# Chapter 17
# Revealing Concepts of a Cloud Deployment Model:
## A Semantic Exploration of a New Generation of the Cloud

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## ABSTRACT

*Cloud computing is a fundamental paradigm in information technology, revolutionizing computational resource access, utilization, and management by providing on-demand access to various computing services, including storage, processing power, and applications, delivered over the internet. By leveraging virtualization, resource pooling, and automation, cloud computing enables unparalleled scalability, flexibility, and cost-efficiency for businesses and individuals alike. The chapter explores the core ideas of cloud computing, summarising its essential traits, deployment strategies, and service models. Moreover, it explores the significance of cloud computing in driving innovation, facilitating digital transformation, and fostering a dynamic and interconnected technological ecosystem. Also, it discuss the advantages and disadvantages of cloud computing along with some future directions.*

DOI: 10.4018/979-8-3693-0900-1.ch017

## INTRODUCTION

Cloud computing can be defined as delivery of Hardware, Software, applications, services, infrastructure, storage over the Internet. Companies like Google, Amazon, Microsoft, IBM, Alibaba, provide cloud services by utilizing the concept of virtualization (Jain et al. 2016), service-oriented architecture (SOA) (Tsai et al. 2010) and parallel computing (Polze et al. 2012). We basically feed server the Hypervisor (Perez-Botero et al. 2013) which is nothing but a software which create the virtual machine. This Hypervisor often called Virtual Machine Monitor (VMM) and the Server called Host and the Virtual machine called guest. It plays a crucial role in Infrastructure as a service (I-S-S-A) solution in cloud computing. SOA is a middleware which enables user and data owner talk to each other. Parallel computing helps to make available abundant resources in cloud environments through distributed data processing, parallel task execution, parallel rendering (Liu et al. 2015) and so on.

Cloud computing offers advantages (Armbrust et al. 2010) (Namasudra et al. 2014) like rapid elasticity, resource pooling, and cost-effectiveness, but it also has drawbacks such as occasional downtime, security risks, and vendor lock-in. Access control is a major security concern due to internet-related issues like hackers. Various schemes, including gateway-based, role-based, and purpose-based access controls, aim to address these problems.

The main contributions of this paper are mentioned below:

In the first part of this paper, fundamentals of cloud computing are presented. All the issues or problems of cloud computing are discussed in this paper one by one. Many future work directions have been also explained in this paper for the cloud computing environment.

In second section we discuss the fundamental of cloud computing. Section-3 explores some related work regarding cloud security and cloud model. Section 4 and 5 presents the benefits and some issue regarding cloud computing. Many future work directions have been also explained in this paper for the cloud computing in section 6 and then we reach to our conclusion part in section 7.

## FUNDAMENTALS OF CLOUD COMPUTING

### History of Cloud Computing

Before the cloud computing comes into the existence there were Mainframe computer. It is basically large and costly. It is so large that the colossal hardware infrastructure of this Main frame computer was installed in a server room (a room for holding Main frame). So, it is not financially feasible for an organization to buy Main frame computer for each user. This was basically an inception of computing era. Then the personal computer comes but it cannot be connected to the database. Further came the Client -Server architecture in which all the data of client connected to the server through network. We can easily implement database using client server. It is cost effective as well as increased the performance, but it has many disadvantages like in many cases the server is prone to denial-of-service attacks, we cannot connect it through worldwide. So, after that distributed system comes into the existence. It is a combination of multiple independent system but all of them act as a single entity to user. The main problem is the system must be present physically in that geographical location. To resolve this problem Grid computing was introduced in 1990's. Before that virtualization was introduced in 1970's by IBM. Under this technology several computers can word concurrently under same environment of comput-