

Cloud Computing Basics

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Abstract:- By using Internet technology cloud provides virtualized IT resources as a service. Cloud Computing is a combination of Grid computing and Cluster computing. By using the Internet a computer grid is created whose purpose is only utilizing shared resources such as on a pay-per-use model, computer software and hardware. The main moto of cloud computing is that you can access your data in any corner of the world by using internet. Cloud computing is a general term for delivering through the internet. Cloud computing is a virtualized computer power and storage delivered via platform-agnostic infrastructures of abstracted hardware and software access over internet. Cloud computing systems usually work on various models like public, private, hybrid, and community models.

Keywords:- Cloud Architecture, Cloud Characteristics, Cloud Computing uses, Cloud Deployments Models, Used Technologies.

I. INTRODUCTION

Cloud computing is a concept which provide a facility to the user to delivering technology though the Internet servers. It is basically for processing and data storage. Without any use of traditional media Cloud computing allows vendors to convey services over the Internet. This method is called Software as a Service, or SaaS. Cloud computing help user to communicate more than one server at the same time and exchange information among them. Cloud computing can increase profitability by improving resource utilization. By improving resource utilization Cloud computing can increase profitability



Fig 1:- Cloud Computing Overview

A. History of Cloud Computing

The name of the term cloud was used to refer to platforms for distributed computing in Internet. It was popularized with Amazon.com when Amazon releasing their Elastic Compute Cloud product (EC2) in 2006. The idea of sharing computer resources or technology was firstly introduced by John McCarthy in 1961.

II. CLOUD COMPUTING BASICS

Cloud computing has evolved by addressing Quality of Service and reliability problems; basically it is grid type computing.

A. Deployments models

They are various deployments models are there

- **Public cloud-** Third party hosts and manages these clouds, later access given to public. Users have no control on such type of cloud and can't see the infrastructure of cloud. Basically they are used for storing data and providing services to user on cloud over internet Example Google and Microsoft have own their cloud infrastructure and later access given to public
- **Private cloud-** This is such type of cloud infrastructure that is dedicatedly for particular organization which hosts all applications and have complete control over data and used internal purpose only, so that there is less possibility of security breach. Security and bandwidth are not issue for this.
- **Community Cloud** - Community cloud computing is available only for members of a group, except that no external person can use this data. It is a multi-tenant cloud infrastructure in which the cloud is shared among other organizations.
- **Multi Cloud** - Deployment can refer to any implementation of multiple Software as a Service (SaaS) or Platform as a Service (PaaS). It describes an environment that relies on multiple clouds, such as Open Stack, Microsoft and AWS. It refers to multiple cloud services, rather than multiple deployment modes. A multi-cloud strategy also offers the facility to select different cloud services or features from different providers.
- **Distributed Cloud** - The word come from computer network it means it can be bring together from a distributed set of machines in different locations, connected to a single network or hub service. It can be differentiate between these two types of distributed clouds-
 1. Public-resource computing
 2. Volunteer cloud
- **Hybrid Cloud** - Hybrid cloud means the ability to connect collocation, managed and dedicated services with cloud resources. Hybrid cloud infrastructure is a combination of two or more types of Clouds (public, private, community). Allows each other to share data and applications. Where every cloud remains to be a single entity but all the cloud combines to create multi-development models that are beneficial.

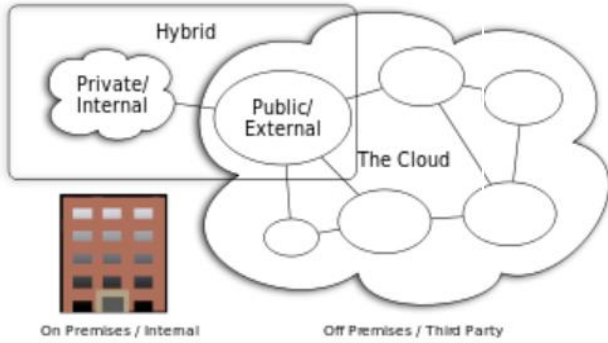


Fig 2:- Hybrid Cloud

B. Cloud Stakeholders

To know why cloud computing is used let's first concentrate on who use it. There are three types of stakeholders cloud providers, cloud users and the end users. These cloud services are of the form of utility computing i.e. the cloud users uses these services pay-as-you-go model. The cloud users develop their product using these services and deliver the product to the end users.

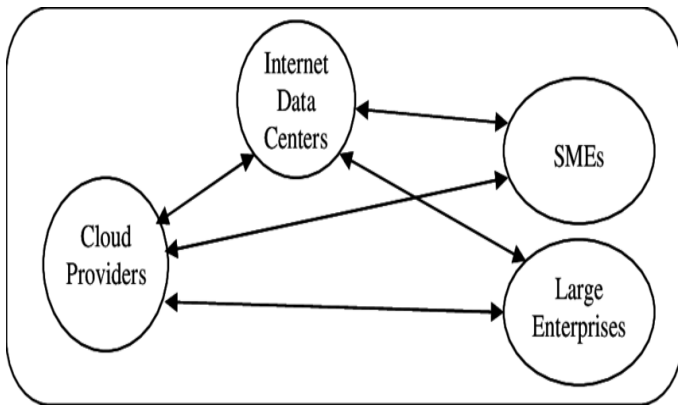


Fig 3:- Interconnection between cloud stakeholders

C. Advantages of using Cloud

Cloud-based services contains reliable IT infrastructure and that is specifically designed to streamline business performance and support development and growth. According to your needs, the price of Cloud Services is different. 5-10GB of free space is available for personal use. For additional storage you will have to pay.

- **Cost-** Cloud computing is often cheaper. Cloud computing eliminates the cost of buying hardware and software and it also eliminate the on-site datacenters cost for setting up and running. If the software is already installed online, you will not need to reinstall it on your own PC. Many cloud computing, such as Dropbox, allow Google Drive to free up to 10 to 15GB of space storage for more space we have to go for paid services. We take cloud services on a monthly or annual basis by paying. In this, we only pay for the services which we need.
- **Scalability and Performance** - Cloud servers can be deployed automatically to help businesses scale up and down and ensure optimum performance under heavy loads.

- **Less IT employees and No special knowledge** – For that PC which have web browser and secure internet connection is need. Client (customer) does not need to have a excellent knowledge about hardware and complex software applications. We don't need to hire specific person for managing the complex hardware structure and software. User can simply use this technology over the internet User can simply use this technology over the internet.
- **Easy to upgrade** - Data centre can provide higher performance than common desktop. It helps to saves resources and money. We can easily migrate from one data center to another one.
- **Worldwide Access** - Cloud computing increases mobility, because now we can access our documents from any device in any part of the world through internet. We can always access these files by storing files on Google Drive using Cloud Services; it does not matter where we are. It is more beneficial for business, employees can take documents without them, do their work at home or on business trips. It increases productivity and provides faster exchange of information.
- **Flexibility, Reliability and More Storage** - The data store on cloud are almost unlimited bandwidth and storage space and Remote cloud servers offer it. It's easier to makes data backup and disaster recovery because the cloud data can be store a copy of these data at multiple redundant sites on the cloud provider's network. During these process no need to spend large money so it less expensive. Cloud computing has increased the storage or Cloud computing provides a large storage, so we will not have to worry about the end of the store at the hard drive now.

D. Disadvantages of Cloud

- **Physical disaster recovery** – For avoiding physical disaster backup of data must be needed. Which used in recovery process. Because in Cloud computing data is not store at local end, it stored at different position. That's why at a glance backup is needed.
- **Dependence on provider** – The one of the most important disadvantage of cloud is dependency on provider. It can be understand using this example if any company wants to change in any IT structure or want to take some extra services; company or organization have to look towards its service provider for those services. Such dependency may include some piece of charge or have to change their service provider, so it is a disadvantage of cloud.
- **Loss of Control** - Cloud Computing Services controls the user. It not only determines how much you will pay to use this service, but with this you can store which information you can store and decide from where you can access it.
- **Security Concern** – When using a cloud computing service, you are essentially handing over your data to a third party. The fact is, these servers are accessing many users simultaneously in the world, and then security issues are there. The companies and government organization have confidential information and policies which must not be go into public. They can always be especially worried, because their data can possibly be harmed by viruses, hackers and other malware. However some servers are

using spam filters, email encryption, and secure HTTPS. Present Scenario of cloud computing security is not properly implemented today. So this is a big concern.

- *Lack of faith in networks* – It is the one of the worst disadvantages of cloud computing because all the Cloud Computing applications totally based on network. Cloud services only be accessed through online. Any failure in network connection cloud system stop working. It also called downtime.
- *Privacy* – It is most important concern in Cloud computing, Because information are store at remote servers or data centers from where anyone can access vital information. For avoiding that most of the servers uses encryption technology and provide password protection.
- *Reputation* – Cloud Computing is very new type of service. Not many companies have an experience with such a kind of services and application outsourcing.
- *Internet* - While Internet usage is increasing rapidly, but it is still not available everywhere. If you are in a location where there is no access to the Internet, then you cannot use the cloud services.

III. CHARACTERISTIC OF CLOUD

Parallel computing- Parallel computing means Cloud naturally supports batch-processing and analyzing terabytes of data very efficiently.

Productivity- When many users work on same data at same time without waiting data to be saved or stored at locally thus productivity may be increased.

Large numbers of machines- Clouds are normally constructed using large numbers of reasonably priced machines. As a result, the cloud vendor can more easily add capacity and can more quickly change machines that fail, compared with having machines in several laboratories.

Security- its security can improve due to centralization of data, increased security-focused resources, etc., but concerns can continue about loss of control over certain sensitive data, and the lack of security for stored kernels.

Extensive desktop application – There are several applications that can't be run on single desktop like mathematical, scientific etc. For that we need such application which are developed for extensive evaluation by using cloud computing.

Automated resource management- Automated resource management feature encompasses a variety of configuration tasks and it naturally handled by a system administrator.

Maintenance- Its maintenance very easier, because it installed only one system and users can access it from server of its system from different place, if problem come then there is need to resolve only server's system.

Virtualization- Mostly all clouds hardware resources are shared by multiple users virtually to improve efficiency. That is,

several lightly-utilized reasonable resources can be supported by the same physical resource.

➤ According to the National Institute of Standards and Technology's cloud computing identifies "five essential characteristics" which are given below-

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

IV. ARCHITECTURE OF CLOUD

The architecture of cloud computing is given below, this architecture show that how cloud work (how to deliver technology to the user) and how software system involved in the delivery of cloud computing. Typically there is multiple cloud components communicate with each other over application programming interfaces, usually web services.

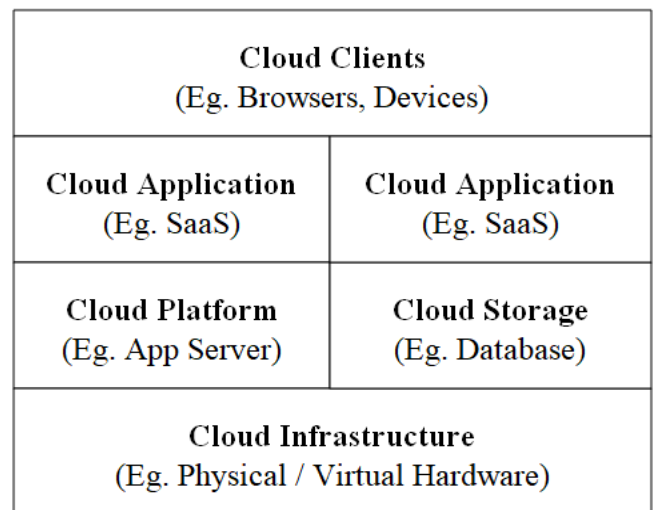


Fig 4:- Architecture of Cloud Computing

V. HOW CLOUD COMPUTING WORKS

Cloud computing basically design for overcomes the need of on-site hardware or software. Google Drive is one of the example of cloud computing.

There are the types of cloud services (IaaS, PaaS, SaaS, BPaaS) and its architecture can be understood through these point.

The Cloud Service Consumer- The first step is, Cloud service consumer means a user want to use cloud service than it need to go to a portal (enterprise or public wise) and order your services.

Cloud Services Provider- Cloud service provider (CSP) and can be a simple virtual machine (VM) based on an image. The working of this stage to receive a order of first stage i.e.

Cloud Service Consumer and validate, through the BSS (this is a next stage of CSP), it will provision the request through the OSS stage, then user will need Operating System Services (OSS), OSS stage will be in charge of deploying the requested service and Business System Services (BSS) which has come under Common Cloud Management Platform (CCMP) and then it send the request of first stage to the next stage for the processing.

Cloud Service Creator - In this stage cloud computing environment will also need to provide interfaces and tools for the service creators. Simply in this stage of cloud the verified request of user can be accept and user allow to use cloud technology. This is the role of the Cloud Service Creator and Cloud Service Consumer components.

VI. CLOUD COMPUTING USES

- MOBILITY is one of the most obvious uses of cloud computing.
- Big data analytics
- Test and development
- Store and back up data
- Recovery data
- Host websites and blogs and Stream audio and video
- Deliver software on demand
- Analyzed data for patterns and make predictions

Types of cloud services: Usually cloud services are divided into IaaS, PaaS, SaaS types (Or A Layer Of Cloud Computing)

Cloud-computing providers their "services" according to different models there are three main types of services most widely accepted - Software as a Service, Platform as a Service and Infrastructure as a Service.

- A. *Software as a Service (SaaS)* - Web-based email, office software, online games, customer relationship management systems and communication tools are all examples of SaaS. As a definition of cloud, it says that Cloud is concept of delivering technology to the user and it is done by the method Software-as-a-service (SaaS). SaaS is the most common form used by small businesses, and includes the use of host software on a remote server. It runs applications through your web browser and stores, retrieves or shares store files outside of our business.
- B. *Platform as a Service (PaaS)* - In a e-commerce website, shopping cart, checkout and payment mechanism which are running on all Merchant’s servers are the example of PaaS. This is a cloud base environment, which you use to develop, test, run and manage our application. This service includes web servers, Dev Tools, Execution Runtime and online database. Platform-as-a-service (PaaS) refers to the services of Cloud computing that supply an on-demand environment for developing. Its approach is to give development environments according to our need, without the complexity of purchasing, creating or managing basic

infrastructure. As a result, you can work fast and release the application quickly.

- C. *Infrastructure-as-a-Service (IaaS)* - It gives access to Services on Demand IT Infrastructure. It includes storage, network and computer that runs our workload. As a business user, we can request IT Services, and pay only the services we are using. Infrastructure as a service (IaaS) refers to online services Infrastructure-as-a-service provide high-level APIs which is used to dereference various low-level details of underlying network infrastructure like scaling, security, backup etc.

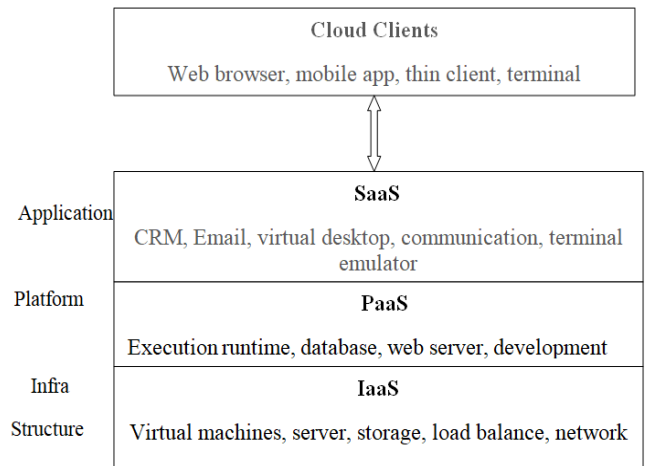


Fig 5:- Cloud Services

VII. TECHNOLOGIES USED IN CLOUD COMPUTING

In Cloud computing systems many technologies are used, the key technologies are data virtualization, data storage, programming model and data management.

Virtualization - Virtualization is a method of deploying computing resources. It separates the different levels of the application system including hardware, software, data, networking, storage and so on.

Distributed Storage - Distributed term come from networking which means a large system and Distributed storage means a large storage. Distributed Storage is used to store large and distributed applications which need to access mass data. HDFS is an example of distributed file system which is applicable to running on commodity hardware. It is very similar to the existing distributed file system.

Data Management - In Cloud computing a large data (mass and distributed data) needs to process and analyze, therefore data management technology must be able to efficiently manage a sets of large data.

Service offered of Cloud Computing - Now days cloud services are used in different various field skill i.e. IT Education Sectors. It is naturally provided by a third party or is sometimes built in-house using DIY techniques and ad hoc hardware.

VIII. CONCLUSION

To summarize it, Cloud Computing is very new and modern technology based on sharing resources (especially software, hardware and infrastructure). Cloud computing is very cheapest technology for a normal user or any organization. Now days companies basically refer to this technology because they store their data at one place without spend a large cost. It's a much better way to store data at one place and it become easier to access data from longer distance.

Cloud computing is an emerging technology which is based on distributed computing. Cloud computing is a technique where a mass data can store without any cost and to use this technology no need to keep a specific system user can store data by using any device like pc or mobile as their preference, cloud basically used over the internet. End-user does not need to have high knowledge to use cloud technology.

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