

A Review on Cloud Computing

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Abstract- “Cloud computing” is recent buzzword in IT world. The future of computing in technical as well social perspective is shown by the phrase. Cloud computing based on the concept of centralizing computation and storage in distributed data centers maintained by third party. This application is much more than simple internet. The main purpose of cloud computing is to provide IT as a service on demand with feature of greater flexibility, scalability, availability, reliability to the cloud users at low cost. Through this user can access the resources they actually reside at the location other than user’s own computer or other Internet connection devices. Cloud computing is a popular computer term which has different interpretations. In computer science by 'cloud' is understood a network of computing devices which work together to provide services. More specifically, in web hosting cloud computing means that all web hosting services (web, ftp, mail, etc) run on many different servers ensuring that a failure in one device will not cause a service failure. In this paper we will discuss about various forms ,cloud services and security risks of cloud computing.

Keywords: Cloud Computing; Security issues; Cloud Computing Forms; Cloud Services; cloud security.

I. Definition

Cloud Computing refers to manipulating, configuring, and accessing the hardware and software resources remotely. It offers online data storage, infrastructure, and application. Cloud computing offers platform independency, as the software is not required to be installed locally on the PC. Hence, the Cloud Computing is making our business applications mobile and collaborative. Cloud Computing provides us means by which we can access the applications as utilities over the internet. It allows us to create, configure, and customize the business applications online.

Cloud Computing is a distributed architecture that centralizes server resources on a scalable platform so as to provide on demand computing resources and services Due to the unprecedented success of internet in last few years, computing resources is

now more ubiquitously available. And it enabled the realization of a new computing concept called Cloud Computing.

A simple example of cloud computing is Yahoo email, Gmail, or Hotmail etc. You don’t need software or a server to use them. All a consumer would need is just an internet connection and you can start sending emails. The server and email management software is all on the cloud (internet) and is totally managed by the cloud service provider Yeah, Google etc. The consumer gets to use the software alone and enjoy the benefits. The analogy is, 'If you need milk, would you buy a cow?' All the users or consumers need is to get the benefits of using the software or hardware of the computer like sending emails etc. Just to get this benefit (milk) why should a consumer buy a (cow) software/hardware? [1]



Fig 1. Cloud Computing Environment

II. Key Features of Cloud Computing

The most effective transition to a cloud computing approach enables organizations to yield the following benefits:

On demand service provisioning: by using Self-service provisioning customers can easily get cloud services without going through a lengthy process. The customer simply requests an amount of computing, storage, software, process, or other resources from the service provider.

Elasticity: that is simple to add more stuff. Cloud computing provides the ability to scale up and down when additional users are added and when the application requirements change.

Cost reduction: Cloud computing also offers the flexibility and scalability up to that extent that you can add or remove the users and services as per your need.

Application programming interfaces (APIs): accessibility to software that enables machines to interact with cloud software in the same way the user interface facilitates interaction between humans and computers. Cloud Computing systems typically use REST based APIs.

Resources Pooling: In the cloud computing environment, the employee can share the data or

services at the same time from any location at any time within business management software hosted at the cloud.

III. Forms of Cloud Computing

There are mainly four forms of cloud computing:

1. Public Cloud: The **public cloud** allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness. IT resources offered as a service and shared across multiple organizations, managed by an external service provider

2. Private Cloud: The **private cloud** allows systems and services to be accessible within an organization. It is more secured because of its private nature. IT resources dedicated to a single organization and offered on demand

3. Hybrid Cloud: The **hybrid cloud** is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud. It is managed as a single entity to extend capacity across clouds as needed

4. Community Cloud: The **community cloud** allows systems and services to be accessible by a group of organizations. Now cost is spread among the different organizations who are sharing the infrastructure so cost is spread among users.

IV. Service Model of Cloud Computing

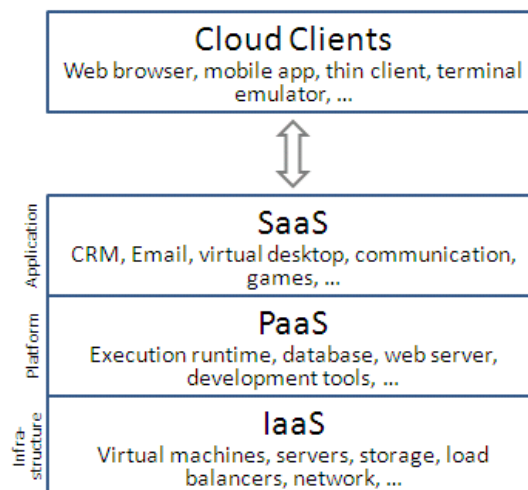


Fig. 2 Cloud Model

1. Infrastructure as a Service (IaaS) is the delivery of computer hardware (servers, networking technology, storage, and data center space) as a service. It may also include the delivery of operating systems and virtualization technology to manage the resources. Benefits: makes the acquisition of hardware easier. Makes instant provisioning of hardware resources in a cheap way.

Advantages:

- Reduce expenditure on hardware and human resources.
- Reduce the risk of ROI (return on investment).
- Low barriers to entry.
- Usually platform independent.

- Infrastructure costs are shared and thus reduced.
- Cost saving
- Scalability and flexibility
- Focus on business growth

Disadvantages:

- The efficiency and productivity of business depends on the vendor's capabilities.
- Potentially greater long term cost.
- Centralization requires new/different security measures.

2. The Platform as a Service layer (Paas) A PaaS is ultimately a contract between an hosted environment and user-provided extensions. It is used in large industry group. Example: Amazon Elastic Compute Cloud, IBM's Blue Cloud, SunCloud, Google App Engine.

Advantages:

- Consumes cloud infrastructure.
- Underlying infrastructure security
- Streamlined version deployment

Disadvantages:

- Centralization requires new/different security measures.
- Multi-tenancy
- Data security[2]

3. The Software as a Service (SaaS) In software as services, the facilities to access the application software and data base are provided to the user. The application run on the platform and infrastructure is managed by the cloud. In SaaS the users have to pay only for what he uses according to his requirement therefore SaaS is also referred as "On-demand software". In this model, application software is installed and operated by cloud providers on the cloud and cloud users can access it from cloud clients. Cloud infrastructure and platform where application run are not managed by cloud users. Therefore there is no need to install and run the application on user's own computer. SaaS is designed for multiple users also known as application service provider model. Examples are online video games, Microsoft window live.

Advantages:

- UI powered by thin-client applications.
- Communication on vis APIs
- Stateless
- Loosing Coupled
- Avoid capital expenditure on software and development resources.

V. Security Issues in Cloud Computing

Privacy and security are two important aspects that must be taken into consideration when talking about cloud computing. The main security issues in cloud computing are as following:-

1. Hijacking of Accounts

The growth and implementation of the cloud in many organizations has opened a whole new set of issues in account hijacking. Attackers now have the ability to use your (or your employees') login information to remotely access sensitive data stored on the cloud; additionally, attackers can falsify and manipulate information through hijacked credentials.

2. Data Breaches

Cloud computing and services are relatively new, yet data breaches in all forms have existed for years. The question remains: "With sensitive data being stored online rather than on premise, is the cloud inherently less safe?" After evaluating each scenario, the report concluded that overall data breaching was three times more likely to occur for businesses that utilize the cloud than those that don't. The simple conclusion is that the cloud comes with a unique set of characteristics that make it more vulnerable.

3. Insider Threat

An attack from inside your organization may seem unlikely, but the insider threat does exist. Employees can use their authorized access to an organization's cloud-based services to misuse or access information such as customer accounts, financial forms, and other sensitive information. Additionally, these insiders don't even need to have malicious intentions.

4. Malware Injection

Malware injections are scripts or code embedded into cloud services that act as "valid instances" and run as SaaS to cloud servers. This means that malicious code can be injected into cloud services and viewed as part of the software or service that is running within the cloud servers themselves.

5. Abuse of Cloud Services

The expansion of cloud-based services has made it possible for both small and enterprise-

level organizations to host vast amounts of data easily. However, the cloud's unprecedented storage capacity has also allowed both hackers and authorized users to easily host and spread malware, illegal software, and other digital properties.

6. Insecure APIs

Application Programming Interfaces (API) give users the opportunity to customize their cloud experience. As the infrastructure of APIs grows to provide better service, so do its security risks. APIs give programmers the tools to build their programs to integrate their applications with other job-critical software.

7. Denial of Service Attacks

Unlike other kind of cyberattacks, which are typically launched to establish a long-term foothold and hijack sensitive information, denial of service assaults do not attempt to breach your security perimeter. Rather, they attempt to make your website and servers unavailable to legitimate users.

8. Data Loss

Data on cloud services can be lost through a malicious attack, natural disaster, or a data wipe by the service provider. Losing vital information can be devastating to businesses that don't have a recovery plan. Amazon is an example of an organization that suffered data loss by permanently destroying many of its own customers' data in 2011. Google was another organization that lost data when its power grid was struck by lightning four times. Securing your data means carefully reviewing your provider's back up procedures as they relate to physical storage locations, physical access, and physical disasters.

VI. Conclusion

Cloud computing has many benefits, but it also has different issues that could be raised. When big data stored in centre around the world, the data could become a target for hacker attacks or be misused. Moreover, stored in different locations, the data could be under other laws that their owners are not familiar.[4] We have so many benefits but on the other hand we also have security threats for the data. But the biggest issue is the security and privacy of the data stored in cloud computing. In this paper we had just an overview about cloud

computing model, services and the security threats.

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