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Cloud Computing and its Security Threats: An Overview

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Abstract: Cloud computing is still an evolving exemplar and there are several challenges of Cloud nowadays. Cloud computing has become a international computing infrastructure. Cloud Computing is expectable to continue growing at a robust rate. When something is in the cloud, it means it is stored on servers on the Internet instead of on your computer. Cloud computing needs security principle and practices in order to become an effective computing technique. It is because credibility of cloud depends upon a well-drafted security-policy. This paper presents a review on the cloud computing concepts as well as security threats inherent within the context of cloud computing and cloud infrastructure.

Keywords – Cloud computing;cloud service;cloud security; cloud threats;cloud users.

1. INTRODUCTION

Cloud computing also known as on-demand computing.Cloud computing is a model for delivering computing resources over the Internet .The resources are retrieved from the internet through web-based tools and applications, rather than a direct connection to a server. Cloud Definition by the National Institute of Standards and Technology (NIST),"Cloud computing is a model for enabling ubiquitous, 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." The best well-known example of cloud computing is Google Applications where any application can be accessed using a browser and it can be distributed on thousands of computer through the Internet. Cloud connects variety of sources/devices like database, mobile, printer, desktop, server, etc.,

2. CLOUD ELEMENTS

The major elements of the cloud computing are:

2.2 Cloud client

A cloud client includes computer hardware and/or software that is used to access the cloud services. Examples include some computers, phones ,browsers, android, web browsers (Mozilla Firefox) and other devices,operating systems.

2.3 Cloud service:

A cloud service includes resources such as applications,products,storage that is presented over the Computer network. The common cloud service includes Software as a Service (SaaS),

Platform as a Service (PasS) and Infrastructure as a Service (IaaS). Some well-known examples are YouTube videos hosting, PayPal ,G-mail etc.

2.4 Cloud application:

It is a software application that is accessed via the Internet thereby it is not installed on the cloud user's own computer, thus reducing the *Costs* for software *maintenance considerably.* Some well-known examples are Google App Engine, Peer-to-peer(bit torrent).

2.5 Cloud platform:

This helps the cloud users to use the cloud applications in an effective way by eliminating the cost and complexity of purchasing and managing the underlying basic computer hardware and software. Google Cloud Platform is the best known cloud computing platform managed by Google organization.

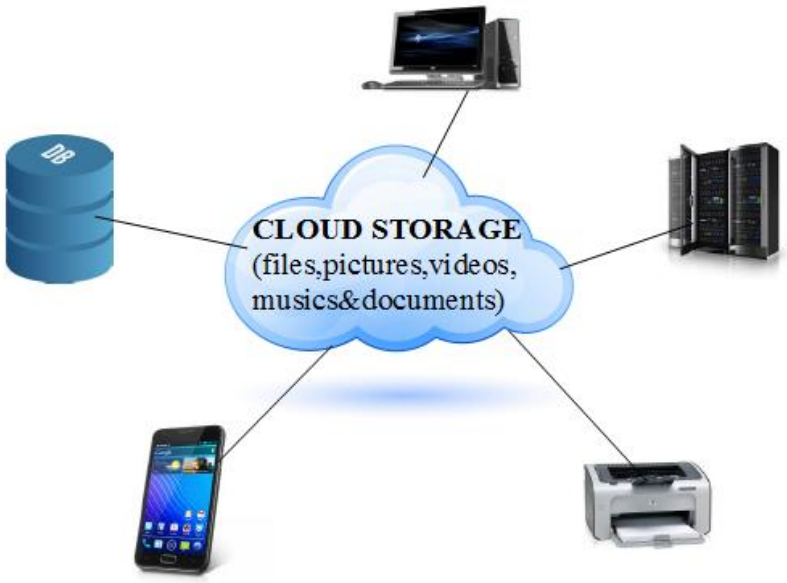


Fig 1. Illustration of Cloud Computing

3. CLOUD SIGNIFICANT CHARACTERISTICS

2.6 *On-demand self-service:*

Cloud computing provides resources when the consumer wants it. This characteristic allows cloud computing users to run their own sessions ,without interaction with service providers.

2.7 Broad network access

Resources hosted in a private cloud network that are available over the network and accessed through a wide range of devices, such as mobile phones, tablets, laptops, and workstations.

2.8 *Resource pooling*

The provider's computing resources are pooled to serve multiple clients, customers or "tenants" with provisional and scalable services . This means *r*esource pooling *leads to higher resource utilization rates and economies of scale.*Examples of resources include storage, processing, memory, and network bandwidth.

2.9 *Rapid elasticity*

Elasticity is defined as the ability to scale resources both up and down as needed.In Cloud Computing,the resources available at any time and in any quantity. The advantage of this characteristics is significant cost reduction and faster revenue generation.

2.10 *Measured service*

In cloud computing any resource that is provided over the Internet *(e.g., storage, processing, bandwidth, and active user accounts)* are controlled and monitored by the cloud provider. This is vital for billing, access control, resource improvement, capacity planning and other tasks. *Typically this is done on a pay-per-use or charge-per-use basis.*

3. CLOUD COMPUTING MODELS

3.2 Service Models

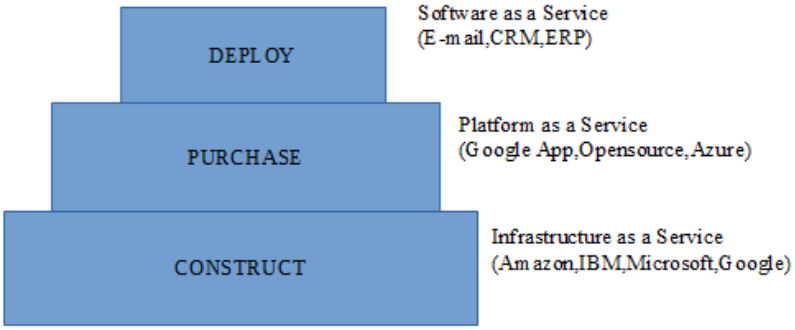
3.2.1 Software as a Service (SaaS)

Software as a Service (SaaS), ALLOWS CLOUD users to access software applications all over the cyberspace.Softwares are subscribed and used online with records saved in the cloud storage rather than on individualistic computers.The softwares are provided in the cloud and can be utilized for different jobs for both individuals and organisations. Access to Software as a Service is consistent with every internet enabled devices and reachable from any location through internet.The well-known examples of SaaS are Google, Twitter, Facebook and Flickr,web-based e-mail.Zoho is another familiar SaaS provider that provides different sort of office applications online.

3.2.2 Platform as a Service (PaaS)

Platform as a Service(PaaS) provides a platform that allows cloud users to develop, execute, and organize applications using Web-based tools .The PaaS can be delivered using a public cloud service provider, where the cloud user controls software deployment and configuration settings, and the service provider contribute the servers, networks, storage and other services to host the end user's application. Google App,Open-source,Azure and force.com are some examples of PaaS.

3.2.3 Infrastructure as a Service (IaaS)



(IaaS) is one of the three essential service models of cloud computing in addition to Platform as a Service (PaaS) and Software as a Service .IaaS is characterized as computing machine infrastructure, such as virtualization, being delivered as a service. Data Centers make use of this IaaS service, where softwares and servers are purchased as a fully outsourced service and usually billed on utilization of the resources.This means the IaaS provides access to computing hardware over the internet , such as servers or storage resources .- The cloud user does not maintain or control the basic cloud infrastructure but has control over storage ,operating systems, deployed applications and few network components.

Fig 2.Cloud Service Models

3.3 Deployment Models

The four forms of cloud computing based on distribution of services are Public Cloud, Private Cloud ,Community Cloud and Hybrid Cloud.

2.10.1 Public Cloud

Public cloud is essentially the cyberspace/Internet. Cloud service providers provide resources in form of application, storage or platform services to the general public .This hepls the cloud users to create and distribute a service in the cloud environment with minimum cost compared to the initial cost associated with other deployment model. Example includes Amazon web services, Google app engine, IBM's Blue Cloud, Sun Cloud, Google AppEngine and Windows Azure Services Platform.,etc

2.10.2 Private Cloud

Cloud services are devoted to a particular organization for their private use in form of application, storage or platform. They are maintained by external or internal service providers for an organization. Public Cloud users are restricted to access the private cloud and its often positioned within the firewall of the organization having access across the intranet only. They are more secure because they are non-sharable. But they are more expensive when compared to public clouds.

2.10.3 Community Cloud

Community cloud computing is a shared cloud computing service that includes a finite set of organizations such as banks with similar requirements. The managing principle for the community will vary, but the security, performance , privacy and compliance requirements of users are same.

2.10.4 Hybrid Cloud

Cloud service made available using a combination of private and public clouds to take advantage of their individual benefits. Best example is a webservice application program which stores information on private cloud internal to their firewall, but uses public cloud to access the front end application .

4. SECURITY

Cloud Security is a growing issue.The Cloud Security Threats includes Data Breaches,Data Loss,DDoS Attack,Account Hijacking,Insider Attacks,Viruses,Phishing Attacks,BYOD.

3.2 Data Contravention /Data Breach

Data Contravention is an incident in which protected or confidential data has possibly been viewed, stolen or used by an unauthorized person. It may affect personal health information (PHI), personally identifiable information (PII), trade secrets or intellectual property. The Home Depot and even the White House were violated in the year 2015. data Contravention can be avoided using Data Encryption techniques.

3.3 Data Loss

In cloud computing environment data loss may occur which can be a major threat for all types of businesses .The best way to avoid data loss is periodical back up of data .

3.4 Distributed Denial of Service Attack

A distributed denial-of-service (DDoS) attack can take down a cloud service at any time. It makes cloud service inaccessible by troubling it with traffic from different sites. The target of DdoS attack includes crucial resources, from banks to broadcast websites. The main goal of a DDoS attack is to close a business downward, which is normally executed by harming the organization's network or website.

3.5 Account Hijacking

Cloud account hijacking is a major threat where the attacker hacks an individual or organization's cloud account . The attacker uses the hacked account info to perform unauthorized access. When it occurs, an attacker generally uses a email account or other credentials to portray the owner. It is more important to control this attack because the cloud data is shared and accessed through Internet. The simplest idea to control this attack is to secure the accounts by updating the password regularly.

3.6 Malware & Viruses

Malware and viruses can create calamity on the cloud.But this can be prevented by using anti-malware software and anti-virus software with regular updation its employees to update this software regularly.

Fig 3.Cloud Security Threats

5. CONCLUSION

Although cloud computing is the evolving technology that provides different services to the cloud users ,it experiences lot of security challenges. In this paper cloud security threats and solutions are provided for these threats to overcome the hazard involved in cloud computing. Our future work focus on preventing cloud security threats.

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