

Chapter 44

A Proposed Framework for Cloud Computing Adoption

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ABSTRACT

This paper presents a review related to Cloud Computing focusing on Cloud business requirements. From the review the author recommends a number of methods managing Cloud services and evaluating its service performance, including the use of a pair of the Hexagon Models. Three organizational challenges of Cloud adoption are identified: (i) Organizational Sustainability; (ii) Portability and (iii) Linkage. The Cloud Computing Adoption Framework (CCAF) is designed to deal with these challenges by helping organizations to achieve good Cloud designs, deployment and services. How these three challenges are addressed by the CCAF is demonstrated using case studies. Services implemented by CCAF are reviewed using the Hexagon Models for comparison. This paper provides recommendations to help organizations, researchers and practitioners to understand Cloud business context, to measure their risk and return analysis, to migrate their services to Cloud from all types and to connect and integrate different services as a single service.

1. INTRODUCTION

Since Year 2007 onwards, Cloud Computing has created positive impacts, business opportunities, large scale adoption and case studies for a growing number of users and organizations. Benefits include improvement in efficiency; offering added values for organizations; saving costs in operations, resources and staff – as well as new business opportunities for service-oriented models (Boss et al., 2007; Vouk, 2008; Briscoe and Marinos, 2009; Hayne, 2009; Schubert, Jeffery and Neidecker-Lutz 2010; Chang et al., 2010 a; 2010 b). In addition, it is likely that cloud computing which focuses on operational savings and green technology will be at the centre of attention in the near future.

There are academic and industrial efforts to define business models and profitability offered by Cloud. From academic perspective, Weinhart et al. (2009 a; 2009 b) propose their Cloud Business Model and suggest Cloud can offer business opportunities and profitabilities. Chou (2009) defines seven different

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business models for all types of organizations. Buyya et al. (2009) present Cloud economic models and demonstrate how SLA can be used for generating economic values. Buyya et al. (2010) also demonstrate applications and services developed for Cloud, and these services are helpful for start-up firms to generate additional revenues. Marston et al. (2010) describe detailed analysis of Cloud Computing business perspective, and present a table of a list of active players in providing Cloud products and services. They recommend their Cloud economics in their business-technology framework, where each Cloud service is rated high or low in terms of business and technology in their matrix.

From industrial perspective, there are an increasing number of organizations offering Cloud products and services. Amazon is a market leader in Public Cloud and offers Elastic Compute Cloud (EC2) for computing capacity and Simple Storage Service (S3) for storage capacity. Microsoft provides Windows Azure services to allow developers to store their codes and develop new applications for their clients or companies. Salesforce.com is a pioneer in Cloud and presents their Customer Relation Management (CRM) applications for a large number of their users. Oracle consolidates resources with Sun Microsystems, and offers several products and services ranging from hardware to application focus. IBM has Cloud products and applications suites to help their customers. In addition, there are more Small and Medium Enterprises (SME) developing and selling their Cloud services and products, and they offer different types of business models and perspective (Marston, et al., 2010). The structure of this paper is as follows. Section 2 presents benefits and characteristics of Cloud Computing. Section 3 explains Cloud Computing for business use and assets factors for successful Cloud business, which then leads to the introduction of the Hexagon Models in Section 4. Section 5 describes organizational challenges for Cloud adoption which needs a careful handling. As a result, a framework is required and is presented in Section 6. Section 7 explains the framework and the three elements, including the work for each element in details. Section 8 illustrates the conceptual diagram of the framework, whereby research contributions offered by each element of the framework are demonstrated presented in Section 9. Section 10 presents topics of discussions including the use of the Hexagon Models, and Section 11 sums up Conclusion and future work.

2. BENEFITS AND CHARACTERISTICS OF CLOUD

There are several discussions about the benefits of adopting Cloud Computing, amongst which Schubert, Jeffery and Neidecker-Lutz (2010) provide the most relevant context. They divide benefits into non-functional, economic and technical aspects. However, some of their descriptions are duplicates of existing points. Their review (Schubert, Jeffery and Neidecker-Lutz, 2010; Chang, 2014) can be summarized as follows:

Non-functional (Schubert, Jeffery and Neidecker-Lutz, 2010; Chang, 2014):

- **Elasticity:** This provides users flexibility in selecting the amount and size of data supported by an application or the number of concurrent users. Elasticity includes real-time reaction to changes in the number of requests and size of requested resources, as well as handling swift changes to demands and services. Agility and adaptability are considered as a subset of elasticity, which allows the dynamic integration and extraction and rapid scaling up and down of physical resources from the infrastructure.

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