A STUDY OF CLOUD COMPUTING: APPLICATIONS AND CHALLENGE

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ABSTRACT : *The essential content highlight the concept of cloud computing and some of the preservative and risk are measures. In this paper also include infrastructure, services of cloud computing, architecture, applications security and challenges of cloud. Cloud computing introduce the sharing of different type of resources and services and relies the terminologies of cloud computing. Cloud computing describe the service model are IAAS, PASS, SAAS. By using these model vendors use application, software and install, develop own applications such as design, development and testing or create software. Cloud computing usage deployment services such as public, private and hybrid cloud. There is architecture of cloud computing that shows the front-end as a vendor, users or client and back-end as a server, storage. It also introduces the different type of virtualization technique such as hardware, network, storage and operating system. There are some security and risk which hamper the growth of cloud computing. This paper relies the applications and its security and challenges issue of cloud computing.*

KEY WORDS *: IAAS, PAAS, SAAS, IT, SOA, CRM, Internet.*

1. INTRODUCTION

The word "cloud" is define to a Network or Internet. A system use in which services stored on the Internet are given to uses on a transitory basis, e.g., on public networks or private networks, i.e. WAN, LAN, or VAN.[1] "Application such as email, web conferencing, customer relationship management (CRM), all runs in cloud. Clouds computing refer to operate, arrange, and contact the services, application through cloud or Internet. It provides data storage on the cloud, backup and service infrastructure and applications. .[12]Instead of keeping data on our hard drives, updating applications for user need, user use services over the internet, at another location, to store information or use its applications [3].

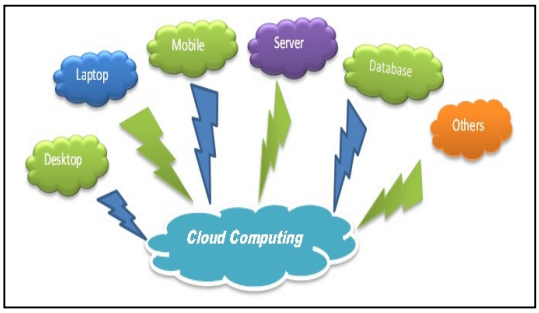

Figure 1 usage of cloud computing

2. CLOUD COMPUTING USES

There are various uses of cloud computing are Emails file storage and sharing, ecommerce, website hosting ,backup, test and deployment, CRM (customer relationship management)[13].

3. OBJECTIVE

The theme of paper for the beginners to help them to understand the basic concept of cloud and cloud computing and its related terms i.e. types of cloud computing and services offered, architecture of cloud computing, virtualization, Para virtualization, infrastructure of cloud computing and services and architecture, application and security and challenges of cloud.

4. METHDOLOGIES

Cloud Computing is classified into twice category:

Based on the location of the cloud computing-It is classified in four ways:

Public cloud:

A public cloud is a standard cloud computing model .public cloud act as services provider makes resources, such as application and storage, available to the general public over the internet. The customer has no control over the public cloud where it is hosted. The infrastructure of public cloud is shared more than one organization. Public cloud services provide free or a pay-per uses model.[8]

Private cloud:

Infrastructure is devoted organization and not shared with another organization. The private cloud develop a system and services to be accessible within an single organization. Private clouds are expensive and more secure compared to public clouds [7].

Hybrid cloud:

Combination of a public cloud and a private cloud is called hybrid cloud. it's developed for use by a single management. In hybrid cloud computing environment an organization provides and manages some resources. The public and private cloud infrastructure which operates independently of each other and using technology provide the vendors are portability and flexibility of data and applications [9].

Community cloud:

Community cloud is sharing of computing infrastructure in between organization of the same community [8].

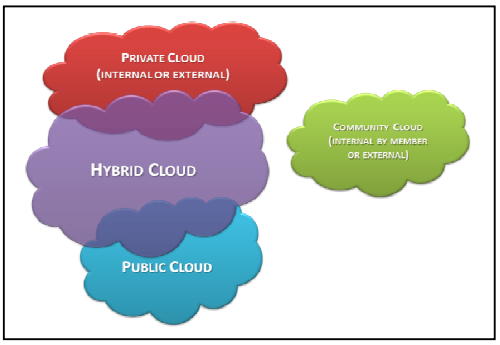

Figure 2 Types of cloud computing

The services of cloud computing is classified in three ways:

Software-as-a service:

Software-as-a services is a software distribution technique includes a all completed software provide on the cloud and utilize the software and its function remotely as a web based services. Users and organizations to access applications and business functionality at a pay-per use basis because the software is hosted remotely.[11] This is a fixed and well known sector of cloud services. The pioneer of this field is Salesforce.com offering the Customer Relationship Management (CRM) online on the cloud. Other example are online email provider like Google gmail and Microsofts hotmail, Google docs and Microsoft provide new restatement of MS-Office called BPOS (Business Productivity Online Standard Suite) .[7]

Platform-as-a services:

Platform-as-a services is provides a development platform and environment to allow developers to build software, applications and services over the internet. Different type of vendor work on various Platforms which is not compatible. Typical players in PaaS are Google Aplication Engine, Microsoft Azure, Salesforce.com etc.

Infrastructure-as-a service:

Infrastructure-as-a service involves offering hardware related services using the principal of cloud computing. These include some kind of storage services (virtual server, disk storage, and database). [17The goal of IaaS in cloud computing is provide a flexible, standard, and operating environment that can become a foundation for PaaS and SaaS. Leading vendors that provider Infrastructure as a services are Amazon EC2, Amazons3, Rackspace cloud srever and flexiscale [18].

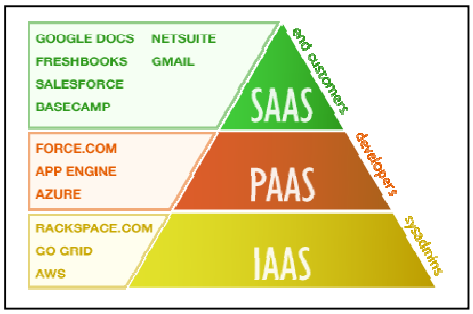

Figure 3 Services of cloud computing

The below classification is also well accepted in the industry.

a) Storage-as a services
b) Database-as a services
c) Information-as a services
d) Process Application-as a services
e) Platform-as a services
f) Integration-as a services
g) Security-as a services
h) Management / Governance-as a services
i) Testing-as a services

5. ARCHITECTURE OF CLOUD COMPUTING

Cloud computing contain the different type of components and sub-components, these components consists of a front-end as a platform (client, mobile devices), back-end platform (server, storage), a cloud based services, and a network (Internet, Intranet, Intercloud). Combination of these components make up architecture of cloud computing. Cloud computing architecture divided into two parts:

Front-end:

The front-end refer to the vendor sector of cloud computing system. Vendors or clients comprise server, tablets and mobile devices, etc. users are interact with software's and an applications through web browser, or through a virtual session. It consists of interfaces between user and services that services are necessary to utilize the cloud computing.

Back-end:

The Back-end refers to the cloud. It consists of all the hardware and devices are required to provide services. It contain of huge data storage, virtual machine, security mechanism, services, deployment models, servers, etc. There are some important points about back-end architecture[20].

It is the duty of the back-end to provide security model, storage, protocols etc.

The server interconnect these protocols is called as as middleware, which helps the connected system to communicate with each other [3].

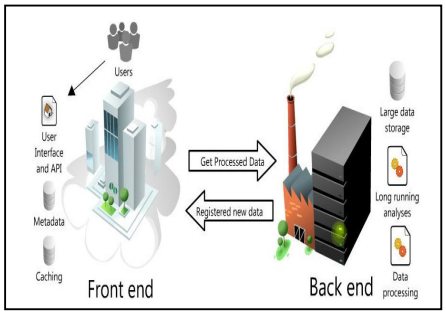

Figure 4 Architecture of cloud computing

6. TECHNOLOGY OF CLOD COMPUTING

There are precise mechanisms that are working back of the cloud computing podium. This technology makes cloud computing flexible, reliable, and reusable. These technologies are virtualization technique, Architecture based on Service-Oriented (SOA), Grid and cluster computing, utility and productiveness computing.

Technique of virtualization:

This technique provide the facilities of sharing single physical instance among multiple applications or resources .and it create a virtual version of a device or resource, such as a server, storage device, network or even an operating system [4].

Concept

Virtualization is normally accomplished by dividing a single instance of hardware into more than one sectors. Each sector operates its own independent environment. Each segment operates as its own independent environment [5].

Develop a virtual machine over the current operating system and its hardware is called hardware virtualization. This hardware virtualization technique provides a specific environment which is logically separated from underlying hardware. This machine is created on virtual machine is known as host machine and whole machine is known as guest machine [4].

Hypervisor

Virtual machine is handled by a software or principal, which is known as hypervisor. Hypervisor is a program which is written in low level language, is act as a virtual machgine is also called firmware. These are type of hypervisor [19].

a) Run on the bare system, lynx secure, RTS hypervisor, oracle VM, sumxVM server. Type1 has no host operating system because they are single on bare system.

b) Hypervisor -2 is a software interface that follow the devices with a system which are normally interacts to each other [4].

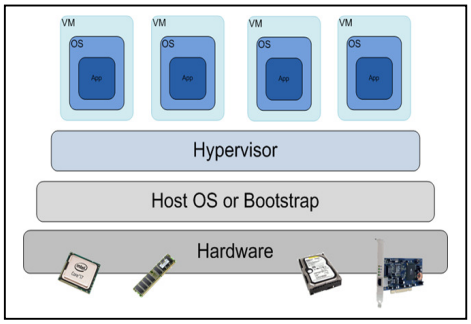

Figure 5 Virtual machine (Hypervisor)

Cloud computing there are different type of virtualization:

a) Hardware virtualization
b) Storage virtualization
c) Server virtualization
d) Operating system-level virtualization
e) Network virtualization
f) Application virtualization
g) Desktop virtualization

7. APPLICATION OF CLOUD COMPUTING

Cloud computing is use in global level at different field such as business data storage and back up, education etc without cloud technology it can't be imagine of IT business in the world [15].

- **Business Applications:**

Main purpose of cloud computing to made collaborative business so it provide different apps for example as MailChimp.com, Chatter.com, Google Applications for business, and quickbooks.intuit.com etc [15].

- **Data Storage and Backup**:

Cloud vendors can be store data online and backup services for example Box.com, Mozy.com, Joukuu.com etc [2].

- **Management Applications**

There are applications which provide management task for example time tracking, organizing notes etc [2].

- **Entertainment Applications**:

Users can be easily store and listen music, songs, video and movie on line for example Audiobox.fm [2].

8. CLOUD COMPUTING SECURITY

The benefits associate with cloud computing are large in size; yet the dynamic, virtualized, distributed and multi-talent nature of cloud present many challenges. Security is a big concern of cloud computing. Data should

be kept in encrypted form in cloud. Here are keys which explain the limitation between the authority of service provider and vendor for protecting data mechanisms below

a) Access Control
b) Auditing,
c) Authentication
d) Authorization

9. CHALLENGES OF CLOUD COMPUTING

There are various challenges of cloud computing that shown below.

- **Security and confidentiality**

Security is primary issue in cloud computing. There are loss of control over data and dependency on the services provider. Confidentiality also required to prevent personal data [14].

- **Portability**

This is another issue to cloud computing to being able to run application one environment in other environment with both virtual and physical hardware and software [16].

- **Interoperability**

To develop Interoperability being able to interchange the application on one platform to other platform to exchange data and information in cloud computing [14].

- **Computing Performance**

Performance computing is becoming a important issue in cloud technology to deliver services at various level of security and utilization of technologies [16].

- **Reliability and Availability**

It is a basic need for cloud systems to be predictable and powerful because most of the IT businesses are now becoming vulnerable on services provided by third-party [7].

10. RESULTS

Cloud computing has been built with raising competitiveness over cost reduction, greater flexibility, elasticity and most favorable resources utilization. When IaaS using current infrastructure on pay-per-use program and handle and maintain IT infrastructure. Cloud computing is used to built up the capability and strength to achieve business goals. The resource sharing at different levels in various cloud offerings such as framework cloud, software cloud (e.g. middleware or classical CRM as a service), application cloud [21].

11. CONCLUSIONS

Cloud computing, the idea that all kinds of computing can be delivered total services over the Internet, is changing everything. It affects billions of dollars in IT spending. Enterprises are quickly moving from buying stuff to renting what they need. Cloud computing is come up technology and have many features from earlier technology like grid and cluster computing. It brings infinite computability, good scalability, services-on-demand, etc. the deployment service model can be deployed application in three ways which is based on the structure of organization and location.

In this technology world there are many ways to consumes and utilize the services by using SAAS, PAAS, and IAAS. For example Microsoft provide impressive services based on on-demand software product e.g. Office 365 is SaaS, which offers online version of Ms-Office suite, Windows Azure is both IaaS and PaaS, which makes the Windows Server operating system.

Save energy, faster server devices, improve recovery, increase uptime is achieved by using virtualization technique. The advantages of virtualization technique is continuously growing and saving both money and time. It is also increase flexibility and agility.

In the cloud computing the reliability, availability, and non functional properties are very good. In cloud computing there are still other challenges with respect to security of data but that issues can be solved very soon.

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