

Cloud Computing and its challenges: A Review

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Abstract— Cloud computing is today's one of the most recent topics due to its cost-efficiency and flexibility and ubiquitous computing. This paper gives a review our early of Cloud computing, its major characteristics and some issues and challenges that it is facing.

Keywords-cloud computing; cloud deployment models; cloud service models

I. INTRODUCTION

It is set of Cloud computing basically relies on sharing computing resources. Cloud computing provides software, platform and infrastructure as a service [1]. In this we do not have local servers or personal devices to handle applications. It provides very simple graphical interface i.e Applications Programming Interface and hides internal complexities from user. It is Internet-based computing which provides different services organization's computers and devices through the Internet. Services can be delivered to you wherever and whenever you need. Cloud computing is a general form of anything that involves delivering hosted services over the internet.

Services provided by cloud computing are classified as:

- Software as a service (SaaS)
- Platform as a service (Paas)
- Infrastructure as a service(Iaas)



Figure 1. Cloud Architecture [4]

II. CLOUD SERVICE MODELS

There are three main services models which are delivering services such as: Infrastructure services, Platform services and Software services.

A. Software as a Service (SaaS)

It provides user with facility to run applications on a cloud infrastructure. The applications are accessible through a front end portal. Clients need no to install any software on their device. They just need a web browser and network connection. SaaS applications are designed for end-users, delivered over the web [2, 3]. The consumer does not manage or control the underlying cloud infrastructure. User has to pay only for services

which he used. For example, web-based emails, Microsoft Office365 etc. With, Microsoft Office365 you can use services of word, without installing it on your computer. You just need to pay monthly fee. You can use this software anytime from anywhere.

B. Platform as a Service (PaaS)

PaaS is the set of tools and services designed to make coding and deploying those applications quick and efficient [2]. It provides platform for developers to create their applications on provider's platform over the internet. Providers may use APIs or gateways installed on consumer's computer. PaaS provides physical server for software. Consumer does not have control over cloud infrastructure, but can control the deployed applications. PaaS is mostly used by software development teams. For example, Google Appss.

C. Infrastructure as a Service (IaaS)

It provides users with virtual servers. IaaS generally includes multiple users on a single piece of hardware [2]. It provides individual servers, disk drives, computing resources, private networks, messaging systems etc. All services are provided to user by paying some fee. User has to pay only for services that he use. i.e pay for what you use model is applied. An organization can build a complete infrastructure using IaaS. The consumer does not have control over cloud infrastructure but can control deployed applications, operating systems, storage devices etc. For example, Amazon Web Services .

III. CLOUD DEPLOYMENT MODELS

A cloud deployment model defines where the physical servers are deployed and who manages them.

A. Public Clouds

This mode most commonly known as cloud computing. It provides services to any number of clients through the public Internet, but these services are owned by the organization selling the cloud services. It is the most cost effective model because user has to pay only for that services which he use [3,4]. It is managed by a third party provider. Public clouds are not suited for the company that has to keep sensitive information in data center, as it does not provide security to sensitive data.

B. Private Clouds

Private cloud provides with same facilities as private clouds, but it takes security into account. It is designed on the basis of an organization [4]. Services totally depend on what is needed by that organization. It includes control over enterprise and customer data. With private cloud, the performance of physical hardware can be controlled and maintained by the organization, and can thus markedly improve data center efficiency while reducing operational expense. It provides high degree of security to sensitive data.

C. Community clouds

It can be said as to semi-private cloud. It is for some set of users. Only users of particular group can have access to services provided by community cloud.

D. Hybrid Clouds

It is the combination of more than one cloud system defined above. It use a shared API to enable hybrid operation. Organization can have benefits of both public and private cloud system, i.e. cost effectiveness of public cloud systems and security of private cloud systems [3]. With hybrid cloud, organizations can utilize the cost benefits of a public cloud and when needed, protect confidential data in a private cloud.

IV. CHARACTERISTICS OF CLOUD COMPUTING

A number of characteristics define cloud data, applications services and infrastructure:

A. Ubiquitous

Services provided by cloud computing are accessible from anywhere[1].

B. Virtualization

It provides with virtual servers and storage devices over the network. These services can be shared among different users. Applications can be easily migrated from one server to another.

C. Pay per use

In this User has to pay only for services which he used.

D. Application programming interface (API)

These provide more user friendly interface for machines to interact with cloud software.

E. Location independence

It enables users to access services regardless of their location. Users can connect from anywhere.[3]

F. Device Independence

It enables users to access services regardless of what device they are using like Laptop, PC or mobile phone.

G. *Rapid elasticity*

Cloud services can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited[4].

H. *On demand self services*

Cloud services can be provided automatically without requiring human interaction with each service provider[1].

I. *Broad network access*

Services are available all the time over the network and are accessible through any kind of device like mobile phones, PC, tablets, laptops, etc.

V. CHALLENGES

A. *Security*

The most important challenge is to manage security. A large amount of sensitive data of different organizations resides on server. Even if only one site is hacker, it will affect multiple consumers..These risks can be reduced to some level by using encrypted file systems, security applications, and buying security hardware etc. Another way to tackle with security problems is to store data within organization only and allowing it to be used in the cloud. Hybrid cloud could support such a deployment.

B. *Data location*

Cloud computing technology does not allow you to know the physical location of the server used to store and process their data and applications. In cloud computing, location of data is not fixed at a point and it is also not known by consumers every time [4]. It has become a critical issue for data governance requirements. It is essential to understand that many Cloud Service Providers (CSPs) can also specifically define where data is to be located. You might not even know what country it will be stored in.

C. *Performance*

Because of traffic over the network, delays are produced. Also sites may get slow down because of some kind of network attack. To tackle with this problem high bandwidth is required. Bandwidth requirement may cost low for small applications but for large applications like data intensive application cost can be high.

D. *Lack of Standards*

There are not proper standards defined for cloud interfaces. Therefore, most clouds will be interoperable. The Open Grid Forum is working to solve this problem.

E. *Insecure APIs*

With the help of API's services are accessed. APIs may expose some sensitive information to unauthorized users [3].

VI. CONCLUSION

Cloud computing provides us with various services like SaaS, PaaS, IaaS. We have different kind of deployment models like public, private, community and hybrid clouds. There are different challenges that cloud computing has to face. Still, cloud computing provide good performance, APIs, etc. So, there must be ways to tackle with these challenges. So, that we can get more out of cloud computing.

VII. REFERENCES

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