

Appendix I: Apple's restrictions on cloud gaming

1. This appendix examines how Apple has used its control over app distribution on iOS to block the emergence of cloud gaming apps on its App Store. Our concerns in this area are set out in broad terms in Chapter 6 – this appendix provides further detail. We examine the impacts of its actions on cloud gaming users and providers as well as whether Apple's motivation to obstruct these services was influenced by its incentive to protect its: (i) position in app distribution via the App Store; (ii) revenue from mobile device hardware; or (iii) own gaming service, 'Apple Arcade'.
2. Microsoft, NVIDIA, Meta, Google, and Amazon are some of the main providers of cloud gaming services. Apple's restrictions on cloud gaming have blocked these providers from offering cloud gaming via native apps.¹ We have sought evidence from these providers, other cloud gaming service providers, and digital store operators to understand the issues faced in delivering cloud gaming to the App Store.
3. Cloud gaming services provide mobile device users access to high-quality games which would otherwise only be available on other platforms (eg on consoles or computers). They achieve this by using the processing power of the cloud, instead of the user's device, to run games. Previously, consumers of mobile gaming were restricted in the range and type of games which they could play by their device's processing and storage capabilities. Although they are currently in a nascent stage of development, cloud gaming services remove that restriction and consequently have the potential to reduce the importance of the hardware capabilities of mobile devices for mobile gaming.
4. Cloud gaming service providers were very positive about cloud gaming's emergence and prospects in the gaming industry and believed that it could provide benefits to consumers and developers, as well as increasing the level of competition between operating systems:
 - Google submitted that 'at a high level, cloud gaming may experience growth as low-latency internet connectivity continues to proliferate, cloud graphics processing capabilities continue to evolve, business models shift in favour of subscription models and publishers move to a direct-to-consumer model. Cloud-based streaming facilitates cross-platform play, a consistent user experience, and the convenience of not even having to download and update native apps'.

¹ Their respective apps are named Xbox Game Pass Ultimate, NVIDIA GeForce NOW, Facebook Gaming, Google Stadia, and Amazon Luna.

- NVIDIA submitted that its service provides advantages over running games locally on a user’s device, such as (i) providing richer graphics, (ii) offering previously unavailable games, (iii) saving space on a user’s device, (iv) decreasing battery drain, and (v) saving time spent downloading and installing games and updates.
 - Microsoft submitted that cloud gaming technology provides benefits to various stakeholders, as well as to competition, arguing that it:
 - **Benefits consumers** by: (i) enabling them to more easily discover and try a wider variety of games on their mobile devices; (ii) eliminating the need for consumers to purchase and upgrade expensive hardware; (iii) removing the hassle of downloading and updating each game on their device; and (iv) providing greater flexibility in the user experience by enabling access from any device.
 - **Benefits game developers** by: (i) removing the need to develop, distribute or maintain different versions of their games across operating systems; (ii) allowing for a seamless experience of their games across operating systems; (iii) allowing them to distribute their work (eg, updates) quickly across operating systems; and (iv) allowing them to reach a larger base of users without porting to multiple operating systems.
 - **Benefits cloud gaming service providers** by enabling them to centrally manage large game libraries or improve their server-side hardware² without requiring any changes to the user’s device.³
 - **Increases competition between operating systems** by removing the need for developers to write for each operating system separately. As gamers would no longer be limited to the games available on their operating system, they no longer face an opportunity cost of losing access to certain games when switching operating systems.
5. Cloud gaming service providers may adopt different business models to monetise and grow their services. From subscription-only models (Microsoft, Amazon) to an *à la carte* offering with an optional subscription service (Google), or a free-to-play, in-app purchases and in-app advertising driven model (Meta), their chosen business model may affect how Apple’s restrictions affect their ability to offer a native app. In Table I.1 below we set out high-level information

² For example, faster processors or more storage.

³ For example, installing updates or removing game apps which are no longer available.

on the business models adopted by some prominent cloud gaming service providers.

Table I.1: Business models of prominent cloud gaming service providers.

Cloud gaming service provider	Model	Content
Microsoft Xbox Game Pass Ultimate	Subscription required to access (£10.99/mo). ⁴ In-app purchases present in some games. ⁵	First and third-party games, focus on AAA games. ⁶
Google Stadia	A la carte games for purchase. Subscription service available (£8.99/mo). In-app purchases present in some games. ⁷	Games available on subscription, further games available à la carte. Includes AAA games.
Facebook Gaming	Free for users to access. In-app purchase and advertising functionality available to developers. Provider may offer alternative compensation to developers for providing game content.	Large number of third-party HTML5 and web games. Limited number of third-party AAA games. ⁸
Amazon Luna ⁹	Six different subscription channels to choose from. ¹⁰ In-app purchases present in some games.	Third-party games, focus on AAA games. Different games in each 'channel' (eg family-friendly, Ubisoft-only).
NVIDIA GeForce NOW	Subscription service (between £8.99 and £17.99 per month) with free version available. ¹¹	Third party games, focus on AAA games. User can play free-to-play games or connect to their existing libraries.

6. To understand the current popularity of these services, we collected data on the number of monthly active users from cloud gaming providers. In January 2022, across the providers who we contacted, there were a total of around 800,000

⁴ [Buy Xbox Game Pass Ultimate — Ultimate 1 Month | Xbox](#) As of 30/05/2022 (date accessed).

⁵ In-app purchases are disabled on the version distributed through Google's Play Store.

⁶ 'AAA games' are typically produced by medium to large sized publishers with larger development and marketing budgets than other types of games such as mobile games.

⁷ [Stadia - One place for all the ways we play \(google.com\)](#) As of 30/05/2022 (date accessed).

⁸ HTML5 games accessed within the app with AAA games cloud streamed in enabled areas.

⁹ Amazon Luna is only available in the US.

¹⁰ [Amazon Luna – Cloud Gaming Service](#) As of 30/05/2022 (date accessed).

¹¹ [Membership Account | NVIDIA GeForce NOW](#) As of 30/05/2022 (date accessed).

monthly active users in the UK and over 10 million worldwide. Indeed, Microsoft alone says that its service has now streamed games to over 10 million people.¹²

7. Further, the cloud gaming industry has been experiencing rapid growth. For instance, a report in 2020 submitted by Apple estimated that cloud gaming revenue would experience a compound annual growth rate of c.65% between 2019 and 2024, representing an absolute growth of around \$8bn over that period. Another report in 2019 also submitted by Apple estimated that potential users of cloud gaming services would grow to around 125 million by this year. As detailed below, this is consistent with the user data we have gathered on Android, but not so for iOS, which has seen relatively slow growth until now.

Development of cloud gaming services on iOS

8. Apple's App Store Review Guidelines include various policies which restrict how cloud gaming apps can function as native apps from the App Store. Although game streaming is currently allowed in principle,¹³ Apple's exception for streaming games includes caveats which prevent cloud gaming apps from being feasible to develop for the App Store in practice.
9. Under these Guidelines, an app which offers access to a catalogue of games is not permitted on the App Store. Each game must be individually submitted to the App Store such that it can be approved by Apple, has a product page, appears in charts and search, has user ratings and review, and can be managed with parental controls. This means that each game must be individually downloaded to the user's device, such that multiple games cannot be streamed from one app. Cloud gaming service providers may only create a catalogue app insofar that it links to the individual App Store product pages for each game.¹⁴
10. All cloud gaming service providers had negative views on the effects these guidelines would have upon the feasibility of delivering cloud gaming apps on the App Store:
 - [One cloud gaming service provider] submitted that these guidelines effectively prohibit game streaming platforms. It said that downloading each game contradicted the unique selling points of game streaming as users would lose the ability to try out and move between games quickly. [Another] told us that hosting games on its cloud gaming platform and making them appear as standalone games effectively amounts to a

¹² [Microsoft says more than 10 million people have streamed games on Xbox Cloud Gaming - The Verge](#)

¹³ After Apple introduced an exception for streaming games in September 2020.

¹⁴ [App Store Review Guidelines - Apple Developer](#) 4.9.

prohibitive ‘cross-publishing requirement’. [A third] raised the fact that many third-party games developers do not allow their games to be made available in this way because of customer confusion. [Another] told us that the full versions of various cloud gaming services had been blocked by the App Store.

- Some providers additionally pointed to the technical barriers posed by the requirement to publish each game in their catalogue as a standalone app. [One cloud gaming service provider] told us that building, testing and rotating hundreds of iOS apps, as well as maintaining¹⁵ and submitting each update for review for each game was an insurmountable technical hurdle for the company as a developer. It said that any improvements to its client-side services would also require re-publishing each game. [Another] highlighted that Apple’s restrictions require developers to spend resources coding two versions of each game, which in some cases may be technologically infeasible.

11. Further, [One cloud gaming service provider] submitted to Apple that its App Store policies presented significant challenges to cloud gaming services accessing the App Store. This provider submitted to Apple that its policies would:
 - Result in a poor user experience:[redacted].
 - Present challenges for game developers:[redacted].
 - Present operational and business challenges to streaming platforms themselves: [redacted].
12. Apple's internal documents demonstrate [some awareness that its policies would result in a deteriorated user experience of cloud gaming services]. [redacted]
13. A range of other policies which block or obstruct cloud gaming on the App Store to a lesser degree were also raised by cloud gaming service providers. We set these out in turn below.
14. Game streaming services are not included in the exemption from the obligation to use Apple’s IAP system which applies to other types of audio-visual streaming such as video and music. Most cloud gaming service providers saw this guideline as obstructive to their ability to deliver cloud gaming services on the App Store, although the extent to which this was the case varied by provider and business model:

¹⁵ For example, maintaining App Store metadata and visual assets such as app icons and screenshots.

- [One cloud gaming service provider] submitted that the IAP obligation created further technical barriers to the delivery of its cloud gaming services. It said that one of its key value propositions is the ability for developers to code a game once and have it available on all platforms. As developers must maintain iOS-specific versions of each game (old and new), the IAP requirement creates a large amount of technical and engineering work which many developers are not prepared to undertake.
 - [X]
 - However, Meta, which uses a free-to-use in-app-purchase driven model, submitted that it was not permitted to offer IAPs on its gaming services: 'Apple prohibited Facebook from offering the gameplay section of its Facebook gaming app on iOS (which is the section of the app where Facebook offers its cloud-gaming services on the Android version of the app). Apple also prohibited Facebook from offering IAPs for Instant Games and on the Facebook Gaming app on iOS which means Facebook cannot offer developers monetisation opportunities.'
15. [Some cloud gaming service providers] were concerned about the restriction prohibiting the offering of interfaces for displaying third party games. [One cloud gaming service provider] told us that this restriction would prevent it from offering many of its games to iOS users as many of the games on its service are third-party games.
 16. [Some cloud gaming service providers] raised concerns that Apple's guidelines state that thin clients are not appropriate for the App Store. NVIDIA told us that this may prevent it from offering a native app for iOS because its service is designed to perform most of the processing in the cloud. [Another cloud gaming service provider] said that there is no way to make its app compliant with this policy given that their services can only be used if the app is running on a thin client.
 17. [One cloud gaming service provider] submitted that its cloud gaming app would never be able to comply with the requirement that all account creation and management must be initiated from the App Store, as this is fundamentally at odds with the essence of cloud-based cross-platform apps.
 18. NVIDIA told us that its cloud gaming app would be unable to comply with the requirement that the app must only connect to a host device over a LAN-based network, as its servers connect to the client device via a WAN (Wide Area Network) instead of a LAN (Local Area Network).
 19. Meta highlighted that the game play section of its Facebook Gaming app – which is also the section of the app where its cloud gaming service is offered on

the Android version of the app – had been rejected in the past due to Apple’s prohibition of creating an app (i) for which HTML5 code distribution is the main purpose of the app, and (ii) which uses a store-like interface to categorise and merchandise HTML5 games.

Direct impact on providers and consumers

20. Apple’s restrictions appear to have pushed cloud gaming service providers to offer their services through web apps on iOS rather than as native apps on the App Store. Table I.2 below sets out where prominent cloud gaming service providers have made their services accessible on Android and iOS.

Table I.2: Availability of cloud gaming services on Play Store, App Store and Web Apps

Cloud gaming service provider	Android		iOS	
	Play Store	Web App	App Store	Web App
Microsoft Xbox Game Pass Ultimate	Yes ¹⁶	Yes	No	Yes
Google Stadia	Yes	Yes	No	Yes
Facebook Gaming	Yes	Yes	No	Yes
Amazon Luna	No	Yes	No	Yes
NVIDIA GeForce NOW	Yes	No	No	Yes

21. By examining how cloud gaming services perform on web apps compared to native apps on iOS, we can set out what the likely impact of Apple’s policies has been on cloud gaming service providers and consumers.
22. While we were told there are some benefits to using web apps, such as being less costly to develop and users not having to download an app, evidence from cloud gaming service providers highlighted two areas of concern.
- First, providers may struggle to acquire and retain users, and users may be unaware of the choices available to them or find it difficult to access a provider’s services since web apps are not currently discoverable on, or

¹⁶ With in-app purchases disabled – available on Samsung Galaxy Store with in-app purchases.

distributed by, the App Store, which is how users are accustomed to discovering apps. Additionally, as discussed in Chapter 5, unlike native apps, web apps on iOS are not automatically added to the user's home screen to aid future engagement with the app, nor are they currently able to send push notifications to re-engage previous users.

- Second, providers are forced to offer a lower-quality service, and users suffer from a deteriorated gaming experience on Apple devices since web apps: (i) cannot offer full-screen mode; (ii) drain battery at a faster rate; (iii) lack support for persistent storage; (iv) are not able to use Bluetooth to connect game controllers; and (v) cannot access mouse movement data. A key reason for this is due to Apple's restriction that browsers on iOS must use Apple's WebKit browser engine. As discussed in Chapter 5, WebKit lags behind other browser engines in functionality, in particular with respect to support for web apps.

Discoverability and engagement

23. Web apps are not listed or discoverable on the App Store. The App Store does not distribute web apps, nor facilitate searching for them. Accessing a web app requires users to navigate to it themselves via Safari or another browser.
24. As discussed in Chapter 5, unlike native apps, web apps on iOS are not automatically added to the user's home screen to aid future engagement with the app; users must manually 'pin' the web app to their home screen using Safari. Web apps on iOS also do not currently have the ability to send push notifications to re-engage previous users. These features of web apps on iOS hinder user re-engagement and as such the overall usage of cloud gaming services.
25. Most cloud gaming service providers from whom we received evidence highlighted discoverability, searchability and engagement as issues faced by cloud gaming service providers when using web apps over native apps:
 - On the App Store's importance in user acquisition, some cloud gaming service providers pointed to user behaviour and expectations as to why the App Store had such an influential position. [One cloud gaming service provider] submitted that turning to the store to discover content was simply what users were used to, and [another] submitted that Apple had 'trained' its users to discover mobile content this way. Further, [a third provider] said that developers have had no incentives to invest in the discoverability of webpages or web apps given their limited functionality compared to native apps and as such app discovery on iOS is driven by the App Store.

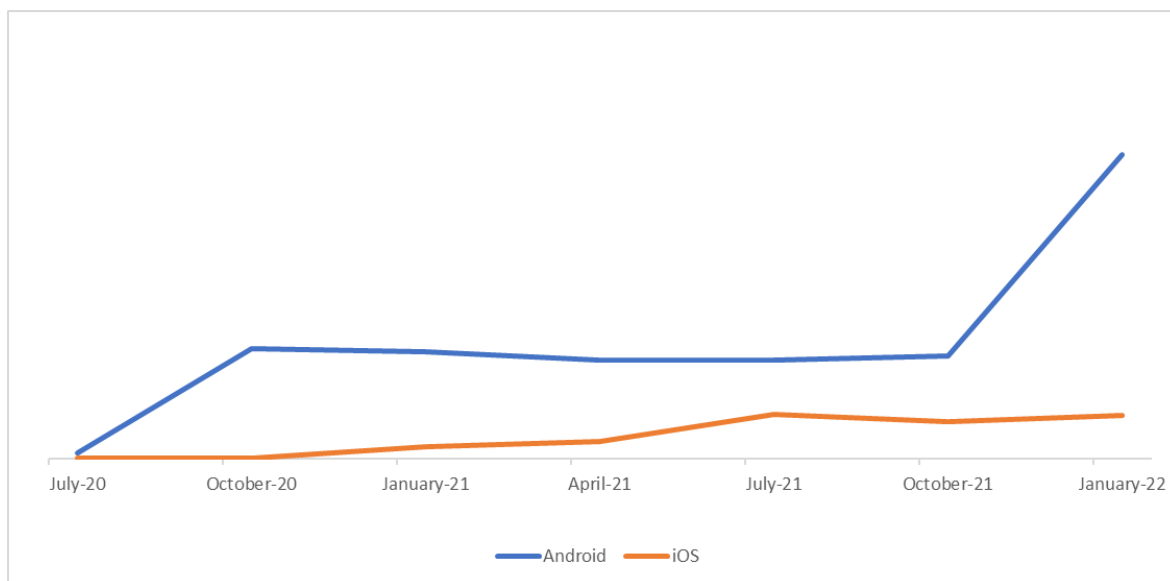
- On the App Store's importance in user retention and engagement, [one cloud gaming service provider] submitted that a web app could not store sign-in data locally for more than 7 days unless it is pinned to the home screen, requiring users to sign-in again every 7 days. [Another] pointed to user behaviour, stating that 'educating' consumers on how to engage with web apps 'imposes challenges because it is not how customers are used to engaging with apps'. [A third] submitted that the inability of web apps to re-engage consumers through push notifications, amongst other issues, further disincentivises developers from investing in discoverability of their web apps rather than native apps on iOS.
26. This means that users of gaming and cloud gaming services on iOS may have less choice of products and services, due to cloud gaming services only being available via web apps, as they may be:
- unaware of their ability to access cloud gaming services on web apps;
 - unsure how to access them even if they are aware of them; or
 - unable to effectively discover or compare additional cloud gaming services even if they are using one already.

Features and functionality

27. Submissions from cloud gaming service providers suggest that a range of features and functionalities of cloud gaming services were hindered by using a web app over a native app on the App Store. A key reason for this is the limited support of browsers on iOS for web apps due to Apple's restriction that all browsers on iOS have to use Apple's WebKit, browser engine. As discussed in Chapter 5, WebKit lags behind other browser engines in functionality, in particular with respect to support for web apps.
28. Limitations of web apps on iOS that cloud gaming service providers saw as the most impactful upon the user experience of cloud gaming included, among others:
- the inability to offer full-screen mode;
 - lack of support for push notifications;
 - inability to access hardware-accelerated graphics rendering;
 - increased battery drain;
 - lack of support for persistent storage;

- not being able to use Bluetooth to connect game controllers; and
 - no access to mouse movement data.
29. On the other hand, cloud gaming service providers submitted that there were some benefits to cloud gaming services from the use of web apps over native apps:
- users can play games on the service seamlessly without having to download an app;
 - it is possible to offer a consistent user experience across different platforms; and
 - creating web apps may be less costly and time-intensive than creating native apps.
30. These views are consistent with evidence from user data submitted by cloud gaming providers. Data on monthly active users from the cloud gaming providers we contacted show that the adoption of cloud gaming services on iOS has been far slower than on Android, and even when consumers have a choice between web apps and native apps, they appear to opt for native apps. In January 2022:
- There were around 10 times as many monthly active users of cloud gaming services on Android phones than on iOS worldwide. In the UK there were around 7 times as many.
 - Both worldwide and in the UK, where users had a choice between a provider's native or web app on Android around 99% of users used the native app, with 1% using either the web app or a combination of the web and native app.
31. Moreover, as shown in Figure I.1 below, the rate of growth of the user base of cloud gaming services has been faster on Android than on iOS, even though both were in similar positions less than two years ago in July 2020. The upwards shift in the trend of Android users from October 2021 onwards is partly due to the beta and full releases of a provider's services.

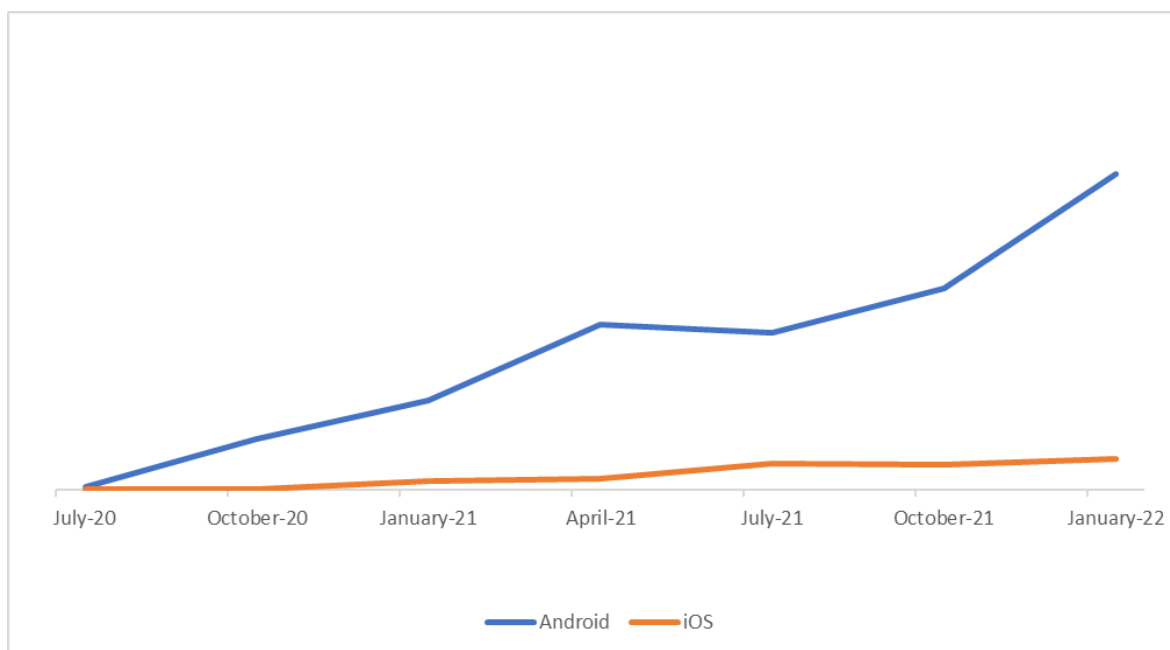
Figure I.1: Monthly active users of cloud gaming services on Android and iOS in the UK since July 2020.



Source: CMA analysis of user data from cloud gaming providers.

32. Worldwide, there is a similar trend with the monthly active users on Android growing faster than on iOS, as shown in Figure I.2 below.

Figure I.2: Monthly active users of cloud gaming services on Android and iOS worldwide since July 2020



Source: CMA analysis of user data from cloud gaming providers.

Potential harm to competition

33. We have considered Apple’s incentives for imposing restrictions on cloud gaming services. On the one hand, Apple has an incentive to bring value to users through the App Store by providing high-quality and diverse content. The

App Store becomes more valuable the better and broader its content is. On the other hand, there may be conflicting motivations which could provide Apple with reasons to impose restrictions on cloud gaming. We have assessed the following types of possible impact:

- protecting Apple's control over how apps can be discovered and accessed on iOS devices;
- protecting the importance of Apple's hardware; and
- giving Apple Arcade a competitive advantage over competing services.

Effects of Apple's restrictions upon its position in app distribution on iOS.

34. Apps which contain a catalogue of games such as cloud gaming services act as a distribution mechanism, which over time may reduce the reliance of iOS users on the App Store for the discovery of and access to games. Additionally, game distribution apps which can also be accessed on other platforms can further reduce the reliance of iOS users upon the App Store as users may not discover or pay for the initial subscription service on the App Store at all.
35. Some cloud gaming service providers submitted that cloud gaming services and gaming platforms overall have the ability to undermine the App Store as a channel for accessing or discovering games:
 - Microsoft told us that 'Game-streaming subscription apps have the potential to change customer patterns and the role of mobile app stores, enabling the emergence of competition that simply could not otherwise develop.'
 - [Another cloud gaming service provider] submitted that:
 - its gaming platform could threaten the App Store in game distribution: 'Apple repeatedly made clear that it was rejecting [X] [...] because it was concerned that it was trying to create a "gaming platform" that would rival Apple's own App Store and Apple Arcade.'; and
 - platform-agnostic services overall may pose a threat to the App Store, and therefore 'By implementing restrictions of this kind, Apple [...] undermines any source of intramural threat to the App Store's hegemony'
36. Apple earned a net revenue around £[400-600] million from digital content App Store billings in the UK in calendar year 2021, representing roughly [0-5]% of its total net revenue generated (excluding any advertising revenue). Gaming apps

are a particularly key source of revenue from Apple, representing over half of Apple IAP revenues in the UK.¹⁷

37. Some cloud gaming service providers submitted that they view Apple's incentive to protect its position in app distribution, particularly with respect to the lucrative gaming market, as one of the reasons why it has restricted the emergence of cloud gaming services on its App Store:
 - [One cloud gaming service provider] submitted that over time, game subscription services could challenge Apple's position in game distribution and circumvent the App Store's lucrative gatekeeping role because players would have an alternative discovery channel to the App Store, and would have access to new games that could not otherwise be played on iOS devices, exercising a competitive constraint on the App Store. It said that by foreclosing game subscription services, Apple protects its dominance in the market for game distribution through the App Store.
 - [Another cloud gaming service provider] submitted that Apple has a strong incentive to restrict the ability of consumers to access services on iOS devices through channels other than the App Store. It said that this incentive has apparently motivated Apple to set policies that prevent consumers and providers from interacting in this way.
38. Apple's internal documents also show that they are aware of the threat which store-like services such as those provided by cloud gaming developers could pose to the position of the App Store. One internal document we received from Apple discussing issues around Microsoft's cloud gaming service said 'It is about literally everything it means to be an App Store - agreements with developers, app review, age ratings, product pages, ratings and reviews, search (the #1 source of app discovery), charts, top lists, editorial, etc - none of this works if the games are not submitted and on our store just like all other apps.'
39. We are mindful that by prompting cloud gaming service providers to offer their services via web apps instead of native apps, Apple may have provided an additional incentive for these developers to invest in web apps.
40. Apple's internal documents demonstrate that it was aware of the potential threat that web apps may pose to the App Store, while acknowledging that web apps may not prove an optimal experience to users. In an email chain

¹⁷ We used Bank of England data to convert from US Dollars into Great British Pounds, this was done using the yearly data from [XUAAUSS | Bank of England | Database](#).

discussing whether Microsoft's cloud gaming service could enter the App Store, an Apple employee said [X].

41. On the other hand, evidence from Amazon showed that Apple engaged with it to [X]. Nevertheless, as discussed above, on iOS web apps have several significant drawbacks compared to native apps for cloud gaming.
42. Overall, if users were to begin to turn to cloud gaming services to find new games rather than the App Store, this could pose a significant threat to an important revenue stream for Apple. Given the limitations of web apps on iOS – and Apple's ability to maintain those limitations as discussed in Chapter 5 – the potential threat from cloud gaming services through web apps seems likely to be much more limited.
43. The impact of the development of streaming services on music distribution may be an instructive example for the possible impact of cloud gaming on app (and specifically game) distribution. In 2010, revenues from music downloads outstripped music streaming revenues by a ratio of almost 10:1, but by 2020 this had reversed.¹⁸ Apple, which had made a significant majority of music download sales through its iTunes store, has by contrast only a 16% share in music streaming through Apple Music.¹⁹ If Apple expected cloud gaming services to have a similar impact on game distribution, this would likely provide a strong incentive to obstruct the emergence of such services.

Effects of Apple's restrictions upon its hardware revenues

44. We examine below how the emergence of cloud gaming services on the App Store may reduce the revenue that Apple generates via device sales by :
 - reducing the importance of premium hardware on Apple iPhones for users' experience of gaming apps; and
 - reducing switching costs between devices by offering platform-agnostic services.
45. Cloud gaming service providers considered that cloud gaming services on iOS may have the ability to reduce switching costs between devices by providing platform-agnostic services and reduce the reliance of consumers upon Apple iPhone hardware:

¹⁸ [IFPI Global Music Report 2021](#). In 2010 digital music download revenues were \$3.9 billion while music streaming revenues were \$0.4 billion. In 2020, digital music download revenues were \$1.2 billion while music streaming revenues were \$13.4 billion.

¹⁹ [NPD estimates](#) gave Apple a 70% share of US digital music downloads in 2010. [Statista](#) estimated that Apple Music had a 16% share of music streaming subscribers worldwide in the first quarter of 2021.

- [One cloud gaming service provider] submitted that operating system-neutral gaming services reduce the importance of the operating system and therefore reduce the cost of switching devices.
 - Microsoft submitted that cloud gaming technology increases competition between operating systems by removing the need for developers to write for each operating system separately; as gamers would no longer be limited to the games available on their chosen operating system, they do not face an opportunity cost of losing access to certain games when switching OSs.
46. Apple earned a net revenue of around £[5.5-6] billion from iPhone device sales in calendar year 2021, representing roughly [50-60]% of its total net revenue generated in the UK. This increases to around £[6.5-7] billion, and [60-70]% of its net revenue, when factoring in the iPad.²⁰
47. Apple's internal documents show that supporting the differentiating hardware factors of the iPhone was a relevant factor whilst discussing whether to allow Microsoft's cloud gaming service on the App Store. In an internal document (email) in 2020, a senior Apple employee commented that [Apple has a strategic interest in supporting high-quality content that leverages the differentiated capabilities of Apple devices]. In a different context, as revealed in court documents in the *Epic* litigation, Apple's Craig Federighi explained to an Apple employee who suggested that Apple acquire a cloud streaming company that cloud streaming apps would make 'little sense for Apple (given our strength of providing high performance local compute)', and that they would be 'counter to our overall customer value proposition'.²¹
48. Some cloud gaming service providers considered that protecting the position of the Apple iPhone, iOS operating system and Apple's hardware revenue from iPhone sales were influencing factors in Apple's decisions around the restrictions on cloud gaming on iOS:
- [One cloud gaming service provider] submitted that Apple has an incentive to restrict operating system-agnostic relationships between consumers and service providers as they would lower barriers that users must overcome to switch away from iOS devices. It said that Apple's policies and practices that prevent these relationships from forming were apparently motivated by this incentive.

²⁰ We used Bank of England data to convert from US Dollars into Great British Pounds, this was done using the yearly data from [XUAAUSS | Bank of England | Database](#).

²¹ Exhibit [PX-0464](#) in Apple/Epic.

- [Another cloud gaming service provider] submitted that Apple is the only manufacturer of mobile devices that is able to sell premium phones on a large scale, and that a transition to cloud-based services will reduce the need for high-end devices, thereby threatening Apple's hardware business.
49. As noted above, there is an inherent cost to Apple of preventing new and high-quality services such as cloud gaming from gaining access to the App Store, particularly given that they are available on the Google Play Store; users who wish to access cloud gaming may become more likely to switch to an Android device if they cannot access cloud gaming apps on their iOS devices.
50. However, we consider that, overall, Apple may believe that the threat posed to its device revenue by cloud gaming services outweighs these costs at present and this provides an incentive to obstruct the emergence of these services. Currently cloud gaming services are in a nascent stage of development – if, by blocking them from the App Store, Apple can hinder their development more broadly, it would be able to better maintain the current prevailing situation, where users who want to play high-quality games need high-quality devices to do so, and so help protect its market position.

Effects of Apple's restrictions upon Apple Arcade

51. Apple Arcade is a subscription service where, for a single flat fee (£4.99 per month in the UK), users get access to the catalogue of games available on the service. Users access the games in the catalogue by downloading them directly to their mobile device as individual apps and the games use the processing power and storage of the device to run the games.
52. Apple Arcade is still a relatively new and growing service. Apple earned an actual revenue of [less than £10 million] in the UK in 2021, a very small proportion ([0-5]%) of its total revenue. This may be expected of its business model in the early stages as it builds its user base. Worldwide, it generated around [£50-60] million in 2020 with around [£X] paid out to third-party game developers – a difference of around [£X].²²
53. To the extent that Apple Arcade would face a competitive threat from cloud gaming services, Apple's restrictions on cloud gaming would shelter Apple Arcade from competition. Overall, it is not clear how strongly Apple Arcade competes with cloud gaming services:

²² We used Bank of England data to convert from US Dollars into Great British Pounds, this was done using the yearly data from [XUAAUSS | Bank of England | Database](#).

- Apple [§], and told us that Amazon Luna and Xbox Game Pass, both of whom offer cloud gaming services, were two competitors to its Apple Arcade service, although it also listed companies who do not offer cloud gaming services on mobile devices such as PlayStation, Electronic Arts, Activision/Blizzard and Square Enix.
 - However, cloud gaming service providers, while noting some similarities and competition between their services and Apple Arcade also highlighted important differences. In particular they noted the higher quality of games available on cloud gaming services given that processing is done in the cloud, and the ability to use the same service across devices as opposed to the 'device-centric' model of Apple Arcade.
54. Internal email discussions from Apple regarding whether and how to permit Microsoft's cloud gaming service on the App Store did not make any reference to a strategic interest of protecting Apple Arcade, and instead were focussed on Apple's App Store Review Guidelines (mostly on its store-like functionality) as well as Apple's strategic interest to emphasise the differentiating hardware capabilities of Apple devices.
55. Overall, we consider that while Apple may be incentivised to hinder the development of cloud gaming, any such incentive is likely to be driven more by the benefits to Apple of protecting its hardware revenues and its market power in app distribution than by the benefits of protecting Apple Arcade.

Apple's stated rationale for restrictions on cloud gaming

56. Apple has provided various justifications for its App Store policies on cloud gaming. Apple claims that its policies around cloud gaming are justified on the grounds of security and privacy, as well as user experience and expectations.
57. Apple said that the App Store provides protections to its customers in relation to apps. It said that akin to other apps on the App Store, games must:
- have product pages which contain important information for all users such as privacy information labels and age ratings;
 - be subject to privacy-protective processes built into iOS (such as preventing apps from accessing device user and sensor data including location, contacts and photos without consent); and
 - be manageable by Apple's Screen Time and Family Sharing features (which allows parents to limit the age ratings of apps, set time limits for device usage and approve purchases and downloads on a child's device).

58. It said that if it were to allow individual software apps such as streaming games to be distributed within a streaming game service app, then these protections would fall away. Aside from these protections, which Apple said were also part of the user expectations for games on the App Store, it said that users expected games to be locatable in App Store searches and be eligible for featuring in App Store charts and editorial sections.
59. There are other types of app available on the App Store which allow users to access a variety of content, which is updated over time and is not reviewed individually by Apple. Apple submitted that the differing treatment of cloud gaming platforms compared to other media streaming platforms can be explained by the distinction between games and other types of content, for example creator apps such as Roblox or YouTube, or traditional media such as music or films. Specifically:
- It said that games are software applications which contain code which dictate the features, functionality, and content accessible within them. It highlighted that users interact with games and are making decisions during those interactions such as buying an item, submitting personal information to create an account or granting consent for location information. It contrasted this to traditional media such as music and films, which are linear and static with no interactive features. Because of these differences, it said that each game must be reviewed under the App Review Guidelines whereas traditional media content does not require individual review.
 - Regarding creator content, Apple said that users and creators of, for example, YouTube videos, Snapchat lenses or Minecraft worlds are not creating new software applications but rather are making content within the bounds of the software provided by the creator app developer. It noted that creator content can offer interactive features such as items for sale or data requests from users, but that it does not need review by the App Review Guidelines as these features occur within the confines of the creator app itself, which has already undergone review.
60. Our view is that the reasons cited by Apple do not provide a compelling justification for its restrictions on cloud gaming apps.
61. First, privacy and security protections for games distributed through the App Store could be replicated for games within cloud gaming apps. These protections could be implemented through a mixture of Apple applying them to the cloud gaming app as a whole (given that that app would itself be distributed through the App Store) and cloud gaming service providers applying equivalent protections within their apps (a number of which are already in place).

62. We engaged with cloud gaming service providers to better understand the protections which they offer their users.
63. [One cloud gaming service provider] told us that:
- All games are tested against a set of policies, technical requirements and product component-related requirements which ensure that products on its service are stable, reliable and provide a consistent, safe and secure user experience.
 - It provides information relevant to each game on product detail pages (PDPs). These include information such as age ratings and other disclosures required by the rating bodies, relevant warnings (eg seizure warnings) and information about privacy permissions. For games which are designed to take advantage of certain hardware or software (eg using a microphone), this information is also available on the PDP prior to streaming the game.
 - Its users can manage their privacy settings (eg what other users can view, who they want to use video for communications, what data it can and cannot collect). It pointed out that games and apps on iOS, Android and Windows request explicit consent to access location, microphone, camera, contacts and photos, subject to the privacy controls of each device.
 - Parents can create a family account through which they can manage aspects such as setting screen time limits, using content controls to filter content, requesting children's activity reports, approving purchases and games, and setting spending limits.
64. Google told us that:
- All games undergo a certification process which involves ensuring that it performs well on the platform and gathering accurate metadata for the product listing page (including providing a valid content rating from a ratings agency).
 - It displays details on each game in the Stadia store which include a link to the game publisher's privacy policy (which sets out what data the game publishers collect from the game). When a game requires access to sensitive information, the Stadia interface will first confirm that the user would like to grant this access.
 - It mediates the APIs used by games, which are subject to internal privacy reviews before launch to ensure that game developers only receive data

that is necessary for the functionality of the game. This is possible as only the Stadia app itself is actually downloaded on the device.

- Parents can create a family group which allows them to set up restrictions such as preventing a child from playing games above a given rating, or approving requests to purchase or play games.

65. NVIDIA told us that:

- As games do not run on the user's device, games do not have access to device data (e.g. contacts, location data). Further, users have all the standard protections offered by Windows PC gaming.
- It tests games to ensure they meet the performance and quality characteristics of high-end cloud gaming. It noted that third-party publishers also have their own onboarding procedures.
- It follows GDPR guidelines and that each user must agree to the NVIDIA privacy policy. It presents the user with the publisher terms of use upon the first use of each game, and all games are tagged with country and region-specific age ratings.
- That third party publishers enforce other game and purchase approval forms, and, depending on the device, that a user's device will also provide protections and security procedures such as parental controls.

66. Amazon told us that:

- In order to ensure that games are suitable for its catalogue, Amazon validates that: (i) the game contains no illegal or prohibited content; (ii) the game supports controller use and that other declared inputs function as expected; (iii) game performance measurements such as frames per second meet expected levels; (iv) game marketing assets are accurate; and (v) in-app purchasing is facilitated by the Luna SDK and correctly fulfilled by the game upon purchase.
- Customers are provided with information including age ratings and content descriptions and (where applicable) links to the developer's privacy policy for each game via a game detail page before they play the game. It noted that most games in the service do not require sharing of personal information with the game developer.
- It does not allow games to access user device and sensor data, except for access to microphone inputs for games with voice chat capabilities, which is only granted with user consent.

- It has a parental control system which allows the account holder to apply parental controls such as game purchase and play approval and the ability to hide certain content and features within Luna.

67. Meta told us that:

- It conducts an extensive review of both the developers and the specific games being uploaded. It will review a developers past work, as well as whether the game has a clear functionality, is free from frequent errors, provides a good user experience and ensuring that in-app purchases provide meaningful and rich experiences for gamers.
- It does not share non-public user information with developers without receiving user consent for sharing data. It provides a developers privacy policy to users when they first start playing a game, and users can change their consent setting later on if they choose.
- Further, developers are only allowed to request user consent to access certain information if they establish a *bona fide* use for the data for gameplay purposes, which is verified by Meta.
- It does not allow customers who are under 13 to use its services, and that all games available on its service must be suitable for all potential customers such that the games it offers must all be suitable for ages 13+.

68. Moreover, Epic submitted that there are no greater security risks associated with cloud gaming apps versus other streaming apps, such as Netflix. It said that only the user's inputs and the game's audio and visual outputs are sent between remote servers and the user's device, which is similar to how video can be streamed to a device.

69. Second, contrary to Apple's view, user and market research evidence we have received suggests that users expect to be able to instantly access all of the games in a cloud gaming service without needing to find and download additional applications.

70. Google told us that it believes that user expectations on how to access games are shifting, similarly to how they shifted for music and video. It said that while this shift has not yet occurred to the same extent with games, it does see some signs of it starting, and believes that cloud streaming technology may accelerate it.

- It noted that the results of a survey of Stadia users highlighted that the fact that Stadia did not require hardware, downloads or updates was one of the top drivers of customer satisfaction of the service.

- Further, in a survey of Google Play newsletter respondents, Google found that gamers on average use 3 gaming platforms, which it sees as demonstrating that they generally own and expect to be able to play games on multiple devices. Moreover, this survey also found that the ability to cloud save was one of the top five features that users cared about in relation to gaming platforms.
71. [One cloud gaming service provider] told us that it believes that, much like the growth of subscription services offering catalogues of video content, gamers will increasingly want access to a broad catalogue of games from a single location, rather than purchasing individual games. Further, research into what it defines as the ‘Gamer’ customer segment referred to in an internal strategy document indicated that it believes that: (i) users will increasingly expect ubiquitous access to their content; and (ii) having the choice of where and how to play games is particularly valued.
 72. Further, users’ expectations may change over time because of innovation. Before streaming music became common, users may have expected to download individual songs from iTunes – this would not have been a good reason for Apple to prohibit music streaming apps.
 73. Finally, it is clear from Apple’s submissions as well as comments by cloud gaming service providers that other types of streaming content also demonstrate interactive features. For example, ‘creator content’ in apps such as Roblox can include a wide catalogue of user-generated games in a single app, while even ‘traditional media’ streaming platforms can contain interactive content – [one cloud gaming developer] highlighted interactive Netflix content such as ‘Black Mirror: Bandersnatch’ or ‘You vs Wild’.
 74. Indeed, Apple’s treatment of these other types of app provides a model for how it could allow cloud gaming apps on the App Store without compromising users’ safety or experience. For example:
 - video streaming apps such as Netflix or Disney+ present age ratings for individual pieces of content within their apps and allow users to set parental controls; and
 - as noted by Apple, it does not need to review individual pieces of content within ‘creator apps’ even when they can access data or ask for payment, because this takes place within the confines of the already-reviewed creator app.
 75. The fact that Google allows cloud gaming apps to be distributed through the Play Store, without any indication that this has compromised user safety, also

indicates that cloud gaming services can be offered in a way that is compatible with privacy and security considerations