Chapter 45
Mobile Learning Services on Cloud

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ABSTRACT

This chapter discusses providing mobile learning services on cloud. Mobile cloud computing brings numerous benefits and enables overcoming technical constraints of mobile learning. The main techniques and approaches in mobile cloud computing are analyzed. A model for mobile learning services delivering through cloud computing is proposed. Several examples of mobile learning services implementations on cloud are presented: Android native application that provides Moodle learning management system features and a SMS service and mobile application for managing the infrastructure of e-learning system.

INTRODUCTION

Rapid advancement and ubiquity of mobile technologies has significantly increased interest in mobile learning. Main idea of mobile learning paradigm is to enable anyone to access information and learning materials from anywhere and at anytime, using a mobile device (Ally, 2009; Chen, Chang, & Wang, 2008).

Mobility is seen by researchers and pedagogues as a new opportunity for education since it provides more chances for learners to personalize their learning process, enhance social interactions, learn more effectively and more autonomously, and collaborate with other peers and teachers at anytime and from anywhere, inside and outside the formal collaborative learning context (Elhussein & Cronje, 2010; Laouris & Eteokleous, 2005; Martin, Diaz, Sancristobal, Gil, Castro, & Peire, 2011).

In (Chen, Kao, & Sheu, 2003) the authors describe five main characteristics of mobile learning:

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- Urgency of learning need;
- Initiative of knowledge acquisition;
- Mobility of learning setting;
- Interactivity of learning process;
- Integration of instructional content.

Ubiquitous learning environments overcome the restrictions of classroom or workplace-restricted learning and extend e-learning by bringing the concepts of anytime and anywhere to reality, aiming at providing people with better educational experience in their daily living environments (Graf, 2008). In a ubiquitous computing environment, many small computers are embedded in daily life objects, enabling these objects to support and assist people in tasks about work, education, and daily life. Such environments allow students to learn at any time and any place, encouraging them to more experiential learning (Lay, 2007) such as learning by doing, interacting and sharing, and facilitate on-demand learning, hands on or minds-on learning and authentic learning (Graf, 2008). Ubiquitous learning combines mobile and pervasive learning and assumes that computers are embedded in everyday objects. A ubiquitous learning system (ULS) supports learners through embedded and invisible computers in everyday life (Ogata & Yano, 2003).

Simultaneously, with wide range of features and technologies used in the context of mobile learning, complex requirements are to appear in projecting and implementation of ubiquitous e-learning environment. Main problems are related to: device interoperability, technical issues (i.e. battery consumption, screen size, limited computational resources), costs, etc. These constraints have lead to finding new innovative approaches in order to enhance m-learning. In this chapter, we propose introducing mobile cloud computing for educational services in order to overcome these obstacles. Currently, mobile cloud computing application in mobile learning services is emerging area (Ouf, Nasr, & Helmy, 2010; Shuqiang & Hongkuan, 2012).

Primary goal of this chapter is to investigate possibilities for delivering mobile learning services through cloud computing. We analyze the need and requirements for implementing m-learning services on cloud. Different approaches and techniques of mobile cloud computing in learning are discussed. Main issue in this chaper is mobile cloud computing in e-learning. Several examples of mobile services provided on cloud are presented in this work: ELAB Android native application that provides Moodle LMS fetaures, SMS service, and mobile application for managing infrastructure of e-learning system.

MOBILE LEARNING SERVICES

Mobile learning systems include set of complex processes, various components, services and user roles. In order to develop effective environment for m-learning, it is necessary to determine the characteristics the users, and then use the information obtained for the creation and implementation of educational processes. Model of m-learning could be expressed through the following function:

MLearn = f{t, s, LE, c, IT, MM, m}

t=time
s=space
LE=learning environment
c=content
IT=technologies
MM=mental model
m=method

In the literature, there are a few definitions of what constitutes a mobile application. An application is mobile if it runs on a mobile device, namely a mobile phone, and is either always or occasionally connected to a network. A mobile application may include data storage, data processing or viewing or transmission to another application or server (Vazquez-Briseno, Vincent,