An Overview on Cloud Computing

Prachetha Kollipara*

Student, Department of Electronics and Communication Engineering, Kommuri Pratap Reddy Institute of Technology, Ghatkesar, India

Abstract: Cloud computing is the merge of different including servers, storage, databases, networking, software, analytics, to offer faster innovation, flexible resources, and economies of scale. As many companies are depending on this technology we have to take into consideration about how safe it is to use cloud computing to store the important data of the company or any individual. We need to get to know it better while using it. In this paper we get to know the details about cloud computing. We will see the types of clouds, which are used for different levels of security in it and the services provided by the cloud and some of the problems faced and the ways some suggested to overcome those problems.

Keywords: cloud computing, data storage.

1. Introduction

Cloud computing is generally about the services provided like storages, data bases, networking, analytics, all these provided online and you only have to pay for the services which are used by you. It provides faster service, resources and work gets done in an easy way. We use cloud services in our day to day life for like storage purpose, editing the data, and many more. We can access these data from anywhere and anytime. It also provides a fast and efficient service for the users and many people tend to use it because it's easy to access and provides quality service and it's of low cost and a good reliability. Although it hasn't been a long time since this technology was introduced many people and companies are relying on this for the reasons mentioned.

A. Types

Each cloud has specific protocols and different access. Each used for a specific reason. There are several modes and different variations introduced for the users. Gmail, banking and medical records are all done with the help of cloud computing, but each one has different level of access. Not everyone can access all of them some data is secured, so only the users can access it. As of now, there are 3 different types of cloud computing: Public, private and hybrid.
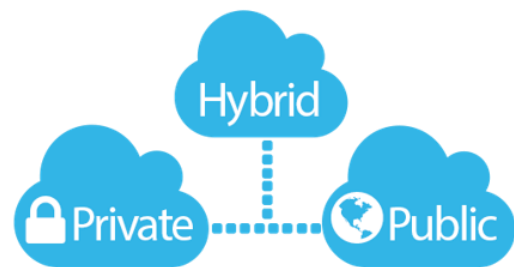
1) Public cloud

These are not owned by a user it is created by the IT infrastructure. These are the most commonly used clouds. The data in this cloud is publicly shared and can be accessed by everyone from anywhere. There is no necessity of paying for few of the public clouds used, they allow the users to use it for free like AWS, Massachusetts open cloud, etc. These are owned by a third party, and the services provided there are controlled by the third party. The data in the public cloud can be seen and shared by the user or the workplace to thousands of other people. Basically, here we share the same storage and network devices. Gmail is an example of public cloud where your account is accessed through a password and the mails can be shared to any number of people. Public cloud can be used to share less confidential information.

2) Private cloud

The private cloud on other hand is solely for a user (single customer), where the data contained is more secured than a public cloud. Users create either a managed private cloud which can be managed by the organisation or a cloud which is dedicated for only their use like a cloud within a cloud. The bank companies, has to use a private cloud to send the data as the information is sensitive. We can even take the example of medical records which are shared through a private cloud. The software and hardware used in this cloud is dependent on the organisation or the company.

3) Hybrid cloud

As the name itself says it is a combination of both public and a private cloud. It is a more complex cloud because it has both the functions of a public and a private. It is created by different

*Corresponding author: prachethakollipara@gmail.com

networks like local area network (LAN), wide area network (WAN), virtual private network (VPN) or others. The business companies tend to choose this type of a cloud, by which it can advertise (which can save some amount) data and keep other data secured which cannot be accessed by everyone. It has more advantages compared to the other two, as it provides more flexibility, more security and other features used by the organisations. We can take few examples of Amazon Web Services (AWS), Microsoft Azure, etc.

2. Types of Services

The services are divided into four:
1. Infrastructure as a service (Iaas)
2. Platform as a Service (PaaS)
3. Software as a Service (SaaS)
4. Function as a service (Faas)

Cloud Service Models
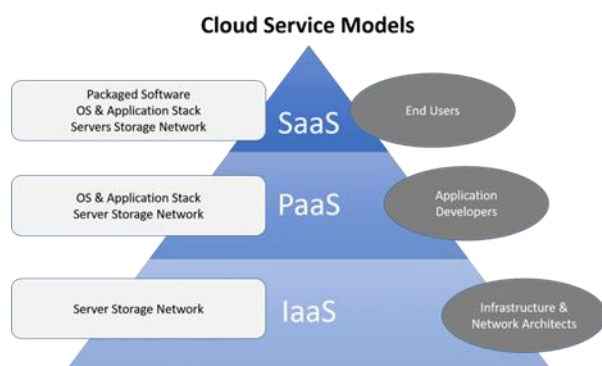
1) Infrastructure as a service (Iaas)

This is a cloud computing that has features like compute, storage and networking resources on demand, we need to pay as we use it. In this service the hardware resources are provided by the external provider, which can help in saving money. It allows users to access virtual machines without server management. It allows the company to scale up the resources according to the situation given that is the demand. It supports the web apps, storage and other networking resources. It can help in management of recovery systems.

Example of IaaS: Amazon EC2, Windows Azure, Google Compute Engine.

2) Platform as a Service (PaaS)

This is an updated version of Iaas. It allows users to access everything from simple cloud-based apps to sophisticated, cloud-enabled applications. Users can pay for the resources they utilise. A platform service offers Hosting Solutions, OS, Software tools for design and development, Environment for server-side scripting, DBMS Network Access, Storage, Server Software, Support. It allows us to avoid the expense of buying and managing of software license.

It also simplifies the coding of the apps as it contains a pre-coded application component in them.

Examples of PaaS solutions include Microsoft Azure, AWS Elastic Beanstalk, Google App Engine, Rackspace Cloud Sites, and Apache Stratos.

3) Function as a service(Faas)

Faas is also known as a Serverless computing, it helps the developers to create the application faster as it eliminates the need of managing infrastructure. The developer does not have to deal with allocation of the resources as it's managed by the cloud. This can help to focus on the business. By which the app or the product can be finished in less time and can be introduced faster into the market. It can help to manage the resources according to the demand. It also helps in more efficient use of the resources as it only produces to match the demand.it is fault tolerant.

Examples of FaaS include Google Cloud Function, Microsoft Azure Functions, AWS Lambda.

4) Software as a service (Saas)

Saas is a type of service where you can use the cloud based apps with internet connection. It is a combination of both Iaas and Paas services. All the infrastructure, app software and app data is provided by the service. it is all done by an agreement and it provides the security required for the user. It allows the company to run at low cost. We know service called Yahoo! or email. This comes under Saas where the user can login into his account from any computer or internet device. We don't need to purchase the Saas application or have to download them. We can save money as it depends on the usage. It can be accessed from anywhere, the data stored is not lost.

3. Cloud Computing

Cloud computing allows the user to store the data, back up the data and also recover it, anytime. It protects our data and is cost efficient. We just have to transfer our data via internet to this storage system and can be accessed anywhere. It also has latest updated versions with help of Saas which lets you have the latest software updates for your device. We can also watch the video and audio files on our device with high quality. One of the main advantage is that it helps in cost cutting of the application development, which can be scaled up or down according to the market.

However, one of the important thing the user has to worry is about the data security. As the user is uploading all the important data in this we need to know how safe is the data? The cloud providers mostly have an agreement before using them that can help in the control of the data present in there. But, taking the present situation there are many threats to the data storage and to meet the changes of it frequently is not an easy task. The users may want to edit the data stored or delete few thing or add few things in the stored data, the server must be able to do it.

One of the approach used in data security is to encrypt the data on the users file into a secret code and then be shared and after that it can be decrypted using the same code. This results in no leakage of the data shared or stored on the cloud.

The data stored can be accessed through multiple devices from anywhere which increases the risk of security it is one of the trouble faced by the cloud, as it is possible to view your data by others. Another is about the fault tolerance; it is basically to continue the work even though there has been a fault in the server or to prevent any failures in the server. Fault tolerant

systems use back up data that take place of the failed system, which in turn results in lo loss of the data. They can restore the data quite quickly. On the event of a failure the page is directed to the backup site which ensures in no loss of the data. There are many fault tolerance models which prevents the loss of data which are

FT clouding, BFT clouding, FTM model, LLFT model, Candy model, AFTRC model, FTWS model, Magi-cube model. Each having different preventive and reaction methods

Model Name	Proactive (P) Reactive (R)/ Adaptive(A)	Response time	Scalability	Reliability	Availability	Usability	Overhead	Cost
Shadow [29]	R/A	L	L	H	A	A	A	H
AFTRC [32]	P/A	A	H	H	H	H	A	A
Remus [25]	P/R/A	H	H	H	H	L	A	A
Niagara [27]	R	A	A	H	H	L	A	L
BFT Cloud [12]	R	H	A	H	H	H	H	H
HQ-BFT [27]	R	H	H	H	H	A	H	H
Zyzzyva [15]	R	H	A	H	H	H	A	A
Magic-cube [40]	R/A	A	H	H	A	H	L	L
Checkpoint-replay Scheme [47]	R	A	H	H	H	H	L	L
Autonomic Approach [48]	P	A	A	H	H	H	A	A
Candy [37]	P/A	H	A	A	A	H	H	H

Fault Tolerance Models in Cloud Computing Comparison
(H=high, L=low, A=average)

4. Conclusion

Cloud computing is one the trending service used today, and we have seen the types and different services provided by it. We have also known about the different problems faced by it, although data security is needed to be improved often because of the threats of online sources. We have seen about the fault tolerance system which takes action before the data is lost or takes place when a failure is occurred. We have seen the techniques or the models used to prevent the problems arised.

References

[1] G. S. Geethamani and Ranjani, "Preserving Privacy in Public Auditing for Data Storage Security in Cloud Computing."
[2] Syed Neha Samreen, Neha Khatri-Valmik, Supriya Madhukar Salve, and Pathan Nouman Khan, "Introduction to Cloud Computing."
[3] P. Neelakantan, "A Study on E-Learning and Cloud Computing."
[4] Venkatesh and M. S. Eastaff, "A Study of Data Storage Security Issues in Cloud Computing."
[5] T. Grance and P. Mell, "NIST definition of cloud computing", National Institute of Standards and Technology, January 2011.
[6] Arjun Kumar, Byung Gook Lee, HoonJae Lee, Anu Kumari, "Secure Storage and Access of Data in Cloud Computing", 2012 International Conference on ICT Convergence (ICTC), 15-17 Oct. 2012.