



AN OVERVIEW OF CLOUD COMPUTING: PLATFORMS AND SECURITY ISSUES

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Abstract

Cloud computing is a new computing model which is widely emerging technology in the recent years is adopted by most of the IT companies and other organizations. Cloud computing enables individuals and organizations to gain access to huge computing resources without capital investment. Cloud computing is a set of IT services that are provided to a customer over a network on a leased basis and with the ability to scale up or down their service requirements. Cloud computing is the internet depend technology which is providing the services to user, small and large organization on demand. Cloud computing stored the user data and maintain in the data canter of cloud provider like Amazon, Oracle, Google, Microsoft etc. However, the cloud environment is considered untrusted as it is accessed through Internet. Therefore people have security concerns on data stored in cloud environment. The major concern of cloud environment is security during upload the data on cloud server.

Keywords: Cloud Architecture, Cloud Computing, Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS).



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Introduction

What is cloud?

The term Cloud refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location. Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN. Applications such as e-mail, web conferencing, customer relationship management (CRM), all run in cloud.

Cloud computing

Cloud computing is a recent technology that uses the Internet, central servers to organize the data and applications, which the user can access. Cloud computing allows individual users and other business peoples to use application without the necessity to install in their computer. They can access their files, which is located in other computer using Internet. This

technology allows for more inefficient computing by centralizing storage, processing memory, and bandwidth. Cloud computing comes in three categories such as Software as a Service (SaaS), Infrastructure as a service (IaaS), Platform as a Service (PaaS).The SaaS provides application software which the user can use. The Paas provides the platform for the user to do his operation .The Iaas provide physical or virtual devices for user. And each provides different services to the user. The cloud is available in four-deployment model namely.

1. Public Cloud
2. Private Cloud
3. Community Cloud
4. Hybrid Cloud

CLLOUD COMPUTING BUILDING BLOCKS:

(1)DEPLOYMENT MODELS

In the cloud deployment model, networking, platform, storage, and software infrastructure are provided as services that scale up or down depending on the demand as depicted in figure.

The Cloud Computing model has four main deployment models which are:



Figure: Deployment Model

(a)Public Cloud:-

The Public Cloud allows systems and services to be easily accessible to the general public. Public cloud is the biggest version of all the cloud deployment models. Public cloud is generally built by large organization to deliver their services to large group of audience. With

proper authentication, anyone can use the services provided by the public cloud. Public cloud is little insecure than other forms of cloud deployment models. Since the cloud is open to the public, security breaches and security vulnerabilities are more in Public cloud.

(b) Private Cloud:-

The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature. Private cloud is the basic cloud deployment model, which is implemented for a limited size organization. The number of users, using the private cloud will be limited. Private cloud is more secured than other deployment models. Private cloud is generally built for internal purpose. Microsoft Azure, Amazon Web Services are the leading service provider for private cloud. In general, Private cloud will not visible or available beyond that cloud users. Private cloud can be built for highly confidential organization such as Defence, banking etc.

(c) Community Cloud:-

The Community Cloud allows systems and services to be accessible by group of organizations. Community cloud is just an advanced version Private Cloud. Community Cloud is generally built to connect two or more organizations and share their computational requirements.

(d) Hybrid Cloud:-

The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud. Hybrid cloud is one of the biggest solutions for the security and performance issue of the public cloud. Hybrid cloud is the combination of one or more cloud deployment models. Hence it has the property of all the cloud deployment models. Hybrid cloud enables the service providers to provide certain resources to the general audience and limit certain services to the particular group of audience. Highly secured services are made private and the rest are made as Public. Although Hybrid cloud doesn't provide complete solution for the security and performance issue , vulnerability can be reduced and performance of the cloud will be better.

Moreover, with the technological advancements, we can see derivative cloud deployment models emerging out of the various demands and the requirements of users. A similar example being a virtual-private cloud where in a public cloud is used in a private manner, connected to the internal resources of the customer's data-centre. With the emergence of

high-end network access technologies like 2G, 3G, Wi-Fi, Wi -Max etc. and feature phones, a new derivative of cloud computing has emerged.

(b) SERVICE MODELS

According to the different types of services offered, cloud computing can be considered to consist of three layers: software as a service (SAAS), platform as a Service (PAAS), and infrastructure as a Service (IAAS). Infrastructure as a Service (IaaS) is the lowest layer that provides basic infrastructure support service. Platform as a Service (PaaS) layer is the middle layer, which offers platform oriented services, besides providing the environment for hosting user’s applications. Software as a Service (SaaS) is the topmost layer which features a complete application offered as service on demand.

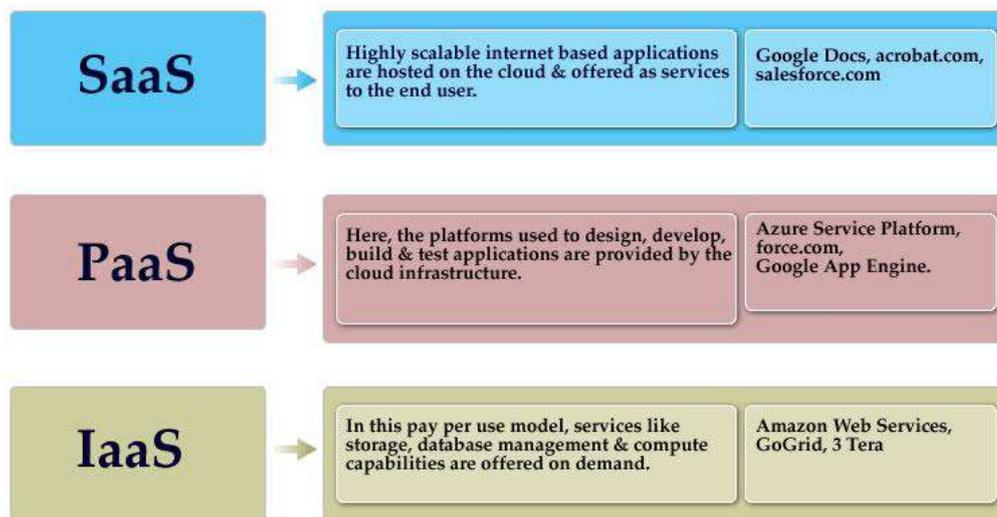


Figure: Service Model

(a) Infrastructure as a Service (IaaS)-:- In this refers to the sharing of hardware resources for executing services using Virtualization technology. Its main objective is to make resources such as servers, network and storage more readily accessible by applications and operating systems. The physical devices (Input and Output devices) and Physical component of the computer is termed as Infrastructure of a computer. Hard disk, RAM, ROM, Graphics card are the physical components of the computer. These physical components of the computer are provided as a service to the end user on Internet virtually. Cloud Service provider will allow you to store data in the Hard disk based upon size requested. This is termed as Cloud Storage. The entire process of providing physical components as service is termed as Infrastructure as a Service.

(b) Software as a Service (SaaS):-

In this model in which an application is hosted as a service to customers who access it via the Internet. When the software is hosted off-site, the customer doesn't have to maintain it or support it. This makes the customer to get rid of installing and operating the application on own computer and also eliminates the tremendous load of software maintenance; continuing operation, safeguarding and support .The term software can be defined as a program or set of instructions which are used to manage the user requirements. Software forms the top most layer of the computer, which will directly interact with the end user. User can utilize software as long as they want and pay for what they have used. Downloading, Maintenance, License issues are completely avoided and taken care by the service provider.

(c) Platform as a Service (PaaS):-

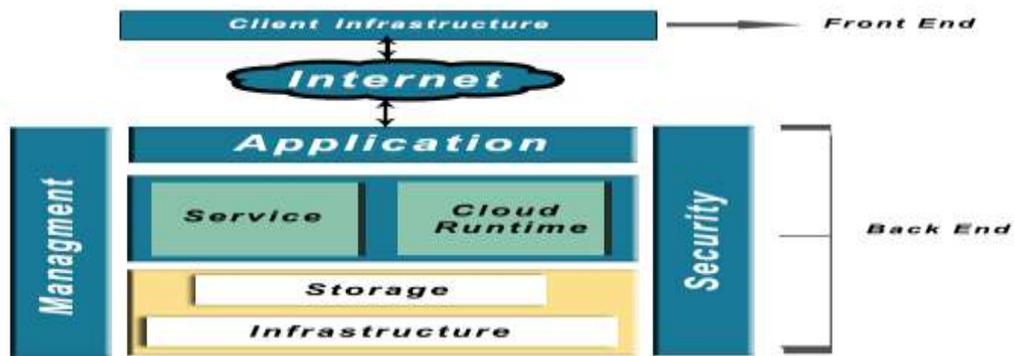
another application delivery model. PaaS supplies all the resources required to build applications and services completely from the Internet, without having to download or install software. In this model, user does not manage the infrastructure like network, servers, operating systems and storage but he controls deployed applications and, possibly, their configurations. Examples of PaaS includes: Google App Engine and Microsoft Azure. In general, the layer which allows the user to install or build some application is said to be platform. Platform to develop, test and deploy code is being provided as a service over Internet. Operating system can also be considered as one of the example for Platform as a Service. Since OS is considered as Software, few may list OS under Software as a Service. The main goal or objective of PAAS is to develop, test and deploy the code easily and multitasking can be implemented in all these steps.

Cloud Storage architecture

The Cloud Computing architecture comprises of many cloud components, each of them are loosely coupled. We can broadly divide the cloud architecture into two parts:

- Front End
- Back End

Each of the ends is connected through a network, usually via Internet. The following diagram shows the graphical view of cloud computing architecture:



FRONT END:- Front End refers to the client part of cloud computing system. It consists of interfaces and applications that are required to access the cloud computing platforms, e.g., Web Browser.

BACK END:- Back End refers to the cloud itself. It consists of all the resources required to provide cloud computing services. It comprises of huge data storage, virtual machines, security mechanism, services, deployment models, servers, etc.

Benefits of Cloud Computing



- One can access applications as utilities, over the Internet.
- Manipulate and configure the application online at any time.
- It does not require to install a specific piece of software to access or manipulate cloud application.
- Cloud Computing offers online development and deployment tools, programming runtime environment through Platform as a Service model.

- Cloud resources are available over the network in a manner that provides platform independent access to any type of clients.
- Cloud Computing offers on-demand self-service. The resources can be used without interaction with cloud service provider.
- Cloud Computing is highly cost effective because it operates at higher efficiencies with greater utilization. It just requires an Internet connection.
- Cloud Computing offers load balancing that makes it more reliable.

SECURITY ISSUES

Cloud computing can provide different services like as a Platform as a service (PaaS), Software as a service (SaaS), Infrastructure as a service (IaaS) so that, security of corporate data in the cloud is difficult, Each service has their own security issues.

Data Security: Data Security refers as a confidentiality, integrity and availability. These are the major issues for cloud vendors. Confidentiality is defined as a privacy of the user data in the cloud system. Confidentiality are designed to prevent the sensitive information from unauthorized or wrong people. In this stores the encryption key data from enterprise C, stored at encrypted format in enterprise D. that data must be secure from the employees of enterprise D. Integrity is defined as the correctness of data, there is no common policies exist for approved data exchanges. Data are not lost or modified by unauthorized users. Availability is defined as data is available on time, any place as user requires. As its web native As its web-native nature, cloud computing system enables its users to access the system (e.g., applications, services) from anywhere.

Data Locations: When users use, they probably won't know exactly where their data will hosted and which location it will stored in. In fact, they might not even know what country it will be stored in. Service providers need to be asked whether they will accomplish to storing and alter data in particular.

Trust Issue: Trust is also a major issue in cloud computing. Trust can be in between human to machine, machine to human, human to human, machine to human. Trust is revolving around assurance and confidence. In cloud computing, user stores their data on cloud storage because of trust on cloud. For example people use Gmail server, Yahoo server because they trust on provider.

Data Recovery: It is defined as the process of restoring data that has been lost, corrupted or accident.

Cloud Key Security Challenges

There are some clouds key Security challenges are:

Authentication: Throughout the internet data stored by cloud user is available to all unauthorized people. Henceforth the certified user and assistance cloud must have interchangeability administration entity.

Access Control: To check and promote only legalized users, cloud must have right access control policies. Such services must be adjustable, well planned, and their allocation is overseeing conveniently. The approach governor provision must be integrated on the basis of Service Level Agreement (SLA).

Policy Integration: There are many cloud providers such as Amazon, Google which are accessed by end users. Minimum number of conflicts between their policies because they user their own policies and approaches.

Service Management: In this different cloud providers such as Amazon, Google, comprise together to build a new composed services to meet their customers need. At this stage there should be procure divider to get the easiest localized services.

Trust Management: The trust management approach must be developed as cloud environment is service provider and it should include trust negotiation factor between both parties such as user and provider. For example, to release their services provider must have little bit trust on user and users have same trust on provider.

Goal of Cloud Computing?

The main goal of Cloud Computing can be defined in a single as, “Anything, Anywhere, Anytime” Computing . To provide any computational requirements as service to the end user, to any location, at anytime is the major of Cloud Computing. Computational requirements are provided over Internet (Network of Network) on demand basis. Another major goal of Cloud Computing is to provide services to any number of services, on demand basis. The number can be expanded and reduced based upon the request. This property of Cloud computing is termed as elasticity.

Conclusion

Cloud computing is the new technology widely adopted by the organization in all over the world. Once organization take decision to move the data over the cloud, organization lose the

control over the data. Thus, the amount of protection needed to secure data. Eventually, the future of cloud computing is a chance for a huge technological breakthrough companies using this technology today. However, in a few years the clouds will bring the world much more usefulness. Very soon, the cloud will allow faster and more efficient operations. And along with cloud spread our life will be accelerated.

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