. For example, Google has introduced Federated Learning of Cohorts (FLoC), a new technology that allows advertisers to target users without receiving any of their personal data. Google's FLoC API uses algorithms to sort users into various cohorts based on interests determined by browsing history. These algorithms are computed locally on each user's device, meaning that there is no central server collecting behavioral data. Members of cohorts are kept anonymous, with cohorts represented by an ID number. Whereas the ad tech industry of the past observed individual online behavior, FLoC allows the industry to observe cohort behavior instead.

Advertising platforms are also expanding their reach to connected devices, such as smart TVs, tablets, or mobile devices, through over-the-top (OTT) media services. OTT delivers media content via the Internet, as opposed to through cable or satellite television technology. Advertisers can use contextual or personalized ads to reach audiences directly, bypassing traditional TV providers.

Advertising platforms are also embracing the Internet of Things, helping advertisers reach consumers in innovative ways by creating new touchpoints in unexpected places, such as on a freezer door at a grocery store. Previously static objects and surfaces can be IoT-enabled, allowing different consumers to see different advertisements on the same surface. IoT devices can act like beacons to transmit signals to individual mobile devices through Bluetooth, serving personalized ads in real-time based on location, such as a coupon for a product while a consumer is at a store.

Applications and Impact:

Targeted advertising has a number of benefits for both consumers and businesses.

- For consumers, targeted advertising increases convenience and efficiency in the online experience. Targeted ads can be more meaningful and relevant, and therefore more effective than non-targeted ads.
- For businesses, targeted advertising has proven to increase revenues and click-through rates. With careful targeting strategies, businesses can reach audiences they otherwise may lack access to, which is especially helpful as businesses enter new markets and build brand awareness.
- For publishers, digital advertising revenue allows many sites to retain free and open access to a majority of content. Even publishers that charge a subscription may supplement this revenue with online advertising, something especially important for news media in an era of declining subscriptions.

Policy Implications:

Targeted advertising has come under scrutiny in many parts of the world, resulting in various proposals to restrict or ban the practice or further regulate advertising platforms, online services, or data brokers.

One concern is that online advertising is a threat to consumer privacy and incentivizes businesses to excessively track users online. To address this issue, many countries have passed data protection laws to give consumers more control over how online services can collect and use personal data. For example, in the United States, the California Consumer Privacy Act (CCPA) gives consumers the right to opt out of third-party data collection and require companies to delete personal information collected about them. Some states have also sought to regulate data brokers, by enacting laws that require them to declare their activities and maintain certain security standards. In the European Union, the General Data Protection Regulation (GDPR), in combination with the ePrivacy Directive (colloquially called the “cookie law”), requires users to give consent before sites store cookies or other data on their devices. These laws have led to a proliferation of cookie banner pop-ups on many websites, especially in Europe. Users must still be given access to a service even if they reject the cookies.

Another concern is that bad actors can abuse online advertising to spread misinformation. In particular, online advertising has been a source of political misinformation, including from foreign actors, that target certain groups or promote political division. A related concern is that scammers and shady marketers use deceptive targeted ads to find gullible users, including adolescents, and then try to sell them questionable products, like miracle weight-loss supplements, instant muscle boosters, and male enhancement pills. Various proposals to address these problems include requiring more transparency for online ads, mandating that online ad networks more thoroughly review ad content, and requiring ad networks to take steps to prevent foreign entities from purchasing political ads.

Targeted ads also open the possibility of bias and discrimination. For example, advertisers may choose to show ads for certain jobs only to a particular gender or homes to a particular race or ethnicity. While discriminatory ads for housing, employment, and credit are likely to violate civil rights laws, regulators may not be able to identify this discrimination without access to the ad network. As such, policymakers have considered requiring ad networks to implement additional safeguards to prevent discriminatory practices.

However, restricting targeted advertising would greatly hurt businesses that rely on these services to reach their customers and threaten the availability of free apps and online services, something that would have especially problematic impacts on low- and moderate-income users. For online services to maintain the same amount of revenue, they would need to show more ads to users, even though these ads would be less relevant to them, or impose new fees.

Further Reading:

- “Internet Advertising Revenue Report, 2020,” PwC/Internet Advertising Bureau, April 7, 2021, <https://www.iab.com/insights/internet-advertising-revenue-report/>.
- “The Privacy Sandbox,” Chrome Developers, n.d., <https://developer.chrome.com/docs/privacy-sandbox/>.
- “Federated Learning of Cohorts (FLoC),” GitHub, n.d., <https://github.com/WICG/floc>.