CLOUD COMPUTING : COMPREHENSIVE KNOWLEDGE OF CLOUD COMPUTING

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Abstract- **Cloud computing means on demand delivery of IT resources via the internet with pay-as-you-go pricing. It provides a solution of IT infrastructure in low cost.Actually small as well as some large IT companies follow the traditional methods to provide the IT infrastructure. That means for any IT company, we need a server room that is the basic need of IT companies. In that server room, there should be a database server, mail server, networking, firewalls, router, modem, switches, QPS, configuration system, high net speed and the maintenance engineers. To establish such IT infrastructure, we need to spend lots of money. To overcome all these problems and to reduce the IT infrastructure cost, cloud computing comes into existence**

Index Terms- **Cloud Computing, Cloud Services, Agility, scalability, multi sharing, maintenance**

I. INTRODUCTION

Resource sharing in a pure plug and play model that dramatically simplifies infrastructure planning is the promise of 'cloud computing'. The two key advantages of this model are ease-of-use and cost-effectiveness. Though there remain questions on the aspects such as security and vendor lock-in, the benefits this model offers are many.

This paper explores some of the basics of cloud computing with the aim of introducing many aspects. Cloud Computing is a computing paradigm, where large pools of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly.

Cloud computing is a practical approach to experience direct cost benefits and it has the potential to transform a data center. The idea of cloud computing is based on very fundamental principal of 'reusability of IT capabilities'. The difference that cloud computing brings compared to traditional concepts of "grid computing", "distributed computing", "utility computing" is to broaden horizons across organizational boundaries. It is a distributed computing on internet or delivery of computing services over the internet

Example- Yahoo!, Gmail, Hotmail

Instead of running an e-mail program on your computer, you log in to a Web e-mail account remotely. The software and storage for your account does not exist on your computer. It's on the service's computer cloud

Without cloud computing

With cloud computing
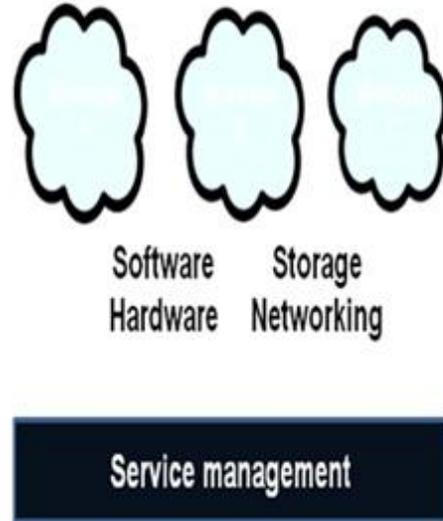
DIFFERENCE WITH AND WITHOUT CLOUD COMPUTING

II. CHARACTERSTICS OF CLOUD COMPUTING

Agility-The cloud works in the distributed computing environment. It shares resources among users and works very fast.

High availability and reliability- Availability of servers is high and more reliable, because chances of infrastructure failure are minimal

High Scalability-Means "on demand" provisioning of resources on a large scale, without having engineers for peak loads.

Multi Sharing-With the help of cloud computing, multiple users and applications can work more efficiently with cost reductions by sharing common infrastructure.

Device and Location Independence- Cloud computing enables the users to access systems using a web browser regardless of their location or what device they use. As infrastructure is off site and accessed via the Internet, users can connect from anywhere

Maintenance- Maintenance of cloud computing application is easier, since they do not need to be installed on each user's computer and can be accessed from different places

III. HISTORY OF CLOUD COMPUTING

Before emerging the cloud computing, there was Client/Server computing which is basically a centralized storage in which all the software applications, all the data and all the controls are resided on the server side.

If a single user wants to access specific data or run a program, he/she need to connect to the server and then gain appropriate access, and then he/she can do the job. Then after, distributed computing came into existence, where all the computers are networked together and share their resources when needed.

On the basis of above computing, there was emerged of cloud computing concepts that later implemented.

At around in 1961, John McCarty suggested in a speech at MIT that computing can be sold like a utility, just like a water or electricity. It was a brilliant idea, but it was ahead of its time, as for the next few decades, despite interest in the model, the technology simply was not ready for it.

In 9999, Salesforce.com started delivering of applications to users using a simple website. The applications were delivered to enterprises over the Internet, and this way the dream of computing sold as utility were true.

In 2002, Amazon started Amazon Web Services, providing services like storage, computation and even human aintelligence. However, only starting with the launch of the Elastic Compute Cloud in 2006 a truly commercial service open to everybody existed.

In 2009, Google Apps also started to provide cloud computing enterprise applications. Microsoft launched Windows Azure, and companies like Oracle and HP have all joined the game. This proves that today, cloud computing has become mainstream

IV. ANATOMY OF CLOUD COMPUTING

4.1. Cloud Architecture

All the computing is a set of IT services that are provided to a customer over a network on a leased basis and with the ability to scale up or down their service requirements. Usually cloud computing services are delivered by a third party provider who owns the infrastructure. It advantages to mention but a few include, scalability, resilience, flexibility and out sourcing non-core activities. Cloud computing offers an innovative business model for organizations to adopt IT services without upfront investment.

SAAS (SOFTWARE AS A SERVICE)

SAAS is a software distribution model in which applications are hosted by a cloud service provider and made available to customers over internet. It is also known as "On Demand Software". In SAAS, software and associated data are centrally hosted on the cloud server. SAAS is accessed by users using a thin client via a web browser

Advantages of SAAS cloud computing layer

Easy to Buy-Its pricing is based in a monthly fee or annual fee, SAAS allows organizations to access business functionality at a low cost which is less than licensed applications. Unlike traditional software which is sold as a licensed based with an up-front cost, SAAS providers generally pricing the applications using a subscription fee, most commonly a monthly or annual fee

Less hardware required- The software is hosted remotely, so organizations don't need to invest in additional hardware.

Low Maintenance required-It removes the necessity of installation, set up, and often daily upkeep and maintenance for organizations. Initial set up cost for SAAS is typically less than the enterprise software. SAAS vendors actually pricing their applications based on some usage parameters, such as number of users using the applications

Disadvantage of SAAS cloud computing

Security- Actually data is stored in cloud, so security may be an issue for some users. However, cloud computing is not more secure than in house deployment.

Latency-Because the data and application are stored in cloud so there is a possibility that there may be more latency while interacting with the applications than a local deployment. So, SaaS model is not suitable for applications whose demand responses are in milliseconds.

IAAS (INFRASTRUCTURE AS A SERVICE)

IAAS is one of the layers of cloud computing platform wherein the customer organization outsources its IT infrastructure such as servers, networking, processing, storage, and other resources. Customers access these resources over internet i.e. cloud computing platform, on a pay-per-user model.
IAAS, earlier called as hardware as a Service is a cloud computing platform based model.
It offers three models: public, private and hybrid cloud

Advantages of IAAS

1-You can dynamically choose a CPU, memory and storage configuration as per your needs.
2-You can easily access the vast computing power available on IAAS cloud platform.
3-You can eliminate the need of investment in rarely used IT Hardware

Disadvantages of IAAS

It is dependent on internet availability.
It is also dependent on the availability of virtualization services.
It can limit the user privacy and customization options

PAAS (PLATFORM AS A SERVICE)

It is a developer programming platform which is created for the programmer to develop, test, manage and run the applications.
A developer is able to write the application and deploy it directly into this layer easily. It extends and abstracts the IAAS layer by removing the hassle of managing the independent virtual machine. In it, back and scalability is handled by the cloud server provider and the end user does not have to worry about to manage the infrastructure.

Advantages of PAAS

1-Developer can focus on development and innovations without worrying about the infrastructure.
2- No requirements of up-front investment in hardware and software. Developers only need a PC and an internet Connection to start building network
3-Some PAAS vendors also provides online communities where developer can get the ideas, share experiences and seek advice from others.

Disadvantages of PAAS

1-One has to write the application according to the platform provided by PaaS vendor so migration of application to another PAAS vendor would be a problem.

2-Corporate data whether it can be critical or not, will be private so if it is not located in the walls of the company there can be risk in of terms of privacy of data.
3-It may happen that some applications are local and some are in cloud. So there can be chances of increased complexity when we want to use data which in the cloud with local data

4.2. WORKING OF CLOUD COMPUTING

Assume that you are an executive at a very big corporation. Your particular activities include to make sure that all of your employees have the right hardware and software they need to do their jobs. To buy computers for everyone is not enough. You also have to purchase software as well as software licenses and then provide these software to your employees as they require. Whenever you hire a new employee, you need to buy more software or make sure your current software license allows another user. It is so stressful that you have to spend lots of money.
But, there may be an alternative for executives like you. So, instead of installing a suite of software for each computer, you just need to load one application. That application will allow the employees to log-in into a web-based services which hosts all the programs for the user that id require for his/her job. Remote servers owned by another company and that will run everything from email to word processing to complex data analysis programs. It is called cloud computing, and it could change the entire computer industry.
In a cloud computing system, there is a significant workload shift. local computers have no longer to do all the heavy lifting when it comes to run applications. But cloud computing can handle that much heavy load easily and automatically. Hardware and software demands on the user's side decrease. The only thing the user's computer requires to be able to run is the cloud computing interface software of the system, which can be a simple as a web browser and the cloud's network takes care of the rest.

V. TYPES OF CLOUDS

5.1. Public Cloud

Public cloud allows the accessibility of systems and services easily to general public. Eg: Amazon, IBM, Microsoft, Google etc.

PUBLIC CLOUD

5.2. Private Cloud

The private cloud allows the accessibility of system and services within the organization. Private cloud is operated only within a particular organization. But it will be managed internally or by third party.
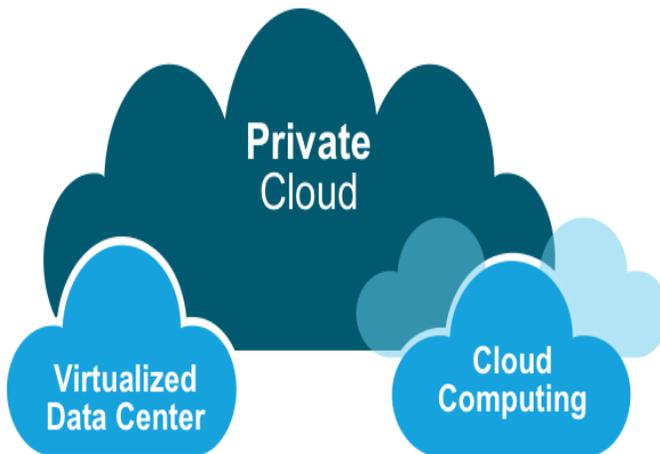
PRIVATE CLOUD

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5.3. Hybrid Cloud

The hybrid cloud is mixture of public and private cloud. Non-critical activities are performed by public cloud while critical activities are performed by private cloud.
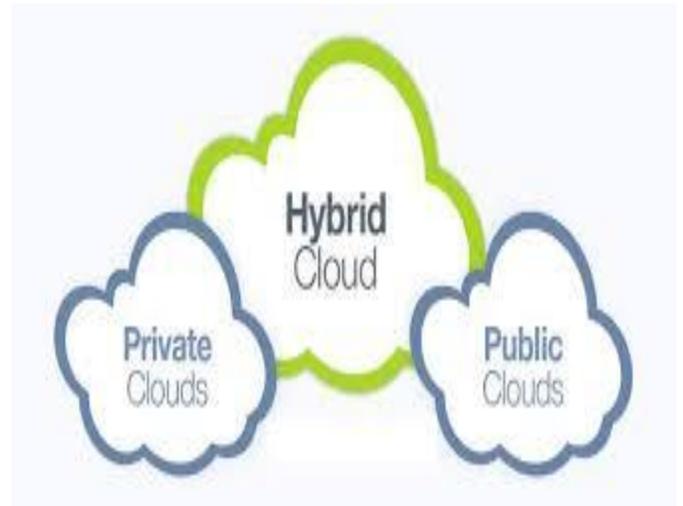
HYBRID CLOUD

VI. ADVANTAGES AND DISADVANTAGES OF CLOUD COMPUTING

Advantages

Lower cost computer for users- In cloud, you don't require a high powered computer to run cloud computing web based applications because applications run on cloud not on desktop PC or laptop.

Lower IT infrastructure cost- By using cloud computing, you need not to invest in larger numbers of more powerful servers, you also need not to require the IT staff for handling such powerful servers.

Fewer maintenance cost- The maintenance cost in cloud computing greatly reduces both hardware and software maintenance for organizations of all sizes.

Lower software cost- It reduces the software cost because you don't need to purchase software packages for each computer in the organization.

Instant software updates- Another software related advantage in cloud computing is that users don't need to face with the choice between obsolete software and high upgrades costs. If the app is web based, updates happen automatically and are available next time when the user logs into the cloud.

Disadvantages

There are various disadvantages of cloud computing

Require a constant Internet Connection- cloud computing is impossible without Internet connection. To access any application and documents you need a constant Internet connection.

Require High Speed Internet Connection- similarly, a low-speed internet connection makes cloud computing painful at best and often impossible. Web-based apps often require a lot of bandwidth to download, as need to download large documents.

Stored Data Might Not Be Secure- with cloud computing, all your data is stored in the cloud.
That's all well and good, but how secure is the cloud? Can't unauthorized users gain access to your confidential data?

VII.CONCLUSION

Cloud computing have several benefits over traditional environments and have capability to handle most sudden, temporary peaks in application demand on cloud infrastructures. Virtualization technology provides good support to achieve aim of cloud computing like higher resource utilization, elasticity, reducing IT cost or capital expenditure to handle temporary loads as well as cloud computing have various flexible services and deployment models which is also one of the main issue of adopting this computing paradigm. Virtualization concepts have open shared nature which is responsible for the violation of security polices and laws as well as degrades their computing reputation and performance. So there is need to focus on privacy and on solutions of various security problems to maintain the trust level of organization for deploying the cloud computing without any hesitation and also need of technical support for elastic scalability to serve by vertical scaling approach which is currently restricted to only horizontal scaling.

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