Chapter 9
Understanding Cloud Computing

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ABSTRACT

Cloud computing is simply considered the realization of the long-held dream of using computing resources in the same way as accessing public utilities. Although the term “cloud computing” has been added to the IT jargon for about four years, many people are still in doubt as to what its actual meaning is. Some people even argue that cloud computing might just be an old technology under a new name. Many questions are raised when it comes to this subject. Why cloud computing? Is it the same thing as web hosting on third party servers? What is the difference between it and other popular terms such as grid computing? Why should organizations consider it? And, is it risk-free? IT, business, and academia folks are continuously asking about cloud computing with the intention of better understanding and realizing it. This chapter tries to demystify cloud computing by means of introducing and simplifying its terms to readers with different IT interests.

INTRODUCTION

Since early 2007, many of the IT professionals, business managers, and researchers have started to talk about a hot phenomenon called cloud computing. Each of these groups defined cloud computing differently according to their understanding of its offerings (Armbrust et al. 2009). Recently, a better description for cloud computing has emerged: to outsource IT activities to one or more third parties that have rich pools of resources to meet organizations ever-changing needs in an agile and cost-efficient manner (Motahari-Nezhad et al. 2009). These needs usually include hardware components, networking, storage, software systems and applications. In addition, logistics such
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as physical space; cooling equipment; electricity and firefighting systems; and of course, the human resources required to maintain all those items are implicitly settled.

Unquestionably, we all remember the global recession that hit the world wide economy in early 2008. During that time, many organizations were unable to keep up with the pace of change. It was really hard for many organizations to balance their IT resources with the actual demand. That is, businesses sunk, whereas IT resources and investments remained as they were.

With cloud computing, users are billed for their usage of remote IT infrastructures rather than owning them. This structure gives users the flexibility to scale up and down in response to market fluctuations. It is known that businesses usually start small with low start-up capitals and eventually flourish and start making profits. During the initial phases of new businesses, organizations usually cannot afford building mass IT infrastructures, which is why they can depend on cloud computing to access small amounts of resources. When they become popular with higher rates of hits, they can easily increase their usage of computing resources by renting more instances. Such resources can easily be disposed of to save overall expenses when not used during downturns or non-peak times.

Typically, cloud computing adopts the concept of utility computing to give users on-demand access to computing resources in a very similar way to that of accessing traditional public utilities such as electricity, water, and natural gas (Buyyaa, R. et al. 2009). In this framework, clients follow a pay-as-you-go model which provides global access as much or as little to computing resources as needed, whenever and wherever needed. Hence, IT executives are relieved from the risks of over/under-provisioning, enabling organizations to accomplish their business goals without highly investing in computing resources.

In the rest of this chapter, we review the present aspects of cloud computing with the aim of helping readers to better understand its concepts.

CLOUD COMPUTING, THE BEGINNING

Accessing computing resources in an easy manner as that of accessing water and electricity is a few-decades-old dream, which is still waiting to be achieved. Professor John McCarthy, a well-known computer scientist who launched time-sharing in late 1957, laid the groundwork for cloud computing by anticipating that corporations would sell resources by means of the utility business model (McCarthy, 1983). Soon after that, various firms started paying for their own use of computing resources, such as storage, processing, bulk printing, and software packages available at service bureaus.

A desire to allow customers to outsource processing and storage for their information has triggered some cloud-like implementations. Some of these implementations were initiated during the last two decades by providing the public with enormous IT infrastructure for their use. Such modules include:

- **Web Hosting**: A public service that provides organizations and individuals with spaces to host their websites and web applications. Web hosting providers usually offer a wide range of hosting options to clients. These Options vary from shared web hosting where tens or even hundreds of websites are being hosted on the same server, to whole servers being solely used and fully controlled by each client. Moreover, some hosting providers offer some of their solutions for free to both personal and commercial users. Rackspace, Yahoo Small Business, GoDaddy are a few
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