Chapter 95
Cloud Adoption in Enterprises:
Security Issues and Strategies

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ABSTRACT

This chapter proposes a security and migration framework with business strategic implementation guidelines for successfully adopting cloud services, namely Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) in contemporary organisations. As a foundation to achieve this, the authors give emphasis to the importance of considering the security, privacy, and governance issues related to cloud implementations, along with the possible benefits of adopting cloud services in businesses. They discuss the various types of cloud, their deployment models, and service levels as these form the basis for strategically planning the security and migration framework implementation of cloud in an organization. In addition, the authors provide a step-wise security and migration framework that could serve as a business strategic guideline for a successful cloud service adoption in enterprises.

INTRODUCTION

With the recent advancements in cloud computing, cloud services are being offered by numerous small, medium and large companies from the information technology (IT) sector. This has raised much interest among researchers and consumers from information systems (IS) adoption viewpoint. Recent cloud developments and marketing drive have triggered eagerness on the part of organizations to move their operations into the cloud platform. Similar to energy and water utilities, cloud computing is aimed to provide on-demand computing services with cost-savings through 'pay-as-you-go' pricing models that are flexible and scalable based on an organization's IT service requirements that keep dynamically

changing from time to time. However, there are many security and privacy risks associated with the multi-faceted dimensions of cloud computing that require clear understanding and business strategic planning before jumping into the cloud.

The recently escalating concerns related to privacy, security, as well as control and governance of the cloud have demanded the need for establishing convincing guidelines to address the current cloud computing risks. These concerns seem to slow down the cloud adoption as compared to the market projections of a high expected growth. There is lack of comprehensive strategic framework or specific guidelines that could serve all its key players in having an integrated understanding of their security requirements for cloud adoption in enterprises. While there is growing maturity in terms of cloud computing capabilities and service provider offerings, there is comparatively less work studying the complexities and risks of the cloud that impede on its adoption. Hence, the main aim of this chapter is to explore the various facets of cloud computing dimensions and propose a security and migration framework with business strategic guidelines for the key players, namely, cloud service providers, cloud architects and consumers. We provide a comprehensive set of step-wise guidelines along with the key cloud players' roles and responsibilities in providing a security and migration framework that would benefit cloud adoption in enterprises.

This chapter gives emphasis to the risks and benefits that form two sides of a coin of cloud computing and provides the reader with deep insights into the main types of cloud services along with a security and migration framework that serves as a business strategy for successful cloud implementations. While the chapter does not serve to be a complete reference for security implementations in the cloud, the main objective here is to identify the security and privacy risks involved in cloud service levels and the need for a security and migration framework for a strategic cloud adoption in enterprises.

BACKGROUND

Recent developments in cloud computing has transformed it from a futuristic vision to a reality of the information world today. From being a mere data centre provisioning of computing infrastructure, systems software, and applications available as services over the Internet (Rodero-Merino et al., 2010; Reese, 2009; Miller, 2008), the expectations are more towards offering secure personalized services for businesses to migrate their IT operations onto the cloud. The present and future business requirements of terabytes of data processing with a need for dynamically changing IT services, the various forms of cloud computing have evolved from Web services and grid services (Miller, 2008; Clayman et al., 2010). Since Web services could not support high-end computational power, storage resources and software systems, grid services were introduced to meet these requirements with complex protocols, security and configurations. Though cloud services and grid services have similar aims of providing access to high-end computing resources and services, cloud has more advantages than grid computing due to its simplicity in access to services over the Internet that are similar to Web services. Cloud's attraction comes from its additional features of virtualization and provisioning of on-demand services that could minimize the costs and at the same time provide dynamic scalability maximizing resource utilization (Buyya et al., 2009). However, despite cost savings, the slow diffusion of cloud services could be attributed to the lack of proper knowledge of cloud computing dimensions with regard to migration (Bisong and Rahman, 2011; Vaquero et al., 2011). In addition, individual users, businesses and government agencies are bogged

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