# Cloud platforms go direct-to-consumer in gaming push, hoping to succeed where startups failed

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## Introduction

Over the past decade, various startups have endeavored to move entire video games to the cloud, although they have seen few victories. Now, the three largest hyperscale cloud platforms – Amazon, Microsoft and Google – are aiming to change the game in cloud gaming, with direct-to-consumer, cloud-powered gaming services.

## The 451 Take

Cloud gaming is an interesting scenario – the consumer-focused business units of Microsoft, Amazon and Google are serving as an internal customer for their respective cloud services. With this infrastructure and internal cloud expertise, these firms could see success in a market where a half dozen startups tried (and failed) to gain traction. This modality has also prompted an eyebrow-raising alliance between erstwhile competitors Sony and Microsoft, as the former publicly announced plans to use Azure to power streaming functionality on PlayStation systems.

## Context

451 Research identifies 'cloud gaming' as fully interactive media rendered fully on remote hardware, removing the need for significant CPU/GPU capabilities on local hardware. By processing these workloads in the cloud, games with identical graphical capabilities can be delivered to any client device – not just game consoles, but also phones, tablets, laptops and streaming media devices such as Google's Chromecast. (Similar concepts are outside the scope of this definition, and therefore this report).

Traditional multiplayer games, such as World of Warcraft, connect players across the internet, but the graphics displayed to the player are processed on the client device. Likewise, Apple Arcade is offered as a subscription service (as opposed to buying individual games), but only uses cloud

infrastructure to distribute game downloads. (For readers unacquainted with gaming, our previous report has identified different approaches to incorporating cloud technologies in gaming.)

While Amazon, Microsoft and Google bring valuable experience in operating cloud services to this market, the pitfalls experienced by startups in this space have only moderately abated. Typical home internet connections often provide unsuitable performance, or have ISP-imposed bandwidth caps that penalize subscribers for a set amount of data transfer in a single billing period.

Now, gigabit fiber-to-the-home internet connections are becoming more widely available, rationalizing the efforts of the hyperscalers to leverage enterprise cloud infrastructure in direct-to-consumer services coming to market currently. While GPUs have long since been resident in the cloud for AI/ML workload processing and media encoding, delivering real-time performance is a higher level of complexity, requiring custom instance types and edge connectivity to reduce latency.

Much of the technology for this approach seems grafted together. But while it is easy to imagine a future where individual instances are spun up on demand when a subscriber wants to play a game, currently, these games appear to run from custom hardware. On the one hand, this seems to make the cloud just a convenient datacenter; alternatively, one can argue that custom hardware is actually the point, because this hardware serves as a performance target for developers. But, if this is taken to be true, these services become, essentially, a less performant console you can access over the internet.

It is difficult to imagine such services finding substantial success, given the current trajectory of gaming – and the fact that the consumer message and target market is poorly articulated – because they are effectively limited to urban areas with good connectivity, leaving out rural, and often suburban, subscribers.

The idea makes sense for graphically intense games targeted at hardcore gamers, but that market already has hardware playing the games on offer. Likewise, ISPs with data caps are a poor fit – Amazon estimates 10GB of data usage per hour of 1080p (full HD) cloud gaming on Amazon's Luna. For families with multiple concurrent streaming activities, such as Netflix streaming or Zoom calls, this added load can quickly run up data caps.

The 'gimmick' impression of this delivery method doesn't help. Google's consumer device business has a reputation for inconsistency and abrupt product line cancellations – the Daydream View VR headset was discontinued just shy of three years on the market. Likewise, Google's refreshed Chromecast, introduced in September 2020, is not compatible with Google's Stadia, prompting questions about the company's commitment to the service.

## Why would you buy this?

Cloud gaming, at first glance, would seem to be more convenient than traditional game consoles, since it should allow any game to be played on any arbitrary platform – including smartphones, tablets and ultraportable laptops, which may not natively have the CPU/GPU power to run the software in question. Nominally, it eliminates the inconvenient process of installing updates for games, and consumers do not want to wait on updates to start playing. It also aims to eliminate the hardware-generation refresh cycle, which averages two years for PC GPUs, and roughly six years for game consoles.

What the reality comes down to is somewhat prosaic – cloud gaming requires high-bandwidth and low-latency connections. These often come at a significant premium (if they're even available) in residential areas in North America, although they are more widespread in East Asia. This is reflected in subscriber counts, according to Kagan Research (a media research group within S&P Global Market Intelligence), which finds that of the 17.2 million estimated subscribers, 56% are in the Asia-Pacific region, compared to only 21% in North America.

Likewise, there is some input lag introduced by offloading processing work to the cloud – this is less noticeable in turn-based games, but can frustrate in action-oriented games that require precise timing to play skillfully. Cloud gaming platforms presently offer a relatively limited library, with few exclusives. Few games available on cloud gaming platforms offer graphical enhancements surpassing game consoles, and those that do are likely to be overtaken by the impending release of the Xbox Series X and PS5 later this year.

## Why would you build this?

It seems likely that cloud platform operators are appealing to developers with stories centered around anti-piracy and anti-cheating topics, as well as ease of content distribution. Until roughly 2010, console games were produced and play-tested to a relative degree of stability, because game-breaking bugs could not be patched in software – a gold master was given to a manufacturer to produce discs or cartridges with the game data.

Now, games are often treated as living systems, with post-release bugfixes months or years after debut, as well as free or paid additional content. Likewise, for games that are primarily or exclusively played online – particularly massively multiplayer online role-playing games – the appeal of unifying build targets for the cloud, rather than for a myriad of client devices, is likely significant.

Further, the enterprise push to the cloud prompted the creation of cloud datacenter regions in physical proximity relative to likely players. Microsoft, for example, has a comparatively high number (60) of Azure availability regions across the world, which can be useful for decreasing the effect of lags, as well as an existing gaming business in the Xbox brand. In effect, it is (or can also be) a synergy play. This existing infrastructure, viewed through the lens of the client device businesses of Google and Amazon, makes it possible to create an internal customer for these resources.

## Cloud gaming players

Although cloud gaming is very much an emerging market, there are five major players at present. Google, Amazon and Microsoft all operate enterprise-focused cloud services; Microsoft and Sony operate consumer-focused gaming services. NVIDIA, purveyor of GPUs, has a foothold in the games industry although is not itself a publisher, making its go-to-market relatively singular compared to competitors. These five companies are detailed below.

**Google Stadia**, introduced in November 2019, allows games to be streamed at up to 4K HDR at 60 FPS, contingent on developer support. Games on Stadia can be purchased individually, with some games bundled with a pro subscription ($10/month). Google sells a custom controller that connects directly to the service via Wi-Fi to reduce latency, bundled with a Chromecast Ultra for $99 (initially $129), although third-party controllers are supported. Games can also be run in a Google Chrome tab, or on supported phones running Android 10 or newer. The GCP-powered cloud back end uses an AMD Vega GPU and unspecified Intel CPU.

**Amazon Luna** was announced in September 2020 with early access beginning the following month, allowing games to be streamed at 1080p at 60 FPS, with initial pricing at $5.99/month. Amazon offers a custom controller that connects directly to the service via Wi-Fi to reduce latency for $49 during early access. Amazon Luna uses AWS G4 instances currently, and Luna will receive upgraded hardware each time AWS refreshes its GPU instances. It additionally uses a customized suite of tools: Amazon AppStream 2.0, NICE DCV and EBS.

**NVIDIA GeForce Now** launched in February 2020 after a years-long public beta. Unlike other cloud gaming services, this does not bundle games, rather, it requires the user to link a Steam, Epic or UPLAY account to play already purchased games. It allows games to be streamed at rates up to 1080p at 60 FPS. The service costs $5 per month, although a free tier exists with session-length

limitations. NVIDIA partners with ISPs to deliver the service outside of North America, including KT Telecom and LG U+ in South Korea, Softbank and KDDI in Japan, Rostelecom and Beeline in Russia, and Taiwan Mobile.

**Xbox Game Pass Ultimate** added cloud gaming capabilities (previously publicly referenced as Project xCloud) in beta in September 2020, giving subscribers access to over 100 games playable via the cloud on Android phones or tablets. The service allows for games to be streamed at up to 720p. On the back end, this functionality is enabled by custom Xbox One S hardware across Microsoft's Azure datacenters.

**PlayStation Now** launched in January 2014. Similar to Xbox Game Pass, the service allows subscribers to download games to play directly on PS4 or PS5 consoles. The cloud gaming feature is used to stream PS2, PS3 and PS4 games on PC or PS4. The service is $10/month or $60/year, and streams at 720p. Interestingly, Sony announced a partnership with Microsoft in 2019 to co-develop game streaming technology, and to partially operate online services for PlayStation on Microsoft Azure, despite the two being direct competitors in the game hardware market.

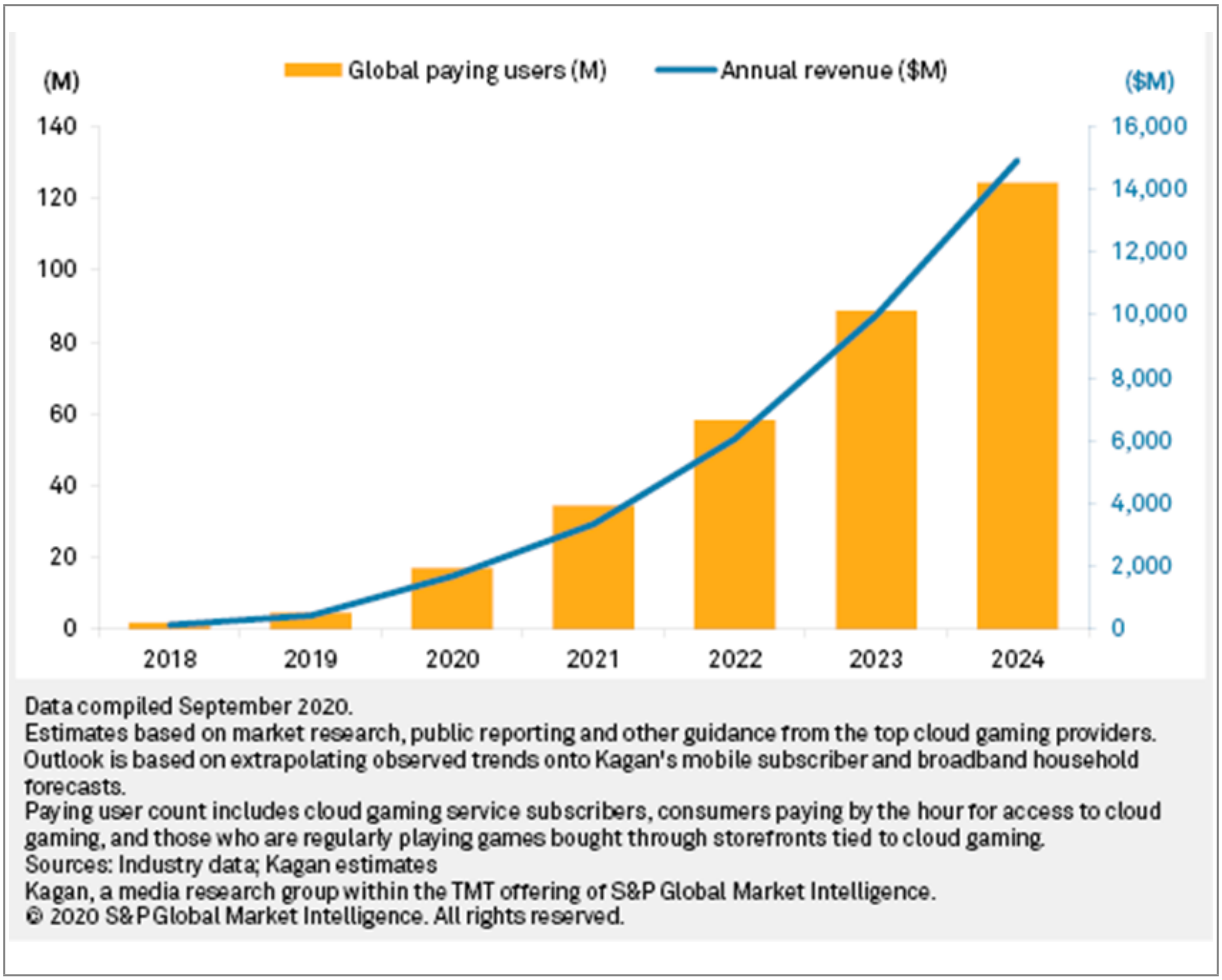
Other competitors exist, including ISP-operated services (largely in Asia)**.** These include **G-cluster**, which only serves the Japanese market. Peculiarly, the retro-game-focused **Antstream** uses a cloud gaming delivery model, although the 1980s/'90s games on offer can be emulated trivially on client devices (providing better performance and dramatically decreasing operational costs). Non-consumer-facing options include product provider **Gamestream**, which markets cloud-based embedded entertainment options for hotels, hospitals and cruise ships, and developer-focused **Ubitus**.

Various failed startups in the cloud gaming space include an abortive attempt at cloud gaming by **IAC**, a defunct streaming service from video game rental service **GameFly**, as well as **LiquidSky**, **OnLive** and **Playcast**.

## Assessing the potential for future growth

Kagan Research estimated in September 2020 that the cloud gaming market would grow to 124.4 million users, representing $14.9bn in annual revenue by 2024. There is a significant caveat to this prediction, however: The monthly rate assessed for Xbox Game Pass Ultimate and PlayStation Now includes features unrelated to cloud gaming, making it more difficult to ascertain interest or uptake in the cloud gaming feature.

**Cloud Gaming Forecast, 2019-2024**




*Source: 451 Research & Kagan, a media research group within the TMT offering of S&P Global Market Intelligence*

*To learn more: 451 Research's Ian Hughes, alongside Kagan Research's Neil Barbour, participated in an S&P Global MediaTalk podcast on the state of the video game industry amid COVID-19.*