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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

LUISA BAKAY, ELISA JONES, and LETICIA SHAW, individually and on behalf of all others similarly situated,

Plaintiffs,

v.

APPLE INC., a Delaware corporation.

Defendant.

Case No. 24-cv-00476

CLASS ACTION COMPLAINT

DEMAND FOR JURY TRIAL

TABLE OF CONTENTS

INTRODUCTION 1

PARTIES 4

I. PLAINTIFFS 4

II. DEFENDANT 5

JURISDICTION AND VENUE 8

DIVISIONAL ASSIGNMENT 8

FACTS 9

I. THE SMARTPHONE DUOPOLY 9

A. The Advent of the Smartphone 9

B. The App Store 11

C. Google Launches Android and the Google Play Store 12

D. Apple and Google Lock into a Duopoly 17

II. THE MOBILE ECOSYSTEM BARRIER TO ENTRY PROTECTING THE APPLE-GOOGLE DUOPOLY 19

A. The App and Platform Critical Mass 19

B. Disparate Development Environments 20

C. HTML 5 and the Rise of Progressive Web Apps 22

D. Blocking the Browser Back Door 22

E. Microsoft Runs into the Powerful Mobile Ecosystem Barrier to Entry and Fails to Enter the Smartphone and Smartphone Operating System Markets 25

III. APPLE AND GOOGLE EXPRESSLY AGREE TO MAINTAIN AND STRENGTHEN THE MOBILE ECOSYSTEM BARRIER TO ENTRY PROTECTING THEIR DUOPOLY 28

A. Apple's WebKit Engine, the WebKit Rule, and the Stranglehold over iPhone Apps 28

B. Google's Blink Engine and the Dominance of Google Chrome on Android 29

C. A Cross-Platform Threat: Mozilla's Open-Source Gecko Browser Engine 31

D. Google, which Makes the Web Browser with the Highest Market Share, Agrees with Apple to use only WebKit on iPhones, Even in its Chrome Browser App 35

E. Google's Agreement with Apple to Use Only WebKit on iPhones Strengthens the MEBE and Prevents an Entrant from Garnering a Critical Mass of Cross-Platform Apps 38

F. The Apple-Google WebKit Agreement Makes No Sense But for Its Anticompetitive Effect 40

1. Apple's WebKit Agreements Make iPhones Less Secure and Prevent Users and Developers from Opting Out 40
2. Google's Elimination on iOS of Its Hard-won Product Differentiation Is Irrational But for Its Anticompetitive Effect 44
IV. THE RELEVANT MARKETS 45
A. The United States Smartphone Market 45
1. Distinct Submarket 46
2. Market Participants and Market Concentration 55
3. The Relevant Geographic Market 56
4. Barriers to Entry 57
B. The United States Smartphone Operating System Market 59
1. Distinct Submarket 60
2. Market Participants and Market Concentration 70
3. The Relevant Geographic Market 71
4. Barriers to Entry 71
V. HARM TO COMPETITION 73
A. Harm to Competition in the U.S. Smartphone Market 73
B. Harm to Competition in the U.S. Smartphone OS Market 75
CLASS ACTION ALLEGATIONS 77
CLAIMS FOR RELIEF 81
PRAYER FOR RELIEF 91
JURY DEMAND 92

INTRODUCTION

1. Defendant Apple Inc. ("Apple") makes and sells the iPhone—the most common smartphone in the United States—along with the iOS operating system that powers it. The iPhone and its iOS operating system are proprietary, and part of a closed ecosystem of apps and services for which Apple, through its App Store, is the sole gatekeeper.

2. In 2023, Apple had a 55% market share of all smartphones sold in the United States. Nearly every other smartphone in the United States is tied to another closed ecosystem—Google's. Google, the maker of Android, uses its Play Store to exercise significant control over the apps and services that can be, and are, provided on Android-based smartphones, which comprise nearly all non-Apple smartphones sold in the United States.

3. For years, Apple and its smartphone counterpart Google have been protected from meaningful competition by their large ecosystem of apps, developers, and users. To meaningfully compete with Apple or Google, a newcomer would have to develop not just a smartphone but a smartphone operating system, then convince developers to build apps for it, and then convince users to switch to the new smartphone platform.

4. This has historically kept out even the most well-resourced competitors, and the U.S. smartphone market settled into a steady iOS-Android duopoly in 2014. There are powerful network effects favoring the two incumbents—users only want to use smartphones with a critical mass of third-party apps, and app developers will only invest in a new smartphone platform if there are sufficient users on the platform to justify the cost—and Apple and Google have supercharged them by designing bespoke, proprietary languages and development tools for iOS and Android, creating large populations of purpose-trained mobile developers with specialized experience in iOS or Android development.

5. These network effects—and the carefully-planned business strategies of Apple and Google—have helped create a powerful barrier to entry, the Mobile Ecosystem Barrier to Entry ("MEBE"), protecting the longstanding Apple-Google duopoly. Companies as powerful and well-resourced as Microsoft have impaled themselves upon it, failing to take even a small fraction of market

share from iPhone and and the smartphones running Google's Android operating system despite a multi-year attempt at a Windows Phone.

6. At the heart of the MEBE and Apple's supracompetitive profits is a simple (and longstanding) fact: every app that runs on the iPhone must be approved by Apple and deployed through Apple's App Store. The only way onto the iPhone and iOS is through Apple.

7. There is, however, another ***potential*** way onto iPhones—through the engine that powers the smartphone's web browser. Apple's Safari browser relies on such an engine to process and render web pages and execute code that runs through the browser and even in native third-party apps. Every browser comes equipped with a browser engine that performs the same function. At the close of the 2010s, this threat vector to the MEBE and to the United States smartphone duopoly came of age.

8. By 2019, apps that ran on browser engines and in web browsers had become incredibly powerful—in many cases indistinguishable in look, feel, and function from native apps distributed through Apple's App Store. These apps, called Progressive Web Apps ("PWAs"), posed not only a threat to Apple's uncontestable hegemony over apps running on its iPhones, but also to its large share of the smartphone and smartphone operating system ("OS") markets in the United States.

9. A modern browser engine is, for all intents and purposes, a potential app store in itself—and a cross-platform one at that. The PWAs that can run on the leading browser engines—engines like Google's Blink, which forms the heart of Chrome, and Mozilla's Gecko, which underpins Firefox—raise the promise of code-once, run-anywhere PWAs that would allow developers to write one full-featured web app, and then deploy it across every major platform, both desktop and mobile.

10. This was the reality that Apple—and Google—faced at the end of the last decade. With the rise of PWAs, a third-party browser engine could mean the end of the Apple App Store and the Google Play Store as single points of entry to the entirety of the country's smartphones.

11. To prevent the emergence of this cross-platform threat, Apple has entered into a series of agreements with browser makers, particularly those who have developed major cross-platform browser engines. By agreement with Apple, none will deploy their browser engines on iPhone. Instead, every web browser on iOS and every iOS app relying on a browser engine must, by agreement, use Apple's browser

engine, called WebKit. Companies that have developed advanced, full-featured browser engines that could serve as cross-platform launching pads for PWAs across both major mobile ecosystems have agreed with Apple not to do so on iPhone.

12. Notably, Apple made such an agreement with its direct, horizontal competitor in both the smartphone and smartphone OS markets, Google.

13. Google, which has the dominant web browser in the United States, Chrome, uses its own browser engine Blink on every platform except iOS. By agreement with Apple, on iOS Google has continuously released its apps and its Chrome web browser with Apple's WebKit instead of Blink, the browser engine behind Chrome. This has prevented Chrome, the world's number one web browser, from serving as a cross-platform launching pad for PWAs on smartphones.

14. Apple, for its part, entered into agreements with every other browser maker, including Microsoft and Firefox, to forgo their own browser engines and use only WebKit on iOS. The result is that every browser on iOS, no matter how branded, is in fact just Apple's Safari browser, reskinned—and every iOS app that uses browser engine functionality exclusively uses Apple's WebKit too.

15. Apple's agreements with browser developers, including browser market-leading Google, do not just protect Apple and iPhone; they also protect Google and the Android smartphones that Google monetizes. By ensuring that developers who seek to write once and deploy on a cross-platform browser engine are excluded from 136 million U.S. smartphones, Apple's agreements restricting browser engine functionality on iOS ensure that no true cross-platform browser engine can exist in the United States. This insulates both Apple and Google from smartphone competition, and it ensures that the companies' respective smartphone ecosystems remain distinct, walled, and fragmented.

16. By agreeing not to deploy a cross-platform browser engine on iOS, Apple and Google have strengthened the MEBE, preventing new entry into the smartphone market, protecting the Apple-Google duopoly in the smartphone OS market, and allowing Apple and Google to maintain a near 100% monopoly over smartphone OSes.

17. Because of Apple's agreements, including with its direct, horizontal competitor Google, Apple has been able to charge supracompetitive prices for its iPhones. No smartphone can enter the

market in the United States without either licensing Android from Apple's co-conspirator Google or creating its own smartphone OS from scratch. As such, there has been no successful entry by any smartphone platform to challenge the Apple and Google ecosystems—and there has been no check on the prices Apple charges iPhone customers.

18. Apple's agreements violate Section 1 of the Sherman Antitrust Act, including because of Apple's *per se* unlawful agreement with Google to divide markets. Moreover, Apple and Google have directly conspired to monopolize the market for smartphone operating systems under Section 2 of the Sherman Act.

19. Plaintiffs are purchasers of Apple's iPhones who paid supracompetitive prices as a result of Apple's anticompetitive agreements. They seek to recover for the overcharge caused by Apple's agreements, and also seek injunctive relief to prevent Apple from continuing to restrain, distort, and overtly harm competition.

PARTIES

I. PLAINTIFFS

20. Plaintiff Luisa Bakay is a domiciled resident of La Jolla, California. Ms. Bakay purchased an iPhone 12 Pro for $1,299.00 on November 15, 2020. Ms. Bakay purchased an iPhone 13 Pro Max for $1,599.00 on November 2, 2021. Ms. Bakay purchased an iPhone 14 Pro for $1,399.00 on September 28, 2022. Ms. Bakay made each of her purchases directly from Apple online via Apple.com.

21. Plaintiff Elisa Jones is a domiciled resident of Zion, Illinois. Ms. Jones purchased an iPhone 12 for $629.00 on May 24, 2023. Ms. Jones made her purchase directly from Apple online via Apple.com.

22. Plaintiff Leticia Shaw is a domiciled resident of Los Angeles, California. Ms. Shaw purchased an iPhone 12 for $799.00 Apple on June 9, 2021. Ms. Shaw purchased an iPhone 14 for $829.00 on December 8, 2022. Ms. Shaw made both of her purchases directly from Apple at the Apple Store in Santa Monica, California.

23. Plaintiffs paid prices for their iPhones that are higher than they would be absent Apple's anticompetitive conduct described in this Complaint. Plaintiffs suffer other ongoing injuries from Apple's

anticompetitive conduct described in this Complaint, including diminished product quality and reduced consumer choice in the United States Smartphone Market and the United States Smartphone OS Market—markets in which Plaintiffs are active consumers.

24. Apple's anticompetitive conduct remains in place and, absent an injunction, will continue to harm competition in the Smartphone Market and Smartphone OS Market by directly increasing prices; preventing price competition; strengthening the MEBE; and reducing consumer choice.

II. DEFENDANT

25. Defendant Apple Inc. ("Apple") designs and manufactures a variety of consumer products, including smartphones, personal computers, tablets, and wearables.

26. Apple is headquartered in Cupertino, California, at One Apple Park Way.

27. According to its 2023 Annual Report, Apple currently sells several models of its smartphone product, the iPhone, all of which run Apple's iOS operating system:

> iPhone is the Company's line of smartphones based on its iOS operating system. The iPhone line includes iPhone 15 Pro, iPhone 15, iPhone 14, iPhone 13, and iPhone SE.

28. Apple also runs several service-based lines of business, namely advertising, AppleCare (Apple's warranty and repair service for its retail products), cloud services, digital content, and payment services.

29. Apple's digital content line of business is operated through its Apple App Store. As Apple explains in its 2023 Annual Report:

> The Company operates various platforms, including the App Store, that allow customers to discover and download applications and digital content, such as books, music, video, games and podcasts.
>
> The Company also offers digital content through subscription-based services, including Apple Arcade, a game subscription service; Apple Fitness+, a personalized fitness service; Apple Music, which offers users a curated listening experience with on-demand radio stations; Apple News+, a subscription news and magazine service; and Apple TV+, which offers exclusive original content and live sports.

30. Apple's smartphone and smartphone operating system business relies on attracting third-party developers to develop apps for its iOS platform. In other words, Apple's ability to sell its iPhones and iOS operating system relies heavily on the availability of apps developed by third-party developers and on attracting third-party developers to continue developing apps. Because third-party developers are attracted to platforms with significant user bases and opportunities for revenue, a feedback loop emerges. As Apple explains in its 2023 Annual Report:

> ***The Company's future performance depends in part on support from third-party software developers***.
>
> The Company believes decisions by customers to purchase its hardware products depend in part on the availability of third-party software applications and services. There can be no assurance third-party developers will continue to develop and maintain software applications and services for the Company's products. If third-party software applications and services cease to be developed and maintained for the Company's products, customer may choose not to buy the Company's products.
>
> The Company believes the availability of third-party software applications and services for its products depends in part on the developers' perception and analysis of the relative benefits of developing, maintaining and upgrading such software and services for the Company's products compared to competitors' platforms, such as Android for smartphones and tablets, Windows for personal computers and tablets, and PlayStation, Nintendo and Xbox for gaming platforms. This analysis may be based on factors such as the market position of the Company and its products, the anticipated revenue that may be generated, expected future growth of product sales, and costs of developing such applications and services.
>
> The Company's minority market share in the global smartphone, personal computer and tablet markets can make developers less inclined to develop or upgrade software for the Company's products and more inclined to devote their resources to developing and upgrading software for competitors' products with larger market share. When developers focus their efforts on these competing platforms, the availability and quality of applications for the Company's devices can suffer.
>
> The Company relies on the continued availability and development of compelling and innovative software applications for its products. The Company's products and operating systems are subject to rapid technological change, and when third-party developers are unable to or choose not to keep up with this pace of change, their applications can fail to take advantage of these changes to deliver improved customer

> experiences, can operate incorrectly, and can result in dissatisfied customers and lower customer demand for the Company's products.

31. Apple sells third-party software through its App Store and charges developers a percentage of the sales of apps, in-app purchases, and subscriptions sold through the App Store.

32. Apple warns its investors that its App Store business model is subject to regulatory scrutiny and litigation. As Apple explains in its 2023 Annual Report:

> The Company distributes third-party applications for its products through the App Store. For the vast majority of applications, developers keep all of the revenue they generate on the App Store. The Company retains a commission from sales of applications and sales of digital services or goods initiated within an application. From time to time, the Company has made changes to its App Store, including actions taken in response to competition, market conditions and legal and regulatory requirements. The Company expects to make further business changes in the future, including as a result of legislative initiatives impacting the App Store, such as the European Union ("EU") Digital Markets Act, which the Company is required to comply with by March 2024. The Company is also subject to litigation and investigations relating to the App Store, which have resulted in changes to the Company's business practices, and may in the future result in further changes. Changes have included how developers communicate with consumers outside the App Store regarding alternative purchasing mechanisms. Future changes could also affect what the Company charges developers for access to its platforms, how it manages distribution of apps outside of the App Store, and how and to what extent it allows developers to communicate with consumers inside the App Store regarding alternative purchasing mechanisms. This could reduce the volume of sales, and the commission that the Company earns on those sales, would decrease. If the rate of the commission that the Company retains on such sales is reduced, or if it is otherwise narrowed in scope or eliminated, the Company's business, results of operations and financial condition could be materially adversely affected.

33. Apple's iPhone is its largest product segment. Apple's net iPhone sales were $200.583 billion in 2023, $205.489 billion in 2022, and $191.973 billion in 2021.

34. Apple's consumer products provide it with high gross margins, approximately 36.5% in 2023, 36.3% in 2022 and 35.3% in 2021. The gross margin on its services business segments is approximately double that—70.8% in 2023, 71.7% in 2022, and 41.8% in 2021.

35. The company's net income was $96.995 billion for its 2023 fiscal year, $99.803 billion for 2022, and $94.680 billion in 2021.

JURISDICTION AND VENUE

36. This action arises under Sections 1 and 2 of the Sherman Act, and Section 4 and 16 of the Clayton Act (15 U.S.C. §§ 12, 15, 26). Plaintiffs and the proposed class seek to recover treble damages, interest, costs of suit, equitable and injunctive relief, and reasonable attorneys' fees for their injuries resulting from Apple's anticompetitive conduct.

37. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 (federal question), 1332 (class action diversity jurisdiction), and 1337(a)(antitrust); and under 15 U.S.C. § 15 (antitrust).

38. Venue is appropriate in this district under 15 U.S.C. § 15(a) (Clayton Act), 15 U.S.C. § 22 (nationwide venue for antitrust matters), and 28 U.S.C. § 1391(b) (general venue provision). Apple transacts business within the district, and it transacts its affairs and carries out interstate trade and commerce, in substantial part, in this district.

39. The Court has general personal jurisdiction over Apple because it is headquartered in California.

DIVISIONAL ASSIGNMENT

40. This is an antitrust class action for which "venue is proper in any courthouse in this District" under Gen. Order No. 44 § D.3 and Civil Local Rule 3-2(c).

FACTS

I. THE SMARTPHONE DUOPOLY

A. The Advent of the Smartphone

41. On January 9, 2007, Apple's late founder and CEO, Steve Jobs, took the stage at the 2007 MacWorld Expo and introduced the first modern smartphone, the iPhone.

42. The iPhone, which was released on June 29, 2007, sold for $499 and came with 4GB of storage. The device was like nothing else being sold at the time. Nokia dominated the global cellular telephone market in 2007, and devices made by Blackberry and Palm provided inelegant access to email over mobile networks. None of the devices at the time provided the ability to run third-party applications that materially augmented the function of the phone.

43. The original iPhone came with 15 apps: Calendar, Camera, Clock, Contacts, iPod, Maps (provided by Google), Messages, Notes, Phone, Photos, Safari, Stocks, Voice Memos, Weather, and Settings. The iPhone integrated the functionality of what used to be several devices (including a cellphone, a portable digital media player such as Apple's iPod, a PDA, and a digital camera), and unlike then-existing mobile devices, Apple's iPhone provided the functionality in a single, polished package.

44. The iPhone also changed the way in which a user interacted with a smartphone. Unlike other contemporary devices, Apple used a multitouch interface rather than a physical keyboard and provided a high-resolution screen. The iPhone's new multitouch interface was far more accurate and

usable than touchscreens of the past. As *The Wall Street Journal* noted when it reviewed the iPhone in 2007:

> The iPhone's most controversial feature, the omission of a physical keyboard in favor of a virtual keyboard on the screen, turned out in our tests to be a nonissue, despite our deep initial skepticism. After five days of use, Walt—who did most of the testing for this review—was able to type on it as quickly and accurately as he could on the Palm Treo he has used for years. This was partly because of smart software that corrects typing errors on the fly.

45. The iPhone's killer app was a web browser called Safari. Even the most advanced cellular-equipped mobile devices at the time provided text-only web browsing or limited image rendering. The iPhone featured the first true web browser on a smartphone—one that could display webpages with the layout and quality available on computer browsers.

46. As *The Wall Street Journal* reported in its iPhone review:

> **Web browsing:** The iPhone is the first smart phone we've tested with a real, computer-grade Web browser, a version of Apple's Safari. It displays entire Web pages, in their real layouts, and allows you to zoom in quickly by either tapping or pinching with your finger. Multiple pages can be open at the same time, and you can conduct Google or Yahoo searches from a built-in search box.

47. The iPhone looked like none of the smartphones at the time, and more importantly, it provided the first practical way to browse and search the web from a mobile device.

48. As a June 29, 2017 article in Big Medium, titled "How iPhone Changed Computing—and Much More" recounted, the iPhone provided users access to the web, which meant web apps:

> The iPhone was the first popular device to make it easy to browse desktop websites on a mobile device. Before the iPhone, the mobile web experience was hobbled by crummy WAP sites, weird trackball cursors, or lousy text-only experiences navigated by keypad. The iPhone's huge (for the era) screen and pinch-to-zoom interaction made it possible to see the whole web from your phone for the first time. **The iPhone released the web from its desktop prison.**
>
> (For the iPhone's first year, the only way to create an 'iPhone app' was to build a web app, remember?)

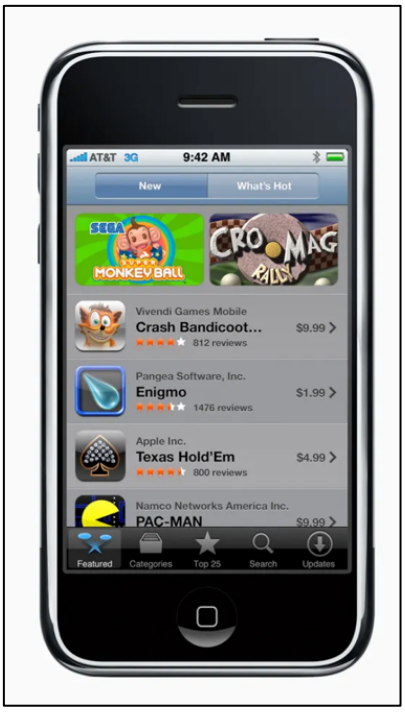
(emphasis in original)

49. The iPhone's computer-like web browsing functionality instantly augmented the functionality of the fifteen-app iPhone.

50. For approximately a year, any new app for the iPhone came in the form of web apps, as Apple had not yet provided a means of downloading and installing third-party applications on iPhones.

B. The App Store

51. In July 2008, Apple provided a means of distribution for third-party smartphone apps that ran on the iPhone. It launched the Apple App Store—an application on the iPhone that allowed a user to download "apps" created by third-party developers, which Apple had approved prior to distribution.



52. Apple's App Store featured games, productivity applications, and social networking apps. Apps quickly proliferated, and by 2010, the App Store had become the leading source for smartphone applications.

53. As CNET reported in a February 15, 2011 article titled, "Report: Apple remains king of app-store market":

> Though more online stores have been crowding the mobile app market, Apple remains by far the app-store leader, according to data out today from IHS, which recently acquired technology researcher iSuppli.
>
> For 2010, Apple took in $1.78 billion in worldwide sales from its App Store, a leap of 132 percent from $769 million in 2009. And while it lost market share to some of its mobile rivals, Apple still captured 82.7 percent of the app store market last year, down from 92.8 percent the prior year.

54. Apple's App Store quickly became a massive revenue generator for Apple and third-party developers. By the end of 2010, Apple's App Store featured 300,000 apps and had launched a billion-dollar industry. As TechCrunch reported in a December 26, 2010 article titled, "The Top 40 iPhone Apps of 2010":

> The iTunes App Store is huge. More than 300,000 apps huge. I've watched this monster start from nothing and turn into a billion-dollar industry in only a few short years. We've been approaching this point for some time now, but it's more apparent than ever that app exposure is of critical importance.

55. Apple's app store eventually expanded to allow in-app purchases and subscriptions. Apps became a significant source of Apple's revenue, as Apple took a percentage of all app and in-app sales through its App Store, which was the only means of distributing third-party applications to Apple's locked-down iPhone.

56. By 2013, sales from all smartphone app stores had reached $25 billion, but Apple, for the first time, faced competition from a significant rival—Google.

C. Google Launches Android and the Google Play Store

57. In 2005, Google acquired a Palo Alto, California company that was developing an advanced operating system originally intended for digital cameras. Android, Inc., which founded in

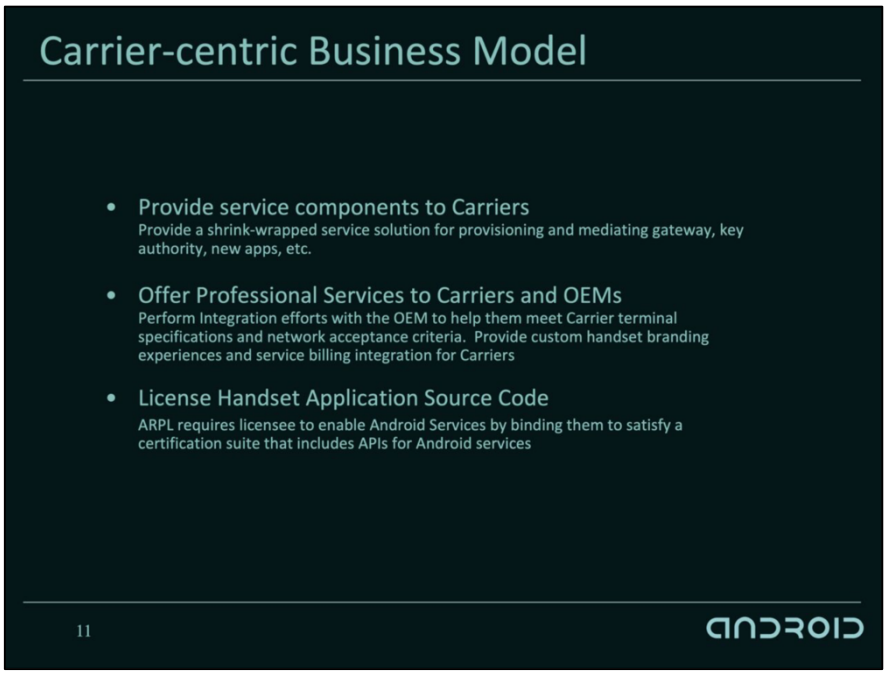
October 2003, pivoted with the rise of the smartphone toward creating a new handset operating system, one that could rival Nokia's Symbian and Microsoft Windows Mobile.

58. As PC Magazine recounted in an April 16, 2013 article titled, "Android founder: We aimed to make a camera OS":

> The creators of Android originally dreamed it would be used to create a world of "smart cameras" that connected to PCs, a founder said, but it was reworked for mobile handsets as the smartphone market began to explode.
>
> "The exact same platform, the exact same operating system we built for cameras, that became Android for cellphones," said Android co-founder Andy Rubin, who spoke at an economic summit in Tokyo. . . .
>
> But growth in digital cameras was gradually slowing as the technology became mainstream. Rubin's company revamped its business plan: A pitch from five months later declares it to be an "open-source handset solution." . . .
>
> "We decided digital cameras wasn't actually a big enough market," said Rubin. "I was worried about Microsoft and I was worried about Symbian, I wasn't worried about iPhone yet."

59. Android was a modified branch of Linux—a free and open source operating system. Android also drew heavily from, and built upon, Java, a programming language developed to generate code that ran on a virtual machine.

60. Android Inc.'s business model was to license its new mobile operating system to handset makers. As Ars Technica recounted in an August 13, 2021 article titled, "Excerpt: How Google bought Android—according to folks in the room," Android Inc.'s pitch deck described the company's technology and business model as a handset operating system that could be tailored to cellular carriers' needs:



61. Google acquired Android, Inc. in 2005. In 2007, after Apple announced the iPhone, Google scrambled to adapt its mobile operating system to provide a competitive product. Google formed the Open Handset Alliance with non-Apple cellphone providers HTC and Motorola, and secured the support of chip manufacturers such as Qualcomm and Texas Instruments.

62. Google was assembling the pieces of what appeared to be its own smartphone product—one to rival Apple's revolutionary iPhone. But what Google ultimately released was an operating system, and connected services ecosystem, that provided other smartphone manufacturers the functionality needed to take on Apple.

63. The Open Handset Alliance announced their partnership in a November 5, 2007 press release titled, "Industry Leaders Announce Open Platform for Mobile Devices":

> A broad alliance of leading technology and wireless companies today joined forces to announce the development of Android, the first truly open and comprehensive platform for mobile devices. Google Inc., T-Mobile, HTC, Qualcomm, Motorola and others have collaborated on the development of Android through the Open Handset Alliance, a multinational alliance of technology and mobile industry leaders.

64. Google had joined forces with other handset makers and carriers to provide a platform for smartphones. As part of this new venture, Google agreed to provide Android under a uniform licensing agreement.

65. In September 2008, the first smartphone with Google's mobile operating system was released. Called the HTC Dream, the device was distributed by T-Mobile and ran Android 1.0.

66. At about the same time, Google announced its own app store, which it called the Android Market. As CNET reported in an August 28, 2008 article titled "Google announces Android Market for phone apps":

> Google on Thursday announced Android Market, an online center that will let people find, buy, download, and rate applications and other content for mobile phones equipped with the open-source operating system.

67. As CNET noted, Android's first task was to attract a critical mass of developers to stock its new app store with third-party applications:

> Attracting developer attention is a key part of the Google-led Android software effort, and those who produce applications will have an easy time getting them to the market, Eric Chu of Google's Android project said in a Thursday blog post.

68. Google had produced a rapid response to Apple's innovative new iPhone. It quickly signed up and assisted hardware manufacturers to become vessels for its Android operating system and Android Market app store.

69. On March 6, 2012, Google changed the name of Android Market to the Google Play Store, unifying the software distribution channel for consumer Android devices under one banner—Google's.

70. As ABC News reported on March 6, 2012 in an article titled, "Google Play Store: New Name for Android Market":

> Goodbye, Android Market. Google's online store for mobile apps—as well as music, movies and digital books—will now be known as the Google Play store, beginning today.
>
> The company says it is consolidating different sites and apps under the new name so that you can "experience a simpler way to manage your entertainment." Up to now, Google offered music files at Google Music,

> books at the Google eBookstore, apps at the Android Market and so forth—and competitors like Apple and Amazon, with one-stop shopping did it better.

71. By the next year, Google Play and Apple's App Store were offering hundreds of thousands of apps and generating billions of dollars in revenue. As *The Wall Street Journal* reported in a March 4, 2013 article titled "Apps Rocket Toward $25 Billion in Sales":

> Nearly five years after Apple Inc. kicked off the mobile-apps craze, the industry is booming.
>
> App stores run by Apple and Google Inc. now offer more than 700,000 apps each. With so many apps to choose from, consumers are estimated to spend on average about two hours a day with apps. Global revenue from app stores is expected to rise 62% this year to $25 billion, according to Gartner Inc. . . .
>
> Apple and Google Inc.'s Play store are today neck-in-neck in terms of smartphone apps catalogs and usage, said analysts. Apple still dominates in terms of money made by more than three to one, according to App Annie.

72. Google had launched a direct rival to Apple's iPhone—both through its own Nexus (and later Google Pixel) devices running Android and the devices of companies such as Samsung, which licensed Android from Google.

73. Google also distributed its own web browser with every Android device—pre-installed and made the default system browser—called Google Chrome. Chrome was Google's answer to the powerful web browsing functionality released with the very first iPhone.

74. As Google described on its own website (as preserved by the Wayback Machine), Chrome was every Android user's default entrée into the Google ecosystem:

> **A first-class browsing experience**
>
> When the user signs into Chrome on one device, the tabs and browsing history of that session are available to the user when she signs into Chrome on another device. Note, it's the entire page content that gets synchronized between Chrome instances, not just the URL, so the user doesn't have to resubmit credentials to see a boarding pass or an article on a site that requires a login.

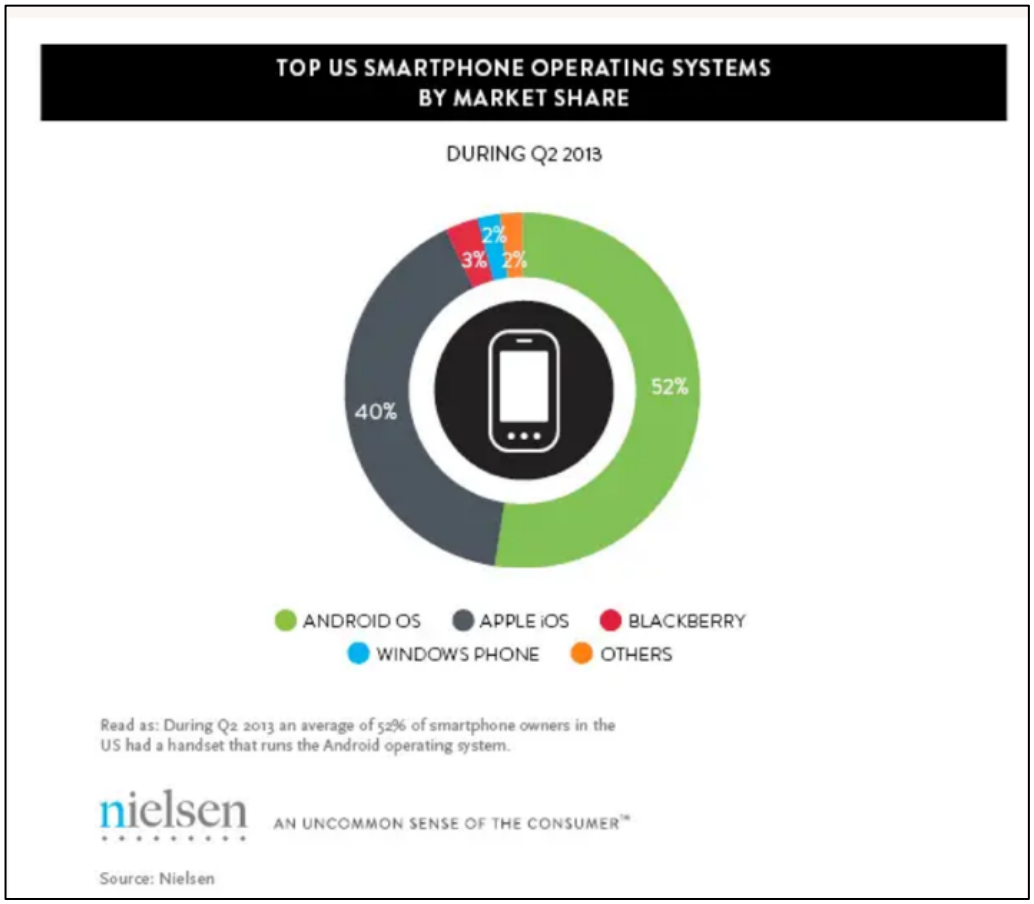
> The address bar uses prefetching to fill in URLs and perform search queries with suggestions based on browsing history and local bookmarks. To save bandwidth, this feature only runs when the user is connected to a wifi network.

75. Through Chrome, Google brought its products, services, and user ecosystem onto Android phones sold throughout the United States (and worldwide).

D. Apple and Google Lock into a Duopoly

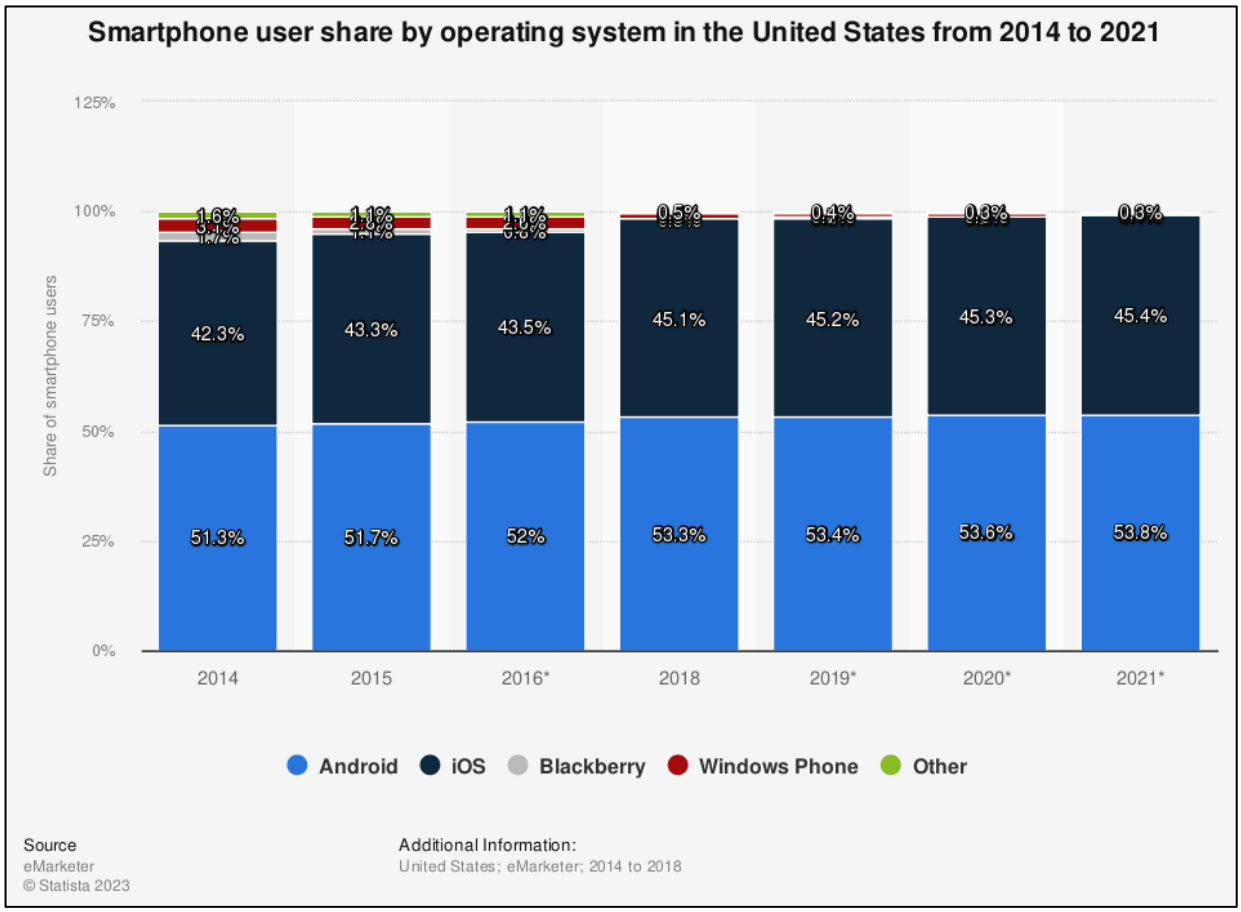
76. Android phones had quickly surpassed iPhone in market share in 2010, but by 2014 the United States smartphone market had stabilized into an operating system duopoly, with Android and iOS smartphones comprising more than 92% of all smartphones in the U.S.

77. As reported by an April 23, 2014 CIO article titled, "U.S. Smartphone Market Share Numbers for Q1 2014," Nielsen estimated that 52% of devices in the U.S. ran Google's Android, and approximately 40% ran Apple's iOS.



78. Globally, Google's Android operating system skyrocketed in market share, powering approximately 75% of all smartphones worldwide by the beginning of 2019.

79. In the United States, however, the two companies were locked into a duopoly that exists to this day, with Android smartphones maintaining approximately half of U.S. smartphone market share, and Apple the other.



80. Beginning in 2010, Google directly marketed its own Android-based smartphone, called Google Nexus. In 2016, Google discontinued the Nexus and announced as its successor the Google Pixel smartphone. Google continues to sell its Pixel smartphones today, directly competing with Apple's iPhone.

81. Both companies maintain their own walled gardens through their control over devices and device operating systems. Google distributes apps and taxes app and in-app revenue through its Play Store, and Apple distributes apps and taxes app and in-app revenue through its App Store.

82. As explained below, this duopoly is maintained by a series of lock-in and network effects arising from distinct "ecosystems." That is, both Apple and Google maintain a constellation of apps and services that keep users on one of the two respective platforms.

II. THE MOBILE ECOSYSTEM BARRIER TO ENTRY PROTECTING THE APPLE-GOOGLE DUOPOLY

83. Apple and Google's duopoly is protected by a powerful barrier to entry, the Mobile Ecosystem Barrier to Entry ("MEBE"), that arises from the critical mass of apps available for each platform.

A. The App and Platform Critical Mass

84. By the time they were locked into a duopoly, both Apple and Google had obtained a critical mass of mobile apps for their platform. As users adopted or purchased apps for either iOS or Android devices, they became less likely to change platforms.

85. By the mid-2010s, both iOS and Android had garnered significant developer support, which in turn meant that other developers were attracted to the two platforms when developing and distributing new smartphone apps.

86. This created a virtuous circle. Both platforms' user bases were (and are) large enough to attract a critical mass of developers to build apps for them, and developers as a result develop more apps for both platforms, attracting more users.

87. As such, in modern day software development, most mobile apps are developed for both iOS and Android devices—and not for any other smartphone platform. For example, social networks, such as Facebook, Instagram, X (formerly Twitter), and Snapchat distribute native apps through both Apple's App Store and Google's Play Store.

88. iOS and Android devices derive direct value from the network effects arising from the fact that the most popular mobile apps run on both platforms. For example, an Android user can send a WhatsApp message from her Pixel or Samsung smartphone, and an iOS user can receive it through the WhatsApp app on their iPhone.

89. Because top apps are developed for both of the two dominant smartphone operating systems (iOS and Android)—but not for any other smartphone operating system—smartphone users will choose one or the other dominant smartphone platform over any potential entrant that has not yet garnered a critical mass of apps and developers to trigger the virtuous circle.

B. Disparate Development Environments

90. A significant factor contributing to the MEBE's strength is that both Apple and Google provide their mobile operating systems' application programming interfaces in disparate—and bespoke—programming environments and languages.

91. Rather than adopt platforms that allow the use of multiple programming languages, such as Microsoft's .NET initiative, Apple and Google by 2019 each locked their mobile platforms into bespoke programming languages and runtime environments—languages and runtime environments developed and provided by Apple and Google, respectively.

92. Apple initially provided a compiler, documentation, and other tools to iOS developers in a language called Objective C. The language was esoteric and required developers not only to learn new syntax, but also to implement their iOS programs using a programming paradigm called Object Oriented Programming.

93. Writing programs for Apple's toolchain, programming language, and developer environment required significant investment by developers. Once they had mastered all of this, as well as the application programming interfaces exposed by Apple's mobile operating system, developers were unlikely to adopt a new platform and learn how to write programs with different tools.

94. Apple compounded the necessary bespoke investment by developers when it developed its own programing language, Swift, in 2014. By 2018, Swift was the primary language used to write iPhone apps.

95. Google forces Android developers to write their apps in Java. Although Java was initially designed to run on a cross-platform virtual machine called the Java Virtual Machine, Google jettisoned that aspect of the Java development paradigm. Instead, Google adopted only the language itself as part of its Android developer platform.

96. Google, like Apple, then developed its own Java-like programming language, called Kotlin, which it announced as the preferred language for Android development.

97. As *TechCrunch* reported in a May 7, 2019 article titled, "Kotlin is now Google's preferred language for Android app development":

> Google today announced that the Kotlin programming language is now its preferred language for Android app developers.
>
> "Android development will become increasingly Kotlin-first," Google writes in today's announcement. "Many new Jetpack APIs and features will be offered first in Kotlin. If you're starting a new project, you should write it in Kotlin; code written in Kotlin often mean much less code for you—less code to type, test, and maintain."

98. As explained below, this was done at the precise time that HTML 5 and Progressive Web Apps ("PWAs") threatened to render native mobile applications—and the proprietary app stores that distributed (and restricted) them—obsolete, threatening the MEBE and the Apple-Google duopoly.

99. Both companies, Apple and Google, had increased the amount of investment required from a developer seeking to build for their respective mobile platforms.

100. The further entrenched a developer became building for either dominant smartphone platform—iOS or Android—the less likely that developer would be to build for a new platform.

101. Because of the differences in development environments, app developers often keep two sets of engineers—one set for the iPhone and one set for Android development. Programmers are often not interchangeable, as they will generally be materially more experienced in and knowledgeable about a particular platform.

102. These disparate development environments work in favor of the Apple-Google duopoly and help to maintain the moat around the United States smartphone market. Mobile app developers are forced to invest in the Apple or Google mobile development environment—and in many cases both—in order to reach a critical mass of smartphone users. This makes developers supremely unlikely to incur the substantial expense of developing for an entirely new smartphone platform—one that by definition will have very few users in comparison with iOS or Android.

C. HTML 5 and the Rise of Progressive Web Apps

103. In the mid-2010s, improvements in web browser technology promised a new type of cross-platform application, one that would run through a browser engine and use newly developed common web technologies like HTML 5, Cascading Style Sheets, JavaScript, and WebAssembly to replicate the look, feel, and functionality of a native application in an operating system- and even hardware-independent manner.

104. In 2015, a web designer and a Google Chrome engineer dubbed this new type of cross-platform, natively web-based application the "Progressive Web App" ("PWA"). Progressive Web Apps promised to make platform-native applications—and proprietary mobile app stores—a thing of the past.

105. Moreover, losing OS-based control on mobile app distribution threatened the smartphone duopoly entirely—a new smartphone platform would not need a critical mass of purpose-built native apps to commend it to consumers, if PWAs allowed mobile developers to build high-performance apps that would run on iPhone, on Android handsets, and on smartphones with some other mobile operating system.

106. The leading evangelists of PWAs—and the browser engines used to run them—were the makers of the two largest browsers by market share at the time, Google (Chrome) and Mozilla (Firefox).

107. However, as explained below, Apple used contractual restraints on its iOS ecosystem—including agreements with Google, Mozilla, and Edge/Explorer developer Microsoft—to exclude the introduction of cross-platform PWAs on iPhones, thereby maintaining its duopoly position in the United States smartphone and smartphone operating system markets and functionally dividing markets with co-conspirator Google (maker of Chrome).

D. Blocking the Browser Back Door

108. The MEBE arises from the critical mass of apps and developers for each dominant smartphone platform. As long as the iOS and Android platforms attract app developers and provide a critical mass of apps, users remain locked into one of those two platforms.

109. Apple and Google, the companies behind iOS and Android, maintain an important choke point over app distribution—their respective app stores. Apple applies strict rules that apps on its App

Store must follow, and Google does the same through a series of policies that it enforces—sometimes with little explanation.

110. Smartphone apps are generally developed to be compliant on both platforms (iOS and Android), and developers will generally invest in complying with any idiosyncrasies of the two platforms.

111. Opting out of the Apple or Google ecosystems is extremely difficult, particularly on iPhone. Apple makes it virtually impossible to load apps onto an iPhone outside of the App Store. Doing so potentially even voids the warranty attached to the iPhone. Moreover, even if their iPhones are successfully "jailbroken" from Apple's control (a technologically complex and dangerous process), users will lose access to many of the iPhone's core functions, such as iMessage and iCloud—apps that frequently communicate and check in with Apple's servers.

112. Google too locks down its operating system. It also punishes people who "root" or "jailbreak" their phones with a voided warranty. Moreover, many apps simply will not run on devices that are rooted or jailbroken.

113. Unsurprisingly, in practice, very few people "jailbreak" their devices or opt out of the Apple (App Store) or Google (Play) distribution system for smartphones. It is too difficult for most users; the tradeoff simply is not worth the risk; and many users rely on continued access to apps central to each ecosystem.

114. This control by Apple and Google over all of the apps on virtually every smartphone in the United States allows them to ensure that no developer can write once and run everywhere. Each company forces its toolchain and platform on developers, each company traps its users into its ecosystem, and together they maintain the MEBE protecting their collectively dominant share of the U.S. smartphone market.

115. Apps are not, however, the only means through which developers can potentially deploy their applications to smartphone users. Because iOS and Android smartphones each contain full-featured web browsers, they can generally run web apps.

116. Moreover, as noted earlier in this complaint, over the past few years, a web-based programming language and runtime environment based on JavaScript has matured such that sophisticated web apps can run through browser engines, including on mobile browsers and other mobile apps.

117. Most web browsers, including Chrome and Safari browsers for smartphones, contain engines that can run JavaScript programs. As explained below, these engines are carefully controlled by Apple and Google on their respective smartphones to prevent them from becoming a cross-platform means of deploying applications.

118. As noted earlier, rich, native-like programs that run through browser engines using JavaScript and other common web technologies are commonly referred to as Progressive Web Applications ("PWAs"). PWAs are applications, delivered through the web, that are built using common web technologies including HTML 5, CSS, JavaScript, and WebAssembly.

119. PWAs pose a clear risk to both Apple and Google's control over the apps that run on their smartphones. If a developer could write a single PWA and deploy it on any smartphone—one running iOS, one running Android, or one running a completely distinct mobile operating system—it would erode the MEBE protecting the Apple-Google duopoly.

120. In other words, PWAs create a cross-platform threat. The way in which this competitive threat would make its way onto a smartphone is through the device's central piece of software—its web browser engine. The web browser engine is the part of the browser that, among other things, renders web pages and runs JavaScript code.

121. Both Apple and Google have created their own browser engines. Keeping the functionality implemented by these engines under control is a vital part of maintaining the MEBE. As explained below, Google maintains its control over the browser engine on Android devices by ensuring that it is the default browser on every Android device. Apple outright bans the use of any other browser engine but its own.

122. Browser engines are also important because many third-party apps show information through an in-app browser. Indeed, some apps are web apps disguised as native mobile apps.

123. Apps that rely on in-app browsers are prominently featured in the top 10 of both the Apple App Store and the Google Play Store. Apps such as Facebook, TikTok, and X, for example, allow users to view websites without leaving the app.

124. Apple and Google impose strict rules on these and other apps as they are deployed through their respective app stores. The ability to run an internal web browser, however, threatens to undermine the application choke point the companies have implemented over their many years of duopoly.

125. To maintain their control over the apps on their platform and to ensure that in-app browsers and rival web browsers do not become cross-platform threats to the barrier to entry protecting their duopoly, both companies develop and deploy their own browser engines—and Apple outright prohibits the use of others.

E. Microsoft Runs into the Powerful Mobile Ecosystem Barrier to Entry and Fails to Enter the Smartphone and Smartphone Operating System Markets

126. In 2015, Microsoft ran directly into the MEBE protecting Apple and Google. Microsoft sought to release its own mobile operating system and smartphones to compete with Google's Android platform and Apple's iPhone. Called Windows 10 Mobile, Microsoft distributed its operating system through handset makers, including once-dominant Nokia.

127. Windows attempted to unify its mobile operating system with its dominant computer operating system, creating a common UI language and developer environment across devices. Microsoft's only hope of overcoming the MEBE was to leverage its large Windows developer base to enter the smartphone market with sufficient apps.

128. However, Microsoft, with all of its capital, power, and technical knowledge, failed miserably. The reason was simple—there were not enough developers to make third-party apps for Windows Phones, and because there were not enough apps, users would not consider switching from iPhone or Android smartphones to a Windows Phone.

129. Microsoft killed its Windows Phone operating system and products in October 2017. Microsoft, which had long enjoyed a similar virtuous circle in Intel-compatible computer software, had failed to bridge the "app gap" in the United States smartphone market.

130. CNET reported Microsoft's capitulation in an October 8, 2017 article titled, "Windows 10 Mobile gets its final death sentence":

> Bill Gates has given up his Windows phone. HP is pulling production of its flagship Windows handset. Now Microsoft has finally seen the writing on the wall—there aren't enough people using Windows 10 Mobile or enough apps to make it viable.
>
> Corporate vice president of Windows 10 and head of Microsoft's "PC-Tablet-Phone" division, Joe Belfiore, said on Twitter Sunday that Microsoft will continue to support Windows 10 Mobile with bug fixes and security updates, but new features and hardware are no longer front and centre.

131. Microsoft's full-scale entry into the U.S. smartphone market had garnered a tiny amount of market share. As CNET reported:

> But the ecosystem had struggled since the launch of Apple's iOS in 2007 and Google's Android operating system in 2008. According to the most recent sales figure from Kantar Worldpanel, Windows phones account for just 1.3 percent of the market in the US, bested only by BlackBerry at 0.3 percent. Compare that with Android's 64 percent share of new phone sales and 34 percent for iOS (figures that are closely matched in the UK and Australia).
>
> Microsoft has attempted to leverage its legacy in the PC space to push further into mobile—Windows 10 Mobile was billed as the "everywhere OS" that would let users shift seamlessly between desktop, tablet and mobile.
>
> ***But users have long complained the lack of apps on Windows Mobile devices is a deal breaker***.

(emphasis added).

132. The reason was clear, even to Microsoft Vice President in charge of Windows 10, Joe Belfiore—there were simply not enough apps to convince iPhone and Android users to give up their ecosystems and switch. As Belfiore explained in an October 8, 2017 tweet:

133. Microsoft had run directly into the barrier to entry protecting the Apple-Google duopoly. Without the ability to attract developers, there were not enough apps for the new platform to break in, and without a critical mass of apps, there were not enough users to attract developers to invest in the new platform.

134. The barrier to entry resulting from the critical mass of apps and developers for the existing Apple-Google smartphone duopoly—the MEBE—was so powerful that Microsoft, which had a significant user base and countless developers for its computer operating systems, could not overcome it.

135. Microsoft, which was ranked 15 on the Fortune 500 in 2022, could not make even a dent in the Apple-Google duopoly's share of the market. When Microsoft killed the Windows Phone, it had obtained only 1.3% of the market.

136. As explained below, when PWAs threatened to erode the MEBE—and the market power enjoyed by Apple in the U.S. smartphone market—Apple and Google agreed to browser engine restrictions that stifled this competitive threat to the companies' smartphone dominance, and Apple used its control over iPhone to extract similar concessions from all other would-be threats, including Mozilla (maker of Firefox) and Microsoft (maker of Edge/Internet Explorer).

III. APPLE AND GOOGLE EXPRESSLY AGREE TO MAINTAIN AND STRENGTHEN THE MOBILE ECOSYSTEM BARRIER TO ENTRY PROTECTING THEIR DUOPOLY

A. Apple's WebKit Engine, the WebKit Rule, and the Stranglehold over iPhone Apps

137. A browser engine, also known as a rendering engine, is a core software component of every web browser. The engine transforms HTML documents and other resources, such as JavaScript code, into an interactive visual representation on a user's device.

138. Browser engines are not standalone computer programs. They are core components of other computer programs, including apps that use in-app browsers or rely on web-based functionality.

139. Apple controls what web-based applications, including PWAs, can do on its devices through the browser engine at the core of its operating system, which it calls WebKit.

140. WebKit 2.0 was deployed as part of iOS 8 in September of 2014. Since then, WebKit has been the cornerstone of Apple's iPhone devices.

141. In addition to serving as the browser engine at the core of Apple's Safari web browser, WebKit is used to render web-based content in iPhone apps. Even a competing web browser must use the WebKit engine rather than its own browser engine, in order to run on iPhone.

142. Apple sets forth this requirement in its App Store Review Guidelines, to which iPhone developers must agree in order to distribute their apps on the Apple App Store—the exclusive means of distributing iPhone apps to almost every iPhone user.

143. Section 2.5.6 of Apple's App Store Review Guidelines states:

> 2.5.6 Apps that browse the web must use the appropriate WebKit framework and WebKit Javascript.

144. This requirement means that any web browser, whether it be in a third-party app or even a web browser app, is at its core, Apple's Safari web browser.

145. Thus, even when an iPhone user loads a webpage using the Firefox browser for iOS, she is in fact using a reskinned version of the same engine underlying Safari.

146. As Macworld explained in a March 3, 2022 article titled, "Developers condemn Apple's 'deeply anti-competitive' browser rules":

> Apple allows alternative web browsers on iOS—it even allows you to make them the default on your iPhone—but they're not given anything like the same freedom afforded to browsers on other platforms. The iOS versions of Chrome, Firefox, Opera and the rest have to be based on Apple's WebKit engine, whereas the versions on Android, Windows, Mac and Linux use other options such as Blink and Gecko.

147. Apple's WebKit is far more restrictive than the engines powering rival browsers on other platforms. In fact, many of the restrictions placed on WebKit hamper PWAs. For example, Apple's WebKit constrains the use of service workers—code modules that allow a web app to, among other things, operate asynchronously and cache online content when there is no Internet access—as part of PWAs.

148. Apple's WebKit is regarded by many as part of its stranglehold over apps, with many restrictions aimed at preventing the development of PWAs on iPhone. As one observer stated in an April 23, 2023 post on YCombinator's *Hacker News* forum:

> Apple's ban of all browsers but Safari turned out to be the main barrier preventing progressive web apps from being viable, deepening the duopoly power of themselves and Google, because Apple refuses to implement basic browser standards that are necessary for PWAs.
>
> And then when they do implement similar browser standards, they don't follow any web standards, they instead make their own proprietary bespoke web standard for Safari.
>
> And they also did other fun things like wait until nearly 2021 to support WebP and let Safari be the #1 source of one-click exploits on iOS.

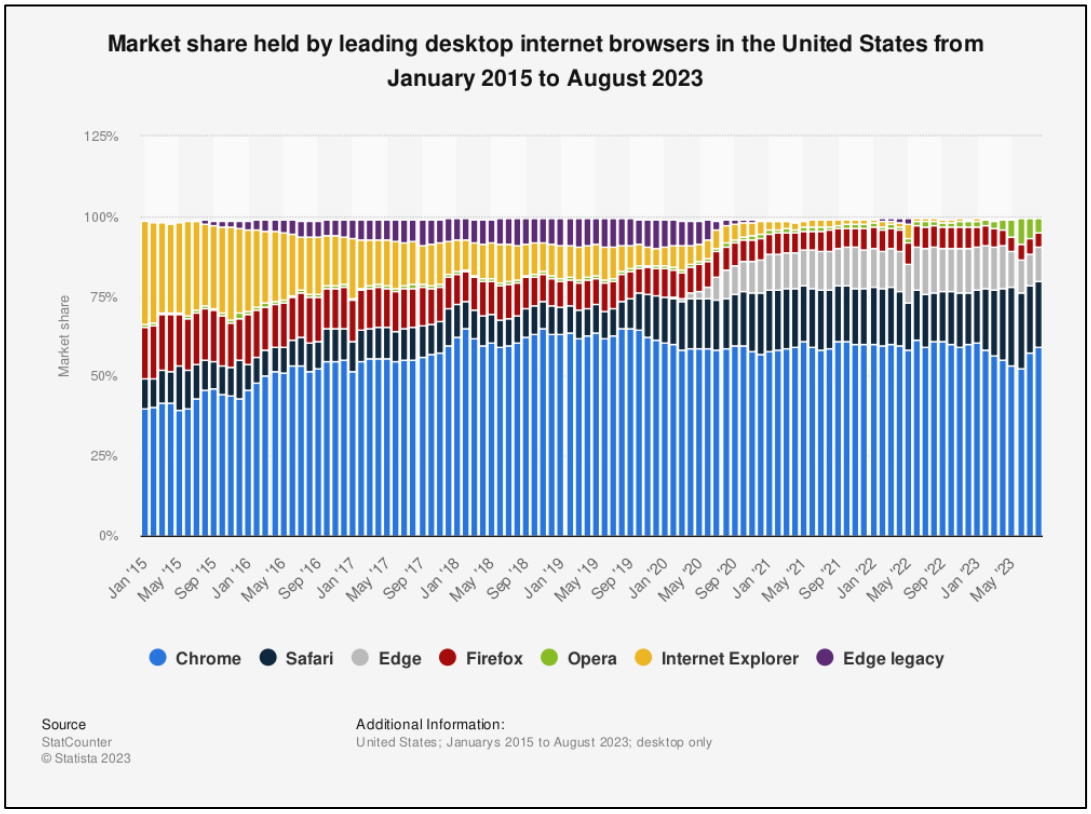
149. Apple's WebKit creates severe incompatibilities with apps that run on other browsers. That, however, is a feature, not a bug, from Apple's perspective. Increased incompatibility reduces the likelihood that a PWA could be written once and run on any smartphone platform with a web browser.

150. Without control over every web browser on an iPhone, Apple would face the prospect of the emergence of a cross-platform browser engine for which a developer could write once and deploy on any smartphone and smartphone operating system.

B. Google's Blink Engine and the Dominance of Google Chrome on Android

151. Google also maintains a stranglehold over the web browsers on Android.

152. Google's Chrome browser is the most widely used web browser in the United States. On the desktop, Chrome has consistently maintained half of the market share.



153. On Android smartphones, Chrome is the default browser, and it is the browser actually used by the overwhelming majority of Android smartphone users.

154. Google uses a fork of WebKit, called Blink, as the browser engine powering Chrome on Android smartphones. Blink, like Apple's WebKit, is riddled with incompatibilities that prevent cross-platform apps and PWAs.

155. Indeed, Google's control over Blink, as well as Apple's control over WebKit, have allowed the companies to eliminate competitive browser engines.

156. In a September 2022 report by Mozilla tilted *Five Walled Gardens*, Mozilla explains that Blink's incompatibilities (and Apple's WebKit requirement) have caused even Microsoft to abandon developing a rival browser engine in favor of adopting Google's Blink engine:

> Faced with both web incompatibility issues and the costs of maintaining a separate browser engine for iOS, Opera abandoned its browser engine in 2013 and Microsoft followed suit in 2019. Both companies adopted Google's Blink/Chromium browser engine for their primary browsers and continue to offer WebKit versions on iOS. In particular, Microsoft's 2019 decision to abandon Trident reveals the scale of the challenge of maintaining a browser engine. Microsoft is a company with currently more than 150,000 employees and a market capitalization of around $2 trillion. Yet it decided to abandon a key piece of software and instead use a browser engine created and maintained by one of its main rivals.

157. Google's Chrome is the most widely used web browser in the United States—and across several device platforms. Google leverages its control over its Blink engine underlying all of these Chrome browsers (except the one for iOS) to ensure that incompatibilities are pervasive.

158. So long as incompatibilities remain between Blink and rival engines, Google functionally prevents the emergence of a potential cross-platform threat in the form of a rival browser engine.

159. Google's large market share gives it significant power over Android smartphones, but it relies on Apple to prevent a cross-platform threat from emerging from its half of the duopoly.

C. A Cross-Platform Threat: Mozilla's Open-Source Gecko Browser Engine

160. In 1998, the first major web browser company, Netscape, created a free software community called Mozilla.

161. In 2003, Mozilla began an ambitious task of developing its own free web browser. On November 9, 2004, Mozilla announced the Firefox web browser.

162. Firefox's web browser became one of the fastest web browsers available, with versions of Firefox besting web browsers bundled with Microsoft and Apple's operating systems in loading speed. At the core of Firefox's high-performance web browser was a browser engine called Gecko.

163. Mozilla's ambition was well beyond providing a free web browser, and in 2011, Mozilla began developing a means of booting a computer directly to its Gecko browser engine. As Mozilla explained in a July 27, 2011 blog post titled, "Announcing Boot to Gecko (B2G)—Booting to the Web":

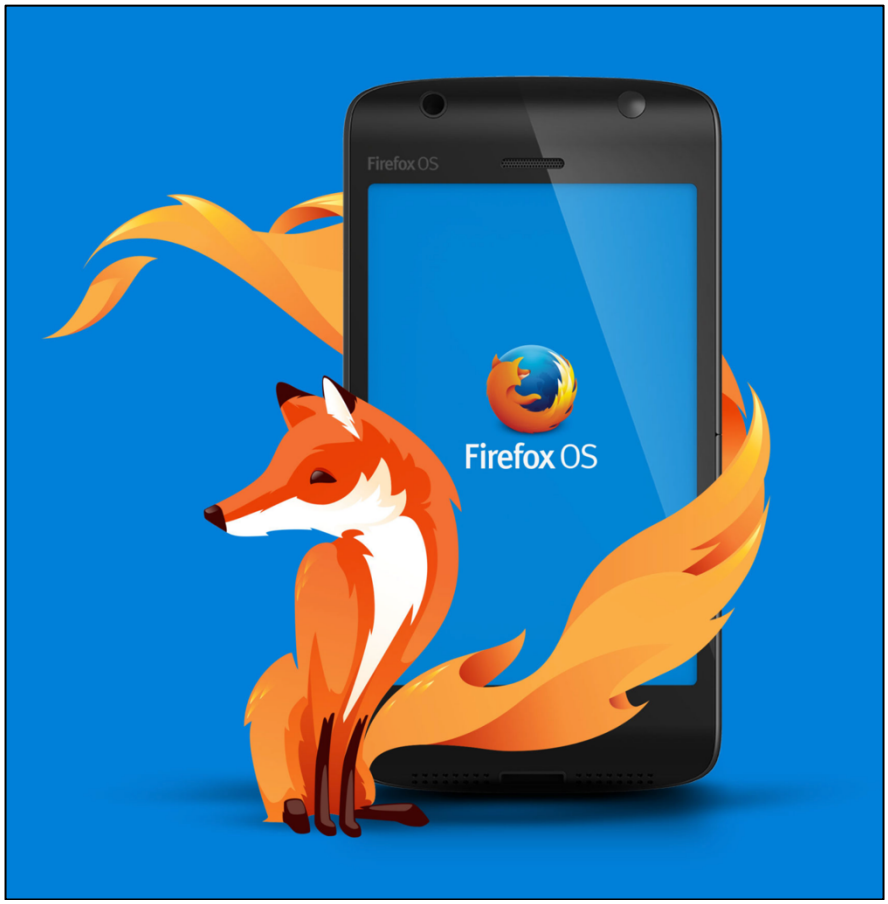
> Mozilla recently announced the Boot to Gecko (B2G) Project which is a project towards the goal of building a complete, standalone operating system for the open web.

The aim of B2G

> The idea is that open web technologies can supersede single vendor control over application environments, and instead use something that will be open for all and consistent across the board. The first main aim is mobile/tablet devices and to be able in such an environment to give access through web technologies to all the capabilities native applications have.
>
> The project is in a very early stage right now, but we believe in communicating this early and getting as much valuable input, help and suggestions as possible to make this out to be all it can be.

164. Mozilla's goal was to build an operating system built on its browser engine. Applications built to run on the web would be immediately portable to every mobile device running the B2G operating system. The move immediately positioned Mozilla against Apple and Android.

165. B2G ultimately developed into a fully-fledged mobile operating system called Firefox OS.



166. In 2013, Firefox deployed its new operating system to handset manufacturers, and by February 2014, Mozilla had announced seven commercial Firefox OS devices.

167. These devices were built entirely on Firefox's browser engine. This meant that an application built in the newest HTML iteration, called HTML5, could not only run on Firefox devices, but on any device running a compatible browser engine.

> Firefox OS devices are the first devices built entirely to open Web standards, with every feature developed as an HTML5 application. Mozilla previewed the future of Firefox OS at its press event, demonstrating how its flexibility, scalability and powerful customization empower users, developers and industry partners to create the exact mobile experience they want. Carriers can easily and deeply customize the interface and develop localized services that match the unique needs of the customer base.

168. Firefox OS provided a platform for cross-platform apps. Its goal was to write once for the open web platform Firefox's engine provides, and run the app on any platform. As Firefox explained in an October 28, 2013 blog post, titled "Progress report on cross-platform Open Web Apps":

> We're working to ensure that those same apps can also run on Android, Windows, Mac OS X, and Linux devices. If your app can adapt to those screen sizes, CPU's [sic], and device capabilities, then we've got a plan to ensure your apps install, launch, quit and uninstall as native apps on each of those platforms.

169. Firefox OS directly challenged Android's app store. Firefox made its Firefox Marketplace available to Android users. As the same blog post explained:

> Android users discover apps in Firefox Marketplace using the Firefox for Android browser. Firefox Marketplace has approved Shotclock for Android, so we just click the install button as we did on Firefox OS. We will automatically repackage the Open Web App as a native Android app to give our users a native app experience for Open Web Apps.

170. Firefox could not, however, deploy a similar store on Apple's iOS. As the blog post explained:

> **iOS**
>
> We'd love to support Open Web Apps on iOS devices, but iOS does not, at this time, include the option to install a Gecko-based web browser, which is currently needed to support Open Web Apps.

171. Firefox OS's goal of deploying only web-based apps proved difficult because of incompatibilities created by Apple and Google's browser engines.

172. By the end of 2015, Mozilla's Firefox OS had failed. Mozilla announced in December 2015 that it would be discontinuing its Firefox OS and its smartphones.

173. Although Mozilla had an operating system that could provide a platform for web applications that could run on any device, it was not able to enter at scale. Mozilla had run into the same powerful barrier to entry that Microsoft had run into.

174. In the past few years, however, PWA technology has improved to the point that Mozilla does not need its own hardware to pose a threat to the dominance of Android and iPhone. Given modern technology, Mozilla's browser engine, Gecko, could create a middleware layer for apps on all platforms and thereby threaten the smartphone duopoly.

175. That is, if Gecko could be deployed on Android and iPhone, then a new entrant in the smartphone market could present a simple proposition to developers: write apps that run on any device that runs a Gecko-based browser, and your app will immediately work on our new devices as well as on iOS and Android. The MEBE could be eroded, and the duopoly broken—simply by virtue of a powerful cross-platform browser engine.

176. For this proposition to work, however, Gecko would have to run everywhere.

177. By 2017, Mozilla had pivoted to deploying its browser engine across platforms.

178. In September 2018, Mozilla announced a new, open-source browser engine designed to run on mobile products, called GeckoView.

179. Mozilla implemented its mobile Firefox browser on Android using the GeckoView software designed to wrap around Mozilla's Gecko browser engine.

180. Prior to its release, Google and Apple controlled the only two major browser engines used by consumers. Gecko introduced a third option. As Mozilla explains in its September 2022 "Five Walled Gardens" report:

> One of the ways Mozilla seeks to do this is through developing and investing in our Gecko browser engine. This matters because there are only three main browser engine providers left: Google, Apple and Mozilla—but Apple's engine only runs on Apple devices. So, without Mozilla, the only cross-platform browser engine would be provided by Google. Putting development of cross-platform web browsers in the hands of a single

company creates not only a concentration of power, but also a single point of failure.

181. Gecko threatened to provide a cross-platform option for developers. Web-based apps, including PWAs, could be written for Gecko and immediately distributed on any platform that ran Gecko. This would directly erode the MEBE protecting the Apple-Google duopoly.

182. Gecko could, however, only provide a cross-platform middleware layer for apps if it was available on every mobile operating system. So long as either Apple or Google prevented Gecko from obtaining a foothold, the proposition of writing once and deploying everywhere was an impossibility, and the economics behind the MEBE would hold firm.

183. Google, which deployed its Android operating system on a variety of hardware, did not maintain the tight hardware integration needed to keep Gecko off of every Android device. The most Google could do was ensure incompatibilities between Gecko and its own Blink engine.

184. On the other side of the duopoly, however, was Apple, which tightly integrated its hardware and operating system, allowing it to exercise unfettered control over what could run on every one of the millions of iPhones it had sold throughout the United States.

D. Google, which Makes the Web Browser with the Highest Market Share, Agrees with Apple to use only WebKit on iPhones, Even in its Chrome Browser App

185. By 2020, Google was the dominant browser on virtually every device. According to W3Counter, Chrome accounted for 63% of all browsers worldwide, with Safari at 14.4%, Internet Explorer/Edge at 8%, and Firefox with 5.1%. In October 2023, estimates placed Chrome at 70% of worldwide browser market share, with Safari 15.1%, Internet Explorer/Edge 3.6% and Firefox 3%.

186. Google's browser dominance was its primary weapon against the cross-platform threat posed by a rival browser engine such as Gecko.

187. On Android devices, where Chrome's market share was substantially higher than across other devices, Google could itself maintain incompatibilities with other browsers to reduce any cross-platform threat.

188. The key, however, was ensuring that no platform could unify applications for both Android devices and Apple's iPhones. If there was no means of writing once and deploying on both

mobile platforms, the MEBE would remain strong enough to preserve the duopoly. Absent a unifying application platform, the virtuous circle of apps and developers would never begin, and the one protecting Google and Apple would remain intact.

189. Safari and Chrome together comprise more than 90% of the U.S. mobile browser market share, with each company maintaining about half of the total share.

190. Google has developed a version of its Chrome browser for iOS. In doing so, Google entered into Apple's Developer Agreement, agreeing that Google could provide its Chrome web browser on iPhones using WebKit—not Google's Blink engine. As a result, PWAs written for Chrome do not run in a cross-platform manner on iOS devices; there is no cross-platform threat from Google's own dominant browser engine.

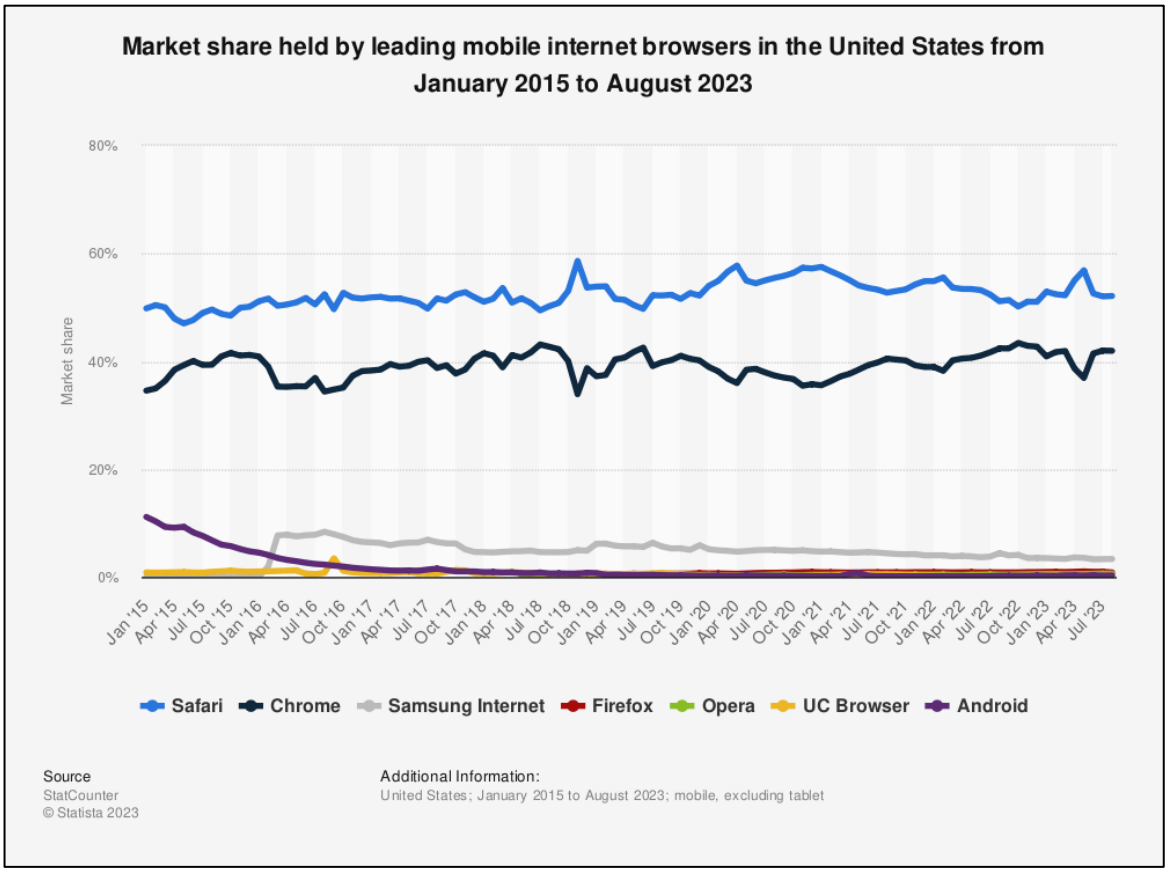
191. Google and Apple maintain an express agreement in which Google provides Chrome on iPhones, but only using WebKit as the browser engine. This express agreement between the two companies behind the United States smartphone duopoly restrains the development of a cross-platform PWA solution for smartphones. In particular, Google—the largest threat to develop a cross-platform PWA solution, as the proprietor of the nation's most popular browser (Chrome) and browser engine (Blink) has affirmatively agreed to run a modified product on Apple devices that prevents Chrome from being a write once, run-anywhere mobile platform.

192. Google is not a passive observer to this agreement: the company, which derives billions of dollars from its own dominant position in the smartphone duopoly, as the purveyor of Android and its inextricably linked Play Store ecosystem, squarely benefits from handcuffing its own mobile browser product on iOS devices. That is, both Apple *and* Google benefit from the smartphone duopoly, and their agreement to prevent the introduction of a cross-platform mobile threat by keeping Blink off of iPhones benefits both companies in the form of supracompetitive profits from the smartphone duopoly.

193. Google released version 80.3 of its Chrome browser in February 2020 pursuant to the companies' agreement, as well as subsequent major versions released to this day, including version 81 in April of 2020, version 83 in May of 2020, and version 84 in July of 2020. Google currently distributes version 120 of Chrome through Apple's App Store pursuant to an express agreement to use only WebKit.

194. There is no technical reason for Google to use WebKit in Chrome for iOS. Its own Blink browser engine is state of the art, and other aspects of Chrome are specially designed to interoperate most seamlessly with Blink. Google has even developed versions of its Chrome browser that could run on iOS if Google and Apple had not agreed to distribute only WebKit-based Chrome through the Apple App Store.

195. On mobile platforms, Chrome and Safari make up almost all of the browsers used. As *Statista* reports, Safari and Chrome together have approximately 94% of mobile browser share:



196. Google's agreement with Apple also applies to any potential entrant, including Mozilla. That is, Mozilla's Firefox browser for iPhone must also use the WebKit engine, precluding the development of a multiplatform PWA threat on smartphones by someone outside of the Apple-Google agreement.

197. Thus, by express agreement, Google and Apple have agreed not to allow any potential cross-platform threat onto the iPhone platform in the form of a non-Apple browser engine. This

agreement has the purpose and effect of preventing anyone—Google with Blink or Mozilla with Gecko—from providing a unified write-once, run-anywhere application platform that runs on both Android and iOS devices, and thereby prevents any erosion of the existing MEBE and the smartphone duopoly it enables.

198. To this day, Apple's WebKit ensures that no cross-platform browser engine can serve as middleware unifying the iOS and Android smartphone platforms. And the companies directly responsible for ensuring this status quo continues, by express agreement, are the companies that develop and profit from those platforms—Apple and Google.

199. Apple and Google maintain this agreement today. No one—not Google, nor any non-conspirator like Mozilla, has been able to deploy a non-Webkit browser engine on any of the millions of iPhones in the United States. This has effectively, and by design, precluded an erosion of the Apple-Google smartphone duopoly.

E. Google's Agreement with Apple to Use Only WebKit on iPhones Strengthens the MEBE and Prevents an Entrant from Garnering a Critical Mass of Cross-Platform Apps

200. Apple's agreement with Google directly affects the markets for smartphones and smartphone operating systems. Preventing a cross-platform layer that would unify the two companies' mobile platforms prevents any new smartphone or smartphone operating system competitor from emerging.

201. This is because absent a unifying cross-platform layer that runs on both platforms, a new entrant into those markets would have to overcome what ultimately defeated Microsoft—it would have to incentivize developers to expend significant resources to develop for a nascent platform with far fewer users than Android or iOS.

202. If cross-platform browser engines could power PWAs and other web-based mobile applications, a new entrant would not have to incentivize developers to do anything additional to support its smartphones. If the new entrant supported the cross-platform browser engine, software could run on its platform as well as on iPhone or an Android smartphone.

203. Together, Google and Apple have agreed not to develop browsers for iOS that use any browser engine besides Apple's WebKit. Moreover, Apple has agreed with Mozilla, the creator of Firefox, to use Apple's browser engine on iOS as well. This web of agreements ensures that a developer cannot write an app that can be deployed on both iPhone and an Android smartphone.

204. But for these agreements, a creator of a rival browser engine could serve as a cross-platform layer unifying both of the dominant smartphone platforms—and new or nascent smartphone platforms as well. A developer could simply write one app and deploy it on all mobile devices and mobile operating systems. This would weaken the MEBE protecting the Google-Apple duopoly, subjecting the companies to competition in the smartphone market and the smartphone operating system market.

205. In addition, because Gecko and other cross-platform browser engines are open-source, Apple and Google cannot risk allowing other engines on iPhones. Doing so would allow "forked" or modified versions of open-source engines such as Gecko onto the iPhone, creating the potential of a unifying cross-platform layer. Even more concerning, an open-source version of Gecko could be modified and deployed by a rival smartphone or smartphone operating system competitor, weakening the MEBE protecting the duopoly and allowing entry.

206. The net effect of the anticompetitive agreements between Apple and other browser developers, including Google, is to prevent smartphone and smartphone operating system competition. So long as there is no cross-platform browser engine that could unify the duopoly's disparate and incompatible platforms, the MEBE surrounding Google and Apple's combined, virtually 100% share of the United States smartphone operating system market remains intact.

207. The Apple-Google agreement, and Apple's web of agreements with other browser developers, has had a clear effect. Prices for Apple's smartphones have monotonically increased year over year. According to Consumer Intelligence Research Partners, LLC, the average selling price of iPhones increased from $873 in December 2020 to $988 in March 2023. Apple continued to raise prices for its iPhone 15 in the fall of 2023. Despite consistently raising prices, Apple has given up very little market share and has faced no competitive entry, leaving its duopoly with Google ironclad. Moreover, because Apple distributes its iOS smartphone operating system with its iPhones, Apple's agreements

have maintained its stranglehold over its share of the smartphone operating system market as well (and Apple's iOS is installed on approximately 100% of iPhones).

F. The Apple-Google WebKit Agreement Makes No Sense But for Its Anticompetitive Effect

208. Apple and Google's agreement not to use any other browser engine but WebKit on iPhones makes no technical or business sense but for the anticompetitive effect of maintaining and strengthening the MEBE.

209. To begin with, Apple's decision to force all iPhone users to use WebKit for all web browsers and apps has left iPhones devastatingly vulnerable to security breaches. Apple's users have no choice but to remain sitting ducks for cyberattacks—they cannot simply use a different browser, and no developers can innovate and improve by developing their own, more secure, browsers.

210. For Google, the agreement eliminates all of its hard-won product differentiation on 136 million U.S. smartphones. Indeed, Google markets its Chrome browser as providing one of the fastest and most customizable browsing experiences—yet Google gives up all of its advancements and improvements across a fully half of U.S. smartphones, instead opting to reskin Apple's Safari browser as "Chrome."

211. The Apple-Google agreement only makes sense because it has the anticompetitive effect of preventing third-party browser engines from working on both platforms, thereby eliminating the possibility of a unifying, cross-platform engine that could ultimately allow a new smartphone and smartphone operating system entrant to overcome the MEBE.

1. Apple's WebKit Agreements Make iPhones Less Secure and Prevent Users and Developers from Opting Out

212. Apple's requirement that Google Chrome use the WebKit browser engine makes no sense but for its anticompetitive effect.

213. WebKit is serially the source of vulnerabilities in iPhones and on the iOS operating system. What makes the vulnerabilities worse is that WebKit is often attacked through code on a remote

webpage. In other words, because WebKit is the iPhone's primary interface to the open Internet, its vulnerabilities are far more severe than general security vulnerabilities.

214. Moreover, zero-days—dangerous, non-public vulnerabilities—have repeatedly been found in WebKit. For example, in February 2022, Apple frantically moved to patch zero-day vulnerabilities in its WebKit browser engine.

215. As The Register reported on February 11, 2022 in an article titled "Apple emits emergency fix for exploited-in-the-wild WebKit vulnerability":

> Apple on Thursday patched a zero-day security vulnerability in its WebKit browser engine, issuing updates for iOS, iPadOS, and macOS.

216. The article explained that WebKit had become a dangerous, single point of failure in Apple's iPhones:

> **Single point of failure**
>
> The Apple patch is relevant not just to users of Safari, which relies on WebKit, but to users of any iOS browser, because Apple requires that all iOS browsers use WebKit—a situation currently being considered by antitrust regulators in the US and UK.
>
> Alex Russel, a program manager for Microsoft's Edge browser who formerly worked at Google and has long evangelized web technology, echoed past frustration with Apple's insistence that only WebKit is fit for iOS.
>
> "Imagine, if you can, a world where installing an alternative browser as your default actually had a change of protecting you from Apple's shocking underinvestment in security," he lamented via Twitter.

217. In June 2023, it was again publicly disclosed that every iPhone was vulnerable to another zero-day that allowed covert and severe attacks. These zero-days have occurred repeatedly for years on Apple's iPhones, and iPhone users have no way of truly changing browsers to protect themselves.

218. Indeed, iPhone zero-days have repeatedly been exploited by spyware companies and sold to authoritarian regimes. As reported on in the SC Media article titled, "Apple patches 17th zero-day of 2023":

> Many of the new zero-days targeting Apple have been vulnerabilities exploited by commercial spyware vendors, explained Ken Westin, Field CISO at Panther Labs. Westin said the spyware vendors rely on these exploits to deploy their spyware to unsuspecting targets. However, once used against a target, Westin said they essentially play their hand and researchers from Citizen Lab, Google, and others have identified the vulnerabilities being exploited and notify Apple to patch them.
>
> "Less than ethical researchers can make quite a bit of money selling the exploits to these companies," Westin said. "There's an increase in demand for spyware by authoritarian regimes, although the commercial spyware vendors say they only sell to certain countries for certain uses, it has been proven several times that it's often not the case and the spyware gets used to target dissidents, journalists and political rivals. Companies like NSO Group have been blacklisted by the U.S. government and are under increased pressure at home and abroad, but other spyware vendors have come into the market."

219. All of these vulnerabilities have something particularly dangerous in common—they are remote exploits. Because WebKit will execute code provided to it by a website, malicious JavaScript or WebAssembly code can be used to hack into an iPhone without any physical access to the device.

220. In addition, Apple's agreements on WebKit provide remote means to exploit Apple's hardware, particularly its new Apple silicon.

221. Recently, a catastrophic example of such a vulnerability was discovered, called iLeakage. iLeakage is a speculative execution attack, meaning it exploits the side effects that remain after a CPU predictively executes instructions while waiting on information from relatively slow random access memory.

222. Because of WebKit, this attack can be orchestrated remotely—simply by feeding code to Apple's browser engine. As The Register reported on October 26, 2023 in an article titled, "Side channel attacks take bite out of Apple silicon with iLeakage exploit":

> University researchers have developed a novel exploit that can steal information from virtually all modern Apple Macs, iPhones, and iPads.
>
> Dubbed "iLeakage," the exploit targets WebKit, the JavaScript engine that powers Apple's Safari browser, and is reminiscent of the Meltdown and Spectre attacks of 2018.
>
> The research shows how a remote attacker could steal secrets such as Gmail inbox data, text messages, password manager-supplied credentials via autofill fields, and other miscellaneous information like watch histories from YouTube.

223. Although the vulnerability is severe on all of Apple's devices, it is catastrophic on its iOS devices, such as the iPhone. As the Register explained:

> The attack can be launched against Macs, iPhones, and iPads running Apple's A-series or M-series chips. For macOS, the attack only works on Safari, but for iOS and iPadOS, there's a much larger attack surface.
>
> As Apple requires all browsers on its App Store to be based on WebKit, third-party browsers on Apple devices, like Chrome and Firefox, are essentially just Safari with proprietary wrappers on them that add functionality, and are therefore vulnerable to the attack.

224. The vulnerability was reported to Apple on September 12, 2022, and it took Apple 408 days to publicly release information about it. What's more, although Apple devised a mitigation for its Macs, it had not yet devised any mitigation for iOS devices.

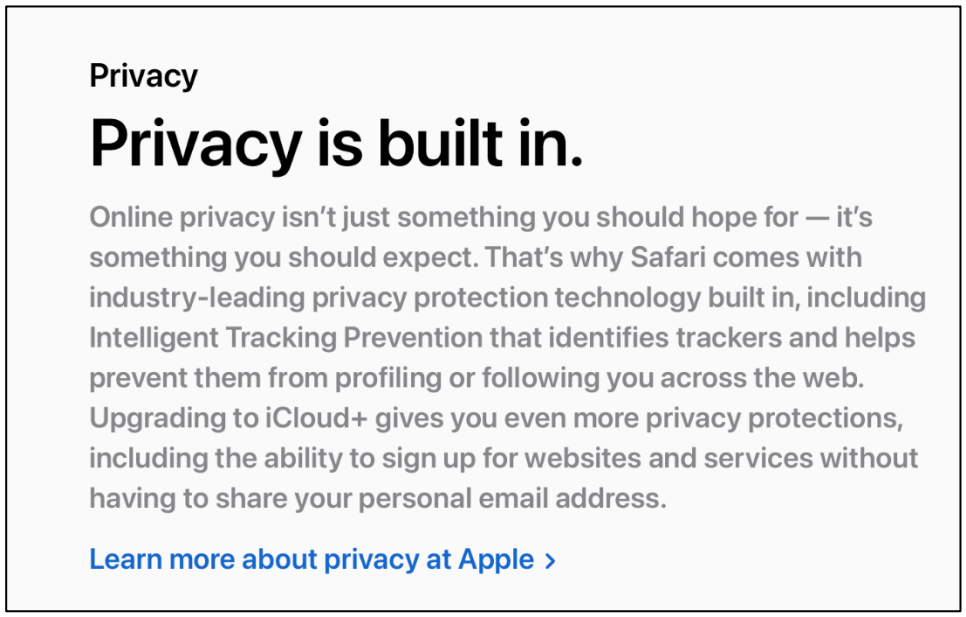
225. The pattern is troubling: Apple's smartphones are repeatedly exploited with dangerous and invasive attacks, and Apple gives its users no choice but to remain fish in a barrel. iPhone users are stuck in a vulnerable state without any choice of switching browsers.

226. None of this is a technical necessity. Indeed, Apple permits any browser engine to run on its Macintosh computers, but does not allow it on its iPhones and other iOS devices.

227. Apple's willingness to routinely expose all of its iPhone users to remotely activated cybersecurity threats is evidence that Apple's real reason for its agreement with Google on WebKit is to

keep out a cross-platform threat. Absent that purpose, Apple's decision to expose its users to catastrophic security risks makes no sense.

228. Apple's conduct is particularly irrational given that it differentiates its iPhone product from Android by advertising browser security. As Apple explains on its page marketing the Safari web browser built into its iOS operating system:



229. Apple is willing to risk its reputation for security—one of its most-marketed product features on the iPhone—to maintain its WebKit agreements. This makes no economic sense but for the anticompetitive effects Apple and Google obtain, particularly the strengthening of the MEBE protecting their duopoly.

2. Google's Elimination on iOS of Its Hard-won Product Differentiation Is Irrational But for Its Anticompetitive Effect

230. But for the anticompetitive effect, the agreement with Apple on WebKit is economically irrational for Google as well.

231. Google expends significant resources advertising the speed and security of its Chrome browser. Google is able to obtain product differentiation by optimizing its Blink browser engine.

232. Indeed, Blink is the primary means Google is able to maintain its massive browser share outside of Apple's mobile devices.

233. Google essentially scuttles all of its comparative advantages to Safari and other browsers on iOS, relying on Apple's browser engine to ensure performance.

234. This makes no sense absent the anticompetitive effects of Google's agreement with Apple. By giving up any product differentiation for Chrome, Google also cedes its ability to lock iPhone users into its Chrome ecosystem through its browser extensions.

235. Google's decision to give up competing with Apple on iOS can only be explained by the anticompetitive purpose and effect of its agreement with Apple. To Google, it is more important to prevent a cross-platform browser engine on the iPhone than it is to differentiate its product on Apple's mobile devices.

236. Doing so maintains the MEBE, and impedes a new smartphone maker from entering the market, even at scale (as Microsoft attempted to do). Google—which benefits from the smartphone duopoly to the tune of billions of dollars annually—has agreed with Apple that the two companies' supracompetitive smartphone profits must be protected at all costs.

IV. THE RELEVANT MARKETS

237. As explained below, Apple's conduct harms competition in two relevant markets—the United States market for smartphones (the "Smartphone Market"), and the United States market for smartphone operating systems (the "Smartphone OS Market" or "SOS Market").

A. The United States Smartphone Market

238. The Smartphone Market is a distinct submarket of the overall market for mobile phones. The product sold in that market is the smartphone, which includes the hardware required to communicate through cellular networks, a multitouch display, a battery with sufficient power to maintain functionality for several hours, and an operating system optimized for mobile applications, hardware, and battery constraints. Smartphones generally run one of two such operating systems—Android and iOS.

1. Distinct Submarket

239. The Smartphone Market is a distinct submarket of mobile phones. Several relevant factors indicate that the Smartphone Market is distinct from others, including the general market for mobile phones.

240. ***Industry and public sources recognize the Smartphone submarket as a separate economic entity.*** Smartphones are widely and universally recognized as distinct from other mobile devices. Although, like traditional cellular phones, smartphones are capable of making phone calls through cellular networks, they are not reasonably interchangeable with traditional cellular phones.

241. To begin with, public sources routinely define smartphones as a distinct market from cellular phones generally. For example, market analysis firm, International Data Corporation ("IDC"), recognizes the market for smartphones as distinct and Apple as the dominant manufacturer of smartphones.

242. As IDC stated in a January 15, 2024 article titled, "Apple Grabs the Top Spot in the Smartphone Market in 2023 along with Record High Market Share Despite the Overall Market Dropping 3.2%, According to IDC Tracker":

> The last time a company not named Samsung was at the top of the smartphone market was 2010, and for 2023 it is now Apple. A sort of shifting of power at the top of the largest consumer electronics market was driven by an all-time high market share for Apple and a first time at the top. Overall, the global smartphone market remains challenged, but momentum is moving quickly toward recovery. According to preliminary data from the international Data Corporation (IDC) Worldwide Quarterly Mobile Phone Tracker, global smartphone shipments declined 3.2% year over year to 1.17 billion units in 2023. While this marks the lowest full-year volume in a decade, driven largely by macroeconomic challenges and elevated inventory early in the year, growth in the second half of the year has cemented the expected recovery for 2024. The fourth quarter (4Q23) saw 8.5% year-over-year growth and 326.1 million shipments higher than the forecast of 7.3% growth.

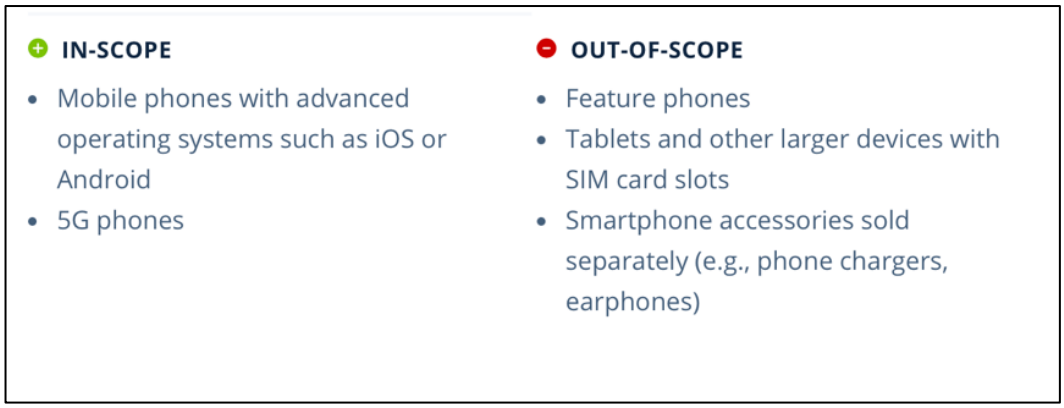
243. Data firm Statista likewise recognizes the Smartphone Market, particularly the United States Smartphone Market, as a distinct submarket. Statista defines the market as follows:

> Smartphones are mobile devices that combine the functionality of a computer with the ability to make phone calls. It typically features a touch

> screen display, a camera, internet connectivity, and a range of other features, such as GPS navigation, music playback, and the ability to run apps (short for applications). Smartphones run on operating systems like Android, iOS, and Windows, and offer a range of apps for productivity, games, social media, and entertainment. Some smartphones also have the ability to connect to other devices, such as laptops, tablets, and wearable devices, to share data and perform other tasks.

244. Statista estimates that Apple has a 62% brand share of the market as of January 2024. Statista also projects that the market will reach $60.8 billion in revenue in 2024, with an annual growth rate of 0.86%.

245. Statista includes within the scope of the market "[m]obile phones with advanced operating systems such as iOS or Android," and excludes other devices, such as tablets and feature phones.



246. Financial firms and investment banks also recognize the Smartphone Market as distinct. For example, as recognized by TechCrunch in a December 1, 2023 article, titled "Smartphone sales to rebound on AI gains, Morgan Stanley says," firms such as Morgan Stanley and Goldman Sachs cover and analyze the Smartphone Market as a distinct economic entity and product market:

> Smartphone sales will mount a comeback starting in 2024, defying growing warnings of a prolonged slump across the mobile sector, according to separate projections by Goldman Sachs and Morgan Stanley reviewed by TechCrunch.
>
> Morgan Stanley's report predicts global smartphone shipments will rebound by nearly 4% in 2024 and by 4.4% in 2025, shrugging off comparisons to the PC industry's multi-year downdrafts. . . .
>
> Goldman Sachs estimates that global smartphone volumes in 2023 will end at a 5% y-o-y dip to 1.148 billion units, down from an estimated 1.206

> billion phones shipped last year. The 2023 decline would mark a second straight annual drop following much steeper falls in 2022.
>
> But Goldman said momentum will rebuild in 2024 and 2025, fueled by new product launches. It forecasts worldwide smartphone shipments rising 3% to 1.186 billion in 2024, then climbing another 5% to 1.209 billion in 2025.
>
> "With the holiday season and continuous restocking, along with better guidance from the supply chain on a market recovery, we revised up 2023-25E smartphone shipments; however, we continue to expect low single digit growth in 2024-25E, and global smartphone shipment to gradually get back to the 2022A level by 2025E," Goldman Sachs analysts wrote.

247. ***Peculiar characteristics and uses***. Smartphones are also widely recognized as distinct from "dumbphones" or traditional cellular phones on a feature basis. Indeed, smartphones have peculiar characteristics and uses as compared to other mobile devices.

248. For example, as TechTarget explains in its definition of "dumbphone":

> A dumbphone (also seen as *dumb phone*) is a mobile telephone that, unlike a smartphone, has little-to-no computing or internet capacity.
>
> Smartphones have become so sophisticated that they are for all intents and purposes miniature computers with the ability to make and receive voice calls—which may be one of their less commonly-used features. Like the cell phones of decades ago, dumbphones are used mostly for calling. The devices typically enable texting, albeit through methods that don't require a full keyboard such as multi-tapping or text on nine keys (T9). Some dumbphones include features such as MP3 players and simple games, in which case they are sometimes called feature phones.
>
> Dumbphones don't require data plans and are typically much cheaper to own and operate than smartphones. Because they don't have many features, the devices have lower power requirements and can run for several weeks on a charge. With their limited connectivity, dumbphones also provide a security advantage over smartphones.

249. A central feature of a smartphone is the use of a multitouch display. These displays allow both input and output through the screen of the smartphone, allowing the smartphone to maintain a form factor focused on a large display.

250. As Lifewire explains in an August 22, 2021 article titled, "What Is a Multi-Touch Screen":

> Multi-touch technology makes it possible for a touchscreen or trackpad to sense input from two or more points of contact at the same time. This

> allows you to use multiple finger gestures to do things like pinch the screen or trackpad to zoom in, spread your fingers to zoom out, and rotate your fingers to rotate an image you are editing.
>
> Apple introduced the concept of multi-touch on its iPhone smartphone in 2007 after buying Fingerworks, the company that developed the multi-touch technology. However, the technology isn't proprietary. Many manufacturers use it in their products.

251. Virtually every smartphone sold uses a multitouch display, including those manufactured by Samsung, Google, and Apple.

252. Moreover, because smartphones interface with the Internet either through apps or a web browser, they are equipped with high throughput transceivers that enable the devices to transmit and receive high-bandwidth data through cellular networks, including 3G, 4G, and 5G networks.

253. Smartphones with LTE and 5G transceivers are capable of broadband Internet connection speeds. Indeed, 5G networks can rival home broadband speeds.

254. As the Wall Street Journal explained in an August 17, 2020 article titled, "5G Smartphones Could Crush Your Home Wi-Fi. So Where's the 5G?"

> This 5G is the fifth generation of cellular networks, designed to replace 4G, aka LTE. AT&T, Verizon and T-Mobile have all been building out their networks here in the U.S. You may have heard how it will unlock the future of self-driving cars, augmented reality and lots of other buzzword-bingo tech terms.
>
> Most of that isn't quite ready, but what is? A bunch of new 5G phones, including an expected iPhone, that are required to tap the speeds of these new networks. And though they are completely upgraded inside, you don't need to sell an internal organ to buy one. I've been testing the $600 Samsung Galaxy A71 5G on AT&T and T-Mobile and the $800 OnePlus 8 5G on Verizon. (I've also been testing an unlocked $1,300 Galaxy Note 20 Ultra on all three carriers).

255. Virtually every modern cell phone is now equipped with 5G functionality. Apple's iPhone supports 5G (since the October 2020 release of the iPhone 12), and virtually every modern iPhone and smartphone includes an LTE transceiver allowing high-speed data transmission.

256. Because smartphones have large multitouch screens and communicate at broadband data rates, they require batteries large enough to power such components for several hours—often for a full business day or more.

257. Smartphone batteries typically provide approximately 4,000 to 5,000 mAh of capacity. These batteries can run typical smartphone loads for approximately 10-12 hours, and when idling, can last several days without being recharged. The batteries themselves typically have two to three years of life before replacement is needed.

258. Apple's iPhone 15, for example, is advertised to last approximately 20-29 hours (depending on the model) while playing back video, and 80-100 hours while playing back audio.

259. Unlike traditional cell phones, which can operate weeks without being recharged, smartphones require large batteries to provide baseline functionality. Because of the power consumption characteristics inherent in smartphone use, smartphone hardware is not interchangeable with other cell phone hardware, particularly the power and battery systems on the smartphone.

260. Moreover, because smartphones power large screens, manage large batteries, and manage complex input and output through multitouch interfaces, they require complex mobile operating systems. Without such operating systems, a smartphone cannot function, whereas traditional cellular phones do not require a complex operating system for their far more limited functionality.

261. The two dominant operating systems are Apple's iOS and Google's Android. These operating systems are optimized to, among other things, manage power consumption, maximize battery life, handle high throughput/bandwidth communication, run full-featured third-party applications, and manage location and cloud services.

262. Smartphones are used for purposes beyond making phone calls through cellular networks. They are used to browse the Internet through the worldwide web, interact with various servers and systems through third-party applications and through the mobile operating system, and even for voice applications, to access VOIP and videoconferencing services that traditional cellular phones cannot access.

263. Smartphones can be used to, among other things, edit documents, take photos, listen to music, watch movies and TV shows, obtain map information and real-time directions, and interact with social media. Traditional cellular phones, such as flip phones and limited feature phones, are unable to perform even a small subset of these tasks—if any of them at all.

264. Moreover, because smartphones are also capable of full-featured web browsing. smartphone operating systems must provide browsers and browser engines. No such functionality is provided as part of dumbphones or traditional cellular phones.

265. Smartphones also provide nearfield communications systems that enable mobile payments. For example, Apple's iPhones provide for contactless payments using Apple Pay. Android smartphones also provide NFC-based contactless payment systems, such as Google Pay and Samsung Pay. Cellular phones do not have such functionality.

266. Because smartphones are highly portable and are carried around by users from place to place, smartphones generally provide means to encrypt and decrypt data at high speeds and with low power consumption. Cellular phones do not generally handle encrypted data, as access to such a device does not generally mean access to a user's documents, contacts, messages, e-mails, and financial information.

267. Smartphones are also distinct from tablets because of their form factor. They can be held to the ear to make a phone call, and they can discreetly take photos. They can be placed in a pocket or carried as part of a wallet. Most tablets have screen sizes that are too large for such applications.

268. Moreover, tablets do not necessarily come with LTE and 5G antennas (though such functionality can be added), whereas all smartphones do. This is because tablets are often kept on the person, such as in a pocket, bag, or purse.

269. ***Unique production facilities.*** Smartphones require highly sophisticated manufacturing. To begin with, because smartphones are power constrained, meaning they must generally operate using a battery, the CPUs and supporting chips for a smartphone must be made with the smallest sized transistors available.

270. Only state-of-the-art chip fabrication facilities are capable of manufacturing nanometer-scale chips. Apple is one of the few companies that manufacturers and distributes devices with 3 nanometer chips at scale. Not every fabrication facility can produce such chips. Taiwan Semiconductor Manufacturing Company ("TSMC") is one of the few fabrication facilities that can manufacture nanometer scale chips, and smartphone manufacturers, such as Apple, have a significant amount of TSMC's capacity.

271. As Ars Technica reported in an August 7, 2023 article titled "Report: Apple buys every 3nm chip that TSMC can make for the next-gen iPhones and Macs":

> It's been rumored for several months now that Apple will be using new 3nm manufacturing process from Taiwan Semiconductor (TSMC) for its next-generation chips, including M3 series processors for Macs and the A17 Bionic for some next-gen iPhones. But new reporting from The Information illuminates some of the favorable terms that Apple has secured to keep its costs down: Apple places huge chip orders worth billions of dollars, and in return, TSMC eats the cost of defective processor dies.

272. Access to fabrication facilities require large orders and the ability to absorb the costs of defective chips that are inherently part of the manufacturing process. Smartphone manufacturers can generally bring these costs down and ensure access through scale.

273. As Ars Technica further explains:

> At a very high level, chip companies use large silicon wafers to create multiple chips at once, and the wafer is then sliced into many individual processor dies. It's normal, especially early in the life of an all-new manufacturing process, for many of those dies to end up with defects—either they don't work at all, or they don't perform to the specifications of the company that ordered them.

274. The design of smartphones requires the cooperative work of hundreds if not thousands of highly-skilled engineers. Each aspect of the smartphone must be engineered by those with significant expertise, including the hardware that operates the smartphone display, the multi-touch interface, the communications chips, the CPUs, the assembly, the heat dissipation systems, encryption and decryption hardware, and the power management system, among many other components.

275. The assembly of smartphones must also occur using skilled labor, but not expensive labor. Indeed, Apple assembles its smartphones in China, then imports the finished product to the United States for sale. The assembly of the product not only requires a sophisticated manufacturing system tailored to building a smartphone, which is an integrated device, but also a complex supply chain to ensure adequate parts are transported to manufacturing plants in time for assembly.

276. Put simply, smartphone manufacturers employ unique production facilities to design, assemble and generally manufacture their smartphone products. The manufacturing process required for a smartphone is bespoke to the product, meaning a manufacturer must build a manufacturing process tailored to the components, price point, and functionality of the smartphone. Almost all smartphone manufacturing requires significant scale for viability, including as to the fabrication of the chips used in the smartphone device.

277. ***Distinct customers.*** Smartphone manufacturers sell to distinct customers from those that purchase cellular phones and dumbphones.

278. Indeed, the customer base for cellular phones is far narrower and mostly geared towards a minority of the population that does not want to—or cannot—operate a complex device or interact with a complex user interface.

279. Flip phones, such as the "Jitterbug," for example, are marketed and used by some of the elderly population. The large buttons and simple user interface appeal to this target demographic. As such, flip phones and other non-smartphone devices are purchased by a distinct set of customers.

280. Moreover, for customers that use smartphones for business purposes, the ability to open third-party apps, make conference and VOIP calls, and browse documents on a large screen make any cellular phone other than a smartphone impossible to use for such purposes.

281. As a general matter, smartphones are marketed to almost all of the U.S. population. Only a small subset of the United States population uses a dumbphone or a flip phone. As Statista explains in on a page titled "Smartphones in the U.S. – statistics & facts":

> Since the introduction of the smartphone, the device has played an increasingly important role in people's life, to the point that today, we

> could not image a day without it. The smartphone market in the United States is one of the world's largest, with over 310 million smartphone users as of 2023. In line with the overall growth of the smartphone market worldwide, the smartphone penetration rate in the United States has continuously risen over the past several years, reaching around 92 percent in 2023. Revenue from smartphone sales is forecast to reach close to roughly 102 billion U.S. dollars in 2023, recovering from the lower revenue recorded in 2022.

282. ***Distinct prices and sensitivity to price changes.*** Smartphones are sold at significantly higher prices than cellular phones, including flip phones and feature phones. Flip phones sell at a fraction of the price of smartphones, including those sold by Samsung and Apple, which reach prices well over $1,000 near the high end.

283. Smartphones include high-resolution cameras, high-resolution screens, and other expensive components. This requires that they sell for at least a certain price—one well above the price of cellular phones. Apple's iPhone 15 Pro begins at $999, and its Pro Max product at $1,199. Samsung's S23+ sells for approximately $1,199.99. Google's Pixel Pro sells for $999. At bottom, smartphones generally sell for prices well above the price of dumb phones or flip phones.

284. Smartphones are generally priced competitively, meaning phones with comparable features are priced similarly. Prices for smartphones are not sensitive to prices for other cellular phones since they are not reasonably interchangeable with them. For example, a price reduction on a flip phone used by a small subset of the population has little or no effect on the price of the full-featured iPhone.

285. ***Specialized vendors.*** There are specialized vendors to the Smartphone market. On the manufacturing side, companies such as TSMC and Samsung sell components to manufacturers of smartphones.

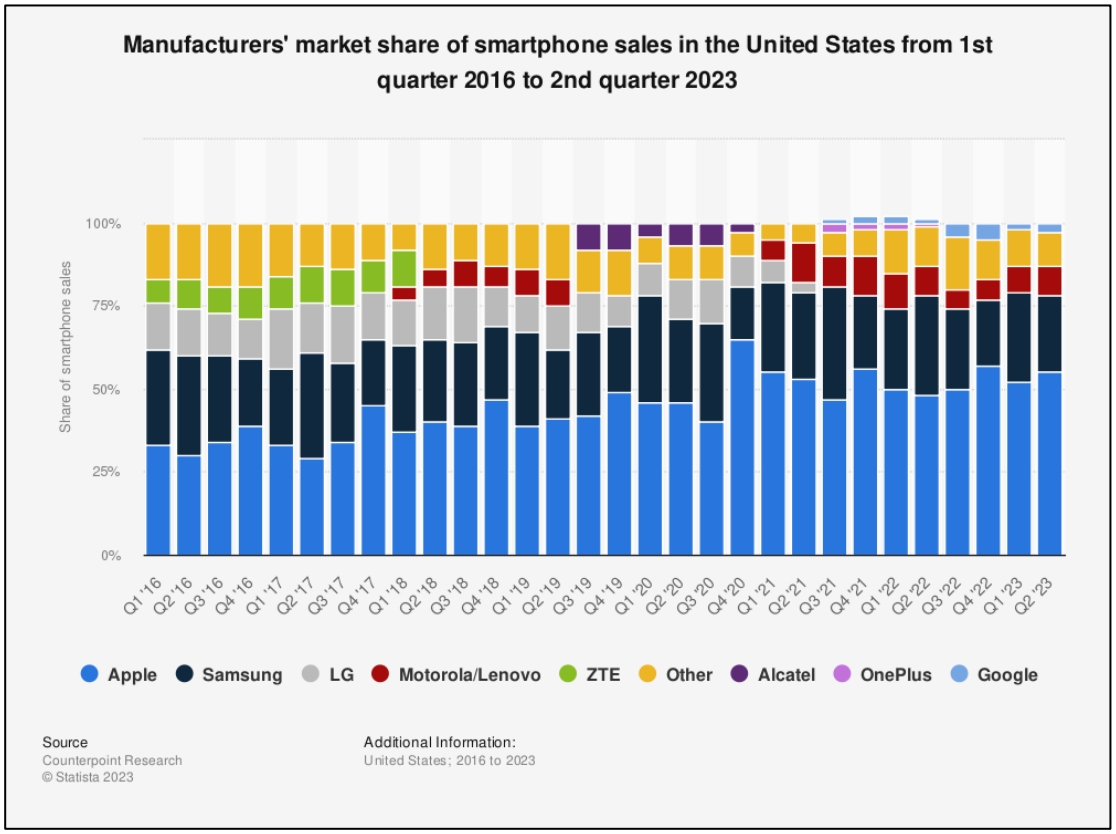
286. For purchasers, there are many specialized vendors, including vendors that repair damaged smartphones, create protective cases and enclosures for smartphones, and who provide aftermarket accessories for smartphones, such as tripods and charging devices.

287. Specialized vendors include Belkin, Insignia, Anker, Caseology, Totallee, Incipio, and Otterbox. There are many more specialized vendors.

2. Market Participants and Market Concentration

288. The Smartphone Market includes several participants. The largest among them is Apple, which maintains the largest individual share of the market. Other market participants from 2016 to the present include Google, Samsung, LG, Motorola/Lenovo, ZTE, OnePlus, and Alcatel. Some of these market participants, such as OnePlus, have withdrawn from the market or lost market share below measurable thresholds.

289. In the United States, Apple has consistently maintained the largest individual share of the market since 2016, currently maintaining more than half of the U.S. Smartphone Market Share. The market shares for each market participant in the U.S. Smartphone Market is set forth below:



290. As of Q2 2023, Apple had a 55% share of the U.S. Smartphone Market, with Samsung at 23%, Motorola at 9%, and Google at 3%. Other brands combined constitute approximately 10% of U.S. Smartphone Market Share.

291. Apple and Google are direct horizontal competitors in the U.S. Smartphone Market, as they both design, manufacture, and sell comparable smartphones. Indeed, Apple's iPhone competes directly with Google's Pixel line of smartphones.

292. The market is highly concentrated. The United States Department of Justice Antitrust Division applies the Herfindahl-Hirschman Index ("HHI") to measure market concentration. Applying that metric here, the HHI of the U.S. Smartphone Market is approximately 3,644 among named brands with more than 1% individual shares, and 3744 if the remaining 10% of small market participants are aggregated. Under any variation of this measure, the U.S. Smartphone Market is highly concentrated. Indeed, the U.S. Department of Justice considers HHIs greater than 1,800 to be "highly concentrated." *See* U.S. Department of Justice & FTC, Merger Guidelines § 2.1 (2023).

3. The Relevant Geographic Market

293. The relevant geographic market is the United States Smartphone Market.

294. To begin with, smartphones are pre-configured, sold by, and generally locked to work with particular U.S. carriers, such as AT&T, T-Mobile, and Verizon. Agreements with U.S. carriers do not automatically allow for connection in other countries—that is, absent reciprocity agreements among carriers or roaming charges. Smartphones purchased in the United States are generally purchased for use in the United States.

295. U.S. smartphones are also not necessarily compatible with cellular networks outside of the United States. Certain geographic regions operate on different radio bands than in the United States, and fallback or legacy networks available in the United States are unavailable in other countries (or vice versa).

296. Moreover, smartphone manufacturers also market cell phones for different bands used in various countries. For example, Apple sells the model A2848 and A2849 of its iPhone 15 Pro and Pro Max for the United States and Puerto Rico, but sells different versions of the iPhone 15s (A3101 and A3105) for Canada, Guam, Japan, Mexico, Saudi Arabia, and the USVI. Apple distributes another

variation for other countries, including Australia, Brazil, Denmark, German, Greece, India, Israel, Sweden, and Switzerland, among many others. *See* https://www.apple.com/iphone/cellular/.

297. United States Smartphones are regulated by United States regulatory agencies, including the Federal Communications Commission. Their sale in the United States is also subject to U.S. patent and intellectual property laws, as well as import and export restrictions imposed by United States regulatory agencies, such as the United States International Trade Commission.

298. To the extent software on a smartphone includes encryption, the smartphone may also be subject to export controls under U.S. laws, which Apple warns third-party developers about on its developer page.[1]

299. Put simply, cross-elasticity of demand for U.S. smartphones is generally limited to the United States geographic region, where smartphones are reasonably interchangeable.

4. Barriers to Entry

300. The U.S. Smartphone Market is protected by powerful barriers to entry, including the MEBE.

301. To begin with, manufacturing a smartphone requires economies of scale, a robust supply chain and access to components, access to expensive manufacturing facilities, design and engineering personnel, software and hardware engineers, and a means of distributing and supporting the product.

302. A new entrant is unlikely to be able to enter at scale without acquiring some or all of the above from an incumbent firm, such as Samsung. For example, Samsung is one of the few sources for high-resolution multitouch displays.

303. Even Apple often relies on Samsung to produce the OLED displays it needs for its iPhone products. As PC Magazine noted in a March 27, 2023 article titled, "Apple Will Be more Reliant on Samsung Display for iPhone 15 Production":

[1]https://developer.apple.com/documentation/security/complying_with_encryption_export_regulations.

> Chinese manufacturer BOE can't mass produce the OLED displays required for the iPhone 15, leaving Apple with little choice other than ask Samsung to make more of them.
>
> As TheElec reports, Apple awarded BOE an order for iPhone standard model displays, but the company has struggled to produce them. The problem is one of light leakage around the hole near the top of the display used for the dynamic island. BOE couldn't solve the problem in time, so Apple has been left with a production hole that needs filling.
>
> The solution is a bigger order for Samsung Display, which is now expected to start production of standard model iPhone 15 OLED panels a month early in May. Samsung Display's production of the higher-end iPhone 15 model displays will go ahead as planned in June. BOE is expected to continue working on a solution to its light leakage problem in the hope that mass production becomes possible soon.

304. The communications chips in smartphones are subject to a complicated web of patent and IP licensing, including for Standard Essential Patents. New entrants would have to obtain costly licenses to enter at scale.

305. An additional aspect of the barrier to entry surrounding the U.S. Smartphone Market is the high cost of designing and manufacturing mobile CPUs and systems-on-a-chip ("SOCs"). Apple, for example, has historically developed its own custom SOCs, including by licensing CPU and other technology from ARM, which it packages as part of its own "Apple Silicon."

306. Creating custom SOCs, among other components, is extremely costly. A new entrant is unlikely to be able to obtain the engineering skill and manufacturing capability to compete with incumbents, such as Apple, on this important basis.

307. To sell a smartphone, an entrant must also obtain a mobile operating system, which must be tailored to operate mobile chipsets, conserve power, operate third-party applications, and interact with communications systems on the smartphone—among many other things. A new entrant cannot generally license Apple's iOS operating system, or the distributed versions of Android used in competing smartphones. A new entrant would have to extensively adapt or customize the open-source version of Android to provide the minimum functionality necessary to sell a competitive product, which, as explained below, locks the new product into Google's ecosystem.

308. Moreover, as explained above, the MEBE protects the U.S. Smartphone Market (as well as the U.S. Smartphone Operating System Market as explained below).

309. The MEBE arises from the feedback loop created by a critical mass of third-party apps for the device. The greater the number of apps, the more individuals are attracted to the product, and in turn, the more developers develop apps for the platform.

310. The U.S. Smartphone Market is protected by the MEBE because a new entrant will have to convince developers to create apps for its device and also convince new users to use the device. Because users will not adopt a smartphone with no third-party apps, developers will also not develop for the platform because of inadequate users, creating a chicken-or-the-egg problem for a new entrant.

311. As explained above, Microsoft was unable to traverse the MEBE because it could not garner enough developer support to build third-party Apps for its Windows Phones. The MEBE prevented Microsoft from selling smartphones.

312. The MEBE in conjunction with other manufacturing and scale-related barriers to entry also prevented Firefox from entering the U.S. Smartphone Market with its own device. Even with a means of running third-party apps through its browser engine, Firefox could not build smartphones at scale and with the necessary hardware features to compete with incumbents. Moreover, Firefox could not ensure cross-platform support due to Apple's anticompetitive agreements with horizontal smartphone competitors, including Google.

313. In other words, there is direct evidence of powerful barrier to entry surrounding the U.S. Smartphone Market, particularly the MEBE. Indeed, Microsoft, with its large user base, direct access to scaled manufacturing, an existing operating system, and unparalleled ability to invest in a new product, could not traverse the barriers to entry surrounding the U.S. Smartphone Market.

B. The United States Smartphone Operating System Market

314. The U.S. Smartphone Operating System Market (the "SOS Market") is also relevant to the claims asserted here, including because Apple's anticompetitive conduct harmed competition in that market and because the same MEBE protects both the SOS Market and the Smartphone Market.

315. As explained below, the SOS Market is a distinct submarket of the general market for operating systems. The SOS Market includes operating systems designed to run on smartphones. As explained below, there are only two products in the SOS Market with non-trivial market share, Apple's iOS and Google's Android. Together, the two SOS Products form a duopoly, with each occupying approximately half of the U.S. SOS Market.

1. Distinct Submarket

316. The SOS Market is a distinct submarket of operating systems. Several relevant factors indicate that the SOS Market is distinct from others, including the general market for computer operating systems.

317. ***Industry and public sources recognize the SOS submarket as a separate economic entity.*** The SOS Market is widely recognized as a distinct submarket of the general market for operating systems.

318. For example, as reported by Statista, Comscore compiles and publishes market share data for the smartphone operating system market (set forth below). Statista Research also describes the SOS Market as distinct:

> Apple's iOS continues to hold the largest share of the smartphone operating systems market in the United States, claiming more than half of the market as of July 2023. Apple's share of the US market has risen steadily since early 2012, when it accounted for around 30 percent. The growth is not reflected in all markets. However, with Apple's global share remaining year-on-year.

319. Counterpoint Research also recognizes the distinct SOS Market, and sets forth U.S. SOS Market shares separately from global market shares. Counterpoint reports that Apple has a 55% market share to Android's 45% as of Q3 2023.

320. The SOS Market is recognized as encompassing a distinct operating system product designed for smartphones.

321. As Howstuffworks.com explains in an article titled, "How Smartphones Work":

> The most important software in any smartphone is its **operating system (OS)**. An operating system manages the hardware and software resources of smartphones. Some platforms cover the entire range of the software stack. Others may only include the lower levels (typically the kernel and

> middleware layers) and rely on additional software platforms to provide a user interface framework. We've added some snapshots of specific smartphone operating systems.

322. Smartphone Operating Systems are also considered distinct from other operating systems by the industry. Such operating systems are defined by the constraints under which they must run and the minimum functionality they must provide.

323. For example, TechTarget defines "mobile operating system," a term used interchangeably with smartphone operating system, as:

> A mobile operating system (OS) is software that allows smartphones, tablets and other devices to run applications and programs.
>
> A mobile OS provides an interface between the device's hardware components and its software functions. It typically starts when a device powers on, presenting a screen with icons or tiles that show information and provide application access. Mobile operating systems also manage cellular and wireless network connectivity and phone access.
>
> Millions of people use mobile operating systems worldwide, powering a wide range of devices, from smartphones to tablets to wearable technology. These systems offer users a wide selection of features, including calling and messaging, internet and cellular data connectivity, multitasking capabilities, interactive user interfaces and access to a wide range of third-party applications and services to enhance the user experience even further.

324. The United States Department of Defense ("DOD") also recognizes mobile operating systems that run on smartphones as distinct. For example, in an August 10, 2022 memorandum (posted publicly on the DOD website) titled, "Use of Non-Government Owned Mobile Devices," the DOD recognizes mobile operating systems as distinct:

> This memorandum and attachment establish minimum requirements for the use of non-government owned mobile devices (e.g., personally or commercially owned), hereinafter "Approved Mobile Device" (AMD), to store, process, transmit, or display up to Department of Defense Controlled Unclassified Information (CUI). This memorandum's scope is limited to mobile device information technology (IT) with ***mobile operating systems (OS) (e.g., Apple iOS, Android)*** used to access and process up to DOD CUI (e.g., Impact Level 5 data), as defined in references (a) and (b).

(emphasis added).

325. Put simply, industry and public sources consistently recognize the SOS Market as distinct from other operating systems, including those that run on general PCs.

326. ***Peculiar characteristics and uses.*** Smartphone operating systems have peculiar characteristics and uses that make them distinct from other OSes.

327. To begin with, smartphone OSes are designed specifically for smartphone hardware. The kernel of the operating system, which is the core software of the operating system that manages memory and hardware, is optimized to operate a system on a battery.

328. Smartphone operating systems also maintain application programming interfaces ("APIs") that are different from other OSes, particularly as to the user interface. Apple's iOS, for example, is based on Cocoa Touch with UIKit, a user interface optimized for the smartphone's multitouch user interface. Apple's desktop PC operating system, MacOS, uses a different interface called Cocoa, with APIs from the AppKit UI framework.

329. As a February 16, 2023 article posted on Medium by iOS Guru, titled "Cocoa Touch and UIKit Frameworks in iOS Development with Swift," explains:

> Cocoa Touch is the application programming interface (API) used to create native iOS applications. It provides a set of frameworks and classes that provide the basic infrastructure for building iOS apps. UIKit is a framework that provides the basic user interface elements and the infrastructure for managing them. Together, they provide the building blocks necessary to create a full featured iOS app.
>
> **Cocoa Touch**
>
> Cocoa Touch is the API used to create native iOS applications. It is based on the Cocoa API that is used for Mac OS X apps. Cocoa Touch provides a set of frameworks and classes that provide the basic infrastructure for building iOS apps. It provides access to the hardware and software features of iOS devices, such as the accelerometer, the camera, the GPS, and the touch screen. It also provides the user interface elements, such as the views, the navigation bar, the tab bar, and the table view.
>
> **UIKit**
>
> UIKit is a framework that provides the basic user interface elements and the infrastructure for managing them. It provides the views, the navigation bar, the tab bar, and the table view. It also provides the event handling

> infrastructure, such as the touch events, the motion events, and the gesture recognizers. UIKit also provides the animation infrastructure, such as the view transitions, the view animations, and the Core Animation framework.

330. In other words, unlike general operating systems that run PCs and laptops, smartphone OSes are designed for multitouch interfaces—particularly the interfaces available on small-screened devices. Due to limited screen space and significant differences in how users interact with smartphone applications, smartphone OSes must provide APIs tailored for smartphones. These APIs built into smartphone OSes are not reasonably interchangeable with those built into general operating systems designed to run PCs and laptops.

331. Operating systems must provide essential applications, such as applications that allow a change in OS settings, that allow a user to obtain a "shell" or means of interacting with the OS's kernel (which can be a graphical user interface), and that facilitate communication with other computers. At the lowest level, smartphone operating systems provide APIs that allow apps to send and receive packets over protocols such as TCP/IP and UDP.

332. At the user level, every modern operating system includes a web browser. The web browser and its constituent parts, including its rendering engine or web engine, is one of the central-most functions of a modern operating system. Indeed, for smartphones, every major OS since the introduction of the iPhone has featured a web browser designed to render and present web pages on the smartphone's more limited screen space and to provide user interfaces for multitouch displays.

333. Smartphone OSes provide both the user interface needed to browse the web and the engine needed to render web pages as part of its web browser. On Apple devices, the default web browser is Safari, and the web engine is called WebKit. On Google's Android operating system, the default web browser is Google Chrome, and the web engine is called Blink.

334. The web engine provided by the operating system is not only used to render web pages on a web browser; it is used to render content in third-party apps. On iOS, WebKit even handles rendering when third-party apps incorporate their own web browsing functionality into their apps.

335. On desktop PCs, users are free to use whatever web browser and web engine they choose. Smartphone operating systems, however, are configurable to restrict the use of other web engines. As

explained above, Apple does not permit any other web engine to run on its devices other than its WebKit web engine. This means that even third-party apps on Apple's iPhones must use WebKit as part of their apps. Apple's laptop and desktop computers are not so restricted.

336. Unlike PC and Desktop operating systems, which can generally run third-party software downloaded from the Internet or distributed physically on a disk, smartphones are almost universally limited to allow downloading apps from a pre-configured distribution source. For Apple, all third-party apps for iPhones must be obtained through Apple's App Store. The iOS operating system uses cryptographic signature checking against an embedded Apple public key to ensure that this restriction is in force at execution time of any third-party application.

337. Android devices are generally configured to permit distribution through Google's Play Store. Indeed, although Android devices can be configured by an OEM to operate with another "app store," almost no devices sold with Android are, as Google bundles significant portions of OS functionality with its "Google Play services." Without configuring Android to obtain apps through Google's Play Store, a smartphone manufacturer loses the benefits of the Android developer ecosystem. Indeed, most smartphone apps for Android rely on Google Play's APIs for important operating system interactions.

338. Put simply, unlike general operating systems, smartphone operating systems are designed and configured to allow only centralized third-party app distribution through channels controlled by the OS maker. None of the general operating systems, such as Microsoft Windows, Linux, and even Apple's MacOS, are designed or configured this way.

339. On Apple's iOS, the restriction on distribution of third-party apps is reinforced and maintained by Apple's WebKit restriction, which prevents the distribution of third-party apps through Apple's own Safari web browser, through an in-app browser in a third-party app, or directly in an app that provides browsing or web-rendering functionality.

340. As a result of this app distribution system, smartphone operating systems almost always run third-party apps that have been pre-approved by the OS manufacturer pursuant to an express agreement as to what functionality and features can be provided.

341. Apple even enters into agreements with third-party developers requiring approval of their app's "business model." Specifically, Section 3.2 of Apple's App Store agreement sets forth "acceptable" and "unacceptable" "business models" for third-party apps.

342. Smartphone operating systems have mechanisms that prevent superuser access by users of the device, whereas general operating systems allow superuser access. To obtain "root" or superuser privileges on iOS, which runs on the iPhone, a user must "jailbreak" their iPhone. Doing so, however, will void the user's warranty and degrade essential OS functionality, including functionality that relies on communications with Apple's systems (*e.g.*, iCloud, iMessage, FaceTime, Apple Pay, Visual Voicemail, Weather, and Stocks).

343. Apple also restricts a user's ability to obtain software updates if they jailbreak their iPhone.

344. On Android, obtaining superuser access requires jailbreaking or rooting the operating system. For many smartphone manufacturers, this will void the warranty. Google's Play store will generally recognize any modifications to third-party applications and will not update them.

345. Whether on Android or iOS, obtaining superuser access to the smartphone OS requires unauthorized and technically complex measures. General operating systems require no such effort, technical knowledge, or unauthorized access to obtain superuser access.

346. Smartphone OSes also prevent access to low-level hardware systems, unlike general OSes. For example, a device driver—software written to interact with third-party hardware—can run on general operating systems, such as Linux, MacOS, and Windows, but third-party device drivers are generally prohibited from running on smartphone operating systems.

347. Smartphone developers must generally write code using the development framework provided by the OS manufacturer. For example, iOS developers must use Apple's XCode toolkit and write apps in Objective C or Swift. Developers are not permitted to write low-level instructions, such as assembly language or C code for the iPhone, particularly to access hardware components, such as the onboard 5G or WiFi hardware. There are no such restrictions on general operating systems, including those that run on PCs or laptops.

348. Smartphone operating systems are distributed with pre-configured device drivers designed and tested for specific hardware. For example, Apple's iOS supports only hardware systems designed and implemented by Apple in its devices. Third-party hardware is not supported at the OS level. A general operating system, however, must operate hardware, such as graphics cards or network adapters, that is developed by third parties.

349. This requires that APIs and system interfaces on general operating systems handle errors and exceptions caused by third-party hardware. Smartphone OSes do not require such infrastructure and generally only come equipped to handle a particular hardware configuration's errors and exceptions.

350. Smartphones must provide location-based services, as smartphones are highly portable. Applications, such as streaming services with content restrictions and digital rights management ("DRM") requirements, rely on such services to ensure that access is restricted to certain regions and/or usage contexts.

351. Smartphones provide robust and tamperproof services for these apps. General operating systems must be configured with additional hardware and/or software for such functionality.

352. Moreover, because video, audio, and streaming content is distributed to smartphones through the OS manufacturers, namely Apple and Google, smartphone OSs contain the necessary encryption/decryption systems, geolocation services, and tamper proofing required to download and play such content on smartphone devices.

353. SOSes therefore provide APIs that app makers can rely upon for such functionality. For example, Android provides the Android.drm APIs.

354. As the Android Developer Page explains:

> **android.drm**
>
> Provides classes for managing DRM content and determining the capabilities of DRM plugins (agents). Common uses of the DRM API include:
>
> Determining which DRM plug-ins (agents) are installed on a device.

> Retrieving information about specific plug-ins, such as the MIME types and file suffixes they support.
>
> Registering a user or device with an online DRM service.
>
> Retrieving license constraints for rights-protected content.
>
> Checking whether a user has the proper rights to play or use rights-protected content.
>
> Associating rights-protected content with its license so you can use the MediaPlayer API to play content.

355. Smartphone OSes are also designed to ensure smooth buffering and playback of content, particularly on limited battery power.

356. ***Distinct customers.*** Smartphone OSes are generally purchased by smartphone purchasers as part of the device. Indeed, because smartphones are highly integrated, smartphone OSs are distributed as an essential part of the smartphone.

357. Because smartphones are almost never sold without an OS, as the smartphone would not have even the minimum functionality to communicate with a cellular network, smartphone customers are distinct from general OS customers, who may purchase an OS separate from their hardware.

358. Moreover, smartphone OSes with minimum operating system functionality are not available without a hardware purchase. Apple's iOS can only be purchased and used (with authorization) in connection with an Apple device. Moreover, because iOS is tailored to Apple's hardware, it cannot run natively on other devices.

359. Google distributes the source code for a base version of Android separately, but that version cannot be run on a smartphone, as it is missing "services" and "service providers" that are necessary for minimum OS functionality. For example, Google's Android must be configured to interact with an App Store—in almost every case, Google's Play Store—to achieve minimum software compatibility and to access certain vital APIs needed for development.

360. In other words, there are generally no smartphone OSes that are distributed or sold separately from hardware. Almost none of the smartphones sold in the United States are sold without a

smartphone OS, and almost all smartphones are sold as integrated with either the Apple iOS or Android smartphone OS.

361. Put simply, smartphone OS customers are distinct from customers that purchase general operating systems.

362. ***Distinct prices and sensitivity to price changes.*** Smartphone OSes are sold with a smartphone. As such, the price for smartphone OSes is paid as part of the price of the smartphone.

363. Apple markets and sells iOS as a distinct part of the smartphones it sells. Indeed, Apple's iOS marketing page features descriptions of iPhone features:

> Every day. More extraordinary.
>
> iOS 17 brings new features to enhance the things you do every day. Express yourself like never before when you call or message someone. Share content in convenient new ways. And do even more with new experiences for your iPhone.

364. Apple's iOS is, however, marketed and sold as a distinct product from the phone, even though it is sold and marketed with the iPhone. Apple's marketing material describes iOS's features, including messaging, location services, search of device content, audio messages, video conferencing through FaceTime, sharing over local and near-field networks (*e.g.*, Airdrop), input and output systems (such as the software keyboard that ships with iOS), password management and security, web browsing features, user interface improvements, power management, and its Siri integrated personal assistant.

365. Because iOS is responsible for much of the iPhone's functionality, including cloud-based services, it is what allows Apple to charge a significant price premium for its devices. Indeed, iOS inducts—and locks in—an iPhone purchaser into Apple's ecosystem, as it is the software responsible for virtually every aspect of that ecosystem.

366. Because of the ecosystem provided by iOS, Apple's iPhone hardware garners a higher price. As a May 2, 2017 CNBC article titled, "Here's why people keep buying Apple products," explains:

> There's one big reason people buy Apple products: the ecosystem.
>
> People don't buy iPhones by the tens of millions just because they like the hardware, though that's a huge part of it, but because they're tied into an

> ever-growing, sprawling ecosystem of software and services that allow you to do more *with* the products if you continue to invest in that ecosystem.

367. Almost every major feature of Apple's ecosystem is provided by iOS, including FaceTime, Messages, content sharing, and iCloud.

368. The price of Apple's iOS is also sensitive to the features it offers. An increase in features offered through iOS results directly in a price premium charged as part of the purchase price of an iPhone. Indeed, iPhones garner a price premium on comparable hardware as compared to hardware sold with the Android smartphone operating system.

369. Apple's iOS is sold directly to consumers.

370. As to Android, the open-source version of Android available from Google is not sufficient to run a smartphone. It requires additional components that are licensed to Google's "partners" and OEMs—namely, smartphone manufacturers—who then incorporate a fully configured, and foundationally different, version of Android as part of their smartphones.

371. The version of Android that is pre-loaded onto Android-based smartphones is sold to customers as a distinct product, with distinct features, but the price of that operating system is incorporated into the price of the Android phone, as well as in the content and third-party apps sold through Google's service providers, such as the Google Play Store.

372. In addition to selling fully configured and featured versions of the Android operating system to OEMs, Google also distributes the Android operating system directly as part of its Pixel phones. It incorporates the price of its version of Android as part of the price of its Pixel phone, though it markets features and functionality provided by Android distinctly.

373. Apple and Google are direct, horizontal competitors in the SOS Market, including because both sell their smartphone OSes directly to consumers as included with their smartphone products.

374. ***Specialized vendors.*** Smartphone OSes have specialized vendors. The most significant vendors for smartphone OSs are third-party developers, which distribute their apps through the app stores associated with each OS.

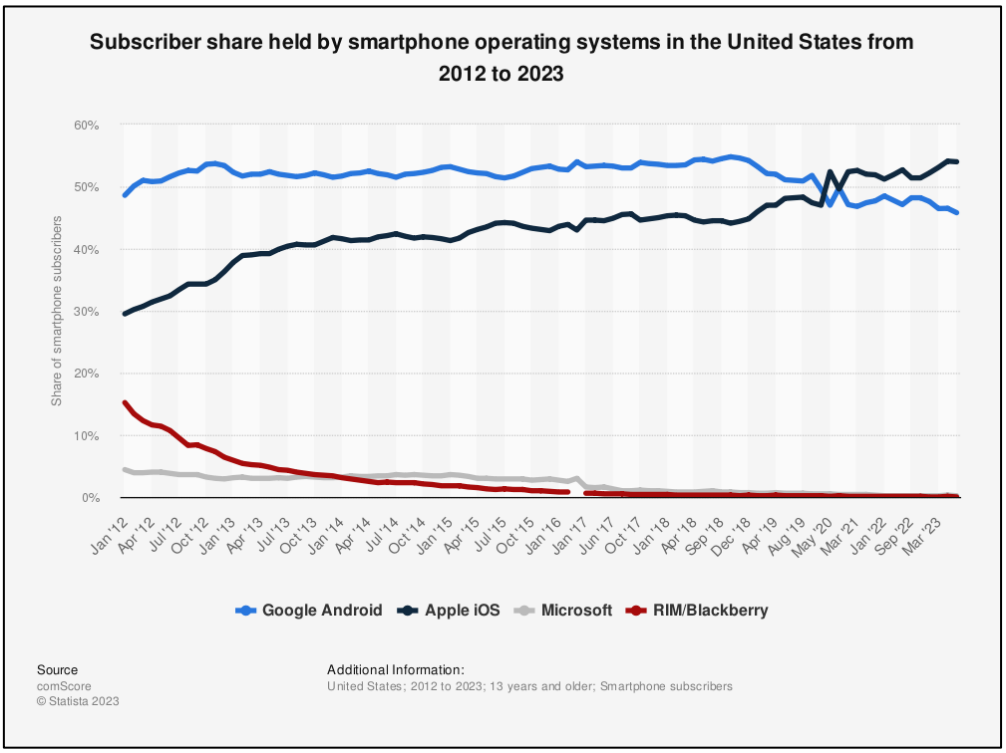
375. In addition, specialized vendors exist to diagnose and troubleshoot smartphone OS problems. These specialized vendors, including Apple's own AppleCare, are trained specifically to service smartphone OSes.

2. Market Participants and Market Concentration

376. The Smartphone OS Market structure is a duopoly controlled by Apple and Google. Both companies are direct, horizontal competitors in the Smartphone Market, and their SOSs compete directly on features.

377. Each company's market share is approximately half of the total. As of July 2023, Google had 45.8% of the market share, and Apple had 54%. The companies together control 99.8% of the market.

378. There are currently no other significant market participants remaining. SOSes distributed by Microsoft and Research in Motion (RIM)/Blackberry are no longer sold in significant numbers in the United States and have essentially been eliminated from the market since late 2017, and definitively by 2018.



379. The HHI metric for the Smartphone OS Market is 5013.64—well beyond the 1,800 HHI that the U.S. Department of Justice considers indicative of a "highly concentrated." *See* U.S. Department of Justice & FTC, Merger Guidelines § 2.1 (2023).

380. If the two companies merged or combined, they would have an uncontested monopoly of the SOS Market, with nearly 100% of the market share.

381. Such a combined entity would have unmitigated and unchecked market power and the ability to impose significant barriers to entry, particularly in light of Apple and Google's combined control of all third-party smartphone app distribution.

3. The Relevant Geographic Market

382. The relevant geographic market is the United States.

383. The iOS operating system is distributed with Apple's smartphones, and because those devices are sold in the United States geographic market (as explained above), so is the iOS operating system.

384. The Android operating system, as configured and licensed by smartphone manufacturers, is also distributed with U.S. smartphones, which are bound to a United States geographic region (as explained above).

385. Moreover, Apple limits the export of iOS to the extent limited by United States law, including restrictions by the U.S. Treasury Department. Apple also maintains separate licensing terms for U.S. purchasers of iOS. Google, when it distributes Android as part of its Pixel smartphones, imposes similar restrictions and maintains separate U.S.-based agreements concerning iOS.

4. Barriers to Entry

386. The U.S. SOS Market is protected by significant barriers to entry. To begin with, and as explained above, the U.S. SOS Market is protected by the MEBE, which is described extensively above.

387. The SOSes themselves are responsible for much of the functionality that creates the ecosystems that are part of the MEBE.

388. Moreover, because of the MEBE, a new entrant would have to provide APIs for developers to make third-party apps. As explained above, however, developers will not develop apps for platforms that do not have sufficient users, particularly where there are technical differences, including in design and exposed APIs, among competing platforms that would require significant investment.

389. Because iOS and Android are the only two dominant platforms, a new entrant would have to provide a platform for third-party apps that could run not only on its new operating system, but could be ported to one of the other dominant operating systems—particularly the most dominant smartphone operating system, iOS.

390. Additional barriers to entry in the U.S. SOS Market include the engineering personnel and technical knowledge required to implement a high-end operating system that can run under significant power constraints.

391. Operating system kernels are so difficult to implement that only two are currently in use in the Smartphone OS Market, both based on modified versions of Unix or Linux OS kernels. A new entrant would have to similarly modify an available OS kernel to enter the SOS Market.

392. A new entrant would also have to provide hardware. If the new entrant wanted to create a product with its own bespoke hardware, it would have to design the SOS in tandem with its hardware design. Such design is extremely expensive and imports many of the barriers to entry protecting the Smartphone Market as a condition for entry.

393. A new entrant in the U.S. SOS Market would also have to comply with extensive regulation by the United States government, including as to encryption services provided by the SOS. This imposes significant regulatory costs for entry.

394. A new entrant to the SOS Market must expend large resources for the testing, marketing and distribution of the SOS. As for testing, the SOS would have to provide error-free functionality, including for mission-critical and high-stakes applications (*e.g.*, those involving driving).

395. A new entrant would also need to secure agreements with hardware manufacturers or distribute its own hardware in order to distribute its operating system, as neither Apple nor Android-based smartphone manufacturers allow users to change the SOS on their smartphones.

396. A new entrant must therefore acquire a means of distributing the SOS with smartphone hardware as precondition for entry.

397. A new entrant must also provide high-speed web rendering as part of its operating system to be competitive. As such, a new entrant must develop a web engine and web browser that is compliant with most web servers and web content. It must also maintain compatibility with the dominant developer of web browsers, Google. In other words, a new entrant must design its SOS in parity with what is available through either Google or Apple's existing products, including as to the web browser and engine it distributes.

398. Development of an SOS is capital intensive. A new entrant would likely have to spend hundreds of millions of dollars in R&D, development, and testing to create an SOS that is comparable in functionality to Android and iOS.

V. HARM TO COMPETITION

399. Apple's anticompetitive conduct is a direct restraint of two distinct markets, the U.S. SOS Market and the U.S. Smartphone Market, and directly harms competition and consumers in those two distinct markets.

A. Harm to Competition in the U.S. Smartphone Market

400. Apple's anticompetitive agreements, including with Google, prevent entry of a rival that could provide a meaningful price check on Apple's smartphones. Apple's agreements do so by strengthening the MEBE.

401. Specifically, Apple's anticompetitive agreements eliminate the threat of a cross-platform web engine that could run PWAs and other web apps on its smartphones—particularly outside of Apple's App Store exclusive distribution channel.

402. With the threat of a cross-platform browser engine eliminated, Apple maintains the MEBE, which requires that a new entrant provide both comparable hardware and a third-party software platform and ecosystem that can attract a critical mass of users and developers.

403. Because of Apple's anticompetitive agreements, including with Google, the MEBE remains a direct barrier to entry to smartphone manufacturers seeking to enter without adopting Google's

Android operating system. Just as with Microsoft's failed attempt at entry, a new entrant would have to develop its own smartphone operating system and third-party software platform, attract sufficient developers to build apps for the entrant's smartphone, and achieve a user base large enough to attract such developers.

404. A third-party app and ecosystem platform's success is dependent on both network effects and powerful feedback loops. Namely, developers need a critical mass of users to warrant an investment in developing for a platform; users need a critical mass of apps to attract them to a new platform and induce them to incur switching costs. Apple's anticompetitive agreements, including with Google, prevent a new entrant from starting this feedback loop, preventing viable entry.

405. The existence of a cross-platform browser engine on iOS would threaten the MEBE, allowing a new smartphone manufacturer to enter with new hardware and obtain the immediate benefits of apps written for other platforms. In other words, entry would be possible because developers need not make a significant investment in a new smartphone platform in order to reach users of the new entrant's smartphone. And, because developers could deploy their cross-platform apps on the new entrant's smartphones, users would be attracted to the new entrant's smartphone product.

406. Apple's anticompetitive agreements fragment 136 million U.S. smartphones from any such cross-platform web app ecosystem, and in effect block the development of any meaningful cross-platform web app solution for mobile devices. These agreements therefore impede and prevent entry into the smartphone market, and as a result, allow Apple to charge supracompetitive prices.

407. Apple's agreement with Google not to deploy a non-WebKit browser engine on iOS also directly harms consumer choice. Indeed, users are unable to guard against security risks to their smartphones posed by Apple's repeatedly vulnerable WebKit engine. This has a direct effect in the U.S. smartphone market, as it impedes the functionality and security of Apple's smartphones and artificially inflates prices for the products above their economic value.

408. Apple has no legitimate technical justification for its agreements regarding WebKit—including Apple's agreement with Google—as these agreements degrade the functionality and economic value of its smartphones.

409. Apple's agreement with Google directly restrains immediately viable browser engines from deploying on iOS, which in turn prevents smartphone entrants from entering with hardware independent of iOS and Android. This directly inflates prices in the U.S. Smartphone Market, including for Apple's iPhones.

410. Apple's anticompetitive conduct also provides it with market power in the U.S. Smartphone Market. Because of Apple's anticompetitive agreement with Google and other web engine makers, such as Mozilla and Microsoft, Apple is able to charge supracompetitive prices for its iPhones. Apple obtains this market power as a direct result of its ability to exclude or impede potential rivals from entry. As such, Apple has increased prices for iPhones from December 2020 to the present without sacrificing market share (as explained above).

411. Plaintiffs have paid the resulting supracompetitive prices for their iPhones and are injured as a direct and proximate result of Apple's anticompetitive conduct.

B. Harm to Competition in the U.S. Smartphone OS Market

412. Apple's anticompetitive conduct directly and separately restrains the SOS Market.

413. Specifically, Apple's agreement with its horizontal competitor in the SOS Market—Google—directly prevents the development of PWAs and cross-platform apps that run through a browser engine available across all, or even most, U.S. smartphones. Indeed, the Apple-Google agreement regarding browser engines perfectly fractures the available smartphone market for browser engine-based web apps such that no potential PWA could reach more smartphone users than a native app developed for one of the legacy owned-and-controlled smartphone app stores (Apple's App Store and the Google Play Store).

414. This strengthens the MEBE protecting the Apple-Google SOS duopoly, allowing both companies to divide the U.S. SOS Market among themselves and obtain a combined monopoly of almost 100% of the share of the U.S. SOS Market.

415. Moreover, Apple and Google's agreement strengthens the MEBE protecting their duooply and combined monopoly.

416. Because Apple's agreement with Google restrains the ability to write a third-party app or PWA that can run on multiple operating systems, it prevents the creation of a rival SOS. In particular, a new entrant in the SOS market would have to attract sufficient developers to its SOS to offer a critical mass of apps to users. At the same time, users will not adopt a new SOS unless there is a critical mass of third-party apps. The network economics in the SOS require that a new entrant start a feedback loop in order to become viable—and Apple's agreements prevent any such virtuous circle from forming.

417. By strengthening the MEBE, Apple and Google ensure the maintenance of their own halves of the U.S. SOS Market, and of their combined monopoly of the U.S. SOS Market.

418. Apple's anticompetitive agreement with Google also erects additional barriers to entry, particularly as a result of increased switching costs. Specifically, by restricting the ability to develop and run cross-platform apps through a browser engine, an iOS or Android user must incur significant switching costs to adopt a new entrant's SOS.

419. Apple's anticompetitive conduct also limits consumer choice, as it prevents users from changing the browser engine in iOS, including in response to serious security risks. This directly degrades the performance of a significant share of products sold in the U.S. SOS Market, diminishes the value of iOS, and provides no procompetitive or technical benefits to users.

420. Apple and Google's anticompetitive agreement not to deploy any other browser or browser engine on iOS also makes no sense but for its anticompetitive effect. The existence of alternate browsers and browser engines on iOS improves the security and functionality of iOS, and it increases the number of third-party apps that will be written for iOS, as a developer could write once and deploy on all of the platforms that have a cross-platform web engine. Moreover, Google is the largest developer of web browsers, and would—but for its agreement with Apple—deploy the full version of its Chrome web browser and plugins on iOS. Apple and Google forgo any such benefits, with no legitimate technical or business justification. This makes no sense except for the anticompetitive effect of excluding a cross-platform threat to the Apple-Google combined monopoly and the MEBE protecting it from competition.

421. Apple's anticompetitive conduct also provides it with market power in the SOS Market. Because of Apple's anticompetitive agreement with Google, it is able to charge supracompetitive prices

for the OS it sells with its iPhones. Indeed, as explained above, Apple has increased prices for iPhones from December 2020 to the present without sacrificing market share.

CLASS ACTION ALLEGATIONS

422. Plaintiffs bring this action and seek to certify and maintain it as a class action under Rules 23(a), (b)(2), (b)(3), and/or (c)(4) of the Federal Rules of Civil Procedure, on behalf of themselves and on behalf of the proposed class of persons (the "Class") defined below.

423. The Class's claims derive directly from a course of conduct by Apple.

424. Apple has engaged in uniform and standardized conduct toward the Class. Apple did not materially differentiate in its actions or inactions toward members of the Class. The objective facts on these subjects are the same for all class members.

425. Within each Claim for Relief asserted by the Class, the same legal standards govern. Accordingly, Plaintiffs bring this lawsuit as a class action on their own behalf and on behalf of all other persons similarly situated as members of the proposed class pursuant to Fed. R. Civ. P. 23.

426. This action may be brought and properly maintained as a class action because the questions it presents are of a common or general interest, and of many persons, and also because the parties are numerous, and it is impracticable to bring them all before the court. Plaintiffs may sue for the benefit of all as representative parties pursuant to Federal Rule of Civil Procedure 23.

The Class

427. Plaintiffs bring this action and seek to certify and maintain it as a class action under Federal Rule of Civil Procedure 23 on behalf of themselves and a class defined as follows:

> All United States persons, including business associations, entities, or corporations, that purchased any model iPhone from Apple from January 25, 2020 to the present, inclusive (the "Class Period").

428. Excluded from the nationwide class defined above is Apple, its employees, officers, directors, legal representatives, heirs, successors, and wholly or partly owned subsidiaries or affiliates; and the judicial officers and their immediate family members and associated court staff assigned to this case.

Numerosity

429. This action satisfies the requirements of Fed. R. Civ. P. 23(a)(1).

430. The members of the Class are so numerous that a joinder of all members would be impracticable. Apple has sold hundreds of millions of iPhones during the Class Period.

Ascertainability

431. The Class is ascertainable.

432. The defined Class consists of individuals who purchased Apple iPhones. The identity of these individuals can be readily determined, including through records maintained by Apple.

433. This information can be used to provide members of each class with direct notice pursuant to the requirements of Rule 23 and the Due Process Clause of the United States Constitution.

Typicality

434. Plaintiffs' claims are typical of the members of the Class.

435. Plaintiffs' claims are the same as those asserted by members of the Class. Each Plaintiff, like the members of the Class, has purchased an iPhone integrated with the iOS operating system, and has been harmed by an overcharge associated with their purchase.

436. Each Plaintiff alleges injury that is not unique to them, but is typical of members of the Class, including measures of damages, such as damages resulting from the overcharge caused by Apple's unlawful monopolization.

437. Each Plaintiff alleges that their injury flows from the common course of conduct alleged as to Apple.

438. Each Plaintiff is similarly positioned as to each member of the Class. As such, their injury can be redressed in the same manner as any redress provided to the members of the Class (and *vice versa*).

Adequate Representation

439. Plaintiffs will fairly and adequately protect the interests of the Class members.

440. Plaintiffs are committed to putting the interest of the Class ahead of their own and to act in the best interest of members of the Class.

441. Plaintiffs understand their obligations to the Class and are committed to monitoring/supervising developments in the case and class counsel.

442. Plaintiffs have retained competent counsel experienced in computer science, antitrust law, and consumer class actions.

443. Plaintiffs have retained counsel with the resources and capital to litigate the case on behalf of the Class.

444. Plaintiffs and their counsel intend to prosecute this action vigorously and to obtain relief, including both injunctive and monetary relief, that will remedy Apple's unlawful conduct.

Superiority

445. This action satisfies the requirements of Fed. R. Civ. P. 23(b)(2) because Apple has acted and/or refused to act on grounds generally applicable to the Class, thereby making final injunctive and/or corresponding declaratory relief appropriate with respect to the Class as a whole.

446. The class device is superior to all other available methods of adjudication, as it would make little sense for each of the millions of class members to separately prove the common conduct in which Apple has engaged.

447. Moreover, damages suffered by each individual member of the Class may be small, meaning that the expense or burden of individual litigation would make it very difficult or impossible for individual class members to redress their injury individually.

448. Because damages may be small, individual members of the Class may not have a rational economic interest in individually controlling the prosecution of a single action, and the burden imposed on the judicial system from having to individually adjudicate such claims will be significant in comparison to the value of individual claims.

449. Class litigation is thus superior to individual litigation and is the best procedural device to vindicate the rights of the members of the Class.

450. In addition, class litigation will streamline the management of the litigation, such that the expense, burdens, inconsistencies, economic infeasibility, and other negative effects of individual mitigation will be lessened if not eliminated.

451. In sum, class litigation is superior because it mitigates significant inefficiencies and barriers that would result from individual litigation. In fact, absent invocation of the class device, the Class's claims would likely not be vindicated individually, Apple's unlawful and anticompetitive conduct, and the resulting overcharge, will go unaddressed.

Commonality and Predominance

452. This action and the claims asserted by the Class satisfy the requirements of Fed. R. Civ. P. 23(a)(2) and 23(b)(3) because there are many questions of law and fact that are common as to all of the members of the Class.

453. These questions of fact and law concern Apple's conduct, which is common as to the members of the Class, and answers to those questions would provide answers to issues posed by claims asserted by all members of the Class.

454. These common issues will predominate at trial, and any individual issues that may arise would not outweigh the predominance of common issues.

455. Common issues that will predominate at trial include, without limitation, the following:

a. Whether Apple's agreements with Google and other browser engine and browser developers violate Section 1 of the Sherman Act;

b. Whether Apple and Google have divided the SOS Market, in violation of Section 1 of the Sherman Act;

c. Whether Apple and Google have conspired to monopolize the SOS Market in violation of Section 2 of the Sherman Act;

d. Whether Apple's agreements with Google and other browser engine makers results in harm to competition in the Smartphone and SOS Markets that is outweighed by any procompetitive benefits;

e. Whether Apple's agreement with Google is *per se* unlawful, or in the alternative whether it violates the rule of reason because the agreement lacks pro-competitive benefits or the anticompetitive effects of the agreement outweigh its pro-competitive benefits;

f. Whether Apple's agreement with Google and other browser engine and browser developers violates the rule of reason;

g. Whether the members of the Class are entitled to injunctive relief;

h. Whether Apple has unlawfully and anticompetitively reinforced and strengthened barriers to entry surrounding the U.S. Smartphone and SOS Markets.

Grounds Generally Applicable to the Classes

456. Plaintiffs intend to seek injunctive relief ending Apple's anticompetitive conduct.

457. Plaintiffs are properly situated to seek such an injunction because Apple has acted and/or refused to act on grounds generally applicable to Plaintiffs and the members of the Class.

458. This means that final injunctive relief or declaratory relief will redress Plaintiffs' harm as well as the harm to members of the Class.

459. An injunction will prevent Apple from continuing its anticompetitive conduct in the future.

CLAIMS FOR RELIEF

REALLEGATION AND INCORPORATION BY REFERENCE

460. Plaintiffs reallege and incorporate by reference all the preceding paragraphs and allegations of this Complaint, as though fully set forth in each of the following Claims for Relief asserted on behalf of the classes.

COUNT ONE
Section 1 of the Sherman Act (15 U.S.C. § 1)
Unlawful Restraint of Trade in the U.S. Smartphone Market
(On behalf of Plaintiffs and the Class)

461. Apple has entered into agreements with Google, Mozilla, Microsoft, and other browser and browser engine developers not to release their own web browser or engine on iOS, but to instead deploy their browsers exclusively using Apple's WebKit web engine on iPhones.

462. These agreements prevent the existence of a cross-platform web engine on iPhone, which could be used to run PWAs and other apps written to run on any mobile platform and smartphone. Absent

these agreements, a developer could write a single app and deploy it on any smartphone—and smartphone OS—that runs a cross-platform web engine or browser. This would remove Apple's stranglehold over third-party app distribution on iPhone, in which Apple's App Store is the exclusive means by which iPhone users can download, run, and update third-party apps.

463. The ability to deploy a PWA or other cross-platform application on a smartphone's cross-platform web engine would immediately erode the MEBE protecting Apple's position and market power in the U.S. Smartphone Market.

464. As a result of Apple's agreements, no cross-platform web engine can be deployed by a potential entrant. This means that entry at scale requires overcoming a powerful feedback loop at the heart of the MEBE: A new Smartphone Market or SOS Market entrant would have to develop a smartphone with a critical mass of third-party apps to attract a large user base, but to attract developers to the new platform, the entrant's smartphone would need a large enough user base to induce developers to invest in the platform.

465. Moreover, the new smartphone would have to overcome significant switching costs that would be incurred by users of iOS and Android if they adopted the new smartphone, meaning that the new smartphone must provide a viable ecosystem at scale—and must do so upon entry.

466. At present, Google and Mozilla have developed cross-platform engines and browsers that could currently run, or could be configured to run, on Apple's iPhones. However, they have agreed with Apple not to deploy such software. Thus, even the Google Chrome or Mozilla Firefox web browsers deployed on iOS are nothing more than reskinned versions of Apple's Safari iPhone web browser, as even web browsers deployed on iOS must use WebKit to render web pages.

467. Absent Apple's anticompetitive agreements, several companies could immediately overcome the MEBE and enter the U.S. Smartphone Market at scale, including Mozilla and Microsoft, both of which have in the past developed a U.S. smartphone. This is because a new smartphone could run a critical mass of PWAs and web apps that run on a cross-platform browser engine, such as Firefox's Gecko, obviating the need for the smartphone manufacturer to license Android from Google or develop a new SOS for its smartphone as a precondition for entry.

468. Entry would also be possible because developers would not need to invest in developing apps for an entirely new platform, and users would not incur significant switching costs to use the new platform, as the apps they use and rely upon will exist on any platform so long as it runs a cross-platform web engine.

469. At present, and as a result of Apple's anticompetitive agreement, no such cross-platform apps can be developed because a developer cannot write an app or PWA for a web engine present on Apple's iPhones, segmenting a large fraction of the U.S. Smartphone Market and eliminating the threat from cross-platform web-based apps and PWAs.

470. The absence of Apple's anticompetitive agreement would unwind Apple's stranglehold over third-party apps through its App Store, as it would no longer be the exclusive means of distributing third-party applications to iPhone users. In turn, the MEBE protecting the U.S. Smartphone Market would be disrupted and new smartphones would be able to enter the market at potentially lower prices or with better features or more functionality.

471. The net result would be the destruction of Apple's market power in the U.S. Smartphone Market and an end to its ability to charge supracompetitive prices for smartphones.

472. Plaintiffs have overpaid for iPhones because of, and as a proximate result of, Apple's ability to prevent a cross-platform threat on the iOS platform. They are injured and damaged in the ways the antitrust laws were meant to protect against.

473. Apple's WebKit agreements are unlawful under Section 1 of the Sherman Act, which prohibits such restraints of trade:

474. ***The Apple-Google Agreement.*** Apple's agreement with Google is condemned by the antitrust laws under the *per se* rule. To begin with, Apple and Google are direct, horizontal competitors in the U.S. Smartphone Market. Apple, which makes and sells the iPhone, competes directly with Google, which makes and sells the Pixel smartphone.

475. The agreement between Apple and Google has the purpose and effect of strengthening the MEBE, preventing and impeding new entry in the U.S. Smartphone Market, as a result protecting their respective positions in the U.S. Smartphone Market.

476. Moreover, Apple and Google's agreement is unlawful because it is an agreement to divide and/or allocate positions in the U.S. Smartphone Market. Google agrees not to deploy its cross-platform web browser and engine on iPhones, and Apple forces all other developers to use the WebKit engine on iPhones. The result is that the MEBE protecting the U.S. Smartphone Market is strengthened, and Google and Apple do not compete on the merits by agreement, maintaining their shares of the U.S. Smartphone Market, and preventing new entry, which also maintains each company's stranglehold on third-party app distribution.

477. This agreement between Apple and Google makes no sense but for its anticompetitive effect. Absent the agreement, Google could deploy its web browser and engine on iOS, not only increasing the reach of its web browser, but also providing Google a platform on which it can run cross-platform apps, including those developed for its Chrome web browser. As for Apple, allowing a non-WebKit browser engine on iPhones would, among other things, increase the security of iPhones, result in more third-party apps, and increase the value of Apple's ecosystem. Both companies forgo these benefits to prevent the emergence of a cross-platform web browser or engine on iOS, which would erode the MEBE and their ability to charge supracompetitive prices for the smartphones they sell.

478. In the alternative, Apple's agreement with Google violates the rule of reason because the agreements anticompetitive effects outweigh any procompetitive benefits. Indeed, as explained above, Apple's agreement with Google does not have any procompetitive or legitimate economic or technical benefit, nor is the WebKit agreement necessary to the creation of a smartphone product.

479. ***Apple's Agreements with browser and browser engine developers.*** Apple's agreements with browser and browser engine developers, including Google, Mozilla, and Microsoft, prevent the use of any web engine other than Apple's WebKit on Apple's iPhone smartphones.

480. These agreements, taken in the aggregate and considered as a whole, violate the rule of reason because they prevent the emergence of a cross-platform web engine on iPhones that would erode the MEBE and make new entry possible at scale.

481. Each counterparty to Apple's agreement either has, or is capable of, developing a cross-platform web engine. Moreover, both Firefox and Microsoft are capable of developing smartphones. Indeed, both have attempted entry in the U.S. Smartphone Market and failed because of the MEBE.

482. The anticompetitive effects of Apple's agreements with browser and browser engine developers outweigh any procompetitive benefits. Indeed, there are no legitimate or procompetitive benefits emanating from Apple's web of anticompetitive agreements with browser and browser engine developers.

483. Apple's agreements with Google as well as with browser and browser engine developers are transactions in interstate commerce, and Apple delivers its iPhone products through the instrumentalities of interstate commerce, including through sales on its website and its physical stores throughout the United States.

484. Plaintiffs are direct purchasers of iPhones from Apple.

485. Apple's agreements have proximately caused injury to Plaintiffs' property, as Plaintiffs have paid supracompetitive prices for their iPhones. Plaintiffs therefore have suffered both injury in fact and antitrust injury.

486. Plaintiffs seek damages and injunctive relief as a remedy for Apple's anticompetitive conduct.

COUNT TWO
Section 1 of the Sherman Act (15 U.S.C. § 1)
Market Division and Unlawful Restraint of
Trade in the U.S. Smartphone Operating System Market
(On behalf of Plaintiffs and the Class)

487. Apple and Google have entered into an agreement to divide the SOS Market. Their agreement is *per se* unlawful under Section 1 of the Sherman Act.

488. Apple and Google are direct, horizontal competitors in the SOS Market. Both companies make and distribute operating systems for smartphones. Apple develops iOS and sells it with its iPhones directly to consumers. Google develops the Android operating system, which it distributes directly to

consumers of its Pixel phone and to consumers through OEMs of other smartphone manufacturers, such as Samsung.

489. As explained above, Apple and Google together possess a duopoly in the SOS Market, and both companies have the ability to increase the price and monetization of their SOS products without sacrificing market share. Indeed, Apple has raised the price of its iPhone products, which are sold with iOS, since December 2020.

490. Apple and Google each maintain "app stores," through which they approve and distribute third-party apps. Both companies earn substantial revenues through the exclusive app, subscription, and content distribution channels associated with their platforms—Apple through the App Store and Google through the Google Play Store.

491. Apple and Google's duopoly is protected by powerful barriers to entry, including the MEBE, which arises from a feedback loop consisting of app developers, available third-party apps, and SOS users.

492. Specifically, a new entrant in the SOS Market must offer a critical mass of third-party apps to attract users, but developers will not incur the cost to develop for a new platform without the existence of a critical mass of users. Moreover, users will not incur switching costs from the Android and iOS ecosystem unless there is a critical mass of apps available for a new SOS.

493. To prevent a new entrant from obtaining the necessary ingredients to trigger such a feedback loop, both companies have agreed to prevent the emergence of a cross-platform web engine on the iOS operating system. Specifically, Apple and Google have agreed not to deploy Google's web engine—or any other web engine—on the iOS operating system. This prevents a developer from writing a single PWA or app that runs on a cross-platform web engine and deploying an app on both Android and iOS devices.

494. Pursuant to this agreement, Google has released major versions of its Chrome browser for iOS without the Google Blink web engine. Instead, Google uses Apple's WebKit web engine, which is used as part of Apple's Safari, as the engine for Chrome on iOS. Moreover, Google has agreed with Apple to use WebKit for all of its apps.

495. Apple, for its part, has maintained a strict requirement preventing any other developers for iOS from using any other web engine besides WebKit. This prevents potentially cross-platform web engines, such as Firefox's Gecko, from supplanting the WebKit engine that is deployed by Apple as part of iOS.

496. As a result, development for Android and iOS must be done separately by third-party developers, and any new entrant SOS would have to obtain developers and apps for its new platform either by contracting with Google for a version of Android, or by creating its own application ecosystem from scratch, as a result of the MEBE's powerful network and feedback loop effects.

497. The agreement therefore has the purpose and effect of preserving the Apple-Google duopoly in the SOS Market by strengthening the MEBE and therefore impeding or preventing entry of a rival SOS.

498. Because of this anticompetitive agreement among the only two direct horizontal competitors in the SOS Market, cross-platform apps based on a browser or browser engine, particularly PWAs, cannot exist.

499. This maintains both Apple's and Google's dominant positions in the SOS Market, as well as their market power.

500. The agreement divides the SOS Market among Apple and Google because so long as no cross-platform threat to the duopoly emerges on iOS, developer, user, and app bases remain fragmented, and the MEBE protecting the companies' respective halves of the SOS Market is strengthened, preventing competitive entry at scale.

501. But for, and as a proximate cause of. the anticompetitive agreement between Google and Apple, a new entrant operating system could overcome the MEBE, creating price and feature competition in the SOS Market.

502. Because of the agreement, which strengthens the MEBE protecting the SOS Market, Apple and Google are able to agree among themselves not to compete on price or SOS features and not to incur into each other's portions of the SOS Market. For example, Google could obtain market share from Apple by deploying its own web engine on iOS or deploying a browser that is superior to the Safari

browser iOS users are currently forced to use. Google does not do so pursuant to its agreement with Apple.

503. For its part, Apple prevents the unification of both the iOS and Android parts of the SOS Market by banning non-WebKit browser engines, protecting the Android Platform from cross-platform apps that run on both iPhone and Android. Indeed, if Apple allowed a cross-platform web engine on its platform, a developer could write a single PWA and deploy it on both Google and Android, destroying or significantly diminishing the MEBE protecting both companies' halves of the SOS Market.

504. Moreover, because of this market division among direct horizontal competitors, Apple and Google maintain their stranglehold over third-party app distribution on their respective platforms. Indeed, if single-coded apps could be deployed across the two major SOSes as a PWA, on a web browser, or using a web engine, then developers would not need to obtain Apple's permission to deploy apps on iOS devices, nor would they have to pay Apple to do so. The same is true as to Google's control of the Android app ecosystem through its Google Play Store.

505. In the alternative, for the reasons stated above, the agreement between Apple and Google violates the rule of reason because the anticompetitive effects of the agreement, including the strengthening of the MEBE and the cessation of merits competition in the SOS Market, outweighs any procompetitive benefits of the agreement. Indeed, as explained above, there are no legitimate technical or business reason for the agreement, nor is the agreement between Apple and Google necessary for the creation of an SOS product.

506. Apple's agreement with Google is a transaction in interstate commerce, and Apple delivers its iOS smartphone operating system with the iPhones it sells through the instrumentalities of interstate commerce, including through sales on its website and its physical stores throughout the United States.

507. Plaintiffs' injuries are inextricably intertwined with the harm to competition caused by Apple and Google in the SOS Market. Indeed, because Apple does not sell iOS separately from its smartphones, Apple's conduct inextricably injures smartphone purchasers by inflating iPhone prices.

508. All Plaintiffs, and all members of the Class, are direct purchasers of iPhones, sold with iOS as an integrated part, and thereby suffered this price inflation.

509. Apple's agreements have proximately caused injury to Plaintiffs' property, as Plaintiffs have paid supracompetitive prices for iOS when they purchased their iPhones. Plaintiffs therefore have suffered both injury in fact and antitrust injury.

510. Plaintiffs seek damages and injunctive relief as a remedy for Apple's anticompetitive conduct.

COUNT THREE
Conspiracy to Monopolize
the Smartphone Operating System Market
Section 2 of the Sherman Act (15 U.S.C. § 2)
(On behalf of Plaintiffs and the Class)

511. Apple and Google have entered into a conspiracy to monopolize the SOS Market. Each company possesses approximately half of the SOS Market, and together they form a near 100% monopoly of the SOS Market.

512. Apple and Google have entered into an express agreement that has the intended purpose and effect of obtaining a near 100% monopoly of the SOS Market and to strengthen the MEBE protecting that monopoly.

513. Specifically, Apple and Google have expressly agreed not to deploy any other web engine but WebKit on the iOS operating system. Pursuant to this agreement, Google has released major versions of its Google Chrome browser without the central part of the product—the web engine—instead using its horizontal competitor's web engine for its product. Put simply, Google has repeatedly and overtly acted pursuant to the express agreement with Apple and has built its web browser with WebKit.

514. In service of this agreement, Apple maintains a strict prohibition on the use of any other web engine on iOS other than WebKit. Apple has overtly acted in service of its agreement with Google by incorporating this prohibition in its third-party developer agreements and enforcing that provision.

515. The net effect of the agreement is to strengthen the MEBE surrounding the SOS Market, impeding and preventing entry at scale in the SOS Market.

516. As a result of the anticompetitive conspiracy to monopolize, a new entrant must develop a new SOS and deploy it with smartphone hardware comparable to incumbent products to traverse the MEBE. In the alternative, a new entrant must license Android from Google, Apple's co-conspirator.

517. A new entrant must also obtain a critical mass of third-party developers and users to create the feedback loop necessary to traverse the MEBE and enter at scale. Without a cross-platform web engine that can run PWAs and other apps, entry is impeded and prevented.

518. Indeed, companies such as Microsoft and Mozilla, which have in the past developed smartphones, cannot viably enter the SOS Market as a result of Apple and Google's conspiracy to monopolize the market.

519. As a result, Apple and Google enjoy an unopposed, near-100% monopoly of the market. Moreover, both can and do exercise market power in the SOS Market as a result of their elimination of cross-platform threats and the strengthening of the MEBE. Apple has consistently increased the price of the iPhones it sells with iOS since December 2020.

520. Apple and Google have specific intent to monopolize. To begin with, Apple and Google's agreement banning WebKit is unambiguous and express. Both parties intentionally entered into, and currently abide, by that agreement. Moreover, Apple has expressly imposed the same requirement on all other third-party developers, including browser and browser engine developers as well as third-party app developers for iOS. Google has intentionally and willfully abided by its agreement with Apple because it has overtly removed the core of its Chrome browser and replaced it with Apple's WebKit in its major releases of Google Chrome.

521. Apple and Google's anticompetitive agreement has created a near 100% monopoly for the combined companies, provided both companies with market and monopoly power (which Apple has used to raise prices), and strengthened the MEBE protecting their combined monopoly.

522. As a but-for and proximate result of this conspiracy to monopolize, Plaintiffs have paid supracompetitive prices for iOS as part of their purchase of the Apple iPhone.

523. Indeed, absent Apple and Google's conspiracy to monopolize, new entry would provide a price check in the SOS Market and competition on the merits would ensue.

524. Apple's agreement with Google is exclusionary and violates the rule of reason. Apple's agreement with Google to prevent non-WebKit browser engines on iOS harms competition in the SOS Market, and the harm to competition outweighs any procompetitive benefit. Indeed, there are no procompetitive benefits or justifications for the agreement, as explained above.

525. Apple's agreement with Google is a transaction in interstate commerce, and Apple delivers its iOS smartphone operating system with the iPhones it sells through the instrumentalities of interstate commerce, including through sales on its website and its physical stores throughout the United States.

526. Plaintiffs' injuries are inextricably intertwined with the harm to competition caused by Apple and Google in the SOS Market. Indeed, because Apple does not sell iOS separately from its smartphones, Apple's conduct inextricably injures smartphone purchasers by inflating iPhone prices.

527. All Plaintiffs, and all members of the Class, are direct purchasers of iPhones, sold with iOS as an integrated part, and thereby suffered this price inflation.

528. Apple's agreements have proximately caused injury to Plaintiffs' property, as Plaintiffs have paid supracompetitive prices for iOS when they purchased their iPhones. Plaintiffs therefore have suffered both injury in fact and antitrust injury.

529. Plaintiffs seek damages and injunctive relief as a remedy for Apple's anticompetitive conduct.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs, individually and on behalf of members of the Proposed Classes, respectfully request that the Court enter judgment in their favor and against Apple, as follows:

A. Certification of the proposed Class, including appointment of Plaintiffs' counsel as Class Counsel;

B. Injunctive relief;

C. An order temporarily and permanently enjoining Apple from continuing the unlawful, anticompetitive practices alleged in this Complaint;

D. Damages (including punitive damages), costs, and disgorgement in an amount to be determined at trial;

E. An order requiring Apple to pay both pre- and post-judgment interest on any amounts awarded;

F. An award of costs and attorneys' fees; and

G. Such other or further relief as may be appropriate.

JURY DEMAND

Plaintiffs demand a trial by jury on all claims so triable as a matter of right.

Dated: January 25, 2024

Respectfully submitted,

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