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A Review on Cloud Computing

Supragya Verma¹, Deshkar Rao Adkane², Amit Shukla³

Assistant Professor, Department of CSE, SARDAR PATEL UNIVERSITY, Balaghat(M.P), India^{1,2,3}

ABSTRACT:Cloud computing is an important part of the present and the future of modern technology. Cloud Computing is used to deliver different types of services over the Internet. The Internet is referred to as the Cloud in 'Cloud Computing'. Cloud computing which is based on Internet has the most powerful architecture of computation. Cloud computing has completely changed the way businesses — and their consumers — store and access their data. Over the last decade, many companies are simply shifting over to an entirely cloud-based model. This trend of cloud computing is leading to a rapid growth in popularity. An important key factor which contributed to the quick evolution of Cloud Computing was the emergence of the Virtualization technology. In this paper, We have given a brief of evaluation of cloud computing by reviewing more than 25 articles on cloud computing.

KEYWORDS:Cloud Computing, Cloud, Virtualization, SaaS, PaaS, IaaS, FaaS,.

I. INTRODUCTION

Cloud computing has become the ideal way to deliver business applications—and the preferred solution for companies expanding their infrastructure or introducing new innovations. Cloud Computing is the method of computing in which the data and programs are stored over the Internet and not on your hard disk. Cloud computing is mainly depend on sharing the computing resources. A load of service is handled by the networks which forms the cloud that's why the load on local computers is not heavy while running an application. Creating a physical infrastructure to store and install servers, storage, application etc, all these would be time consuming and expensive. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases using cloud computing. You only pay for the cloud services you use, you need not pay for any infrastructure that you do not use. It will help to run your infrastructure more efficiently.

Following are some major characteristics of cloud computing:

- On-demand
- Scalability
- Resource Pooling
- Reliability
- Measured Service

There are four services provided by cloud computing that are Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and Function as a Service (FaaS). The basic examples of cloud computing are Facebook, YouTube, Dropbox, and Gmail etc. It offers scalability, flexibility, agility, and simplicity that's why its use is rapidly increasing in the enterprises.

Let's see some quotes on cloud computing capabilities by some CEO's :

- ❖ “Cloud is about how you do computing, not where you do computing.” ~ Paul Maritz, CEO of VMware.
- ❖ “I don't need a hard disk in my computer if I can get to the server faster... carrying around these non-connected computers is byzantine by comparison.” ~ Steve Jobs, Co-founder, CEO and Chairman of Apple Inc.
- ❖ “The cloud services companies of all sizes... The cloud is for everyone. The cloud is a democracy.” ~ Marc Benioff, Founder, CEO and Chairman of Salesforce.

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- ❖ “If someone asks me what cloud computing is, I try not to get bogged down with definitions. I tell them that, simply put, cloud computing is a better way to run your business.” ~ Marc Benioff, Founder, CEO and Chairman of Salesforce.

Some popular cloud computing platforms are as follows :

Microsoft Azure- it is a cloud computing platform created by Microsoft Corporation. It provides a range of cloud services.

AWS (Amazon Web Service)- it is a cloud computing platform developed by Amazon. It provides on demand , secure cloud computing platform.

GCP (Google Cloud Platform)- it is a suite of cloud computing services. It is developed by Google.It provides infrastructure as a service, platform as a service, and serverless computing environments.

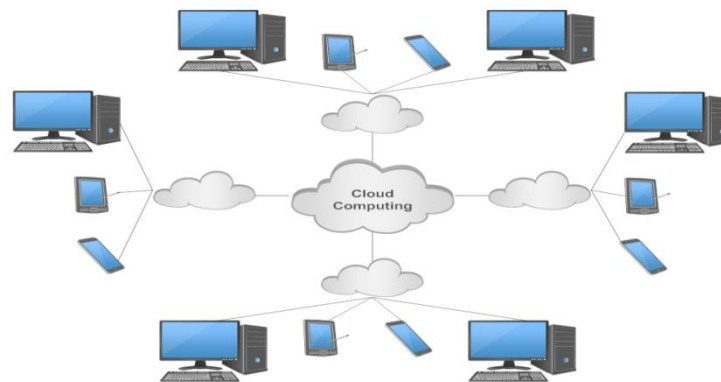


Fig.1

II. EVOLUTION OF CLOUD COMPUTING

Cloud computing is a process that involves accessing of services including, storage, applications etc. through the Internet, making use of another company's remote services for a fee. This facilitates a company to store and access data or programs virtually, i.e. in a cloud, rather than on local hard drives or servers. Cloud computing has evolved through a number of phases that include grid and utility computing, application service provision and software as a service (SaaS), but the overarching concept of delivering computing resources through a global network is rooted in the 1960s. The idea of an “intergalactic computer network” was introduced in the 1960s by JCR Licklider, who was responsible for enabling the development of the Advanced Research Projects Agency Network (ARPANET) in 1969.

According to Susan Bowen, vice-president and general manager at managed service provider Cogeco Peer 1, “His vision was for everyone on the globe to be interconnected and accessing programs and data at any site, from anywhere. It laid the foundation for grid computing, an early forerunner of cloud, which linked together geographically dispersed computers to create a loosely coupled network. In turn this led to the development of utility computing which is closer to what Licklider originally envisioned. It's also closer to what we think of as the cloud today, with a service provider owning, operating and managing the computing infrastructure and resources, which are made available to users on an on-demand, pay-as-you-go basis.”

Computer scientist John McCarthy proposed the idea of computation being delivered as a public utility, similar to the service bureaux that date back to the 1960s. One of the first milestones in cloud computing history was the arrival of Salesforce.com in 1999, which initiated the concept of delivering enterprise applications via a simple website. Another important milestone in the development of the cloud market as we know it today was the emergence of Amazon Web Services (AWS) in 2002. The company provided a suite of cloud-based infrastructure services including

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storage, computation and even human intelligence through the Amazon Mechanical Turk. In 2009, Google Apps also started to provide cloud computing enterprise applications. In 2009, Microsoft launched Windows Azure, and companies like Oracle and HP have all joined the game. This proves that today, cloud computing has become mainstream.

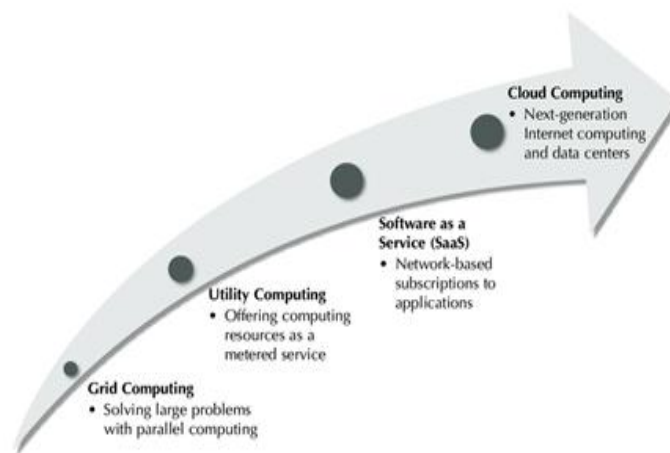


Fig.2

III. COMPONENTS OF CLOUD COMPUTING

There are three basic components which have specific goals and roles in running cloud computing operations. The concept of the three components can be described as follows:

- **Client Computers:** The end user can interact with the cloud using the client computers. They are, typically, the computers that just sit on your desk. But they might also be laptops, tablet computers, mobile phones, or PDAs - all big drivers for cloud computing because of their mobility.
- **Distributed Servers:** The servers are distributed among the different places but acts like they as working with each other. These servers act as if they're humming away right next to each other.
- **Data Centres:** it is collection of servers where the application to which you subscribe is housed. It could be a large room in the basement of your building full of servers on the other side of the world that you access via the Internet. Data centres are the compilation of servers.

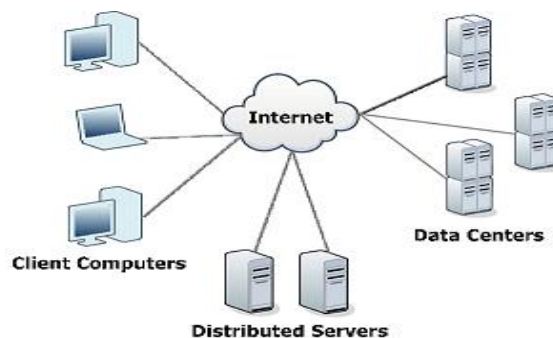


Fig.3

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Another components of cloud computing are as follows:

- **Cloud Services-** products, services and solutions that are used and delivered real-time via internet media.
- **Cloud Applications-** applications that use Cloud Computing in software architecture so that users don't need to install but they can use the application using a computer.
- **Cloud Platform-** a service in the form of a computing platform consisting of hardware infrastructure and software. Usually have certain business applications and use services PaaS as its business application infrastructure.
- **Cloud Storage-** involves the process of storing data as a service.
- **Cloud Infrastructure-** delivery of computing infrastructure as a service.

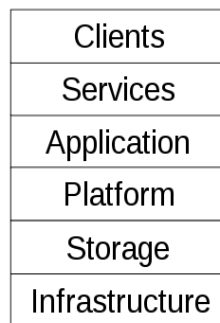


Fig.4

IV. TYPES OF CLOUD COMPUTING

Based on a deployment, we can classify cloud as follows:

- **Private Cloud** – Hosting all your computing infrastructure yourself and is not shared. The security and control level is highest while using a private network.
- **Public Cloud** – Whole computing infrastructure is located on the premises of a cloud computing company that offers the cloud service.
- **Hybrid Cloud** – using both private and public clouds, depending on their purpose. You host your most important applications on your own servers to keep them more secure and secondary applications elsewhere.
- **Community Cloud** – A community cloud is shared between organizations with a common goal or that fit into a specific community (professional community, geographic community, etc.).

Based on a service that the cloud is offering, we classify as:

- **Software as a service (SaaS)**-It is a method for delivering software applications over the Internet as per the demand and on a subscription basis. SaaS helps you host and manage the software application and underlying infrastructure and handle any maintenance (software upgrades and security patching).
- **Infrastructure-as-a-service (IaaS)**- It is the most basic category of cloud computing services that allows you rent IT infrastructure (servers or VM's) from a cloud provider on a pay-as-you-go basis.
- **Platform as a service (PaaS)**- It refers to the supply an on-demand environment for developing, testing, delivering and managing software applications. It is designed to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network and databases needed for development.
- **Functions as a service (FaaS)**-It adds another layer of abstraction to PaaS, so that developers are completely insulated from everything in the stack below their code. Instead of handling the hassles of virtual servers, containers, and application runtimes, they upload narrowly functional blocks of code, and set them to be triggered by a certain event. FaaS applications consume no IaaS resources until an event occurs, reducing pay-per-use fees.

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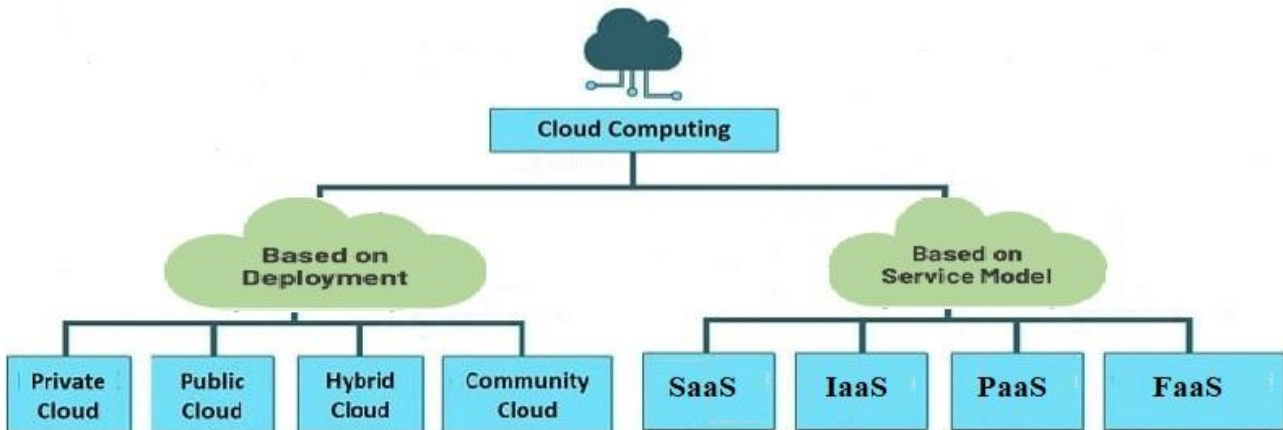


Fig.5

V. BENEFITS OF CLOUD COMPUTING

- **Cost Savings-** Cost saving is the biggest benefit of cloud computing. It helps you to save substantial capital cost as it does not need any physical hardware investments. Also, you do not need trained personnel to maintain the hardware. The buying and managing of equipment is done by the cloud service provider.
- **Scalability-** Cloud infrastructure scales on demand to support fluctuating workloads.
- **High Speed-** Cloud computing allows you to deploy your service quickly in fewer clicks. This faster deployment allows you to get the resources required for your system within fewer minutes.
- **Mobility-** Employees who are working on the premises or at the remote locations can easily access all the cloud services. All they need is an Internet connectivity.
- **Efficiency-** Enterprise users can get applications to market quickly, without worrying about underlying infrastructure costs or maintenance.
- **Reliability-** It is one of the biggest pluses of cloud computing. You can always get instantly updated about the changes.
- **Unlimited storage capacity-** The cloud offers almost limitless storage capacity. At any time you can quickly expand your storage capacity with very nominal monthly fees.
- **Strategic edge-** Cloud computing offers a competitive edge over your competitors. It helps you to access the latest and applications any time without spending your time and money on installations.
- **Security features-** Virtual private cloud, encryption and API keys help keep data secure.

VI. CONCLUSION

In this review paper, we described basic introduction of cloud computing, evolution of cloud computing, components of cloud computing, types of cloud computing and some benefits of cloud computing. Cloud Computing is a term that has gained extensive use over the last few years. Nowadays each and every person is using the services of cloud computing in their daily life. For example Google Photos, Google Drive, and i-Cloud etc. Now-a-days cloud computing is approximately used by all the business and IT industries because of its amazing services. In future cloud computing will become the basic need of IT Industries.

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