Chapter 1

Software Asset Re-Use: Migration of Data-Intensive Legacy System to the Cloud Computing Paradigm

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ABSTRACT

In this chapter, the author examines the migration process of a legacy system, as a software-as-a-service model, to the Web, and he looks at some of the reasons that drive this legacy system migration. As migration is often a multi-step process, depending on the legacy system being migrated, the author outlines several techniques and transformations for each step of the migration process in order to enable legacy systems, of different types, to be migrated to the cloud. Of particular interest are the different methods to handle data-intensive legacy systems to enable them to function in a cloud computing environment with reduced bandwidth. Unlike the migration of an unstructured legacy system to a locally-distributed desktop system, system migration to a cloud computing environment poses some unique challenges such as restricted bandwidth, scalability, and security. Part of this migration process is adapting the transformed legacy system to be able to function in such an environment. At the end of the chapter, several small case studies of legacy systems, each of a different nature successfully migrated to the cloud, will be given.

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INTRODUCTION

What is cloud computing? Cloud computing could be defined as an emerging paradigm of data and computation sharing over a scalable network of nodes (the “cloud”); these nodes include clients, data centers, and Web services (Mirzaei, 2009). Focusing on service provision, Betty defines cloud computing as Internet-based services and resources that are delivered to clients on-demand from a service provider (Beatty, 2009).

In order to access these services, these clients do not need expertise or control over the technology that they access; however, these clients are able to gain access to technology which both improves end-user productivity and is cost-effective (Mirzaei, 2009). For the service provider, these services consist of applications, such as payroll systems, with portals, which use standard interfaces and messages protocols, that can be accessed by clients (Schluting, 2010; Mirzaei, 2009). In addition to services, the providers supply resources to their clients such as servers, network, memory, CPU, and storage (Schluting, 2010).

This chapter describes the process of migrating a legacy system, often data-intensive, to a Web-based environment along with the challenges and possible solutions of such a migration. Unlike other users of cloud computing that utilise services supplied by other Web-based service providers in the “cloud”, this chapter focuses on enterprises that migrate their own legacy systems to the Web and provide services to their own clients using these migrated systems. In the chapter, several short case studies of legacy systems that were successfully migrated to the Web are given with an analysis of each migration.

Reasons to Move to the Cloud

Cloud computing offers many advantages to businesses. The Internet is often the driving force behind legacy modernization today. The Web can save an organization time and money by delivering to customers and partners, business processes and information locked within a legacy system. The approach used in accessing back-office functionality will depend on how much of the system needs to be Internet-enabled (Zoufaly, 2002). For businesses, cloud hosted applications mean that they can access these applications with all of its functionality but without the hassle of hosting the application oneself. This advantage means that business have access to technology but at a lower cost, with less required staff and management time and with the use of outside expertise (Schluting, 2010; Duggan 2010). Cloud computing has even been recommended as a method to reduce the technological gap between developed and developing countries by enabling IT firms in developing countries to access the most current technology while not requiring expertise in the area (Duggan, 2010). Additional advantages include the ability to dynamic scale the application’s capacity depending on clients’ needs, usage based pricing, quick service provision, and standardized services that can be accessed by many different clients (Beatty, 2009). Possible disadvantages include lack of stability, lack of customization ability, and security concerns (Schluting, 2010).

Cloud computing is particularly advantageous to small-to-medium sized enterprises (SME’s) because they have access to enterprise systems at a fraction of the cost without requiring the resources or expertise to host these systems in-house. For larger enterprises, which already have built-in enterprise systems and in-house expertise, using the cloud to host one’s enterprise system rather than to act as a client to a service provider is more feasible. As companies expand and merge, many companies increasingly have disparate locations that need to communicate with each other via their enterprise system. Utilizing the internet and cloud computing offers a cheaper solution than trying to incorporate all of these locations within a company intra-net that accesses the company’s enterprise system. In addition, hosting one’s own system avoids the lack of customizability problem.