CLOUD GAMING

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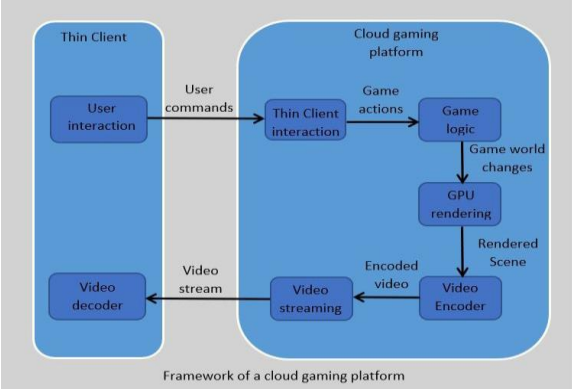
ABSTRACT: Cloud Gaming is a new way to deliver high-quality gaming experience to users anywhere and anytime. It works when complex game software runs on powerful servers in data centers, rendered games scenes are then streamed to the user over internet in real time, and user use light-weight software on device of their choice to interact with the game. Due to increase in internet speed across the globe, cloud gaming has attracted tremendous attraction in gaming industry since late 2000's. In this article we explain different aspects of cloud gaming, and its future in gaming industry.



Framework of a cloud gaming platform

1. INTRODUCTION

Cloud gaming also referred as gaming-on-demand is a new way to deliver computer games to user anywhere and anytime. All the information and complex software are performed on powerful cloud server in big data centers, and the rendered scenes are then streamed to the user over internet. Cloud gaming platform are used in server in data centers and their work can be divided into two parts:(i) A cloud gaming platforms runs complex software that converts gamer's command from the input device into in-game interaction and, (ii) capture the video using capture device and compresses it by video encoder. On user end side less resource demanding software are used to perform tasks like (i) Command receiver, which connects to the game controller, such as gamepad, joystick, keyboard etc., and (ii) video decoder, which uses inexpensive decoder chip to decode encoded data from servers. Internet connectivity plays a crucial role in providing a good experience. Different techniques to compress video are under development to decrease the bandwidth consumption.

In late 2000's several cloud gaming services such as OnLive, G-cluster, ubitus and SONY acquired company Gaikai. The competition between Sony's PlayStation and Nvidia's Grid game Streaming Services heat up the cloud gaming market.

In 2014 report from Strategy Analytics [1] shows that the number of cloud gaming users increases form 30 million in 2014 to 150 million in 2015.

2. ADVANTAGES OF CLOUD GAMING

Increase in Popularity of cloud gaming can be justified by the advantages that it gives over traditional gaming. Some of the benefits of cloud gaming are as follow:

- Access to games anywhere and anytime.
- Easy to Purchase or rent games on-demand.
- Gamers don't need to upgrade their computer hardware to meet the requirement of a game.
- Possibility of piracy of a game are decreased significantly.
  as the executable files are not stored in gamers system.
- The same game can be made available on multiple platforms.
- Gamers can easily migrate across different devices.
- Developers of game can have more profit bypassing retailers.
- Developers can concentrate on single platform and reduces the work in porting and testing code.

3. DISADVANTAGES OF CLOUD GAMING

- Gamers need good internet connection.
- Gamers can't play if internet connection fails.
- Final video will not be as sharp and high detailed due to video compression.
- Cloud-gaming services will always have more latency than powerful local hardware.
- Cloud gaming services require a large amount of internet bandwidth. 1 hour of play can take up to 3GB of data.

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4. CHOOSING THE RIGHT GAME

Computer games are of various genres [2]. Games for cloud gaming are broadly categorized into four types. (i)First-Person [3], games are graphical perspective rendered from the viewpoint of the player's character, such as in call of duty. (ii) Second-Person, games are graphical perspective rendered from the back of the in- game character, such as Grand Theft Auto.

(iii) Third-Person, games fix the gamer's view on 3D scenes projected on 2D spaces, such as Pubg. (iv) omnipresent are games where gamers can control views on the region of interest. Games such as Dota 2, Age of Emperies are very popular. Fast paced first-person shooting games are the most difficult games for cloud gaming, whereas Third-person shooting games are more suitable for cloud gaming.

5. OPTIMIZING CLOUD GAMING PLATFORMS

To fulfill the demands of users, carefully-designed cloud servers are required. Intelligently resource allocation must be done so that the hardware is shared among the users in such a way that performance is not compromised and also the cost of operation is reduced. Unlike cloud computing, cloud gaming requires a lot of GPU power and several attempts are made to efficiently distribute GPU among users using virtual machines and other methods. Virtualization technologies in clouds enable the on-demand resource allocation by creating different types of VMs on physical servers [4]. A set of possible VM (Virtual Machines) types are typically defined by cloud providers and each VM type consists of different quantities of resources (CPU, memory, disk storage, etc.). It is up to cloud providers to make intelligent decisions on how to allocate the heterogeneous resources of physical servers to those required VMs.

6. FUTURE

Cloud gaming has a promising future and can become main-stream gaming service if the cloud gaming service provider overcome the tradeoffs like high internet bandwidth consumption, decreased video quality after compression, increased latency and most important proper allocation of resources to users. Cost of operation will become major hurdle for companies interested to invest their money in cloud gaming industry. Cloud gaming success also depends upon the development in internet services across the globe, as the price for high-speed internet decreases, the feasibility of cloud gaming increases.

7. CONCLUSION

In this article we discussed cloud gaming in five classifications: (i) Advantages, (ii) Disadvantages, (iii) Choice of game, (iv) Optimization, (v) Future of cloud gaming. Cloud gaming is not a perfect solution for gaming industry but a significant approach to deliver games to more people across the globe at reasonable price. Optimization must be made into the system so as to allocate more users to each physical machine so as to reduce operation cost without compromising good gaming experience, otherwise the lower profit margin will lead the service provider out of the business. As cloud gaming services become financially suitable, the ecosystem will keep on expanding and different features can be added to make the experience better, which will lead to the next generation cloud gaming services.

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