Cloud Gaming Virtual Community:
A Case Study in China

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ABSTRACT

Cloud gaming is an emerging Cloud service that trust and trust building in the gaming community is highly important. This paper aims to further investigate a Chinese case study for Cloud gaming by collecting and analyzing data from two most populous cities in China, Beijing and Shanghai. Data analysis and discussion were explained. Results highly support questionnaires designed based on our hypotheses with mean scores 3.5 and above, low standard deviations, high R-squared values above 0.96 and low p-values 0.05 and below. Data between Beijing, Shangia and Chengdu are compared with each other with explanations for all the outputs. We plan to develop a new method that can offer large-scale ANOVA analysis in a single attempt. Limitations and future directions of this research have been addressed, whereby critical factors that can guarantee successful delivery and services of Cloud gaming including trust will be investigated.

Keywords: *Cloud gaming, ANOVA, Trust in gaming, gaming case study in China, quantitative studies in Cloud gaming*

1. INTRODUCTION

There are more than two billions people in the world using the Internet for emails, office work, communications, e-commerce, social networks, online games and other activities (Miorandi et al, 2012). The Internet will be used as a global information and infrastructure for people of different parts of the world to discuss, collaborate, communicate and compute. To cope with a growing number of users for Internet services in the world, the infrastructure and services will be upgraded and modernized. New and improved services will be provided to meet the market demands and ensure a good user satisfaction. These services can be offered by Cloud Computing in the form of Software as a Service (SaaS), which includes online banking, payment, gaming, social networks, customer relationship management, accounting, business intelligence and analytics. Amongst different types of SaaS, Gaming as a Service (GaaS) is an increasingly important area due to its rise of user communities and revenues, since GaaS has brought in billions of revenues for the global market (Lehdonvirta, 2009; Yao and Chang, 2014). However, there are challenges that need to be resolved for GaaS. One area is trust, which investigates the trust building between

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different players, and between players and GaaS service providers and between players and third-party vendors. Although existing literature do describe the importance and impacts, few literature have presented an in-depth study about the investigations of trust building on GaaS in the Cloud. Often there are issues associatyed with trusts in GaaS, which can result in the financial loss, emotional upset and reputation damage for both players and service providers.

The purpose of this paper is to further extend our previous study (Yao and Chang, 2014), whereby a Chinese game was identified and illustrated as a case study for our investigation. Four major hypotheses based on the literature review were set up with its respective questionanaires presented. However, data collection and results were based on only one city, Chengdu, which would require data collection in more cities to ensure a fair representation as a Chinese case study. This motivates us to investigate additional work and data collection in two most populous cities, Beijing and Shanghai, to ensure our work has more data to support a Chinese gaming case study and follow a robust methodology.

The structure of our paper is as follows. Sectrion 2 presents the literature of Cloud gaming literature and Section 3 describes the background information about Cloud gaming including our motivation, continuation from the previous research and the walkthrough of our selected game. Section 4 explains the hypotheses of trust and extension of our previous research. Section 5 outlines our methodology and results. The data collection process, demographics and data analysis. Section 6 illustrates the detailed analysis including the one-way ANOVA analysis and comparisons between different data and two other topics for discussion. Section 7 presents the conclusion and futrue work of our research.

2. LITERATURE ABOUT THE CLOUD GAMING

This section is divided into the literature for the Cloud Computing adoption and the general literature of Cloud gaming.

2.1. The Literature for the Current and Future Cloud Computing Adoption

While Gaming as a Service (GaaS) is the topic for investigation, it relates to related topics including Cloud Computing and Internet of Things (IoT). GaaS is delivered as a service in the Cloud. Similarly, all the data such as the gamer's statistics, game server data, conversations between gamers in the game or between gamers on social networks and community data can be found in the Internet or the gaming Cloud. One way or the other, all these information can be retrieved and obtained by Cloud Computing and IoT. Hence, the future-proof adoption techniques, architecture and business models are essential for the Cloud gaming development. A specific GaaS system design, implementation and service is required to develop the next generation of GaaS. Related literature and services will be explained in the following section.

2.2. General Literature about the Cloud Gaming

There is an increased number of games hosted in the Cloud. The benefits include the consolidation of resources and cost-savings for service providers and the ease of use and accessibility for players (Chang et al., 2010; Chang and Wills, 2013). The role-playing game (RPG) is one of the most popular Cloud Gaming. The RPG game used for our case study is http://jx3.xoyo.com/ which has over one million of users at all times. Due to the large user based community and the billions of revenues the game has generated, this game is very stuiable for our study. Cloud