Comments of Apple Inc.

Apple Inc. submits these comments in response to the request from NTIA in Docket No. 220418-0099, implementing President Biden's Executive Order on Promoting Competition in the American Economy.

Apple agrees with NTIA that it is "critical that [the app] market be robust, open, innovative, and secure," and the company is proud of the role that it has played incubating and stewarding the most vibrant, competitive, consumer-focused, and developer-friendly app market available on any mobile platform in the world—the App Store.

Indeed, the App Store spawned not only new businesses, but an entire industry that has continued to thrive since the App Store's inception. Far from "limiting the ability of mobile apps" to reach consumer networks, Apple gives developers access to hundreds of millions of potential customers across the world. And the developers who have benefited most from the App Store are the small businesses and solo coders who have taken advantage of the app-building tools and distribution network that Apple provides to turn their ideas into the next big thing. The explosion of apps from large and small developers in the last 15 years is, itself, ample evidence of the robust competition in the market for apps. Building a competitive app marketplace has resulted in the generation of billions of dollars in billings and sales and created an economic multiplier effect in communities across the United States and the globe.

Both essential to and inseparable from the App Store's success has been Apple's steadfast commitment to protecting the privacy and security of its users. Apple believes that privacy is a fundamental human right, and it has chosen to build a platform with strong protections for its customers' data. Apple knows that consumers are increasingly putting their most sensitive personal information on their phones, and is committed to keeping that data safe. Apple competes with other products that do not offer the same level of protection and instead choose to let customers load unvetted code onto their devices—which independent studies show leads to more malware and less privacy. The safe and protected environment that Apple offers attracts consumers who know that their data is safe, and benefits developers who can distribute their apps to iOS users who choose the iPhone because of its safe and secure environment. This enables Apple's offerings—and by extension, the offerings of those businesses that avail themselves of Apple's platform—to stand out from the competition.

Apple is proud to have built something extraordinary with the App Store—a pro-consumer and pro-developer economic engine for app developers. Below Apple provides comments/responses to many of the questions identified by NTIA; at the end of individual subsections, the relevant questions are noted in brackets. Because many of the questions focus on core issues of competition in the app economy, Apple provides below an overview of the history of the App Store, a discussion of the robust competition in the marketplace, an outline of two competitive features—security and privacy—that are critical to consumers, and a discussion of the effectiveness of competition in areas of the App Store where Apple itself competes.

Apple's Creation of the App Store in 2008 Revolutionized Software Distribution

The App Store significantly improved the distribution of software for both developers and users. Before Apple opened the App Store in 2008, software developers had no easy way to reach users. Developers had to pay for the tools they needed to build and test their products; then they had to distribute those products, either over the Internet (which had trust and security issues) or through physical disks (which required costly shelf space in brick-and-mortar stores). Likewise, consumers bought applications from software retailers such as Circuit City and were limited to what those retailers had in stock. Installation was complicated and prices were steep. These distribution problems persisted even after the advent of the smartphone. The App Store revolutionized the distribution of software and led to the emergence of hundreds of thousands of new software developers—who could start a business and suddenly reach millions upon millions of potential customers without worrying about the logistics of distribution.

The App Store reduced barriers to entry for developers and provided them with the potential for broader distribution and access to a worldwide audience. In the words of one Silicon Valley historian: "The App Store changed the model for software development entirely. All a programmer needed was an idea and facility with Apple's mobile software code. With those two components, anyone could build and distribute their own apps and market them to millions of people instantly."[1] Meanwhile, for "people opening the App Store at home, it was like walking into the aisles of their local Best Buy. Unfettered access to millions of games and programs on their iPhone required little more than a Wi-Fi connection and a few extra bucks."[2] Consumer choice exploded, and prices plummeted. Software that once cost scores or hundreds of dollars and required a trip to the mall (not to mention laborious installation at home) could now be downloaded instantaneously at a fraction of the cost and effort.[3]

The success of the iPhone and the competition created by the App Store are very much intertwined. Unlike other companies which primarily derive revenue from selling services to consumers (or consumers' information to advertisers), Apple is first and foremost a products company. It sells products to consumers that integrate hardware, software, and services.[4] It does not sell its consumers' personal information to advertisers or others. The *vast majority* of Apple's revenue comes from selling Apple hardware like the iPhone, iPad, Apple Watch, and Mac.

The App Store is a key component of what makes Apple's products uniquely attractive to consumers. Soon after the iPhone was launched, Apple recognized that consumers' enjoyment of the iPhone would be enhanced if they had access to great native apps created by third-party

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[1] Mike Isaac, *Super Pumped: The Battle for Uber*, at 39 (2019).

[2] *Id.*

[3] *See, e.g., Online Platforms and Market Power, Part 2: Innovation and Entrepreneurship: Hearing Before the Subcomm. On Antitrust, Commercial, and Admin. Law of the H. Comm. on the Judiciary*, 116th Cong., at 5 (2019) (written testimony of Morgan Reed, President, The App Association) (scanning software that cost $450 in 2006 now costs $10 or less).

[4] *See, e.g.*, Edwin Chan, *Apple Won't Blindly Pursue Market Share: Report*, Reuters (Jan. 11, 2013), https://www.reuters.com/article/us-apple-iphone/apple-wont-blindly-pursue-market-share-report-idUSBRE9091CR20130111 ("Apple has always focused on providing the best products for its consumers[;] we've never blindly chased market share.").

developers.[5] As Steve Jobs said when announcing the App Store in 2008: "The developer and us have the same exact interest, which is to get as many apps out in front of as many iPhone users as possible."[6] Today, there are almost two million apps on the App Store, only about 60 of which were developed by Apple over the last ten years.[7]

The App Market Cuts Across Many Different Devices and Platforms

NTIA seeks comment on the scope of the app market to assess competition. For both consumers and developers, the app market cuts across many different devices and platforms. Developers create the same apps for multiple platforms, and consumers enjoy those same apps across many of their devices, making the market broad and highly competitive.

The explosion of consumer technology over the past few decades has generated ever-expanding options for consumers when it comes to devices and hardware on which to run software. The App Store competes directly with software distribution on other smartphone platforms—including Google Play, Samsung Galaxy, and Amazon app stores—as well as across a range of devices that is growing larger and more diverse.[8] Every desktop computer, notebook, television, phone, camera, car, game console, tablet, speaker, eBook reader, watch, and more are becoming methods of distributing software to consumers. Consumers conduct banking, monitor their health and wellness, play games, use social media, and use many other types of apps, often moving seamlessly across platforms and from device to device. These are all options for developers and users, and this competitive dynamic drives Apple and its competitors to innovate and expand the third-party offerings available to meet consumer demand.[9] [1, 2, 4, 15]

To get a complete picture of the app market, consideration of those market segments is critical. There are also multiple options for developers to sell their digital goods and services on an Apple device. Distribution of digital content over the internet remains an important option for developers. This includes developer websites and web apps (like those available from Instagram and Starbucks), which can be accessed through any web browser on iPhone and iPad. Indeed, many developers interact with users on the developers' websites, including by allowing users to purchase digital content, and then making that digital content available through the developers' iOS apps. The terms of service for developers to access the App Store, including the commission Apple charges for in-app purchases of digital goods and services, do not apply to transactions that take

[5] Steve Jobs, *Third Party Applications on the iPhone*, Apple (Oct. 17, 2007), http://web.archive.org/web/20071018221832/http://www.apple.com:80/hotnews/.

[6] *Steve Jobs Introduces the App Store – iPhone SDK Keynote*, YouTube at 4:28-4:35 (Mar. 13, 2008), https://www.youtube.com/watch?v=xo9cKe_Fch8.

[7] Juliette Caminade & Markus von Wartburg, *The Success of Third-Party Apps on the App Store*, Analysis Grp. at 1 (Apr. 2022), https://www.apple.com/newsroom/pdfs/the-success-of-third-party-apps-on-the-app-store.pdf.

[8] A study found, for instance, that significantly more than half of the top 200 free apps on the Apple App Store were also available on the Google Play app store. Elliott Long, *Why Users Aren't Locked into Their Smartphone Brand*, Progressive Pol'y Inst., at P4 (Apr. 2021), https://progressivepolicy.org/wp-content/uploads/2021/04/Why-Users-Arent-Locked-Into-Their-Smartphone-Brand4.8.21.pdf.

[9] In addition, a study found that users have a number of options to migrate between smartphones. Instead, consumers choose their devices for "the better experience or features of that brand, whether quality, processors, cameras, screens, security or other characteristics." *Id.* at 13–14.

place through a web browser or web app. Indeed, developers can create web apps for iOS users with no restrictions whatsoever. [6.b, 15]

Apple Fosters Economic Opportunity and Vibrant Competition within the App Store

NTIA seeks comment on the measures it should use for competition. Apple believes the growth and ever-increasing number of apps from creative developers that are enjoyed by consumers is the best evidence of the competitive marketplace.

The App Store has been a game changer in this broad market for consumer and enterprise software, creating competition and expanding app output a thousand-fold. Today, there are approximately 20 million app developers who have collectively built millions of apps worldwide. The App Store offers these developers—including small start-ups—the opportunity to reach millions of App Store customers in 175 countries. The App Store is responsible for more than 2.4 million American jobs, across all fifty states.[10] It has proven to be an engine of economic growth and opportunity. In 2020, developers were conservatively estimated to have generated $643 billion in billings and sales, including $175 billion in the U.S. alone, through the App Store.[11] [1]

Small developers are a big part of that success. Between 2015 and 2020, more than 90 percent of developers qualified as "small," meaning that they had fewer than 1 million downloads and $1 million in earnings.[12] In that same time period, small developers' earnings nearly tripled, and many have had high download growth.[13] The App Store has enabled small developers' ability to compete against much larger companies across all sectors of the mobile app-development industry. [5]

This economic and creative boom has been possible only because Apple has invested—and continues to invest—heavily in creating tools and services to enable app developers to provide high-quality apps on iOS. Apple depends on innovation by third-party app developers to compete, as evidenced by the robust investments Apple has made to encourage and spur new app development. For example, Apple created the Swift coding language to level the playing field for developers, offers developers bespoke tools (Xcode, ARKit) and beta testing software (TestFlight), and has created thousands of application programming interfaces ("APIs") that are available to all developers.[14]

In addition to these technical benefits, Apple provides developers dozens of services such as purchase fraud detection and management; analytics tools to assess app performance and user engagement; monitoring for bugs and coding errors; marketing tools; sales tax collection and remittance; currency conversion; and monitoring of fraudulent transactions. For example, Apple

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[10] *Apple's US Job Footprint Grows to 2.4 Million*, Apple (Aug. 15, 2019), https://www.apple.com/newsroom/2019/08/apples-us-job-footprint-grows-to-two-point-four-million/.

[11] *See* Jonathan Borck, Juliette Caminade & Markus von Wartburg, *A Global Perspective on the Apple App Store Ecosystem*, Analysis Grp., at 3 (June 2021), https://www.apple.com/newsroom/pdfs/apple-app-store-study-2020.pdf.

[12] *Id.* at 6.

[13] *Id.* at 7.

[14] *See id.* at 15–17. Apple's guides and documentation contain step-by-step instructions on how to use the Company's extensive development tools and resources, and Apple's dedicated developer support team helps to troubleshoot and provide advice and support. *See Distributing Your App for Beta Testing and Release*, Apple, https://developer.apple.com/documentation/xcode/distributing-your-app-for-beta-testing-and-releases (last visited May 20, 2022).

offers developers a dedicated publishing platform called App Store Connect, where developers merchandise their products with screenshots and descriptions in multiple languages and manage how their apps and updates get released to customers all over the world. Similarly, Apple provides significant free advertising to help users discover new apps with an entire editorial team dedicated to showcasing great apps in the App Store, benefiting the 72% of small developers without a marketing budget. [6, 7, 8, 10]

Because Apple wants to see third-party developers succeed, all of these tools are available to developers for just a $99 annual fee—an incredible value. Apple has always believed that the biggest ideas can come from the smallest developers. That is why the entire business model of the App Store is built around the idea—which has since been proven true two-million times over—that when there are low barriers to entry for building great software, everyone (developers, consumers, and Apple alike) reaps the benefit. [6]

Apple proactively seeks to expand economic opportunities within the App Store to promote a diverse and inclusive economic marketplace. Apple strongly feels its responsibility to help build a more just and equitable world. It has, therefore, invested over $100 million in its Racial Equity and Justice Initiative, which supports students, innovators, and advocacy organizations leading the charge in creating that more inclusive and more just world. Some examples include Apple's efforts in Atlanta, where Apple has partnered with the Southern Company and community stakeholders to launch the Propel Center, an innovation and learning hub which will offer education tracks, including app development, to students at Historically Black Colleges and Universities. Experts from Apple will develop curricula and offer mentorship, learning support, and internship opportunities. In Detroit, Apple has opened the Apple Developer Academy in partnership with Michigan State University, which is designed to empower young Black entrepreneurs, creators, and coders and help them cultivate the skills necessary for jobs in the iOS app economy, without consideration of the students' academic background or coding experience.[15] And in California, Apple has partnered with the California State University to launch a Global Hispanic-Serving Institution ("HSI") Equity Innovation Hub, which will collaborate with HSIs throughout the country to equip students—including Hispanic/Latinx, Black, and Asian American students—with skills for high-demand careers, with a focus on science, technology, engineering, and mathematics. Apple will provide technology, design support, and thought partnership.[16] Apple has also instituted its Entrepreneur Camp, which supports app founders and developers from underrepresented communities with one-on-one guidance, mentorship, and insights from Apple experts.[17] Through initiatives like these, Apple seeks to foster an even more diverse and inclusive App Store and broader app ecosystem. [7]

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[15] Press Release, Apple, *Apple Launches Major New Racial Equity and Justice Initiative Projects to Challenge Systemic Racism, Advance Racial Equity Nationwide* (Jan. 13, 2021), https://www.apple.com/newsroom/2021/01/apple-launches-major-new-racial-equity-and-justice-initiative-projects-to-challenge-systemic-racism-advance-racial-equity-nationwide/.

[16] Press Release, Apple, *Apple Broadens Racial Equity and Justice Initiative with $30 Million in New Commitments* (Aug. 31, 2021), https://www.apple.com/newsroom/2021/08/apple-broadens-racial-equity-and-justice-initiative-with-30-million-in-new-commitments/.

[17] *Apple Entrepreneur Camp*, Apple, https://developer.apple.com/entrepreneur-camp/ (last visited May 20, 2022).

Security and Privacy Are Key Components of the Competitive Market and Consumers Choose Their Phones with Those Values in Mind

After Apple ignited the global app revolution with the App Store, others followed. Apple now competes aggressively with devices running Google's Android platform, which are manufactured by dozens of companies around the world, and which also offer consumers a way to install and use third-party mobile applications. One key difference between Apple's platform and others in the marketplace is that **Apple's business model is centered on a commitment to user security and privacy.**

Apple's focus on security and privacy provides consumers with a choice they do not have elsewhere in the marketplace. Because Apple engineers security and privacy into its devices, consumers who want that heightened level of security and privacy protection can choose Apple's products. Consumers who are comfortable trading away that heightened level of protection for more flexibility about the sources of apps they can run on their devices can turn to Android. The data show that many consumers want to be able to choose the privacy and security features that Apple builds into iOS.[18] But those consumers do not have another option in the market aside from Apple. If Apple's security and privacy protections were regulated out of existence, the result would thus be less competition and less consumer choice—not more.

Apple's approach also facilitates more competition among apps because it creates a safe space for users to try out innovative new apps and take a chance on programs invented by new or lesser-known developers. Apple's customers never have to worry that they might be better off going with a bigger and more established developer because they just don't know if they can trust the new app on the block—they know that Apple has affirmatively examined each app and deemed it safe. If restrictions were imposed on Apple's ability to impose heightened security and privacy protections, they could blunt the growth of the app economy, further harming developers and depriving users of choice. [8, 11, 22]

Consumers want—and should have—the option to choose maximum privacy protections and control of their information—something Apple products provide. Apple takes "privacy very seriously" [19] and "believe[s] privacy is a fundamental human right."[20] In iOS 15, for instance, the iPhone contains a comprehensive suite of features that place users in control over their own data. One of those features Apple is most proud of is the App Tracking Transparency framework, which requires apps to obtain consent from users before tracking users across other companies' apps and

[18] *See, e.g.*, Greg Bensinger, *Americans Actually Want Privacy. Shocking.*, N.Y. Times (May 20, 2021), https://www.nytimes.com/2021/05/20/opinion/apple-facebook-ios-privacy.html; Estelle Laziuk, *iOS 14.5 Opt-in Rate - Daily Updates Since Launch*, Flurry (Apr. 29, 2021), https://www.flurry.com/blog/ios-14-5-opt-in-rate-att-restricted-app-tracking-transparency-worldwide-us-daily-latest-update/.

[19] Paul Resnikoff, *What Steve Jobs Said About Protecting Privacy In 2010*, Digital Music News (Mar. 25, 2018), https://www.digitalmusicnews.com/2018/03/25/steve-jobs-user-privacy-2010/.

[20] Luke Dormehl, *Tim Cook Calls Apple's Privacy Features a 'Fundamental Human Right'*, Cult of Mac (June 15, 2021), https://www.cultofmac.com/745182/tim-cook-says-apples-privacy-features-are-a-fundamental-human-right/.

websites.[21] Other notable examples include Mail Privacy Protection,[22] the App Privacy Report,[23] and Sign in With Apple,[24] all of which are designed to keep data in the hands of users. These features apply across all apps, including Apple's own apps just as they do to third-party apps. Further, built-in security features such as automatic encryption of personal data and the ability to retain sensitive user data on a user's device (rather than the cloud or data servers) empower consumers by defending against potentially harmful privacy practices from apps.[25] [22]

Apple's App Store policies help mitigate security risks and have helped create one of the most secure consumer technology platforms on the planet. Apple has long been committed to ensuring that its users are protected from external attacks, and that user data remains secure. Apple has managed to do both things well for nearly fifteen years thanks to its curated approach to the App Store, where human reviewers screen every app that developers wish to offer—one by one—in order to ensure that software that threatens user security is not downloaded onto an iPhone from the App Store.

The proof that Apple's approach works is in the data. In 2020, the iPhone platform accounted for just 1.72% of malware infections in mobile devices. By contrast, Android accounted for 26.64% and Windows/PC accounted for 38.92%.[26] Similarly, a 2013 U.S. Department of Homeland Security study found that 79% of mobile device malware attacks were on the Android platform, and only 0.7% on iOS.[27] Among app stores, Android app stores have significantly higher numbers of malicious apps than the App Store.[28] iPhone is thus significantly more protected from the malware infections that other products face. As a group of 23 national security experts recently

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[21] *User Privacy and Data Use*, Apple, https://developer.apple.com/app-store/user-privacy-and-data-use/ (last visited May 6, 2022); *see also* Chaim Gartenberg, *Why Apple's New Privacy Feature is Such a Big Deal*, Verge (Apr. 27, 2021), https://www.theverge.com/2021/4/27/22405474/apple-app-tracking-transparency-ios-14-5-privacy-update-facebook-data.

[22] Press Release, Apple, *Apple Advances its Privacy Leadership with iOS 15, iPadOS 15, macOS Monterey, and watchOS 8* (June 7, 2021), https://www.apple.com/newsroom/2021/06/apple-advances-its-privacy-leadership-with-ios-15-ipados-15-macos-monterey-and-watchos-8/.

[23] *Id.*

[24] Shelby Brown, *What is Sign in with Apple? 5 Things to Know About the Security Feature*, CNET (Feb. 3, 2022), https://www.cnet.com/tech/mobile/what-is-sign-in-with-apple-5-things-to-know-about-the-security-feature/.

[25] *See, e.g.*, *We're Committed to Protecting your Data*, Apple, https://www.apple.com/privacy/features/; *Differential Privacy*, Apple, https://www.apple.com/privacy/docs/Differential_Privacy_Overview.pdf; John Martellaro, *Apple CEO Tim Cook Says Privacy is a Fundamental Human Right*, Mac Observer (May 1, 2018, 6:51 PM), https://www.macobserver.com/analysis/apple-ceo-tim-cook-privacy-is-human-right/.

[26] *See* Nokia, *Threat Intelligence Report – 2020*, at 8, https://www.nokia.com/networks/portfolio/cyber-security/threat-intelligence-report-2020/. In Nokia's most recent Threat Intelligence Report, Android accounted for 50.31% of malware infections in mobile devices, Windows/PC accounted for 23.10%, and iPhone did not register a sufficiently significant number of malware infections to be represented individually. *See* Nokia, *Threat Intelligence Report-2021*, at 8, https://branden.biz/wp-content/uploads/2022/01/Nokia_Threat_Intelligence_Report_2021_Report_EN.pdf (the "other" category accounted for 3.73% of malware infections).

[27] *See* U.S. Dep't of Homeland Security & Federal Bureau of Investigation. *Threats to Mobile Devices Using the Android Operating System*, Roll Call Release (July 23, 2013), https://info.publicintelligence.net/DHS-FBI-AndroidThreats.pdf.

[28] *See* RiskIQ, *2020 Mobile App Threat Landscape Report* (2021), https://www.riskiq.com/wp-content/uploads/2021/01/RiskIQ-2020-Mobile-App-Threat-Landscape-Report.pdf.

stated in a court filing, Apple's approach works to allow users to choose security that "limits risk of national threats from foreign adversaries' scale- and network-based attacks."[29] [16, 22]

Although competition in the market for apps cuts across devices including laptop and desktop computers, security, reliability, and privacy are particularly critical on mobile phones. iPhones (like all smartphones) contain a person's most sensitive data, including financial information, health information, personal correspondence, and physical location information. In addition to the personal risks, online threats also pose national security risks: Experts have indicated that mobile devices are increasingly becoming targets for cyberattacks from foreign adversaries.[30]

Apple's robust App Review process makes the App Store a secure market that consumers and developers can trust. Apple achieves this high level of security in part through a rigorous App Review Process that is designed to protect users of Apple's products from malware and security threats. Apple agrees with NTIA that app review should be transparent and well understood by developers, and that is precisely why Apple publishes its App Store Review Guidelines, which provide transparency and benefit both developers and users.[31]

The Guidelines reflect Apple's core privacy and security principles,[32] and App Review prioritizes the protection of users and developers alike from fraud, malware, and unwarranted intrusion into their privacy. The review, moreover, encompasses not just technical security risks, but also protects against the social engineering that cybercriminals often employ.[33] The Guidelines are a key reason why it is so rare for malicious apps to become available on iOS.[34] Developers also benefit from the security of Apple devices because iOS apps' "greater legitimacy in the eyes of users" permits the developer to focus on enhancing their app, without spending money or time assuring the user that downloading the app is not a security risk.[35]

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[29] Brief of Amici Curiae Former National Security Officials and Scholars as *Amici Curiae* in Support of Appellee/Cross-Appellant at 16, *Epic Games, Inc. v. Apple, Inc*., No. 21-16506 (9th Cir. Mar 31, 2022), ECF No. 101.

[30] *See* Thomas Brewster, *Fake PornHub and Google Android Apps Are Actually 'Russian Spy Tools'*, Forbes (July 24, 2019), https://bit.ly/369UnLH.

[31] *App Store Review Guidelines*, Apple, https://developer.apple.com/app-store/review/guidelines/ (last updated Mar. 30, 2022).

[32] Indeed, the Guidelines acknowledge that "[p]rotecting user privacy is paramount in the Apple ecosystem," and developers "should use care when handling personal data to ensure [they] complied with privacy best practices, applicable laws, and the terms of the Apple Developer Program License Agreement, not to mention customer expectations." *App Store Review Guidelines*, Apple, https://developer.apple.com/app-store/review/guidelines/ (last updated Mar. 30, 2022). Other provisions set out specific policies, which require apps to include a link to a clear and explicit privacy policy, get user permission for any data collected, minimize the amount of data collected to that relevant to the core functionality of the app, respect the user's permission setting, and not share user personal data without permission or use the user data for purposes outside of which consent was given.

[33] *Mobile Malware Evolution 2020*, Securelist (Mar. 1, 2021), https://securelist.com/mobile-malware-evolution-2020/101029/.

[34] Symantec, *Internet Security Threat Report*, at 11 (Apr. 2016) ("Apple is well-known for its stringent screening processes, which is why the number of malicious iOS apps is so much smaller than for Android."), https://docs.broadcom.com/doc/istr-21-2016-en.

[35] Brief of Roblox Corporation as *Amicus Curiae* in Support of Defendant-Appellee/Cross-Appellant Apple Inc. at 2, *Epic Games, Inc. v. Apple, Inc.*, No. 21-16506 (9th Cir. Mar. 31, 2022), ECF No. 123.

Apple invests extraordinary effort to work with developers to help them meet the standards set forth in the Guidelines. Apple reviews, on average, 100,000 submissions for apps or app updates per week. This process includes roughly 1,000 calls per week to help developers diagnose and cure issues.[36] Apple rejects approximately 40% of the reviewed apps, many of which are rejected because they have software glitches or bugs, and/or would compromise users' data privacy or security.[37] When an app is not approved for use in the App Store, Apple provides the developer with the reason(s) and Guideline(s) under which the app was rejected, support to help the developer correct the issues, and assistance with resubmitting the app for approval. Most rejected apps ultimately make it onto the App Store. [8, 11, 17, 18, 19]

App Review is essential to maintaining security on the App Store and iOS. Because Apple's review process protects users and allows Apple to deliver on its promise of secure devices, Apple prohibits the practice of "sideloading" on iOS devices and instead only permits app distribution through the App Store.[38] Sideloading has been recognized as a security threat by entities such as the U.S. Department of Homeland Security, the European Agency for Cybersecurity, and Europol,[39] as well as by experts such as former intelligence officers,[40] and by industry and trade groups.[41] It permits threats such as adware, ransomware, or malware, or scammers who exploit apps to mislead users, attack mobile devices' security features, violate user privacy, and expose developers to piracy and other harms. The increased threat from sideloading would also erode users' and developers' trust in the ecosystem, resulting in many users downloading fewer apps from fewer developers, and making fewer in-app purchases.

Apple's prohibition on sideloading is integral to ensuring that all apps loaded on iOS devices meet Apple's quality and safety standards. Android devices, by contrast, permit some degree of sideloading.[42] This difference, among many others, evidences the robust competition that exists in the mobile app ecosystem. If users prefer their device and data are insulated from the risks associated with sideloading, they can choose an iPhone. If users instead prefer to have the option

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[36] *App Store – Principles and Practices*, Apple, https://www.apple.com/am/ios/app-store/principles-practices/ (last visited May 20, 2022).

[37] *Id.*

[38] Jon Porter, *Apple Argues Against Sideloading iPhone Apps as Regulatory Pressure Mounts*, Verge (June 23, 2021), https://www.theverge.com/2021/6/23/22546771/apple-side-loading-security-risk-report-regulatory-pressure.

[39] European Union Agency For Cybersecurity, "Vulnerabilities – Separating Reality from Hype," August 24, 2016.; Kaspersky Labs & INTERPOL, "Mobile Cyber Threats," October 2014; U.S. Department of Homeland Security, "Study on Mobile Device Security," April 2017; Franklin, Joshua M, et al., "Guidelines for Managing the Security of Mobile Devices in the Enterprise," U.S. Department of Commerce – National Institute of Standards and Technology, March 2020; Urwin, Matt, "Top 5 Types of Sideloaded Apps and the Risks They Pose," Wandera, December 19, 2018; Velzian, Becci, "How to Create a Bring Your Own Device (BYOD) Policy," Wandera, January 13, 2021; Europol, "Just a Game? Only install apps from official app stores," European Cybercrime Centre; Gervais, Joe, "The risks of third-party app stores," Norton, July 18, 2018.

[40] Letter from Robert Cardillo, Former Director, National Geospatial-Intelligence Agency, et al., to Nancy P. Pelosi, Speaker of the House, and Kevin O. McCarthy, House Minority Leader, at 1 (Sept. 15, 2021).

[41] *E.g.*, White Paper on National Security Issues Posed by House Antitrust Bills, Computer & Commc'ns Indus. Ass'n (Sept. 2021) ("[T]hese bills . . . may inadvertently undermine U.S. national security" and "weaken the U.S.'s ability to counter foreign cyber attacks, espionage, influence and surveillance efforts.").

[42] *Google Play Protect: 2.5 Billion Active Devices*, Android, https://www.android.com/intl/en_us/intl/en_uk/play-protect/ (last visited May 20, 2022).

to sideload apps onto their devices at the expense of increased exposure to privacy and security risks, they can choose an Android device.

Attempting to educate users about the security risk is insufficient to handle the risk of sideloading. Experts have determined that "[g]iven the extent and complexity of the risk, expecting end users to have the requisite understanding of security and privacy and how to protect themselves via layered on security, esoteric, or hard-to-find settings, and other methods simply isn't viable at scale."[43]

Moreover, the centralized distribution method prevents and deters bad actors from attempting to bypass Apple's privacy safeguards. Apple can also implement its App Tracking Transparency framework (which prevents apps from collecting and selling private user data without affirmative user consent) only because it can require ATT as a condition of distribution on the App Store; other Apple transparency innovations like Privacy Nutrition Labels (which inform users as to which data an app will collect before it is downloaded) can similarly only be offered in the App Store. If the App Store were no longer the sole option for downloading apps on iOS devices, there would be no mechanism to hold developers accountable for privacy breaches or sidestepping these pro-consumer policies. [15, 17, 18]

Apple permits third-party apps to access sensitive underlying device systems only when there is no security threat in doing so. Apple constantly makes new iOS features, functionalities, and APIs available to third parties for their own development. But in service of its commitment to security, Apple restricts third-party access to some sensitive device systems. As the device's manufacturer and the operating system provider, some of Apple's software necessarily has access to specific, low-level capabilities that, if opened to third parties, would create disproportionate security or privacy risks that are certain to cause user harm. Apple therefore "sandboxes" third-party apps from critical systems on the devices, which prevents the app from making changes to the device or accessing system files and resources. Once Apple is certain that there is no security or data-privacy risk, Apple opens up Apple-developed technologies to third-party developers.

For example, Apple prohibits third-party apps—and nearly all of its own apps and services too—from accessing the whole storage volume of a user device. This is because many types of malware, and in particular ransomware, rely on wide access to device storage in order to effectively attack the user. And if the user were asked to authorize this level of access, they could readily be tricked—for example, by an app that presents itself (outside of the App Store) as a trusted storage app and asks for full storage access in connection with some purported incentive ("free device backup for life if you act immediately!"). Apple mitigates this risk by strictly limiting full access to device storage and other extremely sensitive, low-level capabilities. As a result, iOS is the only computing platform today where ransomware effectively doesn't exist. [24]

[43] *Mobile Future: Pathways to Continued Improvement in Mobile Security and Privacy*, Ctr. for Cybersecurity Pol'y & L., at 8 (May 2021), https://centerforcybersecuritypolicy.org/s/Mobile-Future-Pathways-to-Security-and-Privacy.pdf.

The App Store Model Strikes a Balance That Allows Many Different Kinds of Apps To Prosper

Fifteen years ago, when Apple first considered how to build the App Store, it could have decided to charge a fixed fee to the customer and developer for every download—but this would have meant that there were no free apps in the App Store. It could have decided to charge developers a large recurring monthly or annual fee to access its software development kit—but this would have locked small businesses and solo coders out of the App Store. Instead, Apple settled on a business model that charged developers a minimal, annual fee in exchange for access to all the tools (representing billions of dollars in investments by Apple) that they could need to build incredible apps, coupled with a commission on sold paid apps and in-app purchases. This meant that if those apps were successful and developers made money selling them, Apple would take a smaller percentage of the proceeds than earlier distribution models, like brick-and-mortar stores—but if developers wanted to, they could make their apps available to consumers for *free* if they chose, without any Apple-imposed fees or surcharges. This business model has allowed millions of paid and free apps of diverse categories and kinds to blossom.

The commission Apple charges to some developers for in-app sales of digital goods is competitive and a reasonable way for Apple to recoup part of the cost of its investments. Apple has invested and continues to invest billions of dollars in the iPhone and the App Store, its underlying technologies, and the developer and user benefits discussed above. These investments lead to even more innovations—like automatic updates, app bundles,[44] optimizing app size by 50 percent, and creating an App Store design that focuses on and enhances apps' discoverability.[45] To fund all those benefits, Apple charges a commission on some in-app sales that enables Apple to realize a return on that investment, as well as to fund further App Store innovation.

Critics often refer to Apple's "30 percent commission." If that were truly the commission Apple charged developers for selling in-app digital content, that fee would be competitive with other online stores through which developers sell similar software.[46] But the "30 percent commission" is a misconception. The reality is that Apple charges no commission at all for the vast majority of apps in the App Store, and most developers who do pay a commission pay much less than 30 percent. From the time Apple invited third parties into the App Store to now, Apple has *never* raised the commission. It has only lowered it.

Very few apps pay a commission at all. Because the vast majority of apps are free to the customer, developers pay no commission at all for the distribution of those apps. For those developers who do charge for their apps or for other digital content or digital subscriptions that are consumed in the app, Apple charges a commission on those in-app purchases. Apps that pay a commission account for less than 20% of apps on the App Store.

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[44] *App Store – Offering App Bundles*, Apple, https://developer.apple.com/app-store/app-bundles/ (last visited May 20, 2022).

[45] Press Release, Apple, *Apple Unveils All-New App Store* (June 5, 2017), https://www.apple.com/newsroom/2017/06/apple-unveils-all-new-app-store/.

[46] Jonathan Borck, Juliette Caminade, & Markus von Wartburg, *Apple's App Store and Other Digital Marketplaces*, Analysis Grp., at 2 (July 22, 2020), https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf.

Apps that do pay a commission mostly pay less than 30 percent. Although 30 percent is the maximum rate of Apple's commission, the majority of developers who sell digital content on the App Store pay only 15 percent. Recognizing the importance of incubating the next generation of great apps and app developers, Apple has created the App Store Small Business Program. Under that program, for which all developers who make less than $1 million per year on their apps are eligible, those developers pay a reduced, 15 percent commission.[47] Apple has also implemented other reduced-commission programs. Apple has reduced its commission on subscription purchases, and after the first year of a subscription purchased through the App Store, Apple receives only a 15 percent commission on subscriptions. This change has benefitted all developers, including those that compete with Apple's own services. Apple has also introduced additional flexibility for apps distributing digital content with policies like the Reader Rule. Developers can make available in their app content that was purchased elsewhere by users; that is, if a user has purchased a product outside an app (like a subscription to Netflix, Spotify, The Economist, or a book title from Amazon to use in the Kindle app), those products and subscriptions can be used in the app. Apple receives no compensation from these transactions. [3, 6.b]

Everyone Benefits From Apple's Thriving and Competitive Third-Party App Ecosystem

Third-party apps thrive on the App Store. Although Apple runs the App Store, the App Store is not designed to favor or advantage Apple's own (very limited) set of apps. Nor does the fact that Apple pre-loads certain Apple apps on the iPhone limit competition. Indeed, the evidence is quite to the contrary. Third-party apps have enjoyed large-scale success in the App Store and are the most popular apps in almost all categories. In many cases, third-party apps are the only options for consumers because Apple offers no competing apps. That includes social media apps, dating services, travel planning, and food and drink.[48] In the limited categories in which Apple offers its own apps, third-party apps compete aggressively and, in many cases, have a greater market share than Apple's offerings.

- Spotify has over twice the market share of Apple Music in the music subscription market.[49] As of 2019, Spotify has twice as many paid subscribers as Apple Music does worldwide.[50]
- Google Maps and Waze have been downloaded by Apple users hundreds of millions of times over the past seven years.[51]

[47] *App Store Small Business Program*, Apple, https://developer.apple.com/app-store/small-business-program/ (last visited May 20, 2022).

[48] *The Success of Third-Party Apps on the App Store*, *supra* note 7, at 11.

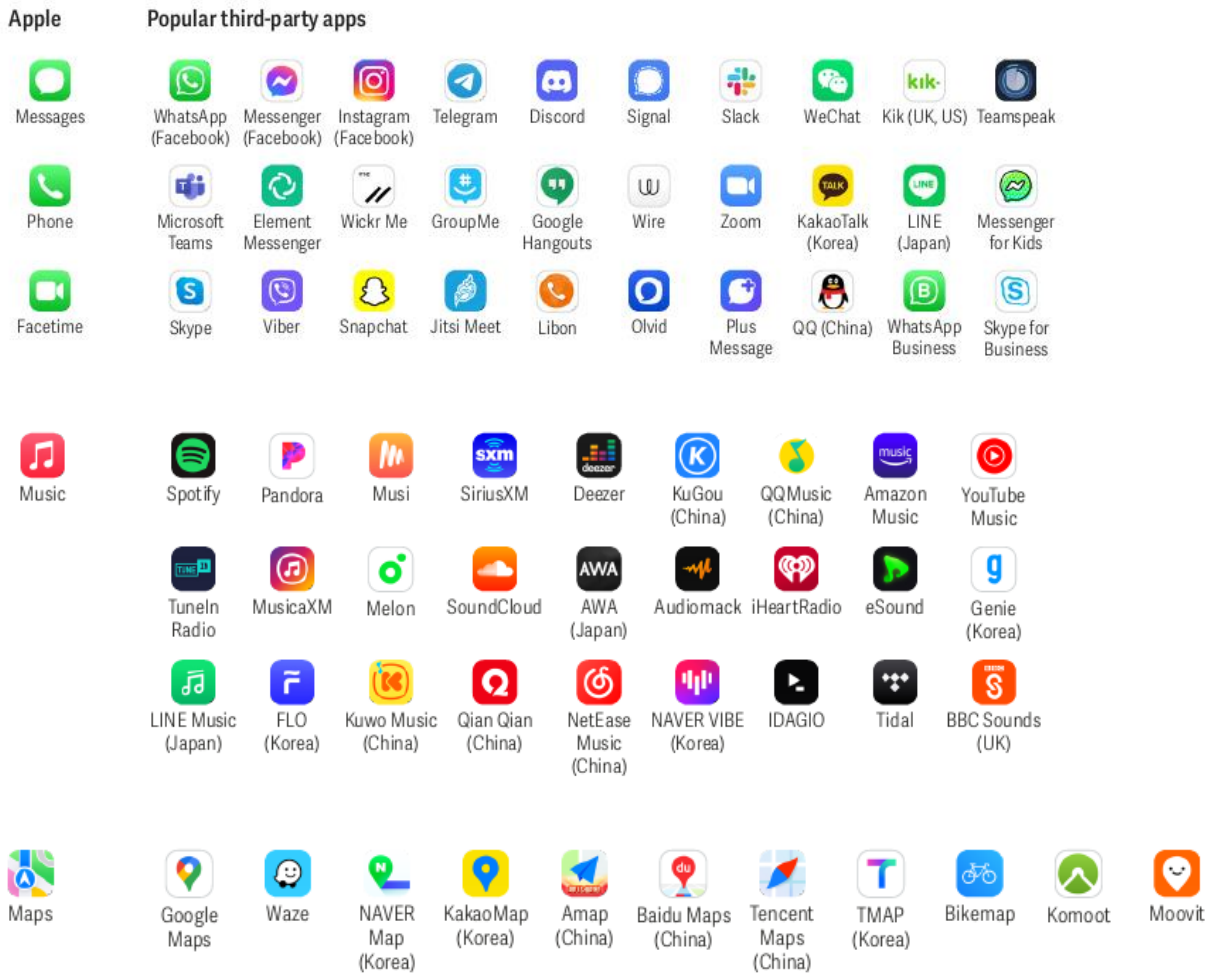
[49] Mark Mulligan, *Music subscriber market shares Q2 202*1, MIDiA (Jan. 18, 2022), https://www.midiaresearch.com/blog/music-subscriber-market-shares-q2-2021.

[50] *See How Many Users do Spotify, Apple Music and Other Streaming Services Have?*, MusicAlly (Feb. 3, 2020), https://musically.com/2020/02/19/spotify-apple-how-many-users-big-music-streaming-services/.

[51] *See* Kyle Andeer Responses to Questions for the Record from the Honorable David N. Cicilline, at 7, https://docs.house.gov/meetings/JU/JU05/20190716/109793/HHRG-116-JU05-20190716-SD036.pdf.

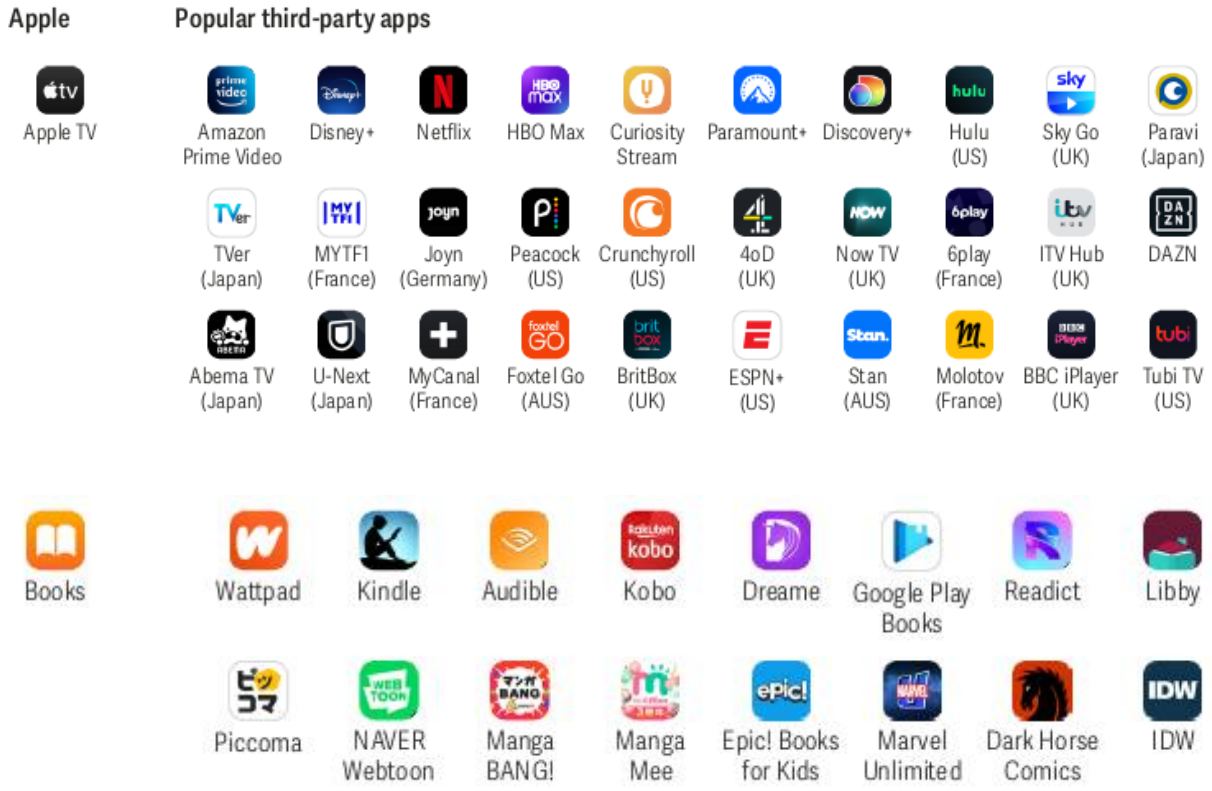
- TikTok, YouTube, Instagram, Snapchat and Facebook Messenger were among the most frequently downloaded free iPhone apps in 2021.[52]
- Mail competes with dozens of other mail apps on the App Store, many of which are free to download, including Gmail, Spark, Yahoo Mail, and Canary.

Popular Third-Party Apps[53]



[52] Juli Clover, *Apple Reveals the Most Downloaded iOS Apps and Games of 2021*, MacRumors (Dec. 1, 2021), https://www.macrumors.com/2021/12/02/apple-most-downloaded-apps-2021/.

[53] Excerpted from *The Success of Third-Party Apps on the App Store*, *supra* note 7, at 20–35.



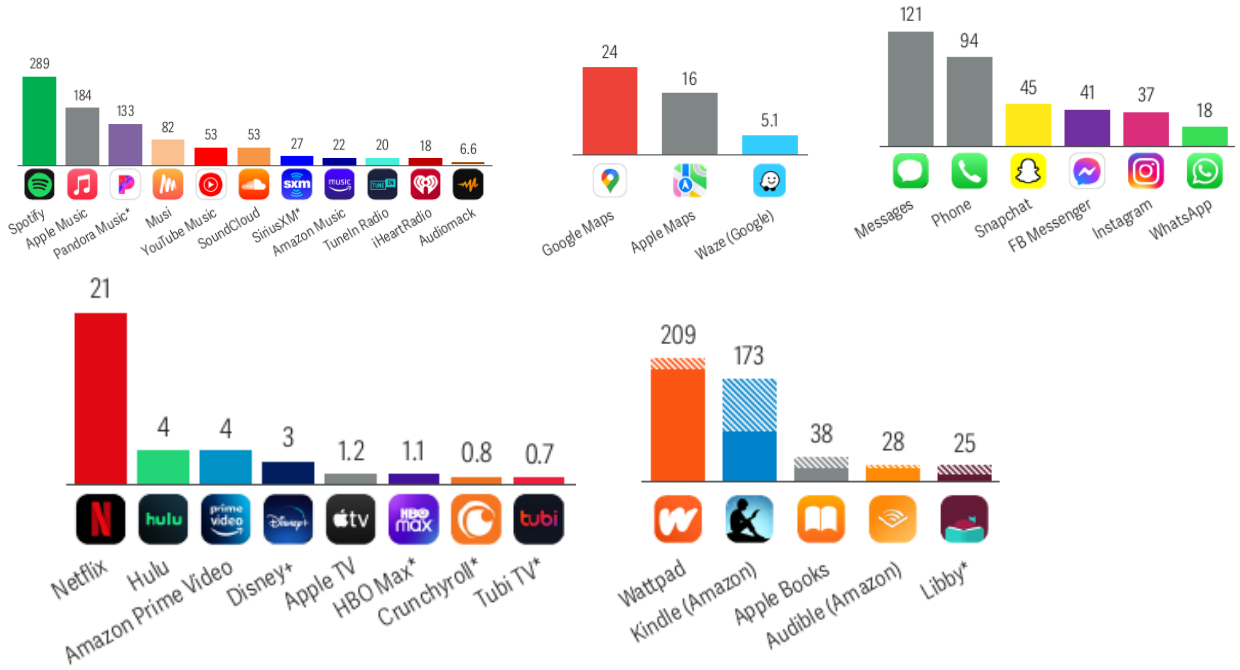
In the health and fitness sector, which has experienced dramatic growth during the coronavirus pandemic, Apple's apps compete against guided workout apps, such as Keep, with 5.4 million monthly active iPhone users, or 30 Day Fitness, with 4.7 million monthly active iPhone users, mindfulness apps, such as Calm, with 7.1 million monthly iPhone users, or Headspace, with 3.3 million monthly iPhone users, and other running, tracking, nutrition and medical apps, such as MyFitnessPal, Nike Run Club, FitBit, and Peloton.[54]

In all sectors, third-party developers thrive. Users rely on multiple third-party apps to communicate, listen to music, consume other media, and travel (among many others).[55] A recent study showed that in the United States, in five major categories, the only one in which Apple had a higher user base than third parties was communication—that is, when users used their iPhone to call or text.

[54] *Id.* at 38–41

[55] *Id.* at 12.

Most-Used Apps in Different Categories[56]



Although Apple offers some apps that compete with third-party apps on its platform, Apple does not use non-public data about developers' apps to compete with those developers in the App Store. Apple's commitment is borne out by the fact that Apple's offerings are very limited and, where Apple does offer an app in a particular category, competing third-party apps are often more successful. [1, 3, 13]

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Apple has a long history of creating competition through its innovations, and nowhere is that more apparent than in the mobile app ecosystem. Since its start in a California garage forty years ago, Apple has been a uniquely American company driven by an entrepreneurial spirit focused on innovation and the consumer experience. Apple's introduction of the App Store ushered in new businesses and revolutionized entire industries. By supercharging competition in the software industry while maintaining its ability to protect consumers' security and privacy with the highest standards in the industry, Apple has maintained its commitment to providing its customers with the best products in the world.

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[56] Excerpts from *id.* at 22–34.