Chapter 2
Forecasting the Trends in Cloud Computing and its Impact on Future IT Business

Ebin Deni Raj  
VIT University, India

L. D. Dhinesh Babu  
VIT University, India

EzenduAriwa  
University of Bedfordshire, UK

M. Nirmala  
VIT University, India

P. Venkata Krishna  
VIT University, India

ABSTRACT

Cloud computing has become the cutting-edge technology for information technology processing and high-end computational tasks. Cloud has started playing its part in almost all business processes. Big data in cloud has become the buzzword. The business impact of cloud has deepened with the growth of big data analytics. Current trends such as green cloud computing, mobile cloud computing, and big data have created social as well as business impact. In this chapter, the authors analyze the field of cloud computing and perform an intense literature survey augmented with mathematical analysis. The forecast on the future of cloud and analysis of the current trends shows that cloud computing is a promising technology that will evolve further in years to come.

INTRODUCTION

Cloud computing is a technology that has evolved from Grid and distributed computing such that provisioning of resources can be done easily without much effort. The resources could be hardware, platform, software, application or any other computing resource. National Institute of Standards and Technology (NIST) (Mell & Grance, 2009) defines Cloud computing as 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 (Babu & Krishna, 2013a). Cloud is a collection of data centres and applications offered as services on subscription basis (Mell & Grance, 2011). In general, cloud service models fall into three broad categories.
Infrastructure as a Service (IaaS) - Service providers provide storage and computing power as a service. Computing power may be in the form of servers, processors, RAM etc. The details about infrastructure will be abstracted from the consumer/customer. The customers will feel as if these physical resources are installed and maintained in their own environment/corporate network. The elastic capability of IaaS makes on-demand provisioning possible. The infrastructure can be dynamically scaled up and down depending on the user requirements. Popular IaaS providers include Rackspace, GoGrid and ElasticHosts apart from many others.

Platform as a Service (PaaS) - Platform provides the base using which applications and software can be developed and maintained. The consumer just needs a web browser to create, test and deploy the developed applications. The infrastructure for the platform need not be always provided by the same cloud provider i.e., If Google is providing the platform, infrastructure might be provided by HP. Using PaaS to develop and deploy applications is much easier than the traditional software development. PaaS provides a set of software and development tools including run time environment for the developer (Tsai, Sun & Balasooriya, 2010). Prominent PaaS providers are AT &T, Teremark, Engine yard etc.

Software as a Service (SaaS) – Software applications can be accessed via various client devices using an interface such as web browser. A lot of time can be saved by using this service model as the user need not install the software in his/her PC and new users can be added on the model very easily. SaaS is nowadays called also as on-demand software. The software is often shared by multiple consumers (Yu et al., 2008). An example of SaaS is web based email service.

Other than these three service models there are numerous other special services that are partly derived from the above said services. These include Communication as a Service, High end computation as a Service, Network as a Service, Database as a service, Security as a service etc (Babu et al., 2011).

There are four different forms by which a cloud can be deployed. They are public cloud, private cloud, community cloud and hybrid cloud. In private cloud the infrastructure is exclusively for an organization. The organization will manage the cloud or it may outsource the management to a third party. The infrastructure may be located on or off the premises of the company. Due to security concerns, many companies prefer private cloud environment. This also helps them achieve optimal utilization of resources.

Public cloud is the most prevailing deployment model. The public cloud is utilized by general public cloud users and the service provider has full authority over the data. The main feature of public cloud is multi tenancy which is achieved using the virtualization technology. Security and privacy are seen as the major challenges in this deployment model (Furht, 2010).

In community cloud the infrastructure is shared by several organizations and supports a specific community that has a shared mission or policy. It may be managed by the organizations or by a third party (Mell & Grance, 2011). Hybrid cloud basically combines two or more clouds together. It can be combination of public, private and community clouds.

In hybrid cloud it is possible to get the advantages of all deployment models discussed so far i.e., public, private and community. The organizations will be able to keep sensitive data under their own private cloud and provide the service using public cloud.

John McCarthy was the first scientist to suggest that computing resources such as computational power and applications could be sold like a utility similar to water or electricity. This idea was very popular in the 1960s but it never flourished due to lack of high performance computing machines.

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