CMA MOBILE BROWSERS AND CLOUD GAMING MARKET INVESTIGATION

MOZILLA RESPONSE TO WORKING PAPERS 1 TO 3

July 2024

Introduction

Mozilla has advocated for and contributed to the Mobile Browsers and Cloud Gaming Market Investigation (the "Market Investigation") and the Mobile Ecosystems Market Study (the "MEMS") before that. We commend the CMA for using its market investigation reference powers under the Enterprise Act 2002 to conduct an in-depth assessment of the features which harm competition in mobile browsers.

As previously set out in detail by Mozilla, browsers and browser engines are fundamental to people's online experiences.[1] A competitive and dynamic browser ecosystem is therefore essential; unfortunately, the status quo falls short of this. Browser competition on desktop operating systems, in particular Windows, shows signs of the recurrence of issues previously addressed by antitrust enforcement.[2] Mobile operating systems, on the other hand, have been more restrictive of browser competition from the start. As the CMA concluded in the MEMS:

> "*Apple's and Google's strong positions in mobile browsers and browser engines, enhanced by these barriers to competition, result in Apple and Google having substantial market power in the supply of browsers and browser engines.*
>
> *Absent intervention, Apple and Google are highly likely to retain this market power within their respective ecosystems for the foreseeable future, raising developers' costs and hindering innovation.*"[3]

Against this background, the CMA's scrutiny of mobile browser competition is not only welcome but also necessary to address the lack of competition and choice which UK consumers suffer.

We broadly support the findings of Working Papers 1 to 3, published on 27 June 2024. Through the Market Investigation the CMA has been able to engage with mobile browser competition issues in a high level of detail. It has also commissioned valuable research, including qualitative studies into web developers and users, and quantitative user research. Accordingly, while the

[1] https://research.mozilla.org/browser-competition/5wg/
[2] https://research.mozilla.org/browser-competition/over-the-edge-the-use-of-design-tactics-to-undermine-browser-choice/
[3] Mobile Ecosystems Market Study, Final Report, paragraphs 5.146-5.147

research and data is specific to the UK, we expect that many of the findings of the Market Investigation will also be of use to agencies considering such issues in other jurisdictions.

1. Working Paper 1: Nature of competition in the supply of mobile browsers and browser engines

We broadly agree with the CMA's emerging thinking in Working Paper 1. We have included below key comments on particular areas including vertical integration, indirect network effects and web compatibility, and market definition.

Vertical integration and barriers to entry and expansion

From the provision of devices, through operating systems, browser engines and browsers, Apple and Google are active at all levels of the supply chain. The CMA recognises the importance of this vertical integration for the competitive dynamics of mobile browsers and the control this confers on Apple and Google. It creates both the ability and the incentive to preference their own products, manifesting in various barriers to entry and expansion.

From Mozilla's perspective, the CMA rightly considers the key issues of the WebKit restriction, preferential access to APIs/functionality, in-app browsing and choice architecture (particularly pre-installation and default settings). Our responses to the Working Papers cover these issues in more detail.

Qualitative user research

Mozilla strongly supports the use of in-depth user research to inform policy interventions. Technology companies of all sizes use various forms of user research for their products and services; it is critical that policy and regulatory interventions in digital markets are also based on sound research and understanding of consumer behaviour.

In the context of user awareness of and engagement with mobile browsers, the research report notes that "*When describing what they do most frequently on their phone, browsing was low on the list, if mentioned. Rather, smartphones were associated with emails, social media, photos, other apps*."[4] While we do not dispute this finding, our research experience indicates that responses to questions like, "*What things do you use your phone for, most often?*" are not always reflective of true smartphone browser engagement, since web browsers are often viewed as a utility and may not be top-of-mind for respondents.

We note that the survey screener[5] and interview screener[6] both demonstrate this: many of the activities listed could be completed on a browser. We do not suggest "browsing" should be

[4] Mobile Browsers Qualitative Consumer Research, Findings presented to Mobile Browsers and Cloud Gaming Inquiry Group, page 16
[5] Mobile Browsers Consumer Research 2024, Technical note on Public Voice panel survey 26, page 25
[6] Mobile Browsers Consumer Research 2024, Technical note on Public Voice panel survey 26, page 49

included in these questions, but the fact that browsing does not fit in this question underscores the unique place a browser occupies in the mobile ecosystem.

Finally on awareness of and engagement with browsers, we consider it likely that many years of poor access to alternatives has conditioned user behaviour and expectation in respect of mobile browsers. For example, not having rival browsers on iOS for several years and not being able to change the default browser away from Safari until 2020 is highly likely to have contributed to the impression among people that mobile browsers are a utility.

There are several important findings in the research which are consistent with Mozilla's own understanding of people's difficulty interacting with operating system level default browser settings. For example:

> "*While respondents were typically able to find and download alternative browsers, they often encountered difficulties working out how to change their default browser–with success not always dependent on digital capability*."[7]
>
> "*Experience of changing the default varied significantly between respondents. While some completed it quickly and simply – it was not unusual for respondents to fail the task (even with some help).*"[8]

As set out in more detail in Working Paper 4, friction-laden experiences of changing default browser settings is indicative of the powerful place occupied by pre-installed browsers and the need for easily accessible default settings which respect user choice.

We also note the findings about people's ability to customise their settings: "*Whether users moved the position of apps depended on how organised and digitally confident they were*." This underscores the importance of honouring users' default browser choices by updating the priority placement that pre-installed browsers often occupy.

Indirect network effects and web compatibility

Working Paper 1 correctly considers web compatibility as a barrier to browser competition and the role of indirect network effects in giving an advantage to incumbents, making it difficult for smaller browser engines to compete effectively and for new ones to enter.

We believe that the CMA could go further in seeking to investigate the causes of web compatibility issues and possible solutions. These must be considered holistically alongside the other barriers to browser competition and associated remedies, including the issues of access to features and functionality, the use of choice architecture to undermine user switching, and the WebKit restriction on iOS.

[7] Mobile Browsers Qualitative Consumer Research, Findings presented to Mobile Browsers and Cloud Gaming Inquiry Group, page 10
[8] Mobile Browsers Qualitative Consumer Research, Findings presented to Mobile Browsers and Cloud Gaming Inquiry Group, page 35

Web compatibility issues have a direct consequence on rival browser functionality and consumer usage because when key web services and web pages do not work on a rival browser consumers will switch back to the browsers on which these services do work. This in turn creates powerful lock-in effects for consumers and increases their costs to switch to and stick with rival browsers. In this regard, even motivated consumers will be deterred from switching to alternative solutions if effective interoperability is not guaranteed.

Web compatibility also creates a burden on companies like Mozilla that have to invest financial and human resources into evaluating and minimising, if even possible, the lack of interoperability and ensuing web compatibility breakage. Mozilla has an entire web compatibility team that is dedicated to identifying and attempting to resolve issues with developers. The team relies on community reports from dedicated Firefox consumers, such as through an in-product issue reporter in Firefox, and the webcompat.com website.

Material progress on web compatibility issues could be made through addressing Google and Apple's use of their own web properties and products/services to reinforce the position of their respective browser engines. Where they deploy non-standard features in their own products/services, this impacts: consumers (who may be forced to switch browsers to use certain products/services); rival browser engine vendors (Mozilla is forced to invest resources to ensure compatibility for Gecko and Firefox); and developers (who must decide whether to follow the non-standard implementation of a powerful player).

The CMA is also correct to highlight the role of open web standards in web compatibility; their continued development is vital to maintaining an open and accessible internet. While their voluntary nature means that web standards are a necessary but not sufficient tool to address compatibility issues, it is also important to recognise that this "limitation" is key to their ongoing success.[9] We are therefore wary of contributions to the CMA's Market Investigation which do not reflect this reality and instead seek to use competition arguments to undermine web standards as a whole.

Market definition

Mozilla broadly agrees with the product market definitions put forward by the CMA in Working Paper 1. We highlight below several specific points.

The CMA's emerging finding that "*[b]rowsers and browser engines should be regarded as separate markets, as they are complements from a user's perspective and, while there may be some supply-side substitutability among the two products (more from browser engines to browsers than vice versa), this is overall relatively limited*"[10] is consistent with Mozilla's experience.

[9] https://www.mnot.net/blog/2024/03/13/voluntary
[10] Working paper 1, paragraph 3.68(a)

The significant cost and expertise required to build and maintain a browser engine means that providing Gecko is a huge undertaking for Mozilla. However, doing so enables Mozilla to develop Firefox in a way that reflects our principles[11] and our vision for the Web.[12] As the CMA noted, it means that supply-side substitutability between browsers and browser engines is asymmetric: browser engine developers can (absent OS policies like the WebKit restriction) far more easily develop a mobile browser than a mobile browser vendor can develop and maintain a browser engine.

This dynamic underlines the importance of ensuring that independent browser engines like Gecko are able to compete effectively across desktop and mobile operating systems to avoid further concentration. It is particularly important considering the inherent advantages that the other two major browser engine developers (Apple and Google) have in providing their own powerful operating systems, and the consequent ability to preference their own browsers and browser engines.

The CMA also noted that the supply of mobile browsers on iOS and Android should be considered as two separate product markets. Mozilla agrees with this approach. Notably, the WebKit restriction meant that Firefox was not available on iOS for many years. However, even without such a restriction, different operating systems are likely to have unique requirements which necessitate a degree of platform-specific development.

Mozilla has already noted above and elsewhere[13] the barriers to effective browser competition on desktop operating systems. In respect of product market definition, the CMA's emerging thinking is that desktop and mobile browsers should be considered separate product markets. This is due to limited supply side substitutability and a greater degree of complementarity on the demand side. Mozilla supports the CMA's conclusion and notes that the finding on different use cases is consistent with our own research on the use of desktop and mobile browsers. We would also note that there are important nuances to the finding of complementarity, such as the fact that not everyone has access to more than one device type.

2. Working Paper 2: The requirement for browsers operating on iOS devices to use Apple's WebKit browser engine

Mozilla has previously highlighted the role of browser engines in the web ecosystem and the key restrictions to browser engine competition - particularly the requirement for all browsers on iOS to use WebKit.[14] As noted in Working Paper 2, this restriction delayed the development and release of Firefox on iOS for a number of years and it continues to limit genuine browser choice and competition for iOS users.

[11] https://www.mozilla.org/en-GB/about/manifesto/details/
[12] https://www.mozilla.org/en-US/about/webvision/full/
[13] Mozilla report, Five Walled Gardens, September 2022
[14] Mozilla report, Five Walled Gardens, September 2022

Paragraph 2.7 of Working Paper 2 notes that iPadOS is a recent fork of iOS, that Apple provided a single operating system across iPhones and iPads until 2019 and that the findings therefore apply across both platforms. We would also note that VisionOS (which supports the new Apple Vision Pro product[15]) is subject to the same restriction on third party browser engines.

The CMA correctly identifies that the WebKit restriction on iOS limits the ability of browsers to innovate and improve their browsers - including by bringing their features and innovations on other platforms to iOS users. It also raises costs (both one-time development costs and ongoing maintenance costs) for Apple's rivals - further restricting browser competition. For example, Apple's suggestion that rival browsers can build their features on top of WebKit ignores the fact that this requires an enormous amount of duplication - cost and resource which Apple does not need to bear. Consumers are directly harmed as they are unable to benefit from developments that Mozilla has implemented in Gecko which, the CMA rightly concludes, "*could lead to worse levels of security, privacy, performance, and feature support for browsers on iOS*."[16]

The ability to provide Gecko on different operating systems allows Mozilla to compete on security, privacy, performance and features - and to do so in a way that reflects Mozilla's principles. The WebKit restriction therefore significantly impedes Mozilla's ability to compete on iOS.

In its assessment of Apple's justifications, Mozilla supports the CMA's nuanced approach to assessing the security of different browser engines and comparing across iOS and Android. The security justifications put forward by Apple for the WebKit restriction should be assessed against this background. For example, the CMA notes in Appendix A to Working Paper 2 the limitations of quantitative comparisons across software or devices, including the fact that a higher number of vulnerabilities could reflect more active efforts to find and fix security issues. We would also note that numbers of vulnerabilities could equally reflect different methods of measuring such vulnerabilities, such as whether internal security research is included alongside externally reported bugs.

Appendix A also considers the Interop Project, which is similarly referenced by Apple in its response to the CMA's updated issues statement[17]. In particular, Apple cites Interop 2023 as a measure of the "high pace of development" of WebKit. Mozilla considers that the Interop Project is an important tool for ensuring that the web remains open and accessible through effective interoperability.[18] However, it is not a measure of the pace of development of WebKit or other browser engines. For example, it is limited to a set of focus areas which are agreed by the consent of all browser vendors and therefore reflect areas in which they are committed to making improvements. It also does not include any mobile browser testing and therefore cannot cover mobile-specific features or mobile-specific limitations.

[15] https://developer.apple.com/visionos/
[16] Working Paper 2, paragraph 3.32
[17] Apple's Response to the Updated Issues Statement, 23 February 2024, page 5
[18] https://hacks.mozilla.org/2024/02/announcing-interop-2024/

3. Working Paper 3: Access to browser functionalities within the iOS and Android mobile ecosystems

The CMA's emerging thinking on access to browser functionality concludes that, while there is some self-preferencing by Google on Android, Apple in particular grants Safari preferential access to a number of important functionalities - often without any explanation or justification. Mozilla's experiences support this finding and the conclusion that: "*[a]ny limitation on the ability of rival browsers to add features relative to Safari, whether through a complete lack of access, poor visibility and documentation, time delay or additional costs, may adversely impact third-party browsers' ability to attract users. The cumulative impact of missing several of these features may be significant for rival browsers. This will be particularly important for smaller browsers who need to provide users with strong reasons to switch away from more established browsers like Safari.*"[19]

There are also several important overarching points made by the CMA about the impact of Apple's actions on smaller rival browsers. Mozilla supports these points, including the following:

- At paragraph 3.68, as noted above, the CMA makes the critical point that each of the features can be considered individually, but also that the cumulative impact of this self-preferencing must also be taken into account. Moreover, Mozilla believes that the impact on competition of many features being preferentially available to the operating system browser should be considered alongside choice architecture advantages, including pre-installation and complex default settings. Together, these factors have made it difficult for independent browsers like Firefox to compete on mobile devices, even once third party browsers were permitted on iOS and more recently when they were permitted to be set as default.
- At paragraph 3.64, the CMA finds that features will often be made available in Safari before other browsers on iOS and that this delay can be a significant period of time - even years. While it may be difficult to measure the precise impact of such delay on mobile browser competition, features which were previously withheld and then later made available must also be taken into account in the CMA's assessment of competition and of potential remedies.
- At paragraph 2.9, the CMA notes that while access to functionality may eventually be granted to third party browsers in some cases, access may be made more difficult or can be delayed by Apple and Google. This can include poor or no documentation of APIs. It impacts Mozilla's ability to innovate and improve Firefox, and ultimately to compete with Chrome on Android and Safari on iOS.

Mozilla has engaged with Apple, Google and Microsoft on the preferential access and treatment of Safari, Chrome and Edge respectively for many years. As noted by the CMA, the causes and status of these issues can sometimes be opaque - both for rival developers like Mozilla, but also for observers and regulators. In order to create transparency and to enable others to share their

[19] Working Paper 3, paragraph 3.68

experiences, Mozilla published Platform Tilt[20] in January 2024. Taking a similar approach to our development of standards positions, it serves as an issue tracker - setting out key instances of technical issues on iOS, Android and Windows which disadvantage independent browsers relative to Safari, Chrome and Edge.

Platform Tilt covers a number of iOS issues mentioned in Working Paper 3, including accessibility APIs[21], integration with messages[22], being able to set and check the default browser[23], and browser extension support[24].

The lack of an API to enable users to transfer their browser data (such as history, bookmarked sites, and cookies) is an issue which is relevant to both Android and iOS, despite being available on desktop operating systems.[25] The lack of progress is perhaps not surprising given that such an API would enable users to switch away from the pre-installed default browsers, but it remains an issue which any consideration of mobile browser competition must address.

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[20] https://blog.mozilla.org/netpolicy/2024/01/19/platform-tilt/
[21] https://github.com/mozilla/platform-tilt/issues/4
[22] https://github.com/mozilla/platform-tilt/issues/5
[23] https://github.com/mozilla/platform-tilt/issues/9
[24] https://github.com/mozilla/platform-tilt/issues/15
[25] https://github.com/mozilla/platform-tilt/issues/6; https://github.com/mozilla/platform-tilt/issues/7