eye/o

The Global State of Ad-Filtering

Including five predictions for the future of ad-filtering by industry experts.

2022

Synopsis

Ad blocking has seen a moderate increase over the years as users continue to demand more control over their browsing experience. This has led to numerous countermeasures from publishers, such as paywalls or ad-blocking circumvention, which are detrimental to the future of the free and open internet.

However, there has been a recent shift from ad blocking (blocking all online ads) to ad filtering (which allows lighter, less disruptive forms of ads while blocking ads that do not meet the criteria of a given ad standard).

Today, most ad blockers on the market implement some form of ad filtering. Ad filtering supports the entire ecosystem; users enjoy a nondisruptive online experience with more control while publishers and advertisers benefit from advertising.

This report will dive deep into the current trends in the ad-filtering industry, including research on users and their attitudes toward advertising, expert insights and a look into the future of ad filtering.

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The state of ad blocking today

Ad blocking has seen moderate growth over the past decade and its adoption varies within regions and age groups.

In 2019, there were 763.5 million **global ad-blocking users** across all platforms.

In 2020, during the COVID-19 pandemic, reports estimated that ad-blocking usage had slowed down with fewer people browsing on desktops.

However, a more recent report showed that the ad-blocking rate had, in fact, increased in 2020 by eight percent on desktop and 10 percent on mobile.

By the end of 2020, there were a total of **257 million users on desktop and 586 million users on mobile**.

KEY MOMENTS

2019 — **763.5m online users** actively blocked ads

2020 — **843m ad blocking users** 257m desktop / 586m mobile

2021 — **820m ad blocking users** 290m desktop / 530m mobile

2022 — **37% of online population**

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE : AD BLOCKING

The state of ad blocking today (continued)

At the end of 2021, there were more than **290 million users of desktop ad blocking and 530 million users on mobile** and the average global ad-blocking rate was estimated at **37 percent**. However, while desktop ad blocking resumed its steady growth, mobile ad blocking experienced a decline from the previous year.

In 2022, it is estimated that around 37 percent of global internet users aged 16 to 64 regularly or occasionally use ad blockers (GWI).

The **majority of ad-blocking users** are based in Asia (40.6 percent), followed by Europe (29.6 percent), the Americas (19.2 percent), Africa (9.2 percent) and Oceania (1.2 percent). Europe has the highest number of searches for 'ad blocking software', and young adults (aged 16 to 34) are more likely to use ad blockers.

According to a CivicScience survey in March 2021, six in 10 US adults (aged 18 to 24) use a desktop ad blocker.

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE : ADVERTISING

The state of advertising today

Similar to ad blocking, global ad spending has consistently increased (except 2020) over the years. In 2021, digital advertising spending amounted to over USD $521 billion, and it is estimated that worldwide digital ad spending will exceed **USD $876 billion by 2026**.

Despite the steady growth in ad spending, ad blocking has undoubtedly caused a significant revenue loss for publishers.

A 2016 report from **Juniper Research** estimated that digital publishers could lose up to $27 billion due to ad blocking by 2020, accounting for 10 percent of the total digital advertising market.

However, the majority of global publishers surveyed (94 percent) in 2021 said they cannot accurately quantify the **loss of revenue due to ad blocking**. In 2020, 50 percent of publishers **relied strongly on reader revenue** as their main source of income.

With no foresight into whether ad-blocking rates will continue to rise or decline, publishers are attempting to recover lost revenue and counter the effects of ad blocking, for instance via paywalls or anti-circumvention strategies.

(more in section B. 'Ad-blocking countermeasures')

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE

Insights from industry players

To provide more in-depth support for our research thus far, we interviewed some industry experts to better understand the state of ad filtering. Our expert contributors will discuss the challenges and potential opportunities within the ad-filtering industry in this section.

Our contributors are:

- Andrey Meshkov, CTO & Co-Founder, AdGuard
- Peter Lowe, Principal Security Researcher, DNSFilter
- Franziska Roesner, Associate Professor, University of Washington
- Vinod Kumar, AVP – Products and Services, Reliance Jio Platform Limited
- Dr. Humera Noor Minhas, Director of Engineering, eyeo
- Felipe Erias Morandeira, SW engineer at Igalia and Chromium contributor
- David Li, Product Manager, Google Chrome
- Pedro Ribeiro, Product Manager, eyeo

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I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: CHALLENGES

Google's Manifest V3

Google's Manifest V3 is the next iteration of browser extensions, particularly in Chromium-based browsers. According to Google, Manifest V3 is a major step towards focusing on three pillars of **their vision for the extension platform** – privacy, security, and performance.

While all browser extensions risk reducing the quality of their product, ad blocking extensions are especially affected. Some of the main challenges for this use case are:

- Replacement of background scripts with service workers
- Restricted capabilities for filter lists and filtering rules

"I'm curious to see what Manifest V3 might lead to should there be a significant public outcry."
— Peter Lowe, Principal Security Researcher, DNSFilter

"We are deeply committed to providing a more secure and private browsing experience for Chrome users by default. As part of that continued effort, we are working to provide both greater transparency - through regular updates on the timeline and progress in addressing known gaps - and guidance - through improved documentation and code samples needed for a smooth transition to Manifest V3.

We are also constantly working on new capabilities based on direct developer feedback, and we encourage the community to view the extension platform as an ever-continuing conversation. We look forward to more community collaboration as we work towards a safer, more private and more performant browsing experience in Chrome."
— David Li, Product Manager, Google Chrome

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: CHALLENGES

Google's Manifest V3 (continued)

Replacement of background scripts with service workers

A service worker is a script that the browser runs in the background but separate from a web page, enabling features that do not need a web page or user interaction. Some examples are push notifications and background synchronization. They also apply to extensions.

Service workers completely change how an extension's lifecycle is handled, with the browser being able to suspend service workers at any time. Ensuring correct functioning when they are suspended requires a more complex implementation of mechanisms related to data synchronization.

Currently, testing is also more challenging as compared to Manifest V2. There is no API for tests to trigger the workflow to suspend and restart service workers, and these events do not always occur as expected under testing conditions.

Restricted capabilities for filter lists and filtering rules

According to Lowe and Andrey Meshkov, Manifest V3 and the maintenance of filter lists are some risks to consider in the industry.

One of the main issues with Manifest V3 is its limitation to filter lists: an extension can only include up to 50 static lists, and only 10 of them can be active at the same time.

“This is a direct threat to the current state of filter lists where thousands of different lists are maintained by a strong community of authors. However, Manifest V3 is also seen as an excellent opportunity for consolidation of filter lists, which could be more effective in theory,” said Meshkov.

(More to follow in section III. Future Outlook)

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: CHALLENGES

Google's Manifest V3 (continued)

There are also limitations to the number of filter rules inside these lists: installed extensions cannot collectively exceed 300,000 static filters and it is no longer possible to update entire filter lists synchronously.

"Manifest V3 introduces a new threat by removing our ability to update filters dynamically, thus making it difficult for the community to quickly fix problematic filters that cause pages to malfunction. On the flip side, this is pushing us to develop more advanced tools to detect filter problems in advance and prevent them from reaching users in the first place." — Pedro Ribeiro, Product Manager, eyeo

During 2022, Igalia and eyeo have collaborated in increasing awareness around this problem and have made a proposal to support disabling static filters in Chromium to alleviate the risk to the community mentioned above.

"From my point of view, Manifest V3 introduces interesting innovations and there is room to adapt it to additional contexts and use cases.

It is true that the process for specifying Web Extension APIs is not as well developed as is the case with more mature Web standards.

Nevertheless, people in the community should be aware that there are forums where they can contribute in the open to the evolution of these Technologies." — Felipe Erias Morandeira, SW engineer at Igalia and Chromium contributor

Finally, the filter rules supported by the Declarative Net Request API introduced in Manifest V3 are only a subset of those in Manifest V2, potentially reducing ad-filtering quality. For example, regular expressions are restricted to a certain amount of memory consumed, and header-matching filters are not supported.

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: CHALLENGES

Chromium limitations on mobile

Chromium does not support mobile extensions. Since most major mobile browsers are Chromium-based, they have been forced to adopt one of the following strategies:

- Adding support for extensions themselves, gaining the know-how in their development teams during the process (e.g. Kiwi Browser).
- Building the ad-filtering engine themselves and adding support for companion apps that provide filter lists which the engine is responsible for processing (e.g. Samsung Internet).
- Integrating an SDK that delivers the feature in a performant manner, allowing them to focus their resources on more relevant browser features (e.g. eyeo Chromium SDK partners).

Meshkov has expressed hope that Manifest V3 holds the key to changing this situation in the long run:

> **"I hope that Manifest V3 is a step towards having browser extensions on mobile. If this comes true, we'll see major changes and significantly more opportunities for ad - filtering."** — Andrey Meshkov, CTO & Co-Founder, AdGuard

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: CHALLENGES

Mobile devices have less computing power

Ad-filtering solutions originated as desktop browser extensions, so hardware limitations have never been a big challenge. Developers still try to optimize their algorithms, but it was not critical for extensions to function.

Due to the vast growth in the mobile user base, however, taking into account hardware constraints has become essential. For example, a current desktop machine tends to have between 16 and 32GB of RAM, but phones move around 4GB.

Monitoring and optimizing metrics like startup time, page load time, memory consumption and the overhead of processing filter lists are now vital for any ad-filtering solution for mobile.

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: OPPORTUNITIES AND NEW TECHNOLOGY

A standard for ads

There are opportunities within the ad-filtering industry for improved standards enforcement and new technology, like network-level ad filtering, server-stitched ads and machine-learning based ad detection.

Franziska Roesner and Vinod Kumar anticipate an opportunity to enforce stricter ad policies and to take a different approach than before.

“It is clear that online ads are a core part of the web ecosystem, and that they can potentially benefit users in multiple ways. However, our studies show that large fractions of ad content on websites are problematic and potentially harmful to users. We see an opportunity for ad filtering to enforce stricter guidelines on ad content than is currently done by ad platforms or websites. Ad-filtering tools could detect and block ads with problematic and potentially harmful content of the types we have identified in our research studies (e.g., blocking native ads containing misleading claims that deceptively look like news articles) while allowing higher quality, well-disclosed ads for products and services."

Such filtering could also be personalized to users, who may have different preferences and perspectives on what ad content is problematic.” — Franziska Roesner, Associate Professor, University of Washington

Kumar echoes this sentiment,

"Onboarding publishers is difficult, but we’re looking for ways to educate them on the shift from ad blocking to ad filtering, including other aspects like trackers and user privacy that should co-exist with ad filtering.

This way, we can ensure a mutual benefit for publishers, advertisers and users. While eyeo and Acceptable Ads are on the right track, there’s more work to be done." — Vinod Kumar, AVP – Products and Services, Reliance Jio Platform Limited

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: OPPORTUNITIES AND NEW TECHNOLOGY

Network-level ad filtering

Through his usage of AdGuard Home, the growth of Pi-Hole, AdGuard DNS and Next DNS products, Meshkov says that there is a demand for network-level ad filtering. Even though the tools are somewhat limited, Meshkov estimates that there are almost 100 million users of network-level blockers and their numbers are growing rapidly.

"I also think these tools will evolve beyond what DNS provides. It has taken more time than I'd expected, but nevertheless, it will happen."

Lowe comments that while blocking by domain name is quick and effective, it is also limited as it brings on false positives when blocking anything that is not dedicated for tracking.

He also sees an opportunity for an improvement in the use of artificial intelligence (AI), specifically machine learning (ML):

"AI and in particular, ML, is promising, yet complicated as there will be a time period where the data will be too inaccurate to be useful. Automatic ad removal has never been done in a commercial setting before so it's tricky."

In 2020, a novel graph machine learning approach for automatic and effective ad blocking called **AdGraph** was proposed to address the maintenance challenges that manually curated filter lists bring. This **approach** was conducted by Umar Iqbal (University of Iowa), Peter Snyder (Brave Software), Shitong Zhu (University of California Riverside), Benjamin Livshits (Brave Software and Imperial College London), Zhiyun Qian (University of California Riverside) and Zubair Shafiq (University of Iowa), and reaped results that showed that AdGraph has better recall than filter lists. It can replicate the labels of human-generated filter lists with 95.33 percent accuracy and can identify many mistakes in filter lists.

I. KEY INSIGHTS INTO THE CURRENT LANDSCAPE: OPPORTUNITIES AND NEW TECHNOLOGY

Network-level ad filtering (continued)

In July 2022, eyeo pioneered the use of machine learning to counter online circumvention of ad blockers, giving its ad-filtering engine a competitive advantage. The goal was to provide a programmatic solution that can better respond to circumvention disruptions, detecting ads in a way that traditional ad filtering cannot. It is also more scalable, as it reduces the maintenance effort required to expand coverage to more online sites.

"The most pressing issues are the automation of ad filtering to prevent circumvention and how to make the approach scalable.

There's also the question of what is acceptable for the user in terms of user experience and privacy, and how this is discovered in a measurable and neutral way." — Gertrud Kolb, CTPO of eyeo

Dr. Humera Noor Minhas, who leads the machine learning team at eyeo, notes:

"We've been experimenting with machine learning models to automate online ad detection, and we've faced obstacles at every turn. This is something that has never been done commercially before, so there's no roadmap or best practices to follow. But every obstacle has been an opportunity for us to create more effective ad filtering.

Also, we're working actively with relevant entities like W3C (World Wide Web Consortium) to pave the way for future efforts in ML-based content filtering."

II. KEY STATISTICS AND FIGURES

User attitudes and motivations

In this section, we will explore how users perceive online ads, the reasons why they use ad blockers and the measures they take to protect their privacy.

Attitudes toward advertising and ad blockers

According to an **AudienceProject survey in Q2 2020**, almost half (47 percent) of US internet users felt negatively toward online ads. 19.8 percent of online users globally try to avoid all types of advertising and 37.2 percent use ad-blocking software regularly or occasionally (GWI). When asked why they block ads, most users (62.1 percent) expressed that there are 'too many online ads'. Other reasons include:

Furthermore, **81 percent of users** also download ad blockers 'to avoid interruptive or annoying ad experiences' and **82 percent** of ad-blocking users prefer a lighter ad experience.

> **"For our user base, ad filtering and anti-tracking (which is also built on ad-filtering technology) are essential and key to our growth strategy."** — Thomas Salomon Director of Engineering, Platform at Avast Software Deutschland GmbH

II. KEY STATISTICS AND FIGURES

User attitudes and motivations (continued)

Many understand the value of publishers

In 2019, eyeo's research[1] revealed that 71 percent of ad-filtering users in the US understood that publishers rely on advertising to keep content free.

A much more recent study in 2022[2] (in conjunction with Samsung Internet users) supported that claim, showing that most users, upon understanding the benefits of ad filtering, are much more open to advertising. These users see the publishers' value and are willing to support them (more revealed in Section C. Ad-filtering stats).

Additionally, the 2021 PageFair Adblock Report also revealed that 63 percent of ad-blocking users are willing to support light and nonintrusive advertising to support publishers.

"We are open to working with publishers and ad providers to find ways that will allow us to place ads without hurting and/or disrupting the experience of our users." — Thomas Salomon
Director of Engineering, Platform at Avast Software Deutschland GmbH

[1] The research polled over 2,500 (2,568) US online users, of this 1,382 of participants2 registered as having an ad-blocker installed on their digital devices.
[2] 300 respondents from the US (120), UK (120) and DE (60); 42% aged 34 or younger

II. KEY STATISTICS AND FIGURES

User attitudes and motivations (continued)

Privacy-oriented mindset

Growing concern about privacy is becoming a significant factor in why users block ads. Here are some statistics from multiple sources that demonstrate its rise:

WHY USERS UTILIZE AN AD BLOCKER (GWI):

14.9%
To protect their privacy

31%
are not comfortable with apps tracking their activity

ONLINE PRIVACY IS IMPORTANT (PAGEFAIR)

87%
of online users feel that online privacy is ‘extremely’ or ‘somewhat’ important.

62%
use ad blockers to protect themselves from malware.

58%
use ad blockers to protect their privacy.

ADBLOCKER DOWNLOADS (STATISTA):

44%
of users have resorted to downloading ad blockers to avoid being tracked online

USER PERSONAL DATA (GWI)

60.9%
of users require more information on how their data will be used.

59.3%
of users need to know how it will be protected before they feel comfortable.

II. KEY STATISTICS AND FIGURES

Ad-blocking countermeasures

Certain ad-tech platforms are focusing on ways to circumvent ad blockers as part of their revenue recovery strategy. Online circumvention of ad blockers is one of the biggest threats to achieving accurate ad filtering.

Circumvention ignores the standards of good online advertising (as laid down by the Coalition for Better Ads or Acceptable Ads). This unsustainable practice leads to user annoyance as it reinforces intrusive advertising that disrupts the user experience.

Users have also spoken up about circumvention practices:

- 61 percent of US ad-blocking users would unlikely return to a website that had disabled their ad blocker without their permission.
- 83 percent of US ad-blocking users would be annoyed if a website disabled their ad blocker without their permission.
- 53 percent of polled ad-blocking users would not turn off their ad blocker if asked to by a website.

The 2022 PageFair Adblock Report supports these statistics by revealing that in 2021, the use of ad-block walls as a standalone ad-block monetization strategy is in decline, with only 1 of the top 100 US publishers using it. In this same report, a UX study was conducted on users aged 18 to 40, revealing that more than 80 percent of users find ad-block walls to be an anti-user tactic. 66 percent rejected the request and 16 percent exited the site.

A similar format, paywalls, where users can only access quality content by paying, reaps similar reactions from users. Most users leave the site instead of trying to disable their ad blocker. A study in the **Journal of Marketing** revealed that the monetization of online content through paywalls “might suppress usage among loyal consumers.”

As a result of the New York Times paywall, unique visitors decreased by 16.8 percent while heavy users decreased by 57.2 percent.

This shows that ad-block walls and paywalls can potentially harm publishers while giving users a poor online experience, reduced access to quality content, and/or a susceptibility to fake or unreliable news.

II. KEY STATISTICS AND FIGURES

Ad-blocking countermeasures (continued)

The often unintended negative impacts of ad blocking

As seen in the data above, users are annoyed with excessive online advertising and therefore download an ad blocker, but oftentimes without understanding the negative impacts these can have on access to quality content. While ad-blocking and ad-filtering users are more aware of the potential consequences than non-ad-blocking users, a more balanced and informed approach is necessary to protect quality content, open access and the user experience.

"From a product perspective, we need to find ways that will allow us to answer business and user needs at the same time without hurting one or the other." — Thomas Salomon Director of Engineering, Platform at Avast Software Deutschland GmbH

"Ad filtering is an important solution to mitigating user and publisher needs, allowing for more control on the part of the user and viable monetization opportunities for publishers." — Gertrud Kolb, CTPO, eyeo

A study conducted by GWI[3] on the negative impacts of total ad blocking (where all ads are blocked) and mobile web browser usage showed that the vast majority **of participants** (over 85 percent - not specifically ad-blocking or ad-filtering users) **were *not* aware that ad blocking may lead to the reduction of neutral or independent content or unequal access to online sources**.

[3] In February 2022, eyeo was given the opportunity to include a couple of questions in one of the Global Web Index consumer surveys targeting participants in the USA and UK. Questions fielded to a sample of 4,009 general population users.

II. KEY STATISTICS AND FIGURES

Ad-blocking countermeasures (continued)

However, a separate study between eyeo and Samsung Internet users[4] revealed that ad-blocking and ad-filtering users were more aware of these negative effects, such as restricted access to content and a loss of revenue for website owners and content creators (more to follow in the section 'C. Ad-filtering stats') than non ad-blocking users. Only a third of ad-blocking and ad-filtering users from this study were unaware of the negative impacts of complete ad blocking, compared to about 46 percent of users from the GWI study mentioned above.

If excessive and intrusive advertising continues, so will the use of ad blockers. The continued use of total ad blockers will continue to threaten quality content and open access to it. We have seen that the efforts to circumvent ad blockers or implement paywalls do not solve user experience problems. So what is a sustainable way to address user experience and still allow content monetization?

[4] 300 respondents from the US (120), UK (120) and DE (60); 42% aged 34 or younger

II. KEY STATISTICS AND FIGURES

Ad-filtering statistics

Ad filtering as a sustainable way forward

Ad-filtering technology has become a sustainable solution for all stakeholders as it respects the user experience while enabling publishers to monetize content; advertisers also benefit as they are able to reach a consenting audience in a lower ad-density environment. The availability of ad standards such as Coalition for Better Ads' Better Ads Standards and Acceptable Ads shows that there are ad-regulation options available that enable content providers to contribute to a better internet, putting the user at the forefront without taking away monetization opportunities or equal access to quality content.

For instance, Avast offers different levels of ad filtering (Basic blocking, Balanced blocking, Strict blocking and PRO blocking) to their users. According to Salomon, Director of Engineering at Avast, "This approach is well perceived by all types of users; only 7 percent are on 'strict blocking' and the rest are under 'balanced'."

In 2021, **62 of the top 100 US publishers** were using at least one form of ad-block monetization strategy to recover lost ad revenue:

"Publishers have realized that it is possible to monetize the part of the previously inaccessible inventory while still offering users a positive experience.

We have been able to witness a wave of increased awareness from publishers regarding ad blockers and their interest in learning more about how ad-blocking users behave in the online world.

In that way, we believe that we can grant this valuable audience a unique online experience while respecting their browsing habits and choice." — Tijana Vankovska, CEO of Unblockia

II. KEY STATISTICS AND FIGURES

Ad-filtering statistics (continued)

"Publishers are ever so sensitive to the needs of their consumers and respect users with ad-blocking in place. With the ability to monetize this inventory that would otherwise go unsold, it's a win-win for all: the consumer, media owner and advertiser.

We at Criteo partner with companies like eyeo, because they specialize in building products that sustain a fair and open web that puts users in control, while also providing user-friendly revenue options for publishers.

Partnerships like this will be a key element as the industry continues to support the decisions of users." — Matthew Hogg, VP of Partnerships, Criteo

"There is an annoying border between users and a positive internet browsing experience. Aloha, as a private browser, places strong consideration on privacy, and we are trying to avoid online activities being tracked as users are permanently fed ads.

That's why ad-filtering is very important for Aloha products." — Stan Malko, CBO, Aloha Browser

About ad-filtering users

There are currently more than 250 million ad-filtering users around the world. At the end of 2021, **a total of 216 million ad-blocking users opted into Acceptable Ads**, up 50 percent from the beginning of 2019. Unlike traditional ad-blocking users, these users are open to Acceptable Ads-compliant, nonintrusive ads as long as their browsing experience and privacy preferences are respected.

Once they accept Acceptable Ads, they become ad-filtering users instead of ad-blocking users. Over the years, eyeo has conducted a few research studies to understand ad-filtering users better.

II. KEY STATISTICS AND FIGURES

Ad-filtering statistics (continued)

In 2019, an eyeo and YouGov study in the US and a **CCM benchmark** study both showed that 90 percent of ad-blocking users do not hate ads and 83 percent would be happy to see noninvasive and relevant advertisements.

A much more recent survey in 2021 conducted by eyeo and Aloha Browser supports this premise, demonstrating that users are open to ad filtering, with key findings indicating:

- More than 70 percent of users say they love or like their browser's ad-blocking feature
- More than 50 percent of users said that they don't mind ads when they don't interfere with their task, when they can control what kind of ads they see, or when they can control their data
- 20 percent of users will knowingly turn off their ad blocker on certain sites out of a desire to support the website
- 28 percent of users said that they are aware sites use circumvention techniques

A study on Samsung Internet (SI) users by eyeo in 2022 also disclosed interesting insight into how users perceive ads on mobile devices:

- 61 percent say they would switch to a different browser with better ad blocking
- 49 percent of users claimed not to have been aware of Acceptable Ads, but upon understanding what it is, 65 percent said they would keep Acceptable Ads enabled
- SI users also seem to be supportive of content creators as they recognize the value of advertising (and ad filtering) in sustaining the open internet; upon understanding what Acceptable Ads is, 65 percent would continue to enable Acceptable Ads to support content creators
- When asked about their perception of the negative effects of ad blocking, 48 percent quoted 'Restricted access to content' and 44 percent quoted 'website owners and content creators not getting paid'.
- Samsung Internet users are provenly privacy oriented, as they take measures to secure their browsing experience. For example:
    - 52.4 percent use a private browsing window
    - 45.8 percent delete cookies from their browser
    - 41.9 percent use a password manager to keep their passwords secure
    - 36.8 percent have deleted an app from their phone due to privacy concerns

III. LOOKING FORWARD

1. The vicious cycle between users and circumvention strategies

Although ad-blocking rates are not rapidly increasing, the data in this report shows that there is no risk of obsoletism either. The same goes for ad filtering with its consistent increase of global users, from 100 million in 2016 to 250 million in 2022.

Here are some predictions from industry experts on the future of ad filtering:

"There's a constant back and forth with ad blocking and trying to circumvent ad blocking. I think it will get harder because the traditional methods will become less effective. People hate ads and are still putting in the effort to block them. For instance, one side may emerge and circumvent ad blockers, leading to more ads being shown and users will counter that and find ways to block these ads. The cycle will repeat." — Peter Lowe, Principal Security Researcher, DNSFilter

Dr. Humera Noor Minhas, Director of Engineering at eyeo, sees the negative effects of this cycle:

"Ad blockers, circumvention of those and then blocking that circumvention is a continual cat and mouse game. Some networks and platforms are resorting to new technology like machine learning to circumvent ad blockers. At eyeo, we're using it to level the playing field to counteract those efforts and preserve user choice and privacy."

Andrey Meshkov, CTO & Co-Founder at AdGuard, sees the same constant cycle as Lowe and Minhas:

"Browser extensions will eventually come to Android Chrome and attract many more new users. At the same time, this will also breathe new life into the anti-adblock companies, so we can expect a new round of struggle with ad-block circumvention."

III. LOOKING FORWARD

2. Filter lists consolidation

Lowe has expressed a heavy reliance on people who maintain filter lists:

> **“I feel that this is a threat that most people don’t really consider. For example, if two or three people who maintain the lists disappear, such as Brave, DNSFilter, AdGuard, eyeo, DuckDuckGo, etc., it could have a huge negative effect.”**

Meshkov predicts that filter lists consolidation will happen one way or another:

> **“While one of the main issues with Manifest V3 is its limitations on the filter lists, it may also provide a great opportunity for filter lists consolidation. This will require more cooperation between the developers of content blocking tools since we will need to provide the necessary infrastructure to authors.”**

However, while filter list consolidation can be a good thing, resulting in more collaboration and fewer but more powerful lists which reduces complexity for the user, it also has its downsides:

> **"It forces us to group smaller and more granular lists into bigger generic ones, reducing the user's ability to customize their web experience. An example of this is AdBlock, which before Manifest V3, allowed users to individually enable and disable lists for blocking videos, newsletters, push notifications and surveys. But after Manifest V3, they will be combined into one single option to block ‘distractions’. Another prediction is that this limitation to the number of rules will push the community to keep the filter lists lean and develop better techniques to identify and remove outdated or redundant filters."** — Pedro Ribeiro, Product Manager, eyeo

III. LOOKING FORWARD

3. Mobile ad blocking is here to stay

As of July 2022, **almost 60 percent of all website visits** worldwide came from mobile devices. Along with that increase in online activity from mobile, mobile ad blocking has also rapidly increased from 167 million users at the start of 2015 to 530 million by the end of 2021.

This increase results from the prominence of mobile banner ads in marketing strategies today. **Mobile is seen as the future of digital advertising** and its spending is predicted to grow to $384.8 billion worldwide by 2023, up from $162.6 billion in 2018, according to eMarketer.

In this same period, mobile display ads are forecasted to grow from $7.1 billion to $11 billion, while desktop display ads will decline from $19.4 billion to $11.9 billion.

III. LOOKING FORWARD

4. Tech capabilities for new devices and platforms

Developing ad-filtering on new devices

The numbers depicted in this report show that users are not pleased with the state of online ads and are open to taking preventative measures, such as downloading ad-blocking software, to ensure their online experience remains positive.

While ad-filtering on desktop and mobile is seen as a sustainable middle-ground to ensure that all advertisers, publishers and users can benefit from the web, more work has to be done to assure that intrusive ads can be detected across all existing and also new devices/platforms, such as Connected TV, mobile in-app ads or podcast advertisements.

For example:
Connected TV is seeing a meteoric rise over the years. In 2021, the estimation for combined online and Connected TV revenue is around USD **$27.72 billion**. In a global survey among marketers in 2021, 81 percent said they "expect to **increase their spending in connected TV advertising in 2022.**"

Meanwhile, mobile in-app advertising is estimated to reach nearly USD $117 million in 2020 as it becomes a highly invested format within the industry. According to Statista, global mobile advertising spending is **set to hit USD $327.1 billion worldwide in 2022**.

According to HubSpot, 82 percent of marketers plan to continue or increase their investment in **podcast advertising** throughout the year and **Statista analysts** predict that podcast ad spending will reach $2.8 billion worldwide in 2022.

III. LOOKING FORWARD

4. Tech capabilities for new devices and platforms (continued)

Server-stitched ads

Something else to keep on the radar is server-stitched ads for videos. Although these types of digital ads do not trigger separate network calls, Kumar of Reliance Jio Platform Limited sees an opportunity for this technology to be made possible if ad filtering is combined with blocking trackers, impression beacons and third-party cookies.

“Digital ads are targeted by metrics such as geolocation, age, gender, etc., meaning each of these cohorts receives different ads. This continued practice of server-stitched ads will be problematic for ad blockers and also intrusive for users.

However, if there’s a standardized way of displaying ads (e.g. adhering to ad standards set by the IAB or similar), this problem can be solved. The digital ads streamed during a sports event (server stitched) will have to fit certain criteria and parameters set by an authority."

III. LOOKING FORWARD

5. New tech and automation

Where there is internet, there will be ads. But where "there is internet" has changed dramatically in the past few years.

Knowing this, we must build a plan and continue investing resources into new technology to address the online advertising that does not respect user choice and experience.

The current efforts we see involving machine learning in the ad-filtering landscape *(as mentioned in section B. Insights from Industry Experts)* are just the beginning of the journey.

"In addition to using ML for ad filtering and anti-circumvention, we have also used it to detect third-party trackers and protect user privacy.

We are researching the use of machine learning to detect ad content to ensure it is acceptable. Machine learning solutions will allow us to take a leap in mobile ad filtering, as the ML models take less device memory than conventional filter lists.

They are also easy to maintain and difficult to circumvent. The opportunities are simply endless!" — Dr. Humera Noor Minhas, Director of Engineering, eyeo

Conclusion

Online advertising plays an important role in the online ecosystem, but interruptive and excessive advertisement alienates audiences, who then might respond with total ad blocking. The vicious cycle is unsustainable, and it is evident that users demand more control, privacy and respect from advertisers, and a more inclusive and less antagonistic relationship to the ads they do see. Ad filtering is a sustainable middle ground that is being adopted by many publishers and advertisers today, and it has received overwhelming support from users who understand the role that advertising plays in keeping the internet free and open.

While ad-filtering adoption is growing, with over 250 million users worldwide, there are still challenges to face within the industry, such as Manifest V3. New technology and automation involving artificial intelligence like machine learning are also on the rise, and there is a need to find new ways to manage and adapt to new technologies.

This report has demonstrated that while the online advertising business is growing strongly and continuously, online users today do not want to be helplessly exposed to advertising.

Instead, they are embracing the concept of ad filtering in exchange for a positive browsing experience.

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About the study

This report is written by eyeo to provide a comprehensive view of the current state and future of the ad-filtering industry. It is backed by research from external sources and insights from expert contributors in the field.

Contributors

- Andrey Meshkov, CTO and Co-Founder, AdGuard
- Peter Lowe, Principal Security Researcher, DNSFilter
- Franziska Roesner, Associate Professor, University of Washington
- Vinod Kumar, AVP – Products and Services, Reliance Jio Platform Limited
- Thomas Salomon, Director of Engineering, Platform, Avast Software Deutschland GmbH
- Felipe Erias Morandeira, SW engineer, Igalia and Chromium contributor
- Tijana Vankovska, CEO, Unblockia
- Stan Malko, CBO, Aloha Browser
- David Li, Product Manager, Google Chrome
- Matthew Hogg, VP of Partnerships, Criteo
- Gertrud Kolb, Chief Technical and Product Officer, eyeo
- Dr. Humera Noor Minhas, Director of Engineering, eyeo
- Cristina Yenyxe Gonzalez Garcia, Director of Engineering, eyeo
- Jens Rösler, Engineering Lead, eyeo
- Mohamed Morsy, Product Manager, eyeo
- Pedro Ribeiro, Product Manager, eyeo
- Alexandra Soldan, Head of Marketing, eyeo
- Durrah Taqiah, Content Marketing Manager, eyeo
- Rean Marie Thomas, Technical Copywriter, eyeo
- Polychronis Pastourmatzis, Senior Creative Designer, eyeo

About eyeo

eyeo is dedicated to empowering a balanced and sustainable online value exchange for users, browsers, advertisers and publishers. By building, monetizing, and distributing ad-filtering technologies, we create solutions that allow all members of the online ecosystem to prosper.

Our ad-filtering technology powers some of the largest ad blockers on the market, like Adblock Plus and AdBlock, and is distributed through **partnerships** to millions of devices.

We are constantly innovating to meet the expectations of the changing online world, with privacy solutions such as **Crumbs** and **Acceptable Ads**, which reaches over 250 million monthly active