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April 2021

Government of Australia
Australian Competition & Consumer Commission
By email to: digitalmonitoring@accc.gov.au

Re: Response of Mozilla to
ACCC Issues Paper on market dynamics and consumer choice screens in search services and web browsers
ACCC Digital Platforms Services Inquiry 2020-2025
September 2021 Interim Report

To the Members of the Digital Platform Branch:

Mozilla welcomes the opportunity to provide our comments to your Issues Paper. As a public benefit organization we play a vital role in keeping the internet open. We appreciate your taking the time to understand the role of browsers to enhance competition online and protect consumers.

Our response addresses the following:
- Mozilla's role to promote a decentralized, open and interoperable internet.
- The necessity of independent browsers and engines to protect consumer privacy, security and freedom to navigate beyond large platforms.
- The need for competition reform to remove challenges in the device ecosystem that inhibit consumers from finding and using their preferred software.

I.   Introduction

The internet should be the ultimate playing field for competition. It has the capability to be a decentralized and interoperable place where any company can advertise itself and offer its services, any developer can write code and collaborate with others to create new technologies, and any consumer can navigate information, use critical online services, connect with others, find entertainment and improve their livelihood. This is all irrelevant without a browser. Like traveling in a vehicle, navigating across websites is both a personal and very public experience; interception, tracking, targeting, cryptomining, and identification are all possible. The browser is a powerful agent in the device ecosystem that can empower consumers to go wherever they want online without restriction, and to do so in a safe, private, and secure way.

The internet crossed one billion users worldwide in 2007. That year also marked the beginning of platform ecosystems that would eventually be referred to as "GAFAM." Google launched Android, Apple released iPhone, Facebook started to scale globally, Amazon released Kindle, and Microsoft continued its popularity on computers through the Windows Operating System.

That same year it was steeped with the infinite possibilities of software to transform society and the realities that software is generally created with corporate incentives, that Mitchell Baker (Chairwoman of the nonprofit Mozilla Foundation) published the 10 principles of the Mozilla Manifesto "for the Internet to continue to benefit the public good as well as commercial aspects of life."[1]

The Mozilla Manifesto

1. The Internet is an integral part of modern life — a key component in education, communication, collaboration, business, entertainment and society as a whole.

2. The Internet is a global public resource that must remain open and accessible.

3. The Internet should enrich the lives of individual human beings.

4. Individuals' security and privacy on the Internet is fundamental and cannot be treated as optional.

5. Individuals must have the ability to shape their own experiences on the Internet.

6. The effectiveness of the Internet as a public resource depends upon interoperability (protocols, data formats, content), innovation and decentralized participation worldwide.

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[1] https://blog.lizardwrangler.com/2007/02/13/

7. Free and open source software promotes the development of the Internet as a public resource.

8. Transparent community-based processes promote participation, accountability, and trust.

9. Commercial involvement in the development of the Internet brings many benefits; a balance between commercial goals and public benefit is critical.

10. Magnifying the public benefit aspects of the Internet is an important goal, worthy of time, attention and commitment.

These principles are at the heart of many tech competition issues being examined today by regulators worldwide. This submission is in response to the ACCC public request for comment on market dynamics related to the device ecosystem. We believe that competition reform is needed to ensure that people are empowered—not controlled—by software they use.

II.   Mozilla, Firefox, & the Open Internet

Mozilla is a unique public benefit organization and open source community formed as a nonprofit foundation in the United States. It is guided by the set of principles shown above that recognize, among other things, that the internet is integral to modern life; the internet must remain open and accessible; security and privacy are fundamental; and that a balance between commercial profit and public benefit is critical.[2]

Our Public Mission & Incentives

Mozilla's story originated in 1997 with Netscape Navigator, the original consumer browser and a popular browser of the 1990s. In a historic move for competition, Netscape publicly released its new browser engine (called "Gecko") under an open source license to enable others to verify, improve, and reuse the source code in their own products. Although Netscape did not last after its acquisition by AOL, its open source browser engine Gecko has continued to shape the internet.

The non-profit Mozilla Foundation was created in 2003 to continue work on open source browser technology and with a larger mission to preserve the open internet. Firefox v1.0 was released in 2004 using Gecko with volunteer open source code contributions from around the world, and it was one of the first major consumer facing products to be built in this way using open source methodology. Today localization developers continue to make Firefox available in

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[2]Mozilla's 10 Principles, https://www.mozilla.org/about/manifesto/.

local languages and with local customizations for their communities to access the internet. Other developers have forked the Firefox codebase and used the Gecko browser engine to create new browsers with different features. The most well known example is Tor, an anonymity browser frequently used by journalists and human rights activists.

In 2005, the Mozilla Foundation created a wholly-owned taxable subsidiary, the Mozilla Corporation, to serve its public mission through open source technology and product development of Firefox. In addition to remaining the sole shareholder of the Corporation, the Foundation advocates for better privacy, trustworthy AI, and digital rights and runs philanthropic programs in support of a more inclusive internet. These programs currently include fellowships and awards that invest in community leaders who are developing technology, policy, education and norms that will ultimately protect and empower people online.

<u>Building the Internet through Open Source Development</u>

Mozilla has spent years building the internet as an open and interoperable platform, especially through our work with Firefox and Gecko. Privacy and security have been fundamental to this work. Mozilla has influenced major companies to adopt better privacy practices such as browser anti-tracking measures and influenced consumers directly with tools to improve digital literacy and better understand third party data collection. It has also sponsored projects to break down barriers for developers. For example, Mozilla previously created an open source mobile operating system and app store premised on HTML5 "web-apps" interoperable with any device rather than the "native app" single device approach. Today Mozilla sponsors crowdsourcing projects for location and speech data for developers to access high quality and free data sets to make products for their local communities.

The incentive for Mozilla's work has always been to level the playing field so that competition can thrive and people can shape their own online experiences.[3] Although GAFAM platforms have contributed many successful innovations to improve the internet, they should not be gatekeepers that reduce it into walled gardens. The internet should be the ultimate universal platform that can grow and thrive with new independent technologies developed by people and companies around the world. This is Mozilla's North Star and we believe it is necessary for effective competition regulation.

Beyond browsers, Mozilla is a home for talented engineers that make the internet more secure, fast, private, and functional in multiple ways. We continue to play a key role in browsers, standards, and open source community initiatives. For example, we have made online commerce

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[3] See Mozilla Principle 5.

and navigation safe through protocols and initiatives like TLS 1.3 and Let's Encrypt.[4] We have created foundational compilers and programming languages like Rust and Web Assembly which are now coordinated by new open source communities for emerging industry applications. We have contributed significantly at global standards bodies to the future of the internet through voice and speech recognition, mixed reality experiences, and royalty free video and audio codecs that make streaming better and more affordable. Mozilla does this despite its small size—less than 1,000 employees worldwide—a fraction of the giant technology companies competing in these spaces.

III.   The Necessity & Ubiquity of Browsers

The browser is the cornerstone of web access and necessary to the open internet. It creates technological compatibility between a device, its operating system, and the web. Browsers have sophisticated capabilities. They can access user browsing history and devices for private information or they can limit data collection; they can be closed platforms or open for third party developers to customize and develop through extensions; they can offer basic or advanced security and privacy features.

<u>Browsers Represent Individuals Online</u>

Browsers are more than a means to an end. The browser is unusual in that it represents the individual person using it. It helps the user visit the sites and services they want to use and it can help protect them while they are there. Navigating across the billions of websites and using online services on a browser is a cornerstone of modern life. Desktop computers are essential to many business and school digital activities, and people often use their browsers heavily for web-based email, video conferencing, document editors and storage. Desktop browsers are also frequently used for shopping, banking, information discovery, and consuming video online. It is worth noting that, globally, most people do not have access to both desktop and mobile devices. By 2025, nearly 75% of the world is expected to access the internet via their smartphone.[5]

Too often the mobile device platform is the opposite of the open web: everything from the operating system, to the app store, to the individual apps listed in the app store and the preinstalled browser are controlled by the same company. This heightens the significance of independent browsers as they are a key means for people to freely move beyond the app based device ecosystem associated with a single platform.

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[4] Mozilla co-founded the Let's Encrypt project to provide free digital certificates that enable site owners to adopt HTTPS encryption. This promotes security and privacy for all internet users. See https://en.wikipedia.org/wiki/Let%27s_Encrypt.

[5] *Nearly three quarters of the world will use just their smartphones to access the internet by 2025*, Lucy Handley on Jan 24 2019 (CNBC). Available at https://www.cnbc.com/2019/01/24/smartphones-72percent-of-people-will-use-only-mobile-for-internet-by-2025 html

Extensive work is invested by independent browsers to acquire and retain every single consumer who has voluntarily chosen to use it over the preinstalled platform browser option. Independent browsers must provide unique experiences that differ from one another and they must constantly improve to offer (at a minimum) comparable browser functionality.

People use a *device* to access the internet, but browsers and browser engines comprise the underlying technology to engage with web content, which is why functionality, navigation efficiency, privacy, security and customization matter significantly. People care deeply about page load speed, multi-tab management, battery life, security, and whether webpages and services work or break. This last factor of webpages not breaking—called web compatibility—is so critical that people will switch to another browser if enough webpages or services don't perform well. Time savings and personalization is another feature of browsers, which can remember browsing history, suggest where to go, and offer to auto-fill routine information like addresses, passwords and credit cards. Privacy and security is another important factor because browsers can take measures to protect consumers as they navigate the web.

Customization is also important. Browser extensions are software developed by third parties to customize a browser. They are crucial to offering a global userbase a browsing experience that fits each person's unique needs. Firefox, Chrome, and Edge share similar extensions platform intended for developers to easily create cross-browser extensions. Many extensions are developed for Chrome first, which is why Mozilla offers specific instructions for developers to make their Chrome extensions compatible with Firefox.[6] Apple does not allow browser extensions on iOS. Popular Firefox Add-ons in Firefox include ad-blockers, password managers, translators, grammar checkers, tab organizers, search tools, and shopping assistants.

People open a browser to access the "web" or the "internet." However, many apps also lead to a browser experience to navigate across webpages, for example, people may click on a hyperlink in the Twitter app to open a news article and continue to surf the web from there. App developers often integrate browser technology within their apps to either keep consumers in a more consistent experience or to track where consumers go (and maybe both). Similarly, clicking on hyperlinks in the Facebook mobile app will open a Facebook browser, clicking on hyperlinks in messages may open the operating system's affiliated browser and performing a 'lookup' after selecting text in iOS opens web search results in Safari. These actions may bring some incremental benefit to the consumer (e.g., a more consistent experience when browsing on Facebook) but there are costs when software is designed without controls for consumers to easily make changes. For example, controls enabling consumers to always switch to an independent browser can mitigate online tracking.

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[6] *Porting a Google Chrome extension, Extension Workshop by Mozilla Firefox* (Last Updated: May 19, 2019). Available at https://extensionworkshop.com/documentation/develop/porting-a-google-chrome-extension/

<u>Search & Browser Integration</u>

Netscape discovered in the 1990s that navigating to web pages is a better experience when search is integrated into the browser. Not only did this value proposition create a monetizable market opportunity between independent browsers and search providers, it eventually became a sustainable business model for independent browsers. Search integrations are the primary revenue source for many independent browsers, including Firefox. These integrations include which search provider is set as the default, as well as secondary and alternative search offerings across languages and locations. The default placement drives the vast majority of funding necessary to cover browser operations, product development, and investments into new features and technologies. As choice and control are core values to Mozilla's mission, consumers have always had multiple and easy ways to access and change their search options.

The business model for independent browsers to support themselves economically is different from digital platforms that can fund their browsers through other business lines. For example, Apple can support its Safari browser with revenues earned from sales of Apple products, and commissions from the App Store, in addition to its Safari search revenue. The browser-search market opportunity created by independent browsers is also quite distinct from platforms that own both of these affiliated products; after all, Chrome is captive to its own Google search engine and IE/Edge is captive to its own Bing search engine.

<u>Browser Engines & Service Dependencies</u>

A "browser engine" is the core software component of a web browser; it transforms the myriad content hosted on millions of web servers into a standard visual representation that people can interact with using their browser. Webpages are built by developers around the world using code that represents their structure and style. The browser engine must interpret this code as fast as possible, optimizing for bandwidth, battery and other open tabs. This is complex technology, which is why a diversity of browser engines with different perspectives and incentives is valuable to shaping the internet.

Five Primary Browser Engines in 2011

Browser Engine	Products used in	Developer
Trident	Internet Explorer, Edge	Microsoft
Gecko	Firefox, Tor, Cliqz,[7] Comodo, other forks.	Mozilla
Presto	Opera	Opera

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[7] Cliqz exited the browser market in 2020. See https://cliqz.com/en/magazine/farewell-from-cliqz.

KHTML	Open source products	KDE community
WebKit (forked[8] from KHTML)	Safari, Chrome	Apple

There are only 3 browser engines left today. Opera stopped supporting its browser engine in 2008 and Microsoft followed suit in 2019. Because WebKit is primarily used on Apple devices, this means that today Mozilla's Gecko browser engine is the only cross-platform browser engine alternative to Google's Blink/Chromium browser engine.

Three Primary Browser Engines in 2020

Browser Engine	Products used in	Developer
Gecko	Firefox, Tor, Cliqz, Comodo, other forks.	Mozilla
WebKit (forked from KHTML)	Safari, all browsers listed on iOS App Store	Apple
Blink/Chromium (forked from Webkit)	Chrome, Edge, Opera, Vivaldi, Brave, Amazon Silk, Facebook Oculus, UC Browser, Naver Whale, QQ Browser, Baidu Browser, etc.	Google

This matters because browser engine diversity is qualitatively different from browser product variety. Just as search products created by third party companies are limited by the power of what Microsoft and Google do with their underlying search engines, there is a limit to what browser products can substantively do beyond the underlying browser engines offered by Google and Apple when those companies do not accept requests to modify codebases and do not offer private APIs and technologies that are necessary to improve and innovate browser functionality.

As an analogy, consider if all cars used the same chassis. You might have multiple brands of cars with different features but they would all be essentially the same under the hood. This would be insufficient to serve a variety of needs, concerns, and wishes. The same applies to browser products: on iOS all browsers are very similar because Apple requires the use of WebKit. On all other platforms, the majority of browsers are very similar because they all use Google's Blink/Chromium. This gives enormous power to Google and Apple to determine the capabilities of browsers and the web; and this can negatively impact consumers. Mozilla plays a key role to influence Apple and Google both through internet standards and browser features, made possible because Mozilla is independent and can innovate and implement changes into its Gecko browser without restriction.

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[8] When a company or developer starts from an open source project and creates their own version that is developed independently, this is known as a "fork" of the original project.

Platforms, Browser Products & Browser Engines

Platforms & Affiliated Browsers using Blink/Chromium		Examples of Independent Browsers using Blink/Chromium	Examples of Independent Browsers using Gecko
Cross-Platform	- Google (Chrome) - Microsoft (IE/Edge)	- Brave - Naver Whale - Opera - UC Browser - Vivaldi	- Firefox - Tor
Platform Specific	- Amazon (Silk) on Kindle devices - Facebook (Oculus browser) on Oculus devices		

As shown above all digital platform companies develop affiliated operating systems, devices, and browser products. Google and Microsoft promote and distribute cross-platform browsers beyond their own platforms. Apple, Facebook, and Amazon only promote and distribute their browsers on their own devices. Independent browser developers like Mozilla compete on all of these platforms and against each of these platform developers' affiliated browsers.

In addition to developing the underlying operating systems, devices, and browsers, Apple, Google and Microsoft also develop critical services that browsers are highly dependent on and heavily impacted by if consumers have inconsistent experiences across different browsers. These are further explained below.

DRM/CDM - This stands for digital rights management / content decryption module. It is necessary for browsers to include so consumers can stream online video content such as Netflix, Amazon Prime, Hulu, and Disney. Of the 3 DRM/CDM options in-market today only Google's Widevine service is compatible across multiple platforms (equivalent services by Microsoft and Apple only work on their own platforms) and Mozilla utilizes this for Firefox. Without DRM/CDM service equality across browsers and devices, consumers will have a lower quality video streaming experience on certain browsers and may be excluded from certain services completely.

Enterprise Services - Microsoft and Google both offer prominent business services used by schools, governments, and organizations such as: Microsoft Office (Word, Excel, Powerpoint, Outlook), Azure cloud services (AI, storage, analytics, security, etc.), G-Suite (Google Docs, Drive, GMail), and Google Cloud Platform (AI, storage, analytics, security, etc.). Apple also offers services focused on enterprises. Without enterprise service equality across browsers business users will have broken and inconsistent experiences on certain browsers.

Consumer Services - Microsoft and Google both offer prominent consumer services such as: Skype and Google Hangouts (video conferencing), Microsoft Office (Word, Excel, Powerpoint,

Outlook), G-Suite (Google Docs, Drive, GMail), YouTube, Google Maps, and Google Earth. Without consumer service equality across browsers consumers will have broken and inconsistent experiences on certain browsers.

<u>Platform Challenges to Browser Use</u>

A browser is complex and expensive software to develop. Maintaining a browser engine and additionally building a browser on top of another browser engine is a major cost. Dealing with service inequality issues that stem from interoperability failure or platforms preferencing their affiliated browsers is another significant cost that could otherwise be spent on innovation.

For example, Apple and Microsoft require their respective browser engines to be used in any browser product listed in their app stores. However, rebuilding a browser for a separate browser engine is a significant technical challenge that requires financial and human capital. This increases development costs and can prevent or delay market entry.

For example, as of April 2021, Mozilla has no listing in the Microsoft App Store because development on Microsoft's browser engine (which is currently Google's Blink/Chromium) is impractical when the value of Firefox is in its unique Gecko browser engine. This impedes download and use of Firefox on Windows because it is not considered a "verified app" by Microsoft.
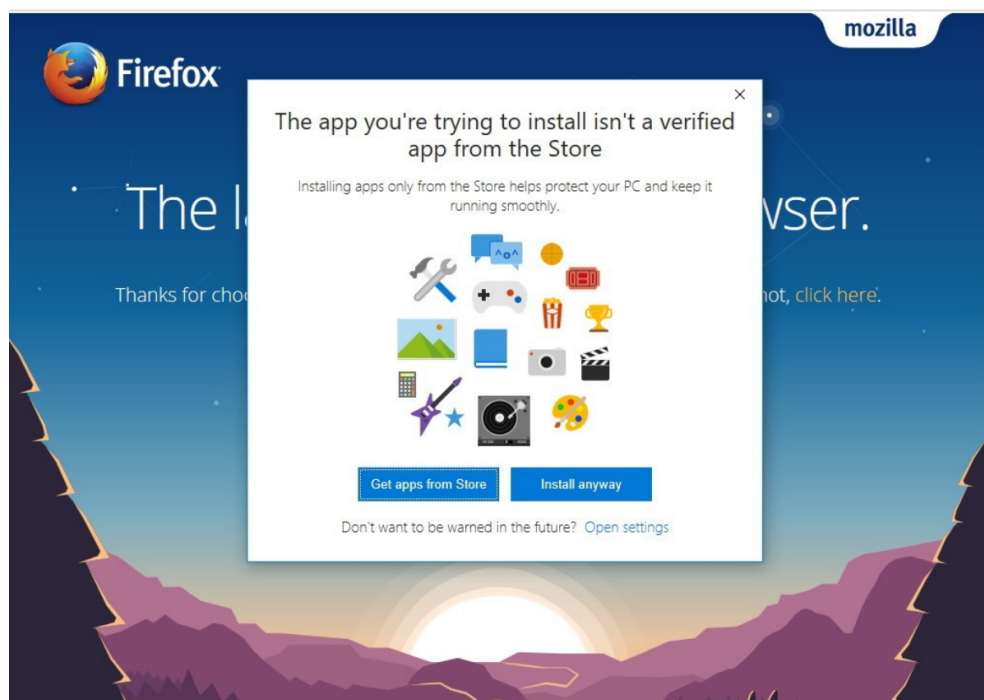
When the Apple App Store was opened to third parties in 2013, Mozilla did not list Firefox for two years because the App Store requires apps to use Apple's WebKit browser engine. Ultimately, Mozilla decided to invest the capital to develop a version of Firefox based on Webkit because many consumers wanted to use Firefox on their iPhones. However, this was a decision driven solely by platform restrictions; we hope that Microsoft changes its Microsoft Store Policy to enable consumers on Windows to get the best of Firefox on Gecko.

Meanwhile, Apple's control over WebKit inhibits Mozilla (and other browser developers) from improving iOS browsers. For example, Apple uses many critical WebKit APIs to offer features in Safari but does not offer these to other browsers developers. This has consequences as shown below.

- Many browsers, including Firefox and Chrome, use Google's Safebrowsing service to detect websites with malware. On iOS, only Safari can offer this because the necessary WebKit APIs are private to Apple.
- All browsers historically supported "Do Not Track" (used by consumers to signal their intent to opt-out of website tracking). In 2016, Apple removed the functionality needed by browser developers to offer DNT on iOS although Safari continued to offer this. Although DNT has since been deprecated, for a period of time it was considered an important control for consumers to signal their privacy intentions to third parties.
- Prior to 2016, other browsers were able to offer features around data saving, cookie settings, multi-profiles, enterprise support and auto-detection encoding, many of which are necessary for privacy functionality.[9] In 2016, Apple made changes that broke existing functionality and impeded new feature development, and has not engaged with bug requests from different browser developers seeking to return these APIs.[10]
- Apple Safari offers Intelligent Tracking Protection (also known as "ITP") which is a framework to limit cross-site tracking by websites. Although Mozilla offers a similar framework on Firefox Gecko browsers it cannot duplicate this on iOS because of Apple's API restrictions. Apple does not offer the ITP framework to other browsers.
- Apple also forbids third-party applications to use "Process Separation," which is a critical operating system feature that is needed for browser developers. Safari makes use of this feature, which, in turn, results in higher stability, quality, and security. This has been explicitly disabled for other applications.

Issues of web compatibility are another major challenge for browser developers. The messages below were shown when attempting to use Microsoft's Skype service on the Opera browser or Apple's business services on the Firefox browser.

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[9] *Google Chrome for iOS loses 'Do Not Track' feature*, Julian Chokkattu on 29 Jan 2016 (Digital Trends). Available at: https://www.digitaltrends.com/mobile/chrome-do-not-track-ios/.

[10] Bug reports available at https://bugs.webkit.org/show_bug.cgi?id=138169 and https://bugs.webkit.org/show_bug.cgi?id=140571.
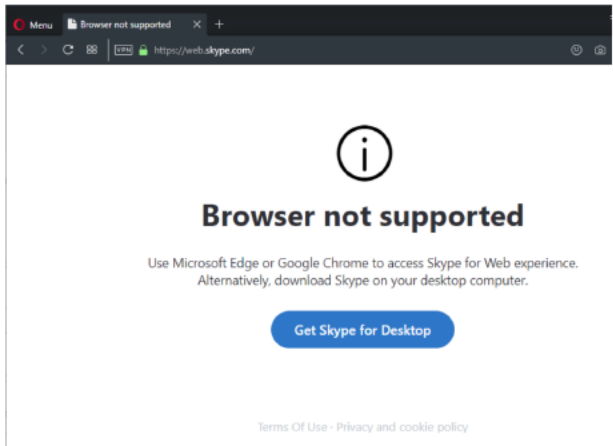
Although most browsers are considered "free" products; there are many non-financial costs associated with acquiring an independent browser. This includes the *time* it takes for a consumer to discover and install a new browser. It can potentially include *lost data* for consumers who can't port their bookmarks, passwords, browsing history and other preferences. The most substantial costs are the *obstacles, annoyances, and overrides* that consumers face from platforms preferencing their own browsers across their affiliated services.

Examples of messages from major platforms:
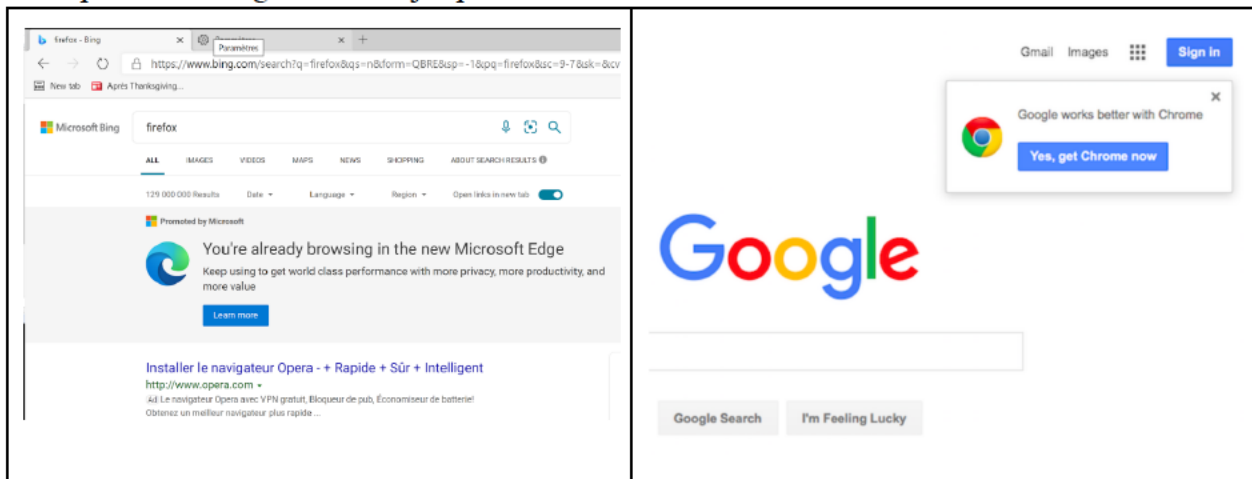
Platform messages can be confusing and lead consumers away from their preferred browser.

Microsoft has also replaced preferred browser settings with Edge. For example, when upgrading from Windows 7 to Windows 10, most people select "Use Express settings." This does not clearly say that it will replace the consumer's preferred browser with Edge.
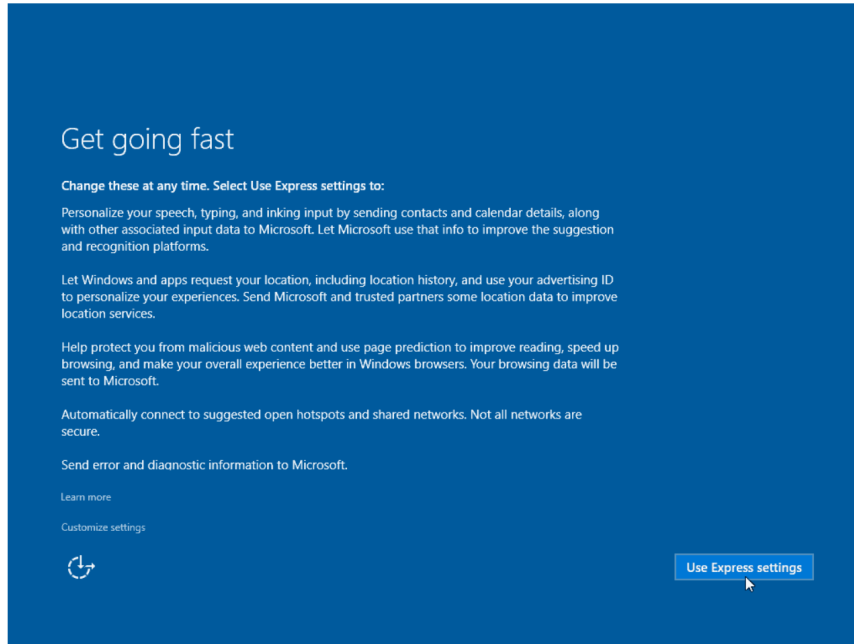
Platform controls, interoperability failures, and consumer friction funnel consumers away from the open web. This isn't the vision of the open internet as a universal platform that anyone can participate in from any browser on any device.

IV. Recommendations to Empower Consumers & Protect the Open Web

Reform is needed to enable independent browsers. Platforms can control the open internet through their control over the integrated nature of the device ecosystem: operating systems, applications on the operating system, and applications in the App Store. This underlying integrated device structure, particularly when fused by an affiliated platform browser, limits the ability of consumers on Windows, Android or iOS to shape their own online experience.

Millions of consumers are already expressing a choice everyday for an independent browser. We encourage competition agencies to remove existing challenges that inhibit browser use.

<u>Principles to Advance Consumer Choice and Competition</u>

Mozilla believes that major platforms should be under an on-going duty to:

Stop practices that distort competition on the merits and inhibit consumer choice, such as:
- Interfering with consumer selection of alternative browsers and use of those browsers to access the internet from links and queries on their devices; and
- Dictating or controlling browser components, such as browser engines, which prevent consumers from accessing and using their preferred browser across all operating systems and devices.

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Start practices that would enhance competition on the merits and empower consumer choice, such as:

- Developing products and services on a nondiscriminatory basis (such as promoting interoperability, web compatibility, and service parity and avoiding self-preferencing)
- Addressing and testing relevant interoperability and web compatibility concerns on a timely basis
- Complying with open standards and offering timely and relevant critical interfaces, APIs, and documentation for product interoperability and web compatibility
- Offering accessible controls for consumers to open and use their preferred browsers and permanently dismiss affiliated-browser marketing

Put another way, consumers must have easy and timely control to:

- uninstall the operating system's affiliated browser
- discover, download and set another browser to default
- port existing browser preferences to the new browser
- pin their preferred browser to the task bar or home screen
- change apps to open webpages in their preferred browsers
- permanently dismiss messages through the operating system and affiliated channels
- keep their preferred browser default and not have this overridden by the operating system's affiliated browser
- engage with video, consumer and enterprise services with equal performance expectations across browsers

Major platforms still stand to benefit from these recommendations, but so do consumers and independent browsers. That should be the ultimate goal of a fair and level playing field.

<u>Choice Screens Alone are not Enough</u>

Browsers are a necessary means for consumers to access and navigate the open internet unrestricted from app developers and the device operating system, which have motivation to control their online movement. Browser product diversity is important to maintaining a balanced internet ecosystem and so is browser engine diversity. This is especially true given that there are only two cross-platform browser engines today: Mozilla's Gecko and Google's Blink/Chromium.

However, Mozilla's experience of the Android Browser Choice Screen implemented in the EU during the Spring of 2019 was that it did not change the status quo. As described in this submission, choosing another browser is of limited benefit if that browser cannot be fully utilized because of platform interoperability failures and platform induced consumer friction.

<u>Transparency & Market Participation</u>

For choice screens to be effective tools, we urge careful consideration to the timing, design, level of oversight and assessment in partnership with oversight bodies, browser developers, and others. This includes knowing relevant details on timing to give consumers advance notice and support with public communications. It would also be helpful to invite public opinion, for example from scholars, consumer advocates, and researchers, to offer insights that can improve the consumer experience and intended impact to competition. For example, ethical design theorists can help ensure the resulting choice screen does not have dark design patterns that can strongly influence behavior in one direction and instead present options that are equal in parallel, with consideration to cognitive load, and add to meaningful choice with additional information.[11]

We think this would be best run by the ACCC as a **market test** with sufficient attribution metrics available to browser developers to understand the impact of the choice screen on installation and retention. We also believe a **public report** with transparent metrics should be made available. And that this should include **progress** on removing operating system controls over independent browsers, improving web interoperability on dominant platform services, and prohibiting platform induced consumer friction.

Conclusion

As a public benefit organization Mozilla's role is to steward a decentralized, open and interoperable internet. Independent browsers and browser engines can protect consumer privacy, security and freedom to navigate beyond large platforms. We appreciate the ACCC's work to address the problems in the digital marketplace with competition reform. We remain at your disposal should you have any further questions.

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[11] Dark Patterns (by Harry Brignull), *available at* https://www.darkpatterns.org/.