A Basic study on Cloud Computing

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Abstract: *Cloud computing has been the buzzing Word over the last few years but surprisingly and whether we realize it or not we are using it as well. Gmail, Facebook, DropBox, Skype, Paypal, SalesForce.com are all examples of cloud computing. Cloud Computing refers to on-demand delivery of resources through the Internet. In traditional data storage systems, Server room contains a Data base server, Mail server,* networking, firewalls, routers, modem, switches, QPS *(Query Per Second means how much queries or load will be handled by the server),* configurable 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. This paper intend to throw lights on Cloud computing, its need, how it works, pros and cons.*
Keywords: *Coherence, Economy – of – Scale, QPS* .

I. Introduction

Cloud Computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. Cloud computing consists of hardware and software resources made available on the Internet as managed third-party services. These services rely on advanced software applications and high-end networks of server computers. Cloud computing relies on sharing of resources to achieve coherence and economy of Scale similar to a utility. Cloud computing had become a highly demanded service or utility due to the advantages of high computing power, cheap cost of services, high performance, scalability, and accessibility - as well as availability.

It uses remote services through a network using various resources. It is basically meant to give maximum with the minimum resources i.e. the user end is having the minimum hardware requirement but is using the maximum capability of computing. This is possible only through this technology which requires and utilizes its resources in the best way. It provides three services namely Information as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS). cloud computing provides numerous advantages over traditional computing like agility, lower entry cost, device independency, location independency, and scalability, etc. As a coin has both sides, Cloud computing also has barriers as well. It includes the Security threats, Technical issues, data privacy, etc.

II. Cloud Computing

Cloud computing uses remote services through a network using various resources. It is basically meant to give maximum with the minimum resources i.e. the user end is having the minimum hardware requirement but is using the maximum capability of computing. This is possible only through this technology which requires and utilizes its resources in the best way. Industry experts believe that this trend will only continue to grow and develop even further in the coming few years. While cloud computing is undoubtedly beneficial for mid-size to large companies, it is not without its downsides, especially for smaller businesses. Cloud Computing is a flexible, cost-effective, and proven delivery platform for providing business or consumer IT services over the Internet. However, cloud Computing presents an added level of risk because essential services are often outsourced to a third party, which makes it harder to maintain data security and privacy, support data and service availability, and demonstrate compliance.

III. Why Cloud?

In traditional storage type, when storage limits are increased, secondary backup devices and even third party websites are used to store the excess data. Moreover, data are stored in different multiple locations to avoid complete loss of data in case of disaster or malfunctioning of equipments.
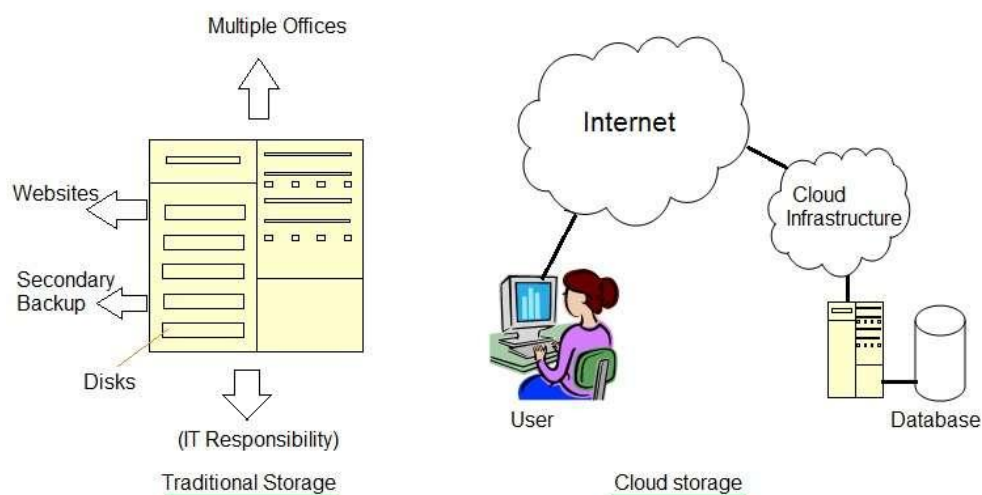
Fig 1: Traditional Storage VS Cloud Storage

As shown in the figure, Cloud storage is the one which uses separate location where in all the serving and backup data servers as well as database are maintained. The user can access this location using internet. Following are the major differences between traditional storage and Cloud storage:

In traditional storage data access time is faster compared to cloud storage model.

Sharing of file to others is possible from anywhere using cloud storage model.

It is impossible to retrieve the data in case of failure of the systems.

IV.   How Does Cloud Computing Works?

The information is stored on physical servers maintained and controlled by a cloud computing provider, such as Apple in regards to iCloud. Cloud Computing makes use the concept of Virtualization and it refers to the act of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices and computer network resources. The two types of Virtualization include Hardware virtualization and Desktop virtualization. Hardware virtualization or platform virtualization refers to the creation of a virtual machine that acts like a real computer with an operating system. Software executed on these virtual machines is separated from the underlying hardware resources. For example, a computer that is running Microsoft Windows may host a virtual machine that looks like a computer with the Ubuntu Linux operating system; Ubuntu-based software can be run on the virtual machine. Desktop virtualization is the concept of separating the logical desktop from the physical machine.

One form of desktop virtualization, virtual desktop infrastructure (VDI), can be thought of as a more advanced form of hardware virtualization. Rather than interacting with a host computer directly via a keyboard, mouse, and monitor, the user interacts with the host computer using another desktop computer or a mobile device by means of a network connection, such as a LAN, Wireless LAN or even the Internet. In addition, the host computer in this scenario becomes a server computer capable of hosting multiple virtual machines at the same time for multiple users.

V.   Cloud Computing Services

Cloud Computing provides three services namely Platform as a Service (Paas), Infrastructure as a Service (Iaas), and Software as a Service (SaaS). Depending on the need, one may choose the services.

5.1 Platform as a Service (Paas)

Platform as a service (PaaS) or application platform as a service (aPaaS) is a category of cloud computing services that provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure typically associated with developing and launching an app. PaaS can be delivered in two ways: as a public cloud service from a provider, where the consumer controls software deployment with minimal configuration options, and the provider provides the networks, servers, storage, operating system (OS), middleware (e.g. Java runtime, .NET runtime, integration, etc.), database and other services to host the consumer's application; or as a private service (software or appliance) inside the firewall, or as software deployed on a public infrastructure as a service.

5.2 Infrastructure as a service (IaaS)

Infrastructure as a service (IaaS) is a form of cloud computing that provides virtualized computing resources over the internet. This type of Cloud computing provides the "raw materials" for IT, and users usually

only pay for the resources they consume, including (but not limited to) CPU cores, RAM, hard disk or storage space, and data transfer – examples IaaS providers include ProfireBricks, and other Cloud computing IaaS providers.

5.3 Software as a Service (SaaS)

Software as a service is a software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted. It is sometimes referred to as "on-demand software". It provides improved access to data from any networked device while making it easier to manage privileges, monitor data use, and ensure everyone sees the same information at the same time.

VI. Popular Cloud Providers

Cloud iCloud.
Google Cloud Connect for Microsoft Office.
IBM SmartCloud.
Amazon EC2 - virtual IT.
Google App Engine - application hosting.
Google Apps and Microsoft Office Online - software as a service.
Apple iCloud - network storage.

VII.   Quantifiable Improvements

7.1 Cost Efficient

Cloud computing is probably the most cost efficient method to use, maintain and upgrade. Traditional desktop software costs companies a lot in terms of finance. Adding up the licensing fees for multiple users can prove to be very expensive for the establishment concerned. The cloud, on the other hand, is available at much cheaper rates and hence, can significantly lower the company's IT expenses. Besides, there are many one-time-payment, pay-as-you-go and other scalable options available, which makes it very reasonable for the company in question.

7.2 Almost Unlimited Storage

Storing information in the cloud gives you almost unlimited storage capacity. Hence, you no more need to worry about running out of storage space or increasing your current storage space availability.

7.3 Backup and Recovery

Since all our data is stored in the cloud, backing it up and restoring the same is relatively much easier than storing the same on a physical device. Furthermore, most cloud service providers are usually competent enough to handle recovery of information. Hence, this makes the entire process of backup and recovery much simpler than other traditional methods of data storage.

7.4 Automatic Software Integration

In the cloud, software integration is usually something that occurs automatically. This means that you do not need to take additional efforts to customize and integrate your applications as per your preferences. This aspect usually takes care of itself. Not only that, cloud computing allows you to customize your options with great ease. Hence, you can handpick just those services and software applications that you think will best suit your particular enterprise.

7.5 Easy Access to Information

Once we register ourself in the cloud, you can access the information from anywhere, where there is an Internet connection. This convenient feature lets you move beyond time zone and geographic location issues.

VIII.   Barriers

8.1 Security**.**

When using a cloud computing service, you are essentially handing over your data to a third party. The fact that the entity, as well as users from all over the world, are accessing the same server can cause a security issue. Companies handling confidential information might be particularly concerned about using cloud computing, as data could possibly be harmed by viruses and other malware.

8.2 Privacy.

Cloud computing comes with the risk that unauthorized users might access your information. To protect against this happening, cloud computing services offer password protection and operate on secure servers with data encryption technology.

8.3 Loss of Control.

Cloud computing entities control the users. This includes not only how much you have to pay to use the service, but also what information you can store, where you can access it from, and many other factors. You

depend on the provider for updates and backups. If for some reason, their server ceases to operate, you run the risk of losing all your information.

8.4 Internet Reliance.

While Internet access is increasingly widespread, it is not available everywhere just yet. If the area that you are in doesn't have Internet access, you won't be able to open any of the documents you have stored in the cloud.

9. Top 10 Security Concerns

- Data Breaches.
- Hijacking of Accounts.
- Insider Threat.
- Malware Injection.
- Abuse of Cloud Services.
- Insecure APIs.
- Denial of Service Attacks.
- Insufficient Due Diligence.

IX. Conclusion

Moving data to the cloud will make keeping up with our work as easy as keeping up with our personal life on facebook. Using a cloud computing environment generally, requires you to send data over the Internet and store it on a third-party system. As people are saving their personal and important data to clouds, so it becomes a major issue to store that data safely. There are many security algorithms, but security of all these algorithms can be broken by anyone. So it is very necessary to make security of cloud more strong. The privacy and security risks associated with this model must be weighed against the benefits versus alternatives.

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