Chapter 11
A Survey:
Threats and Vulnerabilities in Cloud

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ABSTRACT

The cloud computing field is an emerging field and continuously growing at a fast pace. The data stored on the public cloud is not safe as the attackers can hack or gain unauthorized access to the data and can modify its contents to harm the organizations and the users as well. They pose security threats and risks at various levels. These threats need to be removed and security actions need to be taken at right time to protect the cloud data and resources from being misused by the attackers. Some of the security measures are summarized in order to protect the data.

INTRODUCTION

Cloud computing requires the use of internet that provides shared computing resources and data to computers and their users on demand. It offers enormous benefits to the industry and the community. The cloud computing platform provides the capability for optimal and shared utilization. It provides its users the ability to access the cloud services vigorously and effectively over the internet, wherever and whenever needed. It offers shared pool of elastic and powerful resources (network, servers, storage, application and services) that can be effectively managed and provisioned and is cost-effective. The management of computing resources over the internet is easy. Depending on the above mentioned features, all the applications and services deployed by the organizations and the users are switched over to the cloud and they are needed to make sure that their data on the cloud remains safe and secure. Customers make use of cloud resources corresponding to their need and pay according to the use, which ensures complete utilization of resources by letting machines and storage go when not in use. The main aim of this paper is to manage the computing resources of the cloud along with ensuring security while storing and retrieving data to and from the cloud. Trust is also an important factor that plays a vital role of providing security between different parties over the network.

BACKGROUND

Aspects of Cloud Computing

The important facets or characteristics discussed in (Ali, M., U. Khan, S.U., Vasilakos, A.V. 2015) of cloud computing are as follows that offers numerous benefits to its customers are described below-

- **On-Demand Self Service:** Customers can directly request and manage the services (they need) from the cloud. There is no need to interact with the cloud service providers for requesting the resources. This is accomplished by employing web services and management interfaces.
- **Ubiquitous Network Access:** Customers access the services and their applications and data present on the cloud using some standard mechanisms and protocols. It provides a broad network access which ensures that the services made available to the users on the cloud should support any type of platform(for example, mobile phones, laptops, workstations, tablets etc). The services and data are available from anywhere and at anytime.
- **Resource Pooling:** The resources on the cloud are manifold and can be shared among numerous and varied customers in a multi-tenant environment. Customer generally has no command or knowledge over the exact location of the resources but may specify location at higher level of abstraction (example, country, state or data center).
- **Rapid Elasticity:** The resources can be rapidly and elastically provisioned according to customer's demands. In some cases it can be automatically done, to quickly scale out and rapidly released to quickly scale in. Resources available for provisioning are unlimited and can be purchased in any quantity at any time.
- **Measured Service:** The cloud environment provides the usage of various resources and services which are reported to customers and the CSP. The metering process offers the ability to automatically optimize the use of resources and also, the customers have to pay only for those resources which are used by them. It allows resources to be used in pay-as-you-use manner.
- **Multi-Tenancy:** This property allows multiple customers (that may or may not belong to the same organization) to use a single resource.
- **Service Models:** There are three categories of services provided by cloud computing namely-Software as a service(SAAS), infrastructure as a service(IAAS), and Platform as a service(PAAS).

Software as a Service

This layer provides the facility of renting the users the applications that run on clouds, instead of paying to purchase these applications. Saas is used by those companies that deploy their businesses due to the ability to reduce cost. Liu et al. (2011) discuss the prospect of providing the cloud services to cloud consumers as email, billing, customer relationship management, sales, social networks, content management applications and many more (Liu, F., Tong, J., Mao, J., Bohn, R., Messina, J., Badger, L., & Leaf, D. 2011). The CSPs for Saas are: Cloud9 Analytics, Antenna Software, Live Ops, NetSuite, Google Apps, Salesforce.com, IBM, Rackspace etc. as specified by Chou(2013) in (Chou, T. 2013).

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