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CLOUD COMPUTING: ISSUES AND SOLUTIONS

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Abstract— ***Cloud computing is the use of computing resources like hardware and software that are delivered as a service over a network. This paper covers different aspects related to cloud computing. This advance technology is used for hosting and delivering services over the Internet. It provides the full scalability, reliability, high performance and relatively low cost feasible solution as compared to dedicated infrastructures. This cloud services are available for use according to requirement of customer. As it gives number of advantages to the customers at the same time it has some issues that must be consider during its deployment. The main concern is security, privacy and trust. In this paper security privacy & trust issues of cloud computing are reviewed. The paper identifies the issues and the solution to overcome these problems.***

Keywords— Cloud Computing, Network, Cloud Services.

I. INTRODUCTION

Computing and software resources that are delivered on demand, as service. Today, cloud computing generates a lot of hype; it's both promising and scary. Businesses see its potential but also have many concerns. This Emerging computing paradigm offers attractive financial and technological advantages. The cloud provides convenient, on-demand network access to a centralized pool of configurable computing resources that can be rapidly deployed with great efficiency and minimal management overhead[1][2][3].

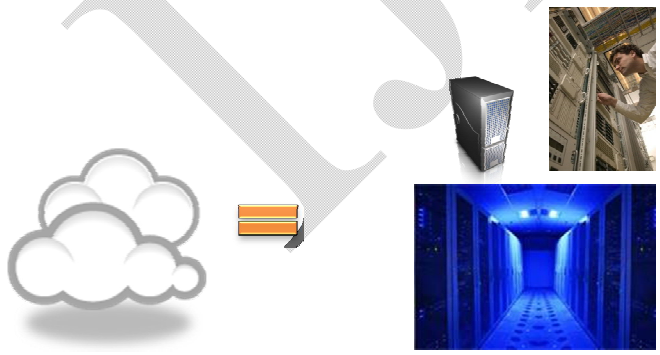

Fig 1 : A Walk in the Clouds. Cloud Computing

The Cloud delivers a hosting environment that is immediate, flexible, scalable, secure, and available – while saving corporations money, time and resources.

Cloud requires:

- An Internet connection,
- An account – should contain username and password
- Terms and conditions

Advantages:

- Can be less expensive compared to buying software and hardware
- Can be used from any computer or device with an Internet connection
- The device does not need as large of an internal storage system
- Compatible with most computers and operating systems
- Updates occur across the service

1.1 Cloud Computing Services

Cloud computing is advanced technology which is emerging rapidly in the market. It provides various services to its customers. According to requirement and the need customer can select required service and pay accordingly. Cloud computing provides a variety of computing resources, from servers and storage to enterprise applications[4].

Cloud Services Architecture:

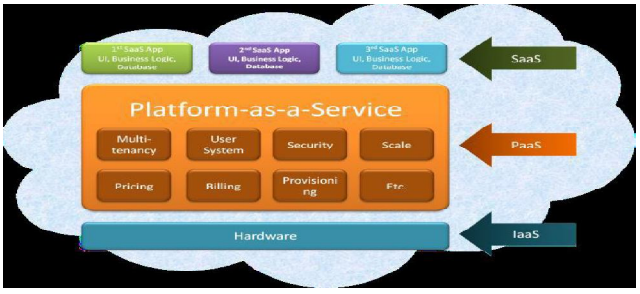

Fig 2 : Cloud Computing Security Issues in Infrastructure as a Service

Infrastructure as a Service (IaaS)

In this most basic cloud service model, cloud providers offer computers – as physical or more often as virtual machines , raw (block) storage, firewalls, load balancers, and networks. IaaS providers supply these resources on demand from their large pools installed in data centers.

- Usually billed based on usage
- Usually multi tenant virtualized environment
- Can be coupled with Managed Services for OS and application support

Examples:

Platform as a Service (PaaS)

In the PaaS model, cloud providers deliver a computing platform and/or solution stack typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers. With some PaaS offers, the underlying compute and storage resources scale automatically to match application demand such that the cloud user does not have to allocate resources manually.

- Typically applications must be developed with a particular platform in mind
- Multi tenant environments
- Highly scalable multi tier architecture

Examples

Software as a Service (SaaS)

In this model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users do not manage the cloud infrastructure and platform on which the application is running. What makes a cloud application different from other applications is its elasticity. This can be achieved by cloning tasks onto multiple virtual machines at run-time to meet the changing work demand. Load balancers distribute the work over the set of virtual machines.

- Usually billed based on usage
- Usually multi tenant environment
- Highly scalable architecture

1.2 Types of Cloud

Public cloud

Applications, storage, and other resources are made available to the general public by a service provider. Public cloud services may be free or offered on a pay-per-usage model. There are limited service providers like Microsoft, Google etc owns all Infrastructures at their Data Center and the access will be through Internet mode only. No direct connectivity proposed in Public Cloud Architecture.

Community cloud

Community cloud shares infrastructure between several organizations from a specific community with common, whether managed internally or by a third-party and hosted internally or externally. The costs are spread over fewer users than a public, so only some of the cost savings potential of cloud computing are realized.

Hybrid cloud

Hybrid cloud is a composition of two or more clouds that remain unique entities but are bound together, offering the benefits of multiple deployment models.

Private cloud

Private cloud is infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally[5].

II. BENEFITS CLOUD COMPUTING

- ✓ Access to applications from anywhere
- ✓ Software free or pay per use
- ✓ 24 hours access to infrastructure and Content
- ✓ Opening to business environment and advanced research
- ✓ Protection of the environment by using green technologies
- ✓ Increasing functional capabilities

III. CLOUD COMPUTING SECURITY ISSUES

Security issues of cloud computing fall into two categories:

- ✓ Security issues faced by cloud providers
- ✓ Security issues faced by their customers

The Cloud Security Alliance (Cloud Computing Alliance, 2010) did a research on the threats facing cloud computing and it identified the flowing major threats [6][7].

- Failures in Provider Security
- Attacks by Other Customers
- Availability and Reliability Issues
- Legal and Regulatory Issues
- Perimeter Security Model Broken
- Integrating Provider and Customer Security Systems
- Abuse and Nefarious Use of Cloud Computing
- Insecure Application Programming Interfaces
- Malicious Insiders
- Shared Technology Vulnerabilities
- Data Loss/Leakage
- Account, Service & Traffic Hijacking
- Unknown Risk Profile

In the last few years, cloud computing has grown from being a promising business concept to one of the fastest growing segments of the IT industry

Security

Data can be stored on local hard drives as well as on high security servers in the cloud. But the important part is which data is most secured? Some argue that customer data is more secure when managed internally, while others argue that cloud providers have a strong incentive to maintain trust and as such employ a higher level of security.

In the cloud, data will be distributed over these individual computers regardless of where your base repository of data is ultimately stored. Hackers can attack virtually any server.

Privacy

Data is scattered all over the network so, data privacy protection will face the controversy of different legal systems. Users may leak hidden information when they accessing cloud computing services [8].

Reliability

Downtimes and slowdowns problem is faced by cloud servers also. Here, user is dependent upon CSP i.e Cloud Service provider.

Legal Issues

Safety measures and confidentiality from individual all the way through legislative levels.

How to provide the security

- ***Data Segregation***

Search for the different ways which can be used to segregate your data. Ask for the different proofs which are related to segregation [9].

- ***Disaster Recovery Verification***

Find the information regarding, if any problem arises does your provider will be able to completely restore your data and service and find out how much time it will take to do so.

- ***Long-term Viability***

Get the information from prospective providers about the way in which you will get the data back if any problem arises [10].

- ***Find Key Cloud Provider***

First solution is of finding the right cloud provider. Different vendors have different cloud IT security and data management. A cloud vendor should be well established, have experience, standards and regulation. So there is not any chance of cloud vendor closing.

- ***Clear Contract***

Contract with cloud vendor should be clear.

- ***Better Enterprise Infrastructure***

Enterprise must have infrastructure which facilitates installation and configuration of hardware components such as firewalls, routers, servers, proxy servers and software such as operating system, thin clients, etc. Also should have infrastructure which prevents from cyber attacks.

- ***Use of Data Encryption for security purpose***

Developers should develop the application which provides encrypted data for the security.

- ***Cloud Security Controls***

Cloud security architecture is effective only if the correct defensive implementations are in place. These controls are put in place to safeguard any weaknesses in the system and reduce the effect of an attack. While there are many types of controls behind cloud security architecture, they can usually be found in one of the following categories.

- ***Deterrent Controls***

These controls are set in place to prevent any purposeful attack on a cloud system.

- ***Preventative Controls***

The preventative control will safeguard vulnerabilities of the system. If an attack were to occur, the preventative controls are in place to cover the attack and reduce the damage and violation to the system's security.

- ***Corrective Controls***

Corrective controls are used to reduce the effect of an attack.

- ***Detective Controls***

Detective controls are used to detect any attacks that may be occurring to the system.

IV. CONCLUSION

In This paper author has discussed about what is cloud, different services which are provide by cloud computing. Author have provided the information about the issues which can arises by using the services of cloud computing. The aim is not only to aware the people about the issues but author have provided the methods or ways which will helps the user to reduce these problem.

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