Chapter 17


Zhaolong Gou
Yamaguchi University, Japan

Shingo Yamaguchi
Yamaguchi University, Japan

B. B. Gupta
National Institute of Technology Kurukshetra, India

ABSTRACT

Cloud computing is a system, where the resources of a data center are shared using virtualization technology, such that it provides elastic, on demand and instant services to its customers and charges them based on the resources they use. In this chapter, we will discuss recent developments in cloud computing, various security issues and challenges associated with cloud computing environment, various existing solutions provided for dealing with these security threats and will provide a comparative analysis these approaches. This will provide better understanding of the various security problems associated with the cloud, current solution space, and future research scope to deal with such attacks in better way.

1. INTRODUCTION

Along with the increase of various internet-related services, the concept of cloud computing (Mather, 2009) is becoming more well-known. Cloud computing is a terminology that involves resource through the internet to provide dynamic and scalable system virtualization. Cloud computing involves deploying groups of remote servers and software networks, and allows centralized data storage and online access to computer services or resources. The definition of cloud computing is mainly based on five

DOI: 10.4018/978-1-5225-0105-3.ch017
characteristics: multi-tenancy (shared resources), massive scalability, elasticity, pay as you go, and self-provisioning of resources. Cloud computing is a system, where the shared resource is used by the data center virtualization technology (Hassan, 2011), such that it provides elastic, on demand and instant services to its customers and charges them based on the resources they use.

Cloud computing applications are already present on the market, trying to help companies and individuals to stretch resources and work smarter by moving everything to the cloud. Nowadays the business operations (Marston, 2011) are more and more dependent on cloud computing (Mather, 2009), the situations are more focused on business growth and product enhancements, rather than worrying about storage or maintaining 24-hour server to ensure maximum throughput.

For example the first approaches belongs to the Amazon and it is called AWS (Amazon Web Services), launched in 2002. (Surcel, 2008) AWS is a collection of remote services intended for client applications or web sites. According to the Amazon news, there are almost 500,000 developers that are subscribed to the AWS.

However, there are various security issues and challenges being related to cloud security. There are many security issues and challenges which we are faced in, so we should analyses for cloud computing situations.

Therefore, in this chapter, we will discuss recent developments in cloud computing, various security issues and challenges associated with Cloud computing environment, various existing solutions provided for dealing with these security threats and will provide a comparative analysis these approaches. This will provide better understanding of the various security problems associated with the cloud, current solution space, and future research scope to deal with such attacks in better way.

In Sect.2 we will discuss about the background of Cloud computing, including its history and models. In Sect.3 we discuss mainly about issues in cloud computing, and Sect.4 we reveal challenges in Cloud computing. Finally we discuss current situations about Cloud computing.

2. PRELIMINARY

2.1 History

Firstly, the word “Cloud Computing” is new, but this idea can go back from several decades. It was pioneered by John McCarthy, a well-known computer scientist who initiated timesharing in late 1957 on modified IBM 704 and IBM 7090 computers (Mell, 2011).

In 1983, Sun Microsystems proposed the idea about “The Network is the Computer”. In 2006, Amazon released a service named “Elastic Compute Cloud” (EC2), and this year Google CEO Eric Schmidt at SES first proposed the “cloud computing” concept. In 2007, Google and IBM began at the American University campus, including Carnegie Mellon University, MIT, Stanford University, University of California at Berkeley, University of Maryland, and so on, had a plan to promote cloud computing. The program hopes to reduce the cost of distributed computing technology in academic research, and to provide relevant software and hardware equipment and technical support for these universities. In 2008, Yahoo, HP and Intel announced a joint research program, which covers the United States, Germany and Singapore, to improve cloud computing. In July 2010, NASA and Rackspace, AMD, Intel, Dell and other vendors announced they will support “OpenStack” open-source project, and Microsoft said to support OpenStack which integrated with Windows Server 2008 R2 in October 2010; and Ubuntu has already