Chapter 2
Cloud Computing Terms, Definitions, and Taxonomy

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ABSTRACT

Cloud computing has taken the IT industry by storm. It has ushered a new era of computing and IT delivery model. This chapter introduces terms and terminologies associated with cloud computing from a vendor neutral perspective. Readers are gradually introduced to cloud computing elements which pave the way for better understanding in later chapters.

INTRODUCTION

For the last few years we have seen the reverberation of cloud computing in global IT field. Although some have seen it as a hype and most common buzz word, cloud computing appeared as a valuable driver of growth for business, cost saving, reducing energy usage and extricating the headache of IT infrastructure administration and maintenance. Not only has it been the linchpin of low cost delivery model but also a highly powerful tool to intercept market with a much quicker time for valuable businesses. It is fascinating to see how organizations can configure and use cloud based offerings, also known as services (will be discussed later), in a matter of minutes or hours as opposed to days, weeks or months in conventional IT system. It is no embellishment to say the businesses need to adopt cloud computing to cater for on-demand services delivery that

arises from Service Oriented Architecture (SOA), Unified Computing (UC), integrated application architectures and distributed computing. Application architecture has expanded far beyond the very early client server model. High performance and distributed computing model was visualized by grid computing earlier. Cloud computing has added few more dimension to this era to make an epoch making revolution. Now it is not just a hyped technology but a disruptive technology shaping the IT industry. Companies have become global and so are their IT infrastructures. IT resources (servers, storage, network etc) are spread all over the world and these are connected through internet. Industries have never seen such a revolutionized architecture. To the end user the whole thing is just one network. Internet has been the weaver to bring the IT resources together. As cloud computing definitions are revealed progressively in this chapter, readers will gain more insight into this.

BACKGROUND

There is a plethora of definitions available for cloud computing. Many different sources have defined cloud computing from different perspective and the definitions have been the subject of debate. We will present several definitions in this section and will unfold cloud computing with detailed description of its traits and features. Cloud computing has attracted attentions from academia, industries, tech-savvy individuals and analytic firms. This positive attitude and rumination towards cloud computing resulted in many definitions.

Cloud has often been used as a metaphor for internet. In network diagram blocks of network and transport mechanism are often represented by a cloud (Rittinghouse & Ransome, 2010). However, cloud computing has got some additional new meanings. To start with, it can be stated that cloud computing is the culmination of grid computing, utility computing, unified communication (UC), Service Oriented Architecture (SOA), Web 2.0 and many other similar technologies. It has been described as the new age of computing, adopting a "pay as you go" or utility model, similar to electricity, water and other common place utilities. To an end user, cloud computing is an illusion of a pool of infinite computing resources on demand. These resources are served by a sprawl of servers, networking equipments and storage systems from a data center. This new consumption and delivery model displays a shift from a Capital Expenditure (CAPEX) to an Operating Expenditure (OPEX).

From the myriads of definitions available, the definition by National Institute of Standards and Technology (NIST) has been widely accepted (NIST, 2010).

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.

Cloud computing is an elastically scalable, virtualized system which can be rapidly provisioned with flexible pricing model (pay as you go) (Rimal, Eunmi, & Lumb, 2009; Sarna, 2011).

According to Reliable Adaptive Distributed Systems Laboratory, UC Berkeley, cloud computing is the aggregation of application delivered as services over internet and hardware and systems software in the datacenters that provide those services (Armbrust, et al., 2009).

Nicholas Carr in his Wall Street Journal bestseller (Carr, 2008) portrayed a very insightful discussion of technological transformation and an insight into cloud computing. He has analyzed how disruptive technology like cloud computing is shaping the world. Following is an excerpt from his famous book "The big switch: rewiring the world, from Edison to Google":

A hundred years ago, companies stopped generating their own power with steam engines and dynamos and plugged into the newly built electric grid. The cheap power pumped out by electric utilities didn't just change how businesses operate. It set off a chain reaction of economic and social transformations that brought the modern world into existence. Today, a similar revolution is under way. Hooked up to the Internet's global computing grid, massive information-processing plants have begun pumping data and software code into our homes and businesses. This time, it's computing that's turning into a utility.

The shift is already remaking the computer industry, bringing new competitors like Google and Salesforce.com to the fore and threatening stalwarts like Microsoft and Dell. But the effects will reach much further. Cheap, utility-supplied computing will ultimately change society as profoundly as cheap electricity did. We can already see the early effects – in the shift of control over media from institutions to individuals, in debates over the value of privacy, in the export of the jobs of knowledge workers, even in the growing

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