Chapter 12
Cloud Computing: Next Generation Education

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ABSTRACT
This chapter presents cloud computing as a way and a solution used for the next generation education. It summarizes cloud computing implemented in education systems. Discussions include interests in and concerns about cloud computing. This chapter also presents scenarios of education system merger and acquisition, and governance and control in cloud computing education systems. It provides examples of how cloud computing can be used to educate and communicate better in the next generation education environment.

INTRODUCTION
Cloud computing (CC) has generated a lot of digital dialog regarding information and enterprise server virtualization by technology giants such as Microsoft, IBM, Dell, Cisco, BMC, CSC, IDC, Oracle, Iomega, Amazon, HP, and so on. Cloud Computing is a frontier technology environment built on providing infrastructure services maintained and managed in data centers adjoined by enterprise infrastructures such as data-content storage and networking.

This chapter will discuss cloud computing infrastructure security concerns, provide three education system scenarios regarding merger and acquisition, give examples of how cloud computing can be used in an education system environment, and provide some IT governance and control methods. In addition, it will briefly discuss ITIL© known as IT Infrastructure Library used with Cloud Computing. Also provided in this chapter is information about three major cloud service vendors (CSPs) and National Institute of Standards and Technology (NIST).
Cloud Computing

Scope of this chapter regarding cloud computing is to hopefully provide research facts and a focus roadmap for the best cloud computing infrastructure in education systems and global information technology enterprise systems to provide awareness to company IT decision-makers that lead to decisions on whether to embrace cloud computing.

BACKGROUND

National Institute of Standards and Technology (2009) states: “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

Many major companies, education systems, learning infrastructures and organizations have not fully embraced moving their sensitive information and data to a second-party or third-party cloud service provider because of concerns about transparency regarding cloud computing rules and regulations, security infrastructure, and legal issues that will be encountered. No decision-making model can correctly predict the future with a zero degree of failure; however, when planning for a cloud computing infrastructure deployment for education or business use, all concerns and legal issues must be addressed, reviewed, and considered by all stakeholders.

Surveys of end users (college students, educators, technology decision makers, public and private corporate business decision-makers) have repeatedly yielded the following questions: Why should I move to Cloud Computing? Is my information-content security? What is the liability factor if the organization moves all information-content to a cloud computing environment? If we move to Cloud Computing, is it cost effective? How will Cloud Computing benefit Education employees, stakeholders, and students?

Cloud computing network security infrastructure policies, access control requirements, application development policies, cloud computing day-to-day performance regulations, company financial information (statement of earnings, 10-Q filings, cash reserve statements, employee compensation records, tax returns, etc), intellectual property policy content, and authentication between company and organization cloud infrastructure have not been fully defined to the satisfaction of some business decision makers.

Cloud computing is still a frontier technology infrastructure environment, but is widely considered by some technology decision-makers to be the next generation of technology solutions. Cloud computing is here to stay; it works, it makes sense, and its possibilities are huge.

The cloud service provider (CSP) giant Amazon.com (EC2) has invested millions of dollars in cloud computing infrastructure development, hardware, and physical data center storage facilities in the United States of America and globally (Amazon.com, 2011). Amazon.com is not the only CSP; other CSP giants such as Microsoft and IBM also provide cloud computing services.

According the report and recommendations based on the discussions with the Leadership Council for Information Advantage (EMC, 2010), moving to the cloud “does not change the information governance requirements”, it will maximize organizations’ ability “to leverage information for business advantage”, it will “require less of an owner-operator mindset”, and with best practice, organizations will “achieve true information advantage” (EMC, 2010).

Fear-factor, no governance and policy standards, uncertainty, no master solution for integration-deployment, no standard taxonomy for public-private-commercial cloud computing,