Chapter 53
A University of Greenwich Case Study of Cloud Computing:
Education as a Service

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ABSTRACT

This chapter proposes a new Supply Chain Business Model in the Education domain and demonstrates how Education as a Service (EaaS) can be delivered. The implementation at the University of Greenwich (UoG) is used as a case study. Cloud computing business models are classified into eight Business Models; this classification is essential to the development of EaaS. A pair of the Hexagon Models are used to review Cloud projects against success criteria; one Hexagon Model focuses on Business Model and the other on IT Services. The UoG case study demonstrates the added value offered by Supply Chain software deployed by private Cloud, where an Oracle suite and SAP supply chain can demonstrate supply chain distribution and is useful for teaching. The evaluation shows that students feel more motivated and can understand their coursework better.

1. INTRODUCTION

The Joint Information Systems Committee (JISC) has announced Cloud Computing is increasingly attractive for research and education, and they believe there are the following five reasons for University Cloud adoption (JISC, 2011):

- Reduce environmental and financial costs where functions are only needed for short periods.
- Share the load when a university is working with a partner organisation so that neither organisation need develop or maintain a physical infrastructure.

- Be flexible and pay as you go. Researchers may need to use specialised web-based software that cannot be supported by in-house facilities or policies
- Access data centres, web applications, and services from any location.
- Make experiments more repeatable. Write-ups of science experiments performed in the cloud can contain reference to cloud applications like a virtual machine, making the experiment easier to replicate.

The UK Universities are adopting Cloud computing, either private cloud or hybrid cloud, to save operational costs, enhance quality of service and improve efficiency (Chang et al., 2011e; JISC, 2011). Indeed, Cloud Computing offers a variety of benefits including cost-saving, agility, efficiency, resource consolidation, business opportunities and green IT (Chang et al., 2010a, 2010b, 2011b, 2011d, 2011e, 2012; Foster et al, 2008; Kagermann et al., 2011; Schubert, Jeffery and Neidecker-Lutz, 2010). As more organisations adopt Cloud, there are challenges such as security, interoperability, migration measurement of Cloud business performance (Chang et al., 2011b, 2011c, 2011d). To address these increasing requirements, a structured framework is necessary to support business needs and recommend best practice which can be adapted to different domains and platforms. Cloud Computing Business Framework (CCBF) is the proposed solution (Chang et al., 2011a, 2011b, 2011c, 2011d, 2011f). The goal is to help organisations achieve good Cloud design, deployment, and services, and deliver solutions, recommendations and case studies to businesses.

Clouds are commonly classified into Public Clouds, Private Clouds and Hybrid Clouds (Ahronovitz et al., 2010; Boss et al., 2007; Sun Microsystems, 2009).

Public Cloud: Cloud services offered in public domains such as Amazon EC2 and S3. This approach is for organisations wishing to save costs and time without obligations on deployment and maintenance. For organisations without Cloud Computing deployment, this is the quickest way to make use of Cloud Computing. The down side is there are concerns for data security in public domains including data loss and conflicts, legal and ethical issues (Krutz and Dean Vines, 2010).

Private Cloud: Bespoke cloud services are deployed within the organisation, thus data and accessibility are only for internal users. This approach is suitable for organisations focusing on privacy and data security, or to change or simplify the way people work. The downside is that some implementations are complicated, time consuming or costly to complete.

Hybrid Cloud: An integrated approach is to use part public and part private cloud to deliver a solution. This approach is suitable for universities wishing reducing costs, whilst maintaining privacy and data security. Downside is that integrating the different architectures is not easy and it is likely this model ends up either public cloud or just private cloud due to complexity and time involved.

Community Cloud: Ahronovitz et al. (2009) from National Institute of Standard and Technology (NIST) proposes four types of Clouds, the fourth is Community Cloud, which they define as "A community cloud is controlled and used by a group of organisations that have shared interests, such as specific security requirements or a common mission." The downside is that it takes years to establish a working community for sharing and mutual learning. However, the added values and benefits for Academic Community could be worth far more than the time and effort spent. Briscoe and Marinos (2009) propose that the concept of the Community Cloud draws from Cloud Computing, Digital Ecosystems and Green Computing, with these five major characteristics: Openness; Community; Graceful Failures; Convenience and Control; and Environmental Sustainability.

This chapter is not about the literature of Cloud Computing but how it can be adopted in

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