Cloud Gaming-The wave of future games

Antu Jilson
Department of MCA
Amal Jyothi College of Engineering
Kanjirapally, Kerala.
antujilson2022@mca.ajce.in

Mrs.Meera Rose Mathew
Asst. Professor MCA
Amal Jyothi College of Engineering
Kanjirappally, Kerala
meerarosemathew@amaljyothi.ac.in

***Abstract*— Gamers may enjoy high-quality gaming experiences anywhere and at any time. Since the late 2000s, cloud gaming has gotten a lot of attention from academia and industry, thanks to the proliferation of high-speed networks and cloud computing. In cloud gaming, game software operates on powerful servers in data centres, game scenes are broadcast to gamers in real time over the Internet, and gamers interact with the games using lightweight software that runs on a variety of devices We review the most recent cloud gaming research from a variety of perspectives in this paper, including cloud gaming platforms, optimization strategies, and commercial cloud gaming services. The readers will obtain an overview of cloud gaming research as well as become acquainted with recent advances in this field.**

I. INTRODUCTION

Cloud gaming is a novel technique of delivering computer games to users, in which complicated computational games are run on powerful cloud servers without the need to install or download on a PC or console. The game is rendered and played on the remote server, we can see and interact with them locally in our device. It is just like a Netflix or any other online platform, the only difference is that the server where the video stream is coming from can also pick up and react to your inputs. With cloud gaming, we need a high speed internet connection.
The cloud gaming platform runs computer game programs, it is divided into two major components:

i. i. game logic, which is in charge of translating gamer commands into in-game interactions.
ii. scene renderer that generates game scenes in real-time.zThe gamer commands from command prompt.

encoder are all implemented as a part of cloud gaming platform.

TYPES OF CLOUD GAMING

Based on the technology employed in the gameplay process cloud gaming can be divided into 3 types:

a) Video Streaming

Video Streaming is associated with streaming interactive video. The Steps are simple. First for controlling the game the player sends an input command to the server. At this time server, process the operation and run the game. The game result is stored into consumers device over internet using client.

b) Command Streaming

In cloud game logic and graphic commands are processed, while rendering occurs on user's device. Compared to streaming an interactive video, this reduces the load on the network. While sending commands it require less bandwidth from internet compared to transmitting the video. The problem is that the game graphics is limited, by the GPU capabilities of the device.

c) File Streaming

File streaming is also called stream file transfer. This technology allows users to access the game after downloading number of small files to their device. This allows instant access to games with low bandwidth Internet connections.

II. THE FUTURE OF VIDEO GAMING IN CLOUD

The race to 5G and rise of cloud computing enabled the gamers to roll out cloud-based gaming. The growing penetration of high internet speed and greater the availability of smart devices. With the Indian gaming industry rapidly moving to the cloud, India has become one of the hot spots for cloud gaming. The peoples in the world are using smart phones more than device. The smart phones has no processing power to play google games.

III. GAMING AS A SERVICE(GAAS)

DOI: 10.5281/zenodo.6361754
ISBN: 978-93-5607-317-3 @2022 MCA, Amal Jyothi College of Engineering Kanjirappally, Kottayam

GAAS is a concept in the video gaming business that distributes video games and game content on a subscription basis, comparable to software as a service (SAAS). It supports the free-to-play model, and rather than selling cloud games, it makes money entirely from the gaming service. It's also a web-based infrastructure that solicits user feedback. It's a mix of client and server technology where the game is saved and rendered in the cloud.

IV. *ARCHITECTURE OF CLOUD GAMING*

A. 3-D Graphics Streaming

The cloud server delivers the command to the client server and the interprets the command and renders the scene.

B. Video Streaming

The server converts 3D commands to 2D commands. Post conversion sends the video stream to the client.

C. Video Streaming With Post -Rendering Operation

This system sits in the middle of the two, with the server handling the rendering of 3D visuals. Client-side processing is used for low-processor activities.

V. CLOUD GAMING FRAMEWORK

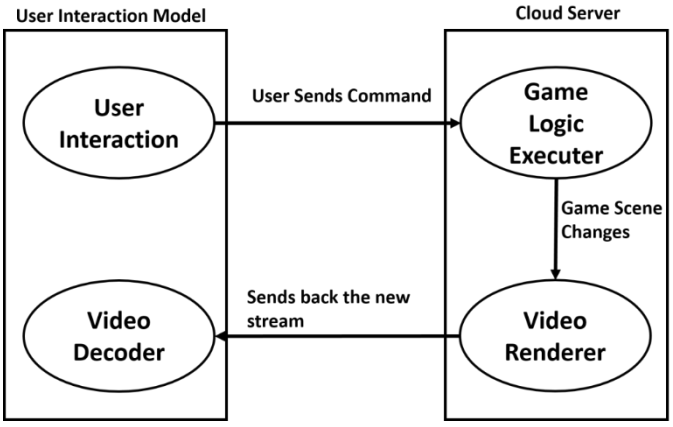


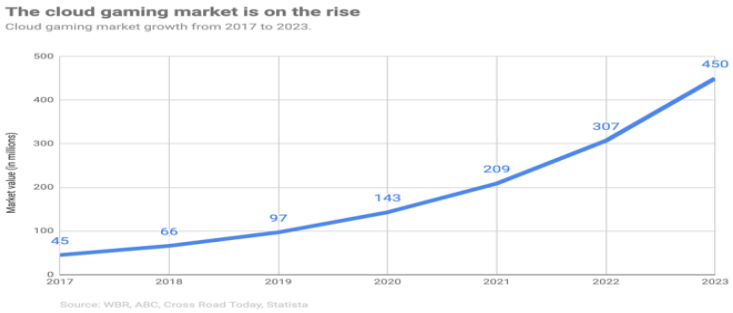
Figure 1

Figure 1 shows the various functions and modules required by a cloud gaming system. As we observed, a player' command is sent to the cloud server by internet from user interaction model. Once it reach the cloud server it converts it into appropriate game actions. It is then interpreted to game logic executer.

The cloud system's graphical processing unit (GPU) converts the game world modifications into a displayed scene. The video encoder must compress the produced scene before sending it to a video streaming module, which subsequently sends the video stream back to the thin client. The client then decodes the video and shows the frame to the player.

VI. GROWTH OF CLOUD GAMING MARKET

Cloud gaming allows a wider audience to enjoy high-end gaming experiences. It allows users with hardware and device constraints to play with reduced latency through the cloud. By 2023, the cloud gaming market is predicted to have grown to $450 million, up from $45 million in 2017..



Cloud gaming encompasses more than just game and file streaming; it also includes television streaming, which is predicted to grow at a rate of over 15% over the next five years.

VII. CLOUD GAMING TODAY

There are many cloud gaming services currently in operation. OnLive is one of the most important one, its user base is low with 1800 user at peak time before its restructuring in August 2012.Latency and image compression is more noticeable.

VIII. IS IT THE FUTURE?

Cloud gaming is failed to catch on, as OnLive user's show us. NVIDIA is most currently working on project shield. It is an android based game console with the ability to stream PC games from your PC. It has powerful graphics card. Latency is very lower because you are using home network and bandwidth cap is local. NVIDIA seems to be betting on this vision, which could offer some of the benefits of cloud gaming without some of the

DOI: 10.5281/zenodo.6361754
ISBN: 978-93-5607-317-3 @2022 MCA, Amal Jyothi College of Engineering Kanjirappally, Kottayam

drawbacks — as long as you have powerful enough PC gaming hardware.

IX. BENEFITS

i. More Competition
ii. Hardware limitations out of the window
iii. Value for the gamer
iv. No privacy
v. Availability of more device

X. CLOUD GAMING SERVICES

a. Vortex

It can turn your PC or Mac into a high-end gaming PC, with a variety of price plans and hardware options to fit any budget. Vortex can broadcast games in full 1080p HD at 60 frames per second, but not in 2K or 4K. Connection speed and stability affect resolution and frame rate.

b. GeForce NOW

It is graphics chip designer. Nvidias cloud based gaming service for windows, macOS, SHIELD TV, and android devices. If you have a solid and fast internet connection, you can play these in 1080p at 60 frames per second with no lag. To work, mobile devices must be connected to Wi-Fi or have a steady 4G connection.

c. *PlayStation Now*

Monthly subscription-$9.99 .you can play hundreds of PS4, PS3,and PS2 games on demand with play station now. Over 800 games can be streamed to a PS4 or PC, just connect your dual shock 4 controller via USB, install the play station.

d. Jump

Jump is a monthly subscription service that allows you to stream independent games to your PC for $4.99. Jump is compatable with windows, Mac, Linux.

e. Shadow

Shadow is the best cloud gaming service currently available. It aims customers to satisfy high eng gaming PC. The system is maintained by shadow cloud and set up to run game library in your device. It allows you to play in 4K at 60 FPS or full 1080p (HD) at 144 FPS.

XI. CLOUD GAMING VS CONSOLE GAMING

a. Pros Console gaming

A video game consisting of images generated by a console and displayed on a screen. A handheld device called a controller is used to control the game. In the event that you purchase a physical disc of a game from a retailer, that disc belongs to you. With the exception of titles that require online connections or don't contain the entirety of their code on physical media, discs and cartridges you buy are yours to play forever. It is usually in the form of optic disk, digital download, ROM cartridgeIf you run out of space and delete a game, you will have to reinstall these updates. Because of the fixed nature of the hardware, traditional console gaming is also limited to the systems.

b. Pros Cloud gaming

When compared to console gaming, cloud gaming is more convenient. To begin with, cloud gaming — at least with large companies like as Google Stadia, Project xCloud, and Shadow.

Cloud gaming also eliminates the need to download and update games and material. Cloud gaming employs hardware on remote servers, so the resolution and speed of your games aren't dependent on the device you're playing.

c. Cons Console gaming

Traditional console gaming won't have you eating up your internet bandwidth every month, but it still comes with its share of drawbacks. Main cons of console gaming is It has high cost. With fixed nature of hardware, console gaming is limited to system.

d. Cons Cloud gaming

The fact that cloud gaming is predicated on the concept of ownership is a major disadvantage. There is no such thing as a guarantee. If your internet is down, you won't be able to play the games you bought. Because the internet is slow, image quality suffers. It was determined by the download speed. The impact of data limitations on your ability to use cloud gaming services is the most essential consideration.

DOI: 10.5281/zenodo.6361754
ISBN: 978-93-5607-317-3 @2022 MCA, Amal Jyothi College of Engineering Kanjirappally, Kottayam

XII. *FUTURE SCOPE*

GPU Resource sharing

A proposed method to improve game streaming scalability is adaptive graphics processing unit resource scheduling. Most gaming providers uses dedicated HPU to all players. This is the best performance but the waste resources. However resource management algorithm have been developed upto 90% of GPU orginal power.

Predictive Output

Algorithms are used to predict player's output which will overcome impact of latency in cloud gaming applications. Stadia's head of engineering. Majd Bakar foresaw the future possibility of using such a concept to "[reduce] latency to the point where it's basically nonexistent", referring to this concept as "negative latency".

XIII. CONCLUSION

The gaming industry is gaining momentum with Gaming as a Service. The cloud gaming framework enables smooth computations for complex gaming scenes. In the near future, cloud gaming will disrupt the hardware industry with its wide range of benefits.

Cloud gaming costs service providers a lot of money, therefore it's not a perfect solution. These tactics in this study have proven effective in providing a good gaming experience while optimising cloud and network resources. Without these changes, service providers will be unable to accommodate enough cloud gaming customers on each physical computer. Programming paradigms that are cognizant of cloud gaming will improve both user experiences and resource utilisation. This will allow for the implementation of increasingly inventive, yet demanding ideas, resulting in key momentum toward the development of next-generation cloud gaming services. In conclusion, technological advancements make playable cloud gaming services a reality; more optimization techniques gradually make cloud gaming services profitable; as a result, we believe we are on the cusp of a new era of a whole new cloud gaming ecosystem, which will eventually lead to the next generation cloud gaming services.

XIV. *REFERENCES*

1. Cloud-Gamming
https://en.wikipedia.org/wiki/Cloud_gaming

2. A_Survey_on_Cloud_Gaming_Future_of_Computer_Games
https://www.researchgate.net/publication/306006176_A_Survey_on_Cloud_Gaming_Future_of_Computer_Games

3. **A Survey on Cloud Gaming: Future of Computer-Games-Publisher:IEEE-**
https://ieeexplore.ieee.org/document/7536162

4. **What Is Cloud Gaming, and Is It Really the Future? CHRIS-HOFFMAN** -
https://www.howtogeek.com/160851/htg-explains-what-is-cloud-gaming-and-is-it-thefuture/

5. "**Cloud gaming vs. console gaming: The pros and cons-of-each**". www.digitaltrends.com. Retrieved 2019-10-28.

DOI: 10.5281/zenodo.6361754
ISBN: 978-93-5607-317-3 @2022 MCA, Amal Jyothi College of Engineering Kanjirappally, Kottayam