

An Overview of Cloud Computing

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Abstract: Cloud computing approach has revolutionized the way we access different computing resources over the Internet. Cloud computing model has different characteristic features like broad network access, on demand service, resource pooling etc. Utilizing cloud computing paradigm cost of owning and managing computer hardware and resources is reduced. Cloud computing encompasses different service models like IaaS, PaaS, SaaS and it can be deployed using private, public and hybrid cloud approach. In this paper we will provide an overview of cloud computing technique, its benefits, challenges and future scope.

Keywords: Cloud computing, SaaS, PaaS, IaaS, service models.

I. INTRODUCTION

Cloud computing is a paradigm which has changed the way we access hardware, software and other computing resources over the internet. It allows us to avail the facility of software and hardware resources that are managed and provided by a third person or party at remote locations. In simple words, it is the delivery of computing resources over the internet.

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage space, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [1]. Cloud computing facility can deliver services in form of software (e.g. email, web browser), platform (e.g. development tools) and infrastructure (e.g. storage space). It is a service-oriented application; many firms are relying on cloud computing paradigm to cater to the needs of users. It has its own share of benefits and challenges and has tremendous scope for the future.

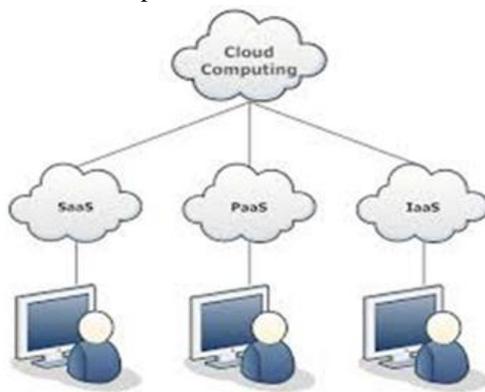


Fig 1. A Cloud Computing model

II. BASIC CHARACTERISTICS

1. On demand self-service

A user can avail the resources and facilities like mail service, storage space, software development tools etc. as per his need and a user is exempted from interacting with a service provider. User can log on to a website or application utility and use the resources.

2. Broad network access

Cloud computing paradigm is a web-based facility and the resources can be accessed over the internet through standard mechanisms using laptops, desktops, PDA's and smart phones.

3. Resource pooling

Cloud computing model provides a shared pool of resources to multiple users. Different resources are assigned and reassigned as per customer demand. Customers have no knowledge of the exact location of the resource provider.

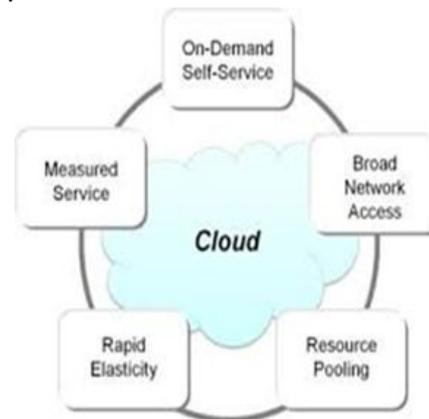


Fig 2. Characteristics of cloud computing

4. Rapid elasticity

Computing resources can be provided dynamically and in a flexible manner as per the demands of the customers. The service provider can increase or decrease the resource supply to the user. The services appear to be unlimited for the user or customer, which can be accessed at any time.

5. Measured service

Cloud computing model is a service-providing one and it controls and enhances the utilization of resources by applying some metering technique to different services that are provided. Resource utilization can be controlled, monitored, and analyzed for enhancing the quality of service provided to the users.

III. CLOUD COMPUTING SERVICES MODELS

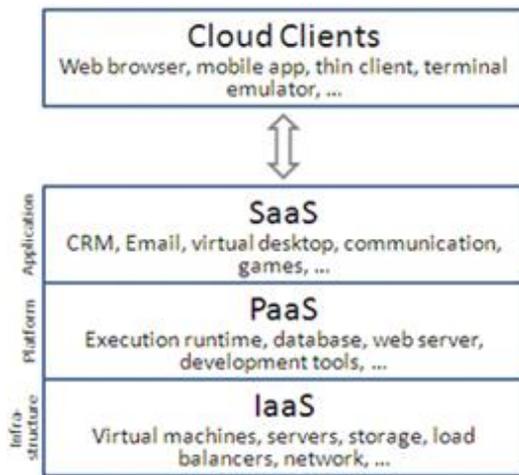


Fig 3 Cloud computing services model

1. Software as a Service (SaaS)

This model provides software applications as services to the customers in this model users simply make use of a web-browser to access software that others have developed [2]. In SaaS the resource provider allows a user to use the application on his demand, the application or resource is provided on the cloud and a large number of users are serviced simultaneously, for instance the web based email service is a perfect example of SaaS the user does not manages the mail server or the underlying hardware he simply accesses the mail service on demand, Google docs, salesforce.com, zoho.com are also examples of SaaS providers.

2. Platform as a Service (PaaS)

PaaS model provides conducive environment for development of some application or for performing some computation, software development tools are provided on the cloud the user can use the service or resource provided to develop some application or utility. PaaS provides users with a high level of abstraction that allows them to focus on developing their applications and not worry about the underlying infrastructure [2] a suitable example is Google Apps facility which provides users with complete development environment some other PaaS examples are Microsoft Azure, Force.com, Aakami Edge Platform.

3. Infrastructure as a Service (IaaS)

IaaS model provides resources like servers, storage systems, networking equipment etc on the cloud such resources are availed by the users on demand, users acquire computing resources such as processing power, memory and storage from an IaaS provider and use the resources to deploy and run their applications [2]. An example of IaaS is GoGrid application it provides users access to dynamically scalable computing and storage resources and dedicated servers other examples are Amazon Elastic Compute Cloud (EC2), IBM Computing on Demand, Microsoft Live Mesh etc.

IV. CLOUD DEPLOYMENT STRATEGIES

1. Private Cloud

Private clouds are designed exclusively for a single organization its services are availed solely by that organization such a cloud can be operated by the organization itself or by some third party, private clouds can exist on or off the premises, private clouds provide better security, robustness and control of the cloud infrastructure as it caters to the needs of a single organization and has a limited access.

2. Public Cloud

The services and resources provided by public cloud are available to the general public such a cloud can be managed, owned and operated by a government, academic or business organization or a combination of them the cloud infrastructure is available to the public on a commercial basis by a cloud service provider, this enables a consumer to develop and deploy a service in the cloud with very little financial outlay. A public cloud does not mean that a user's data is publicly visible public cloud vendors typically provide an access control mechanism for their users public cloud provides an elastic, cost effective means to deploy solutions [3]. Public clouds require significant investment and are usually owned by large corporations such as Microsoft, Google or Amazon.

3. Community Cloud

This type of cloud is provided for exclusive use by a specific community of users of an organization who share some concerns like mission, policy, security requirement etc. the cloud infrastructure is shared among a number of organizations with similar interests and requirements the operation may be in-house or with a third party on the premises [4].

4. Hybrid Cloud

A hybrid cloud is a combination of public, private and community clouds, each cloud in a hybrid cloud could be independently managed but applications and data would be allowed to move across the hybrid cloud [2] the participating clouds are bound together by some standard protocols [4] in hybrid cloud each cloud is a unique entity but there is a coordination among them and data and application portability exists.

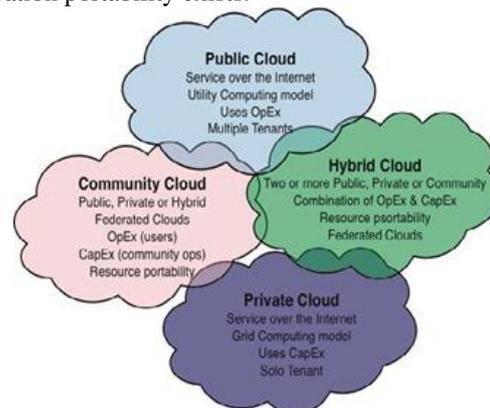


Fig 4. Cloud computing deployment models

V. BENEFITS OF CLOUD COMPUTING

1. Reduced Cost

The cloud computing approach is very cost efficient for a customer the cost that is incurred on the purchase of software, hardware, network bandwidth, storage and other computing resources is eliminated as all the services and resources are provided by the cloud service provider it can significantly lower the company's IT expenses [8] a customer can avail these services on demand also the user can do away with the cost of obtaining license for software applications.

2. Storage capacity increases

The storage capacity of any user or customer availing the resources provided by cloud computing environment increases manifolds as the storage capacity of any cloud services provider is much larger than what a user can get on his own, there are dedicated cloud services for providing data storage facility to users like Google Drive, SkyDrive etc

3. Resource availability

As the cloud computing paradigm is web based this has greatly enhanced the resource availability factor any user having access to the internet can access the services so the hindrance that location posed has been eliminated

4. Efficient backup

As the data is stored on the cloud the customer of the service is free from making the backup of that data moreover the organizations that provide the services and resources on cloud have a very efficient and secure system of data backup.

VI. DRAWBACKS OF CLOUD COMPUTING

1. Security/privacy

Cloud computing model is web based service provider user has to access the services through Internet and we know Internet is prone to different types of attacks from unscrupulous elements, the cloud service providers have a very competent security system but still there is a possibility that our data can be stolen and some private information may get compromised, in some cases the organizations that provide cloud services may have a corrupt bent of mind and can breach the trust of their customers by accessing their data .

2. Technical Glitches

The cloud computing model uses the Internet platform for providing services and like all platforms Internet also has its vulnerabilities it can face malfunctions or some technical snags, also some malicious attack can render the web useless apart from that the software or computing resource that is being provided may develop some fault and finally in case of power outage the whole process may come to a standstill.

3. Limited Features of Resources

Cloud computing approach has revolutionized the way people avail services over the internet but many services

that are provided over the cloud do not possess all the functionalities that their desktop counterparts possess for instance document editing and presentation making applications that are provided over the cloud are similar to the standard desktop ones but they lack certain features and functions possessed by the standard desktop version.

VII. CONCLUSION

Cloud computing model has come a long way since its inception it has revolutionized the way users avail services, people all over the world are being served by cloud services as we speak from an everyday utility such as an email to on demand network bandwidth, data storage etc. are being served over clouds. This approach has many benefits in terms of cost, availability, enhanced storage capacity, backup etc. on the flipside it has challenges in the areas of security, privacy, limitation of features etc. but the pros outweigh the cons and organizations all across the globe are striving to eliminate the problems that a cloud encounters.

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