International Journal of Scientific Research in Computer Science, Engineering and Information Technology
© 2017 IJSRCSEIT | Volume 2 | Issue 5 | ISSN : 2456-3307

A Survey on Cloud Computing

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ABSTRACT

Cloud Computing is basically provides on demands services to local clients or users with the help of internet. Cloud Computing offers applications, infrastructures and online data storage facilities by which we can manipulate, configure and access the software and hardware resources easily and quickly. This paper represents the types of cloud computing, its characteristics, deployment models service models, advantages, disadvantages of Cloud Computing. In this paper, we also discuss the technologies of Mobile Cloud Computing like Grid Computing, and some issues related to the Cloud Computing that are security and data privacy issues.

Keywords: Cloud Computing, Mobile Cloud Computing, infrastructures, applications, etc.

I. INTRODUCTION

Cloud Computing: Cloud computing is a kind of on-demand computing where we can share no. of resources and information to the computer. Cloud Computing offers user to use different kinds of infrastructures, platforms and software that provides at very cheap cost. Cloud Computing allow us to create and customize different online applications and games. It also helps us in manipulating, accessing and configuring different kinds of hardware and software resources. It also provides us online data storage infrastructures and applications. Cloud computing is internet based computing which is reliable and user friendly in nature. A Cloud Computing is used in these days and it is an emerging term of computing utilities. Cloud Computing have various kinds of important characteristics and software. Cloud Computing is referred from network computing where applications are run on a server, which is connected. Cloud Computing allow us to create and customize different online applications and games. It also helps us in manipulating, accessing and configuring different kinds of hardware and software resources. It also provides us online data storage infrastructures and applications. Cloud computing is internet based computing which is reliable and user friendly in nature.

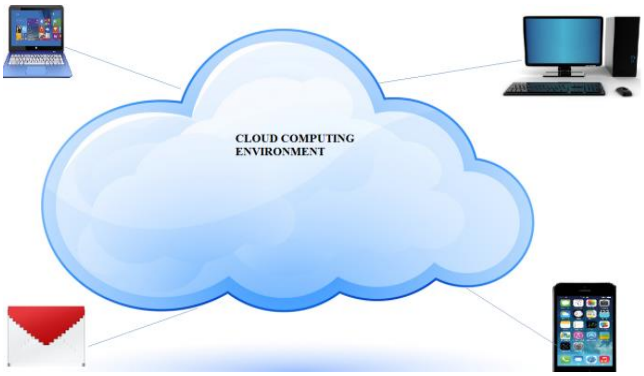

Figure 1. Cloud Computing

II. CHARACTERISTICS OF CLOUD COMPUTING

A Cloud Computing is used in these days and it is an emerging term of computing utilities. Cloud Computing have various kinds of important characteristics and software. The different characteristics of Cloud Computing are:

A. Provide On-Demand Services: It provides services such as e-mail, network, applications and software without the help and interaction of service provider.

B. Large Network Access: Cloud Computing Services are available over the network. It provides public, private, hybrid and community cloud for easy network access to the user.

C. **Elasticity:** Cloud is very scalable and flexible to complete different needs of services are provided very quickly and user can easily access more or less services from cloud pool.

D. **Measured Services:** The different resources of cloud can be measured, controlled and optimize easily.

E. **Agility:** It improves user's ability to re-provision technical and infrastructure resources.

F. **Maintenance:** The maintenance of cloud computing application is very easy because there is no need to be installed on user's computer.

G. **Reliability:** Reliability improves with using multiple redundant sites, which makes well-designed cloud computing which is suitable for business and disaster recovery.

III. DEPLOYMENT MODELS IN CLOUD COMPUTING

Depending on the organizational structure, the provisional location and also based on their specific business, operational, and technical requirements the cloud services can be deployed in different ways. Mainly there are four primary cloud deployment models they are:

- Public Cloud
- Private Cloud
- Community Cloud
- Hybrid Cloud
- Distribute Cloud
- Inter Cloud
- Multi Cloud

A. **Public Cloud:** It provides on–demand services like business, government organizational and academic. In Public Cloud single administrator provides services to the multiple users. The only disadvantage of Public cloud is it is less secure in nature. This deployment mode represents the true cloud hosting. Services are rendered over a network that is open for users. The services are provided by vendors free of charge or on the basis of pay per usage.

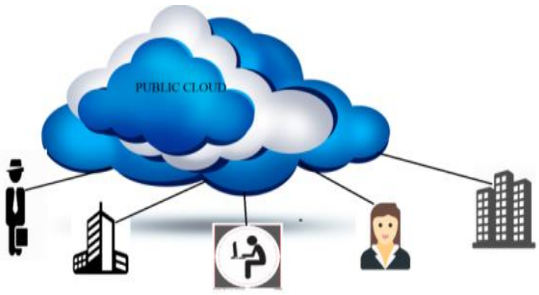

Figure 2: Public Cloud

B. **Private Cloud:** The system and services is accessible only within an organization. The advantages of Private Cloud is high privacy, improve reliability, more security, cost and energy efficient in nature. This deployment model is owned by a single organization. Cloud infrastructure is operated for a single organization, managed internally and by third party. This deployment model is hosted internally and externally.

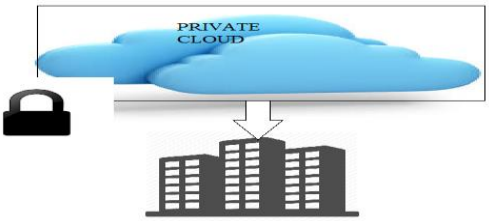

Figure 3: Private Cloud

C. **Hybrid Cloud:** It generally includes the critical and non-critical activities of public and private cloud both. In hybrid cloud, some network issues are faced. Hybrid cloud is also composition of public, private and community cloud. This deployment model is composition of two or more cloud that remains different identities but are bounded together and offering the benefits of multiple deployment models. This deployment model has ability to manage, connect dedicated services with cloud resources.

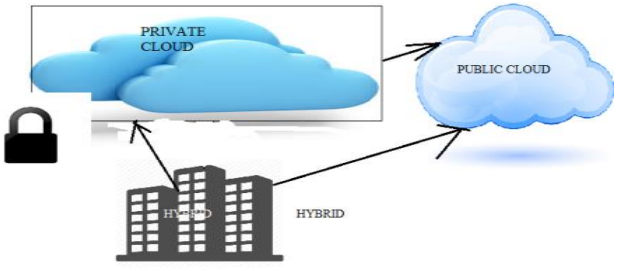

Figure 4: Hybrid Cloud

D. Community Cloud: The system and services are accessible by a group of organizations in community cloud. In this deployment model organization with similar requirements, share a cloud infrastructure. This model is helps to reduce costs as compared to the private cloud deployment model.

Figure 5: Community Cloud

E. Distributed Cloud: In distributed cloud different set of machines are located at different location but all are connected to a single network.

F. Inter Cloud: It shows the inter-connectivity between cloud and cloud globally. It focuses on the direct inter-operability between public cloud service providers and consumers.

G. Multi Cloud: In multi cloud, no. of computing services lies in a single heterogeneous architecture to increase flexibility through choice and reduce reliance of single vendor.

IV. SERVICE MODELS OF CLOUD COMPUTING

- SaaS (Software as a Service)
- PaaS (Platform as a Service)
- IaaS (Infrastructure as a Service)

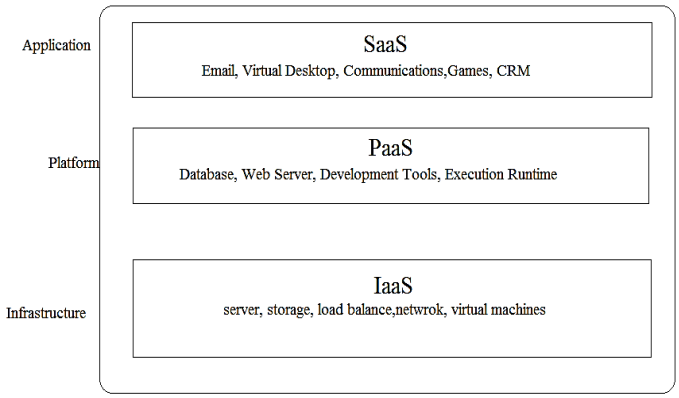

Figure 6: Service Models of Cloud Computing

A. SaaS: It is developed over internet. It is a type of delivery model where different software and data are hosted in cloud environment by a third party, which may be called as Cloud Service Provider. In SaaS the user access different applications and databases. It operates and install application and software in cloud and user access these easily. Software runs on computers managed and owned by the SaaS provider, versus installed and managed on user's computer. The software is accessed over the public network and offered on a monthly or yearly subscription.

Characteristics of SaaS

1) Software are distributed and delivered in a "one to many" model
2) All software are managed from central location
3) Users not need to handle software upgrades and patches

Example: E-mail, Virtual desktop, games etc.

B. PaaS: It provides typically toolkit and standard for development. It generally provides computing platforms, operating system, databases and web server etc. It combines the environment for developing and provisioning cloud applications. All hardware and software required to operate and build cloud based application are provided with the help of PaaS via public internet, dedicated network connection and VPN. The user is pay by use of the platform and control how those applications are utilized throughout their life cycle. It provides a cloud based environment with everything required to support the life cycle of building and delivering cloud applications without any cost and complexity of managing the hardware and software.

Characteristics of PaaS:

1) Provides tools to handle subscription and billing management.
2) Good integration with web services and databases.
3) Multi-tenant in nature by which multiple users utilize the same application.
4) Test, deploy, host and maintain number of applications in the same development environment.

C. IaaS: This is the most basic and common service model. It provides physical and virtual machines and computer. In this model, cloud user maintains operating system and applications. The IaaS model

is generally used to access essential IT resources. These resources are included services which are linked to computer resources, communication channel and data storage. IaaS provides resources such as servers, networking, data centre space on a pay-per-use basic and storage services also.

It is a method of delivering cloud-computing infrastructure like server. Network, storage and operating system as an on-demand services rather than purchasing the entire server.

Characteristics of IaaS:

1) Allows for dynamic scaling
2) Different cost and utility pricing model
3) Multiple users on a single piece hardware
4) Different resources are distributed as a services

V. ADVANTAGES

There are various advantages of cloud computing that are explained below:

A. Reliability

Cloud computing is more reliable and consistent in IT infrastructure with a much-managed platform. It provides very flexible and reliable services. It is easily available so the user can easily work at any location.

B. Manageability

In Cloud Computing all resources are maintained by the service providers, user can enjoy simple web based user interface for accessing applications, services and software without any need of installation. The different software is easily updated and provides fresh software.

C. Cost Efficient

It reduces the cost and provides applications and services as compare to the server cost. Cloud Computing is the most effective method to use, upgrade and maintain the all services provide to users.

VI. DISADVANTAGES

There are also some disadvantages of cloud computing also that are explained below:

A. Downtime

As cloud service providers take care of different and number of clients every day, they can become overwhelmed and may even come up against technical outages. This can lead your business process being suspended. If your internet connection is not available, you will not be able to access any of your servers, data and applications from cloud.

B. Limited Control

The cloud infrastructure is monitored and managed by service provider. It gives minimal control over to the customer. The customer can only manage data, services and application itself.

C. Security Issues

The major issue of cloud computing is security issue. You must choose more reliable service provider who will keep your information and data totally secured.

VII. TECHNOLOGIES

A. Grid Computing: This technology divides all tasks into smaller tasks where group of computers in different locations relate to each other to achieve specific objectives. It is the collection of different computer resources from different locations to achieve a common goal. It is like a distributed system with non-interactive workloads that involve many files.

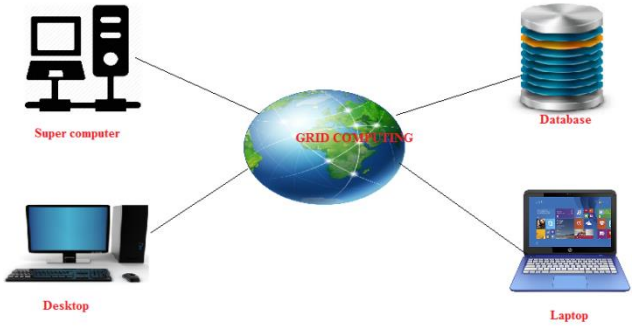

Figure 7 : Grid Computing

B. Utility Computing: Utility computing is a kind of service model or pay –per-use model where resources and infrastructure are provided to customer for specific usage like on-demand services. It is type of service provisioning model in which a service provider makes computing

resources and infrastructure management are available to the customer as needed and charges only for the specific usage. This computing is the packaging of computing resources such as computation storage, service as metered services.

VIII. CONCLUSION

Cloud computing becomes an important paradigm for delivering and managing the various services over the internet. Cloud computing provide more efficient, more flexible and less expense in IT services to end users. Firstly, this paper represents a brief introduction about cloud computing and discuss about the characteristics of cloud computing. Secondly focused on the different service model like SaaS, PaaS, and IaaS that are used for specific applications and cloud computing models like public, private, community, hybrid, distributed, inter and multi cloud. Thirdly discuss about the technology, advantages and disadvantages of cloud computing.

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