

Google Stadia is the first true cloud-gaming platform; MNOs can use edge computing to grow their portfolios

April 2019

Roberto Kompany

Google unveiled Stadia, a new cloud-based gaming platform, at the Game Developers Conference (GDC) in San Francisco in March 2019. The concept of cloud gaming has been around for a while, but has so far been focused on storing gamers' profiles and streaming game software to a console. With Stadia, game visuals will be delivered through Google's Chrome browser or through its Chromecast devices using its own cloud servers; all the graphics processing and rendering will be done remotely, and gamers will no longer need to acquire console hardware. This comment provides an overview of the role of edge computing and 5G in helping mobile network operators (MNOs) to address the challenges and opportunities in this new cloud gaming market.¹

Google aims to use Stadia to deliver more power than today's gaming consoles offer

The video game industry has come a long way from the early days of arcades and Pac Man. It is now worth more than USD130 billion, and is dominated by a select group of console manufacturers, such as Microsoft, Nintendo and Sony (that make the Xbox, Nintendo Switch and PlayStation (PS), respectively), as well as game publishers, such as Electronic Arts.² Each of the consoles offered currently packs quite a lot of horse-power; this is necessary for today's 3D graphics rendering, which is computationally intensive and requires expensive hardware.

Moving the console from the home to the cloud may sound trivial, but it does pose significant technological challenges. Google plans to launch its Stadia service with 4K resolution and a frame rate of 60 frames per second (fps). By contrast, the latest PlayStation (the PS4 Pro) only delivers a resolution of 2160p and a frame rate of 60fps for sub-optimal visual effects and 30fps for enhanced visual effects. This means that Google's cloud must host more-powerful graphics processing units (GPUs) than those in the PS4 Pro in order to deliver on its plans.

Sophisticated video codecs can deliver 4K/60fps visuals over a 30Mbps broadband connection, but such broadband speeds are not widely available, even in developed markets such as the USA. Moreover, the response rate or latency that is required (the delay between the gamer executing a move and the server sending back the next visual image) is largely determined by the distance between the gamer and the cloud servers. The demonstrations given at the GDC would not have suffered any major issues given that the event was held just 60km from the Google headquarters in Mountain View, San Jose, but it is likely that most gamers will be much further away from the servers.

¹ For more information about Google's Stadia cloud-gaming service, see Analysys Mason's [Google plans to use its Stadia cloud-gaming service to gain a central position in the digital gaming value chain](#).

² The Wall Street Journal (2019), *Google Unveils Stadia, a High-End Gaming Service Without a Console*. Available at <https://www.wsj.com/articles/google-stadia-aims-to-stream-games-from-cloud-11553018739>.

Google will need to use edge computing to succeed with the Stadia gaming platform

Removing the console is just the first step in democratising gaming beyond the high-end players that are willing to buy dedicated hardware. The service must be ubiquitously available in order to get occasional gamers onboard. Today's 4G networks will not be adequate given the low latency that is required. Even the upcoming 5G networks on their own will not provide low enough latency for the complex gaming that Stadia is designed for.

Edge computing platforms can deliver reduced latency communications because they process data closer to the user than public cloud servers do. Such platforms will be required for high-performance gaming including virtual reality/augmented reality (VR/AR) and split rendering. Google has access to many edge nodes that are used for content caching and delivery, such as for YouTube or Google Search.³ MNOs also have access to highly distributed network architecture and are already engaged in various edge computing trials.

MNOs could use gaming to invest in their edge computing platforms and move up the edge value chain

Telefónica is one of the MNOs that is exploring the ways in which edge locations could be used to support the virtualisation of its access networks in order to provide new services. Deutsche Telekom founded MobileEdgeX, in which MNOs work together to create a platform that enables third-party workloads to be placed into the most appropriate edge locations based on the location of the end user. At MWC 2019, MobileEdgeX demonstrated AR gaming with Niantic.

It is unclear whether the existing consoles will survive beyond their current physical forms. Players other than Google, such as Microsoft and Sony, have announced their own plans for cloud gaming; for example, the PS5, which is due to be released in 2020, is rumoured to be cloud-based. Furthermore, publishers could host their games on generic cloud-based platforms from Google, Microsoft or an MNO by using an aggregator.

More-demanding chips will be required as gaming becomes more sophisticated (with more-realistic 3D graphics) and VR/AR becomes commonplace. Chip providers, such as Nvidia, will need to continue to create more-efficient, multi-tenanted and virtualised GPU platforms to increase processing power and make them suitable for edge platforms.

Gaming can provide MNOs with an opportunity to [move up the edge value chain and become edge application enablers](#) by running game platforms as virtual machines/containers on their edge servers. MNOs also have a wide-ranging customer base and are well-placed to form 'Netflix-style' partnerships with gaming publishers/aggregators. Such partnerships are beneficial for both parties involved: the MNOs can increase customer satisfaction and retention, and the publishers/aggregators gain a route to market.

³ Google, *Google aims to deliver its services with high performance, high reliability, and low latency for users, in a manner that respects open internet principles*. Available at <https://peering.google.com/#/infrastructure>.