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A Study on Social Networks and Cloud Computing

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ABSTRACT
Nowadays, there has been fast growth in cloud computing and social networking technologies. Cloud computing translates the computing resources to a third party, eliminating the need to purchase, configure and maintain those resources. With the increase of minimum operational costs in hardware, software and human effort, many companies are considering the use of cloud services. Likewise, social networks have seen enormous growth, with millions of Internet users actively participating across various social networking websites. Even corporations also using social networks as a means to market and reach their customers. This paper will survey the cloud computing models, social networks, benefits and security threats of cloud computing.
Keywords:- cloud, social networks

I. INTRODUCTION

A social network is a network of individuals connected by interpersonal relationships. The relationships between these individuals have a number of different names across different social networks such as friends, or followers. Through these relationships users share messages and media amongst themselves. There are many online social networking websites such as Face book, LinkedIn Twitter and so on. These social networking sites have well over 100 million active members. With such a great number of users using these services, social networks present an interesting area of study in a variety of ways (Falahi, 2010).

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 public and private networks, i.e., WAN, LAN or VPN. Applications such as e-mail, web conferencing, customer relationship management (CRM) execute on cloud. Cloud Computing refers to manipulating, configuring, and accessing the hardware and software resources remotely. It offers online data storage, infrastructure, and application.

Cloud computing and social networking has intermingled in a variety of ways. Most obviously social networks can be hosted on cloud platforms or have scalable applications within the social networks. Recent research has also proposed cloud based applications using social networks for user management and authentication in a system called social clouds (Chard, 2010). In this paper, we examine the trends and issues in cloud computing and social net working. The paper is organized as followed: Section 2 briefly reviews cloud computing models, Section 3 describes social clouds ,Section 4 examines the current applications of social networks, Section 5 reviews benefits and security threats and Section 6 concludes the paper.

II. CLOUD COMPUTING

Cloud computing offers platform independency, as the software is not required to be installed locally on the PC. Hence, the Cloud Computing is making our business applications mobile and collaborative.

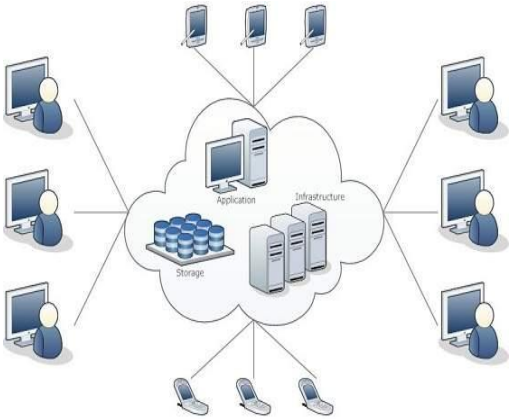


Figure 2.1 The concept of cloud computing

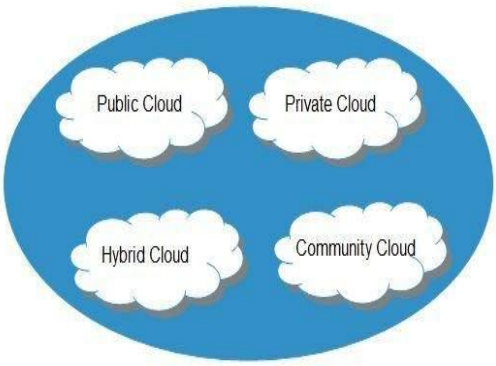
A.BASIC CONCEPTS

There are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. There are two working models for cloud computing:

- Deployment Models
- Service Models

1. DEPLOYMENT MODELS

Deployment models define the type of access to the cloud, i.e., how the cloud is located? Cloud can have any of the four types of access: Public, Private, Hybrid, and Community.



Public Cloud

The public cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness.

Private Cloud

The private cloud allows systems and services to be accessible within an organization. It is more secured because of its private nature.

Community Cloud

The community cloud allows systems and services to be accessible by a group of organizations.

Hybrid Cloud

The hybrid cloud is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

2. SERVICE MODELS

Cloud computing is based on service models. These are categorized into three basic service models which are -

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

Anything-as-a-Service (XaaS) is yet another service model, which includes Network-as-a-Service, Business-as-a-Service, Identity-as-a-Service, Database-as-a-Service or Strategy-as-a-Service.

The Infrastructure-as-a-Service (IaaS) is the most basic level of service.

Cloud services	Applications
Saas	CRM, Email, games, Virtual desktop
Paas	Database, web server, Deployment tools
Iaas	Virtual machines, Servers, Storage networks

Table2. 1: Cloud Services

- *Infrastructure-as-a-Service (IaaS)*

IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.

- Platform-as-a-Service (PaaS)

PaaS provides the runtime environment for applications, development and deployment tools, etc.

- *Software-as-a-Service (SaaS)*

SaaS model allows using software applications as a service to end-users.

III. SOCIAL CLOUDS

Social media sites have large number of user scattered across the globe. This makes them ideal candidates for cloud adaptation. Many have been quick to adapt this technology.

Social networks help boost internet usability by storing heavy multimedia content in cloud storage systems. Videos and photographs are the most popular content on social media, which essentially use up the maximum space allotted to them. They have the capacity to slow down entire websites with their sheer weight. Cloud computing vendors such as Salesforce and Amazon nowadays provide varied services including from Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP). As they deliver these things through cloud servers, clients can use the flexibility and scalability of the system without purchasing standalone software or hardware.

Apart from data storage, the social networks are now also using clouds for various other tasks. For example, this can be ideal for big data analytics. One of the benefits of using cloud systems is that users can access vast amount of structured and even non-structured data easily. You must have noticed the much-improved analytics provided by sites like Facebook, especially for its business users.

Another way cloud computing becomes helpful is by reducing the cost of data backup and recovery in case of a disaster. If the data is only stored in one central location, it becomes much riskier. If something happens there, it is almost impossible to recover the data. But through cloud they remain accessible through shared resources across the globe. This is especially useful for social networks as the store personal data of its users and so cannot afford to lose even one bit of it no matter how trivial they are.

IV. SOCIAL NETWORK APPLICATIONS

There exist a number of social applications that are making use of cloud computing technologies. As previously discussed, these applications typically involve using the existing user management capabilities of the social network to use cloud resources much like the content that is already being shared by social networking users. Box.net is one such cloud storage provider. They have created a variety of apps aimed at sharing their stored data across numerous social networks. These include Twitter, Linked.in and Facebook. The application interfaces with social networks and posts links that allow users access to the stored data (Cassavoy, 2011). The flexibility of cloud services to scale up and down to meet the resource need fits well with the dynamic nature of the social network.

A. Facebook

Facebook is a social networking website that provides users a personal profile page where they can post messages, photos and other media. These

materials can be shared with other users who they have 'friended.' Other features include: groups and friend lists. As of September 2012, Facebook has surpassed one billion active users who use their service. A cloud storage provider, Dropbox has introduced Facebook integration. Facebook allows storing and sharing files within groups. Now Drop box has been integrated such that files from the CSP can be uploaded directly from Dropbox to Facebook (Taylor, 2012). Facebook has also partnered with Heroku, 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 (Lee, 2012). Internally, Facebook hosts the largest in volume Hadoop cluster that consists of 4,400 nodes and over 100 PB of data (Menon, 2012).

B. 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". Users are able to communicate with each other through adding an username prefixed with the "@" symbol. As of December 2012, Twitter announced they had over 200 million active monthly users. Twitter uses Hadoop clusters to do off-line batch processing of user relationship data to power their People You May Know feature (Ryaboy, 2012).

C. LinkedIn

LinkedIn is a social network geared towards professional networking. Users are provided with a profile page where they can maintain a list of connections with other users on the service. Other features include: resume posting and job postings. As of January 2013, LinkedIn had more than 200 million users on their network. LinkedIn's architecture is made of several components. For features such as People You May Know, Hadoop, Hive and Pig are used to batch process off-line data. Other features such as recommendation products and rate limiting are powered by the distributed data store Voldemort. LinkedIn has about 10 Voldemort clusters, across over 100 nodes (Auradkar, 2012).

D. YouTube

YouTube is a video sharing website where users can upload, view, share and comment on videos. Users are provided with a profile page that lists their videos and messages. Users are able to subscribe to other users to receive updates on their videos and comments. As many as 1 billion unique users visit YouTube in a month. YouTube makes use of a delivery cloud that is responsible for serving video content. YouTube uses two methods of load distribution across this cloud. Based upon the user's location, users are directed to video cache servers in close proximity. During peak hours, they may be directed to a farther cache if located in a heavy usage area. The second method is just a redirection to another user if the current server being used is busy. This delivery cloud has three components: video id space, video servers, and a physical server cache. The video id is a fixed length unique identifier for each video. The video server organization consists of several DNS namespaces representing a set of logical video servers. The physical server cache is a hierarchy of physical servers grouped into primary, secondary and tertiary locations (Adhikari, 2011).

E. Flickr

Flickr is a video and image hosting website that allows users to share and comment on photos. As of 2012, the site has hosted over 6 billion images. Flickr uses federation architecture for their user data such as favorites, where the database is distributed across servers as shards. These database slices, shards, are arranged in a master-master ring replication. Each shard holds roughly 400,000 members' data, with the entire database sized at over 12TB (Pattishall, 2008).

F. eHarmony

EHarmony is an online dating website that is aimed to matching couples thorough their common interests. EHarmony has a membership of over 30 million members. To support this matching feature, eHarmony processes event log files that are parsed with Hparser. These files are stored in a staging table that is roughly 30 billion rows at 1.2 TB worth of data as of 2012. At this point in the process, tools such as Hive are used to

query the data for relationship discovery. The processed files are stored in a Hadoop Distributed File System for one year before being archived in Amazon's S3 service (Chiguluri, 2012).

V. CLOUD COMPUTING BENEFITS

A.Flexibility

Users can scale services to fit their needs, customize applications and access cloud services from anywhere with an internet connection.

B.Efficiency

Enterprise users can get applications to market quickly, without worrying about underlying infrastructure costs or maintenance.

C.Strategic value

Cloud services give enterprises a competitive advantage by providing the most innovative technology available.

D.Scalability

Cloud infrastructure scales on demand to support fluctuating workloads.

E.Storage options

Users can choose public, private or hybrid storage offerings, depending on security needs and other considerations.

F.Control choices

Organizations can determine their level of control with as-a-service options. These include software as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS).

G.Tool selection

Users can select from a menu of prebuilt tools and features to build a solution that fits their specific needs.

H.Security features

Virtual private cloud, encryption and API keys help keep data secure.

I.Accessibility

Cloud-based applications and data are accessible from virtually any internet-connected device.

J.Speed to market

Developing in the cloud enables users to get their applications to market quickly.

K.Data security

Hardware failures do not result in data loss because of networked backups.

L.Savings on equipment

Cloud computing uses remote resources, saving organizations the cost of servers and other equipment.

M.Pay structure

A "utility" pay structure means users only pay for the resources they use.

N.Streamlined work

Cloud service providers (CSPs) manage underlying infrastructure, enabling organizations to focus on application development and other priorities.

O.Regular updates

Service providers regularly update offerings to give users the most up-to-date technology.

P.Collaboration

Worldwide access means teams can collaborate from widespread locations.

Q.Competitive edge

Organizations can move more nimbly than competitors who must devote IT resources to managing infrastructure.

VI. SECURITY THREATS OF CLOUD COMPUTING

A. Data breaches

As enterprises stores vast data in the cloud, it becomes an attractive target for the hackers. In a case of security breaches involving financial data, healthcare data, and revenue details can be more devastating. It may lead an enterprise to incur fines, face lawsuits or even criminal charges.

B. Compromising Credentials

A well-defined Identity and Authentication technology where enterprises provide to right access to the right person at the right time. Sometimes they fail to remove user access even after they left the organizations which could lead to obtaining their credentials.

C.Hacking Application Programing Interface

To interact with the cloud services enterprise uses interfaces and API. The overall cloud security (Authentication, access control, monitoring depends highly on the security of the API). Poor interfaces and APIs may expose enterprises to security issues questioning their CIA (Confidentiality, Integrity, and Availability)

D. Exploiting system vulnerabilities the multitenancy in cloud computing where enterprises share memory, databases and other digital resources may create new attack surfaces. This can become bigger security issues if hackers could exploit system vulnerabilities or bugs.

E. Hijacking the accounts In Cloud, Computing attackers can eavesdrop on financial transaction activities change or could modify it. Multifactor authentication can be a common defense-in-depth protection strategy.

F. Data Loss when an authorized user uploads files to the cloud there are chances for data loss that can be costly for an enterprise.

G.Advanced Persistent threats APT's are the parasitical form of attacks and are difficult to detect. Enterprises should monitor the costs involved to overcome APT attacks improper planning would increase the enterprise's security spending

H. DDoS attacks In cloud environment enterprises should be aware of application-level Dos attacks targeting web server and database vulnerabilities.

VII. CONCLUSION

networks and their applications can be done. The benefits and various security threats related to cloud computing are reviewed.

This study gives the review on cloud computing and cloud computing models. The review on various social media

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