Chapter 6
Issues in On-Demand Cloud-Based Gaming Storage: Quality of Service and Quality of Experience

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ABSTRACT
Cloud computing is the most utilized and evolving technology in the past few years and has taken computing to a whole new level such that even common man is receiving the benefits. The end user in cloud computing always prefers a cloud service provider which is efficient, reliable and best quality of service at the lowest possible price. A cloud based gaming system relieves the player from the burden of possessing high end processing and graphic units. The storage of games hosted in clouds using the latest technologies in cloud has been discussed in detail. The Quality of service of games hosted in cloud is the main focus of this chapter and we have proposed a mathematical model for the same. The various factors in dealing with the quality of service on cloud based games have been analyzed in detail. The quality of experience of cloud based games and its relation with quality of service has been derived. This chapter focuses on the various storage techniques, quality of experience factors and correlates the same with QoS in cloud based games.
INTRODUCTION

Online cloud based games have picked up such a great amount of prominence in the most recent years and the credit is shared by distributed computing and the increased utilization of mobile phones. Distributed computing has risen as the most utilized computing system by majority of the clients. The advancement in mobile, cloud and graphics technologies gave rise to a new filed named mobile cloud gaming. A new paradigm named gaming as a service (GaaS) was introduced to stream games across the internet (Cloud Gaming – Gaming as a Service (GaaS) | NVIDIA GRID). GaaS delivers video games to users and reduce the power consumption of the user’s mobile device and provide storage for user’s game data. Cloud computing enabled better scalability and cost effectiveness and accelerated the growth of online apps (Raj E. D., Babu, Ariwa, Nirmala, & Krishna., 2014). Gaming on-demand has made cloud computing to merge with the online gaming technology (Kamarainen, Siekkinen, Xiao, & Yla-Jaaski., 2014).

The expectation of game players for a better gaming experience and the massively multi player online games (MMOGs) has led to the foundation of cloud gaming. Cloud gaming architecture helps in distribution of workload among multiple cloud servers and clients. The advantages of cloud gaming includes scalability, reduced cost, and elastic nature of cloud computing (L.D. Dhinesh., Gunasekaran, & Krishna, 2014). Games have volatile customer base and there are instances where games become popular overnight. Online gaming performance and experience depends on lot of factors which includes network Quality of service (QoS), and quality of experience (QoE). Cloud based game developers takes into account the network deficiency and game experience from a user perspective. Game engines are the core part of any online gaming system. In traditional online games and cloud based games has a significant difference in the underlying technology. In online games, the user requires the graphic processing units, and powerful processors to play the game effectively. In cloud based games the input from the user is received and sent to the game server and the user requires just a video rendering display. The only constraints in cloud based gaming is how quickly and consistently users can access the game servers deployed over a cloud. The solutions to these constraints are discussed in detail in the sections quality of service and quality of experience in cloud based games.

While the idea of cloud gaming itself is not novel, the exponential levels of popularity for playing games over a scope of different stages has driven up the business sector for facilitating recreations on the cloud (Google App Engine) (Windows Azure). The mobile-friendly market is quickly attesting itself as the bedrock for diversions that most clients appreciate. A mobile game player client joined on a 3G
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