Chapter 2
Role of Security Mechanisms in the Building Blocks of the Cloud Infrastructure

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ABSTRACT

This chapter describes how security plays a vital role in cloud computing, as the name itself specifies the data can be stored from any place and can be owned by anyone. Even though the cloud offers many benefits such as flexibility, scalability and agility, security issues are still backlog the cloud infrastructure. Much research is being done on cloud security equal to the scheduling problems in the cloud environment. The customers under the cloud providers are very concerned about their data, which has been stored in the cloud environment. In this regard, it is essential for a cloud provider to implement some powerful tools for security, to provide a secure cloud infrastructure to the customers. Generally speaking, there are some foundational needs to be attained and some actions to be combined to ensure data security in both cloud, as well as, non-cloud infrastructure. This book chapter concentrates only on the security issues, security measures, security mechanisms, and security tools of the cloud environment.

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INTRODUCTION

The Internet is definitely one of the greatest inventions in the history of humankind, if not the greatest invention. It is a fact everyone agrees on as it has made our lives simpler and has made the entire world, a global village. The Internet has ensured that we enjoy the privileges offered by it such as fast and efficient communication, access to knowledge at our fingertips and so many offers that are more exciting. Today there are more than a billion devices connected to the World Wide Web (www), i.e., the Internet that shows its growth and the number of computers or so-called nodes is destined to increase in the upcoming years.

Since the advent of the Internet, storage and accessibility of data have been two major factors bothering the users and hence storage of files on the internet, which could be accessible by only the allowed users, was an idea, before it became reality in the 1960's. Robnett Licklider is the inventor of Cloud Computing, which allows users to store files online in storages called Clouds. These files, which were stored in the cloud, could be accessed later on any time thus saving the space on the physical hard disk of the user's computer.

Cloud Computing

Cloud Computing (Armbrust et al., 2010) is the term used to describe the delivery of computing services such as servers, storage, software and more, all over the Internet. Companies which provide such services are called cloud computing vendors. Some of the major vendors are Amazon (EC2), Google (Google Cloud Storage, Drop box), HP (Enterprise Services Cloud-Compute), IBM (SmartCloud), Microsoft (Azure), etc. Many of the scheduling problems in the cloud environment can be solved by using soft computing techniques such as auto associative memory network (Kowsigan, Balasubramanie, 2016). Metaheuristic approaches can also be used to solve scheduling problems in the cloud environment (Kowsigan et al., 2017). Probability distribution was used to schedule the jobs in a cloud environment (Kowsigan et al., 2017).

Cloud computing is being used by almost all the users of the Internet. Even the simplest and most often used tasks such as sending emails, editing documents, listening to songs online, etc., use cloud computing behind the scenes. Here are a few uses of cloud computing:

- Making new services and applications
- Storing and retrieving data
- Analyzing data to make predictions
- Hosting websites and blogs
- To provide software on demand
- Streaming the videos and audio clips

Cloud Security

The worldwide cloud computing market is expected to grow to $191 billion by the year 2020. Although it is universally known and agreed that cloud computing has numerous advantages, there is no denial that there are absolutely no disadvantages. Despite the number of advantages far outnumbering the disadvantages, it is necessary to keep in mind that the disadvantages have to be taken care of. A breach