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Cloud Computing and its Applications in Social Network

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ABSTRACT: Cloud Computing has been one of the major buzzwords recently but it is surprisingly known that the people have been using it for more than 10 years. Some examples of cloud solutions are Facebook, drop box, Gmail, Skype, and Salesforce.com which were not thinking about them in these terms. The information can be accessed over the internet without having any external communications used to enable it. The main services existing in Cloud computing is the Cloud storage. Using the cloud storage, data can be stored on multiple third party servers which is not cared by the user and no one knows where exactly data saved. With the increase in size of the data every day, there is a need to handle, manage and mainly to store data, is a major problem faced by the people or organization. This article specifies applications of cloud computing in Social Networking.

KEYWORDS: Architecture, Models, Services, Social network, Types

I. INTRODUCTION

Cloud computing is delivery of compute power on demand, database storage, applications through a cloud services platform using net and we need to pay only for what we use. In our daily activities cloud computing always keep on working behind the scene like watching movies, playing games, sending mails and listening to music etc. Cloud computing, helps to storing data or backup and also recover the data when needed, create applications, deliver software on demand, host websites and many other things. Customer can access the services provided by cloud making the use of internet whenever there is a demand. Cloud computing services models has three types namely SaaS (Software as a service), PaaS (Platform as a service) and IaaS (Infrastructure as a service). SaaS service provides users with access to the cloud-based software. PaaS provides users with an environment in which user can develop manage and deliver applications. IaaS is a service where vendor provides users access to computing resources such as servers, storage space, and networking. Three types of clouds known are namely public, private and hybrid clouds. Public cloud is based upon concept of shared resources, and can be accessed within organizational boundaries. Private cloud is also known as internal clouds, and is designed only for exclusive use by a single organization. Hybrid cloud combines public and private cloud. This cloud is said to be more flexible than public and private clouds.

In recent years there have been various areas in which this technology is used i.e. Cloud Computing has plenty of Applications. This is a concept which is widely used in our lives as well our surroundings.

II. CLOUD COMPUTING

Cloud computing defines making the computer resources available, for storing data and computing power, without any kind of management by the user using it. Huge clouds, have functions distributed across many locations from central servers [8]. In short, cloud computing means storing the data and accessing it with use of Internet and there is no need of your computer's hard drive. When data is stored on or run programs from hard drive, it's called as local storage and computing. Working out of your hard drive is how the computer industry is functioning for decades.

III. ARCHITECTURE OF CLOUD COMPUTING

Cloud computing architecture consists of the two parts, namely front-end and the back-end that is shown in Fig 1. The front end is used by the user and the back-end is managed by the host. These two the ends connect each other by the means of internet [14].
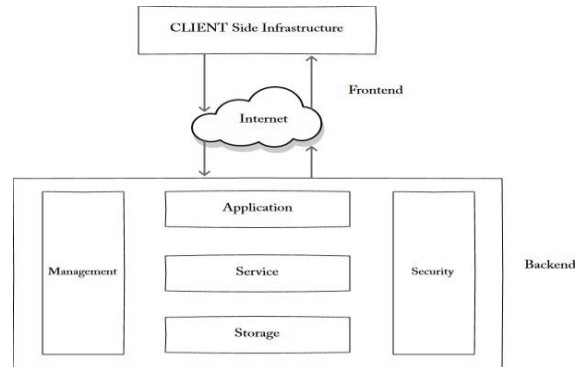
Fig. 1. Architecture of cloud computing

A. *Front End:*

The client part of cloud computing system is referred as front end. Front end complies of applications and interfaces which are required to access the cloud computing platforms, Example - Web Browser [14].

A. *Back End:*

The back End refers to the cloud itself. It complies of all the resources of cloud computing services. It has large capacity to store data, deployment models, virtual machines, services, servers, security mechanism etc. Providing the security of data for cloud users along with the traffic control mechanism is the responsibility of the back-end. Server provides middleware that helps to connect devices & communicate with each other [14].

IV. BASIC CONCEPTS OF CLOUD COMPUTING

There exists certain models and services that are working behind the scene to make cloud computing accessible and feasible to customers. The two models for cloud computing are as follows [1]:

B. *Deployment Models*

C. *Service Models*

Deployment models defines different types to access the cloud, i.e. Cloud has these four types of access as shown if Fig 2: Public, Private, Hybrid, and Community [8].
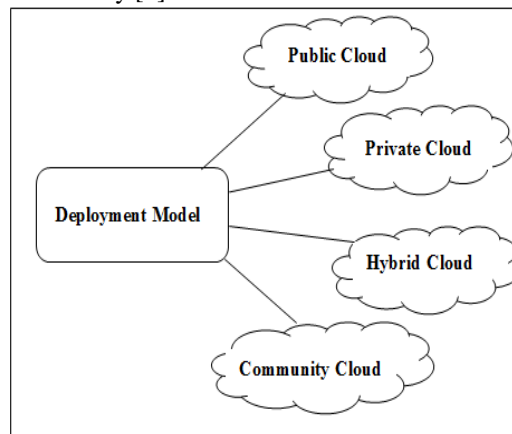

Fig 2: Deployment Model

D. *Public Cloud:*

A public cloud is a cloud computing model which has services, such as applications and storage, are available for general use which can be accessed using Internet [2]. In public cloud infrastructures and services are made available to various types of customers and used publicly by users. The services provider is completely responsible for providing and also managing services to the users who are on pay-per- use basis [1]. Users are considered authorized, whereas the privacy and security are considered to be the big issues. Some examples of public cloud are Amazon EC2, Google App Engine etc.

E. Private Cloud:

A private cloud is also called internal designed and it is for exclusive use by a single organization. Private cloud is virtualized, joined together by mass quantities of IT infrastructure into resource pools [2]. Private cloud is privately owned and managed. Security is more in private cloud than public clouds because their users are inside the organization and are trusted users. Microsoft cloud, IBM cloud are some examples of private cloud.

F. Hybrid Cloud:

Combination of public cloud and private cloud is hybrid cloud. Using hybrid businesses can take advantage of data hosting and secured applications on private cloud [1]. Any organization can store its sensitive client data on a private cloud application, and can also inter-connect this application to a billing application that is provided on a public cloud as a software service [10].

G. Community Cloud:

This cloud has an infrastructure which is shared by organizations that support a specific community. As it is shared by large groups it helps to reduce cost as compared to a private cloud. Various government departments requiring access to the data relating to hospitals, roads, stations infrastructures make use of community model for gathering information [10].

V. SERVICE MODELS

There are three service models as shown in Fig 3. Namely Infrastructure as a service, Platform as a service and Software as a service.
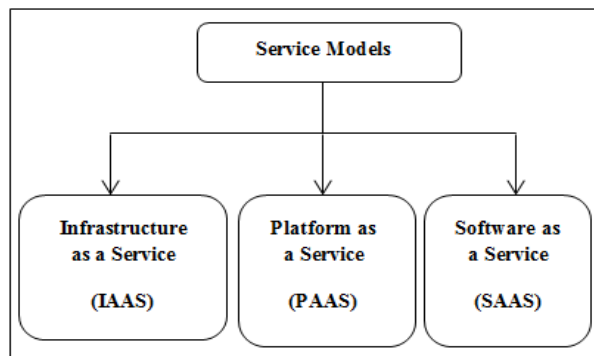

Fig 3: Service Model

Once a cloud is established, deployment of its services is different for different users according to their requirements. Three types of Cloud Services.

H. Software as a Service (SaaS) —

In Software as a service an application is hosted as a service to users and they can access it using the internet. This service provides us different software application, resources and operating system, and we need not install them on our machine, and no need of even upgrading and buying licensees [9].

I. Platform as a Service (PaaS) —

Platform as a service is a model that provides all the resources that are required to build applications and services that are accessed using internet, without any need of downloading or installing software [6]. PaaS services include application design, development hosting, web service integration, collaboration, security, scaling, DB integration etc. users/Customers purchase access to the platforms, which enables them to deploy their own software and applications in the cloud [4].

J. Infrastructure as a Service (IaaS) —

Infrastructure as a service provides computing resources that are virtualized, network resources with IaaS users assemble their own cluster on which they are responsible for installing, maintaining and executing their own software

stack [4]. Tools which IaaS use are virtualizing and converting their physical resources to the logical resources which is then provisioned and published to users/customers when needed [6].

VI. APPLICATIONS OF CLOUD COMPUTING

As the concept of cloud computing is expanding in recent years its applications are rapidly increasing. Few applications are Emails, games, CRM, storage networks, virtual machines, Database web server, deployment tools, virtual desktop, servers and many more. Cloud Computing is now a days more applicable for social networks, backup and data recovery, application development, test or development. We will take a look at the Social Network application of cloud computing [4].

VII. CLOUD COMPUTING IN SOCIAL NETWORK

Social network is a network where individuals are connected by interpersonal connections. Across various social networks these connections between individuals have different names such like follower, or friends. With help of these connections are able to share messages and media with each other. Plenty of online social networking websites are available such as Face book, Instagram, LinkedIn, Twitter and so on [7]. Such networking sites have more than billions of active members. Due to such a large number of users, these social networks present an interesting area for study [5].

There are a number of social applications that are using various cloud computing technologies. These applications use existing customer management capabilities of the social network to use cloud resources or may be the content that is already shared by another social networking customer [3]. One such cloud storage provider known is Box.net. Different apps have been created aimed at sharing their stored data across various social networks. Which includes Twitter, Facebook, Instagram and LinkedIn. Application interfaces with post links and social networks which allow users to access the stored data. The cloud services are flexible that is it can to scale upwards or downwards that meet the resource needs because of dynamic nature of the social network.

In today's generation there is a lot of use done of the social networks for both personal and commercial purpose [2]. For managing such a huge traffic, there is a requirement of cloud technology. The internet usability is enhanced to larger extent due to the social network. To store large multimedia content use of cloud storage systems is done. Huge amount of space is occupied by photos and video clips which is important content of social networks. The services that are provided by the cloud service provider can be utilized without any charges. Besides storing of data, social sites also utilize clouds for a big task like big data analytics [3]. Face book, has a more improved analytics that are used mainly by the business users. Social networks use clouds is to reduce the costs that is related to their data backup and recovery of data in case of any disaster. Due to cloud computing it possible for the users to access the resources from anywhere around the globe. As social networks maintain personal information of its clients it is important that should not lose any part of the information, however, trivial it is [2].

K. Facebook

Facebook is a very well-known social networking website that provides users a personal profile page where they can share messages, photos and other media. These materials can be shared with other users who they have 'friended.' Other features include: groups and friend lists [7]. As of 2019, Facebook has more than 2.37 active users on monthly basis who use their service. A cloud storage provider, Dropbox has introduced Facebook integration. Using Facebook we can store and share files within groups. Now Drop box has been integrated such that files from the CSP can be uploaded directly from Dropbox to Facebook. Facebook has also partnered with Hurok, a PaaS provider, for hosting Facebook applications using a variety of languages such as PHP, ruby and python. Their system is integrated within Facebook to provide a user friendly experience for novices to be introduced to application development on Facebook. Facebook hosts Hadoop cluster that consists of 4,500 nodes and over 200 PB of data which is largest in volume. Facebook itself is a cloud application [11]. Users can view their photos, updates from any corner of the globe only if you have internet connection. Secondly, it also has its own data centers, managed with a security layer enhanced on it. Thirdly, it provides inbuilt APIs for developers. Developers can create their own applications from these provided APIs. [7].

L. Twitter

Twitter is a social networking service that provides users a personal page where they can post messages that are no longer than 140 characters called "tweets" [5]. Users can have conversation with each other just by adding a username prefixed with the "@" symbol. Till November 2019, Twitter announced that they have over 330 million of active users

out of which 145 million of them use the service daily. Twitter makes use of Hadoop clusters for off-line batch processing of customer's relationship data. [1].

M. LinkedIn

LinkedIn is a social network which is geared towards professional networking. LinkedIn users are provided with a profile page where they can maintain a list of connections with other users on the service. Other features of LinkedIn include, resume posting and postings for jobs [1]. As of February 2020, LinkedIn had over 575 million users on their network while 260 million of them are active users on monthly basis. LinkedIn's architecture is made of several components. For features like Hive, Pig and Hadoop are used for batch processing off-line data. Some other features like suggesting products and rate limiting are powered by the distributed data store Voldemort. It was NoSQL storage engine of LinkedIn. As it is said the company is embarking on a "multi-year migration" of all its workload to Microsoft Azure cloud computing platform. Today, LinkedIn operates its own data center. Company has in all five data centers, including the primary corporate data center, three others are in U.S. and another one in Singapore [5].

N. YouTube

YouTube is asocial network for video sharing where users can upload, view, share and comment on videos. Users have their own profile page that lists their videos and messages. They are able to subscribe to other users to receive updates on their videos and comments that are posted on their profile [1]. As many as 2 billion unique users visit YouTube each month. YouTube uses a delivery cloud which serves video content. YouTube has two ways of loading distribution across the cloud. According to customer's location, customers are directed to video cache servers. During peak hours, if located in a heavy usage area, users may be directed to a farther cache [5]. The second method is redirection to another server if the current server being used is busy. This cloud has three components, they are namely video id space, video servers, and a physical server cache. The video id for each video is of fixed length and unique. The video server organization contains several DNS namespaces representing a set of logical video servers. The physical server cache contains hierarchy of physical servers which is grouped as primary, secondary and tertiary locations [1].

O. Instagram:

Instagram is free video sharing and photos uploading social networking service form many users on their smart phones itself which has been a great success. The total number of active users on Instagram is more than one billion up to February 2020. More than 50 billion photos are shared till January 2020 [13]. Instagram has developed a simple app, and serves millions of users from day one, without spending anything on servers and even technicians to maintain the server, not to mention the space the keep them. Amazon web services helps to run Amazon infrastructure, running instances on their elastic compute cloud. Photos that are uploaded on Instagram are stored in Amazon S3 and other data is stored with PostgreSQL [12].

P. Pinterest

Pinterest, is a website and also a mobile application that operates system to discover and save information on World Wide Web. It handles more than 335 million users and approximately 50 terabytes of data a day, by the end of 2019. It has revealed that all of their data growth has be done exclusively in the Amazon Web Services cloud. Customers pay on hourly basis on the amount they use. Pinterest pays about $52 for an hour to Amazon during peak hours of the day, and about $15 at the night when traffic on the app is less (Most of the customers are in the US). Many other services that Pinterest uses adds up to some few hundred dollars per month, but even then, paying that much to service 18 million users isn't too bad a deal. And the ability to scale down and scale up as and when needed helps Pinterest to use new services easily and at low cost.

VIII.   CONCLUSION

Various types of cloud computing and cloud services are available. Cloud computing have applications in all the fields and also have an application in Social network media like Facebook, Twitter, Instagram, LinkedIn YouTube and Pinterest.

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