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Optimization of Resource Usage for Computer-Based Education through Mobile, Speech and Sky Computing Technology

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Abstract

Cloud computing encompasses any subscription-based or pay-per-use service over the Internet. Using a cloud that is owned by a single service provider has its demerit to the customer such as the risk of downtime or breakdown of equipment arising from disaster that can jeopardize the subscribers' business. Data security and reliability due to over centralization of company's data poses a high risk for subscribers, hence a call for distributed cloud also known as Sky Computing. When application is distributed across several clouds with varied interest, infrastructure, policy, etc, the issue therefore will be how to determine the most cost effective cloud during access time. The amount of money a student pays in accessing learning content is determined by how much an institution pay as subscription to cloud providers. The objective of this study is to utilize optimization theory to determine the most cost effective cloud for mobile virtual education in Sky Computing environment. This will be achieved by optimizing resource usage for Computer-based Education through Mobile, Speech and Sky Computing Technology. As a proof of concept, we will design and implement a cloud middle ware (CMW) to interface with an eEducation system. Access to the eEducation shall be Mobile, Speech and Web. Through the communication platform, the students can communicate with their teacher at any convenient time, and vice versa at the most reduced cost.

Keywords: Cloud, eEducation, Optimization and Sky Computing.

1. INTRODUCTION

The information age and technological revolution has made computer-based education indispensable for learning, teaching, social interaction among learners. A lot of research has been done on deploying educational system on web, mobile, speech and cloud platform. The cloud platform allows institutions to use resources on a pay as you go basis, without necessarily having to invest huge sum of money in acquiring Information Technology infrastructure. These new features have a direct impact on information technology (IT) budgeting, particularly for educational institutions that may not be able to afford personal IT infrastructure and also may find it difficult to pay high subscription rate to web server owners or cloud owners for service usage.

Providers of cloud computing uses networks of large groups of servers typically running low-cost consumer PC technology with specialized connections to spread data-processing chores across them. These development however bring problems including risk of failure since the application reside on cloud owned and managed by a single cloud provider. Having an application distributed across multiple clouds to a large extent reduces the risk of data security and storage, as well as power and equipment breakdown. This is one of the reasons that led to the bringing together of several clouds (owned by different providers) to form what is known as Sky Computing. The main advantage of the cloud computing is that this technology reduces the cost effectiveness for the implementation of the Hardware, software and License for all (Mallikharjuna et al. 2010). Users can further benefit from low cost and high resource utilization by using sky computing.

2. STATEMENT OF THE PROBLEM

Sky Computing is an emerging computing model where resources from multiple clouds providers are leveraged to create large scale distributed infrastructures (Keahey et al., 2009). These clusters provide resources to execute scientific computations requiring large computational power. Cloud computing is gaining acceptance in many IT organizations, as an elastic, flexible and variable-cost