

A Review Paper on Cloud Computing

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Abstract

Today is the era of cloud based computing in the IT industries, Cloud computing which is based on the internet has the most powerful architecture of computation. It reckons in of a compilation of integrated networked hardware, Software and internet infrastructure, I have given a brief of evaluation of cloud computing by reviewing more than 20 articles on cloud computing present today. The outcome of this review signalizes the face of the IT Industries before and after the cloud computing.

Keywords – Cloud, SaaS, PaaS, IaaS, Cloud Computing.

1. INTRODUCTION

Like in the reality that the real clouds are the collection of water droplets, the term 'Clouds' in cloud computing is the collection of networks. The user can use the modalities of cloud computing boundlessly whenever demanded. Instead of setting up their own physical infrastructure, the user ordinarily prefer a mediator provider for the service of the Internet in cloud computing. The users have to pay only for the are requesting[2].The workload can be shifted to reduce the work load in cloud computing 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 [1]. So the requisition of hardware and software at the user side is decreased. All that we need to have a web browser like Chrome/IE to use cloud computing. Here are the key features of cloud computing:

I. Resource pooling and elasticity

II. Self –Servicing and On-Demand Services

III. Pricing

IV. Quality of Service

There are three services provided by cloud computing that are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) [1]. The basic examples of cloud computing which are used by general people in daily life 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.

2. EVOLUTION OF CLOUD COMPUTING

One day in a speech at MIT around in 1960 John McCarthy indicated that like water and electricity Computing one day will also be sold and that is what IT industries are doing these days using the Cloud Computing through a convenient website[3]. Amazon Web Services were started by Amazon in 2002 and they were providing the services of storage and computation. In around 2009 big companies like Microsoft, Google, HP, Oracle had started to provide services like cloud computing [4]. Nowadays each and every person is using the services of cloud computing in their daily life. For Example Google Photos, Google Drive and iCloud etc.

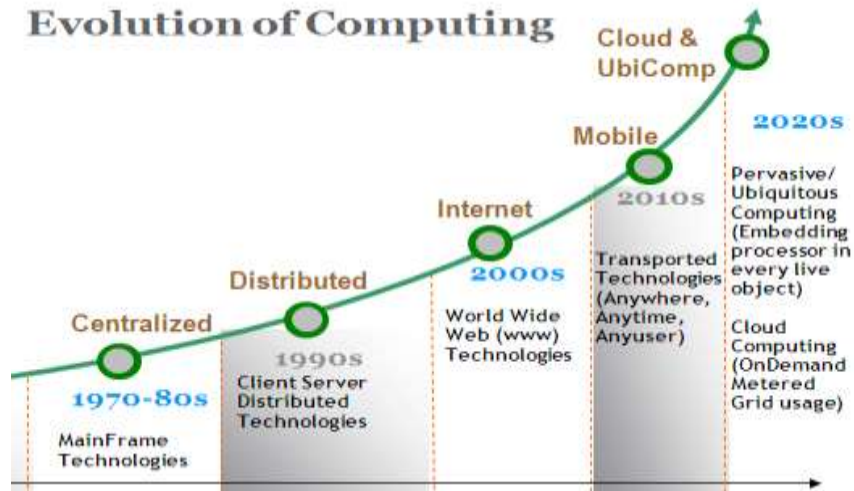


Fig-1 EVOLUTION OF CLOUD COMPUTING

3. COMPONENTS OF CLOUD COMPUTING

Cloud Computing has three basic components as follows-

1. **Client Computers:** The end user can interact with the cloud using the client computers.
2. **Distributed Servers:** The Servers are distributed among the different places but acts like they as working with each other.
3. **DataCentres:** Data centres are the compilation of all Servers resources.

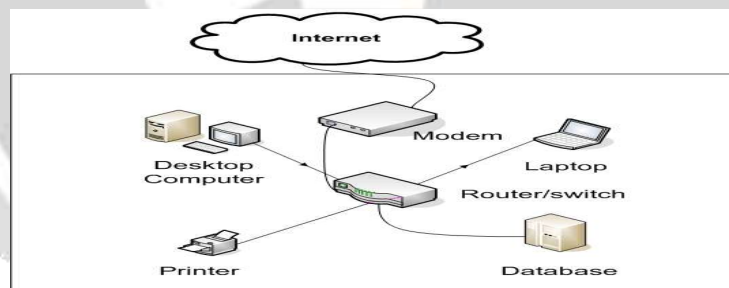


Fig-2 COMPONENTS

4. SERVICES OF CLOUD COMPUTING

1. **Software as a Services (SaaS):** The way of carrying application as a service on the internet is known as software as a service. In place of installing the software on his computer, the user simply access it via the internet [5]. It makes the user free from managing the complex software and hardware. The SaaS users do not need to buy software, maintain, and update. The only thing user must have an internet connection and then access to the application is very easy Example: Microsoft Office 365, Google Apps etc.
2. **Platform as a Service (PaaS):** A development environment or platform is given to the consumers as a service in PaaS upon which user can deploy their own software and coding. The customer has the liberty to construct his own applications that can run on the provider's infrastructure [5]. Product as a service providers offers a predefined composition of OS and server to obtain the management capacity of the applications. Example: LAMP (Linux, Apache, MySQL, and PHP). J2EE, Ruby etc

3. Infrastructure as a Service (IaaS): Many computing resources are provided by the storage, network, operating system, hardware, and storage devices on demand. IaaS users can access the services using a wide area network, such as the internet [5].

Example: A user can create a Virtual Machine on IaaS network.



Fig-3 CLOUD COMPUTING SERVICES

5. DEPLOYMENT MODEL OF CLOUD COMPUTING

1. Public Cloud: The public cloud is a computing service supplied by the third party providers atop the public internet [6]. These services are available for any user who wants to use them and they have to pay for only the services that they have consumed.

2. Private Cloud: The computing services provided over the internet or private network come under the private cloud and these services are offered only to the selected users in place of common people [1,6]. A higher security and privacy is delegated by private clouds through the firewall and internal hosting.

3. Hybrid Cloud: Hybrid cloud is the combination of public cloud and private cloud. In the hybrid cloud each cloud can be managed independently but data and applications can be shared among the clouds in the hybrid cloud.

6. OTHER MODEL

1. Community cloud- Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party, and either hosted internally or externally. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized[7].

2. Distributed cloud- A cloud computing platform can be assembled from a distributed set of machines in different locations, connected to a single network or hub service. It is possible to distinguish between two types of distributed clouds: public-resource computing and volunteer cloud.

- **Public-resource computing**—This type of distributed cloud results from an expansive definition of cloud computing, because they are more akin to distributed computing than cloud computing. Nonetheless, it is considered a sub-class of cloud computing.

- **Volunteer cloud**—Volunteer cloud computing is characterized as the intersection of public-resource computing and cloud computing, where a cloud computing infrastructure is built using volunteered resources. Many challenges arise from this type of infrastructure, because of the volatility of the resources used to build it and the dynamic environment it operates in. It can also be called peer-to-peer clouds, or ad-hoc clouds. An interesting effort in such direction is Cloud@Home, it aims to implement a cloud computing infrastructure using volunteered resources providing a business-model to incentivize contributions through financial restitution[8].

3. Multicloud- Multicloud is the use of multiple cloud computing services in a single heterogeneous architecture to reduce reliance on single vendors, increase flexibility through choice, mitigate against disasters,

etc. It differs from hybrid cloud in that it refers to multiple cloud services, rather than multiple deployment modes (public, private, legacy)[9][10][11].

4. Poly cloud- Poly cloud refers to the use of multiple public clouds for the purpose of leveraging specific services that each provider offers. It differs from multicloud in that it is not designed to increase flexibility or mitigate against failures but is rather used to allow an organisation to achieve more that could be done with a single provider[12].

5. Big Data cloud- The issues of transferring large amounts of data to the cloud as well as data security once the data is in the cloud initially hampered adoption of cloud for **big data**, but now that much data originates in the cloud and with the advent of **bare-metal servers**, the cloud has become[13] a solution for use cases including business **analytics** and **geospatial analysis**[14].

6. HPC cloud- HPC cloud refers to the use of cloud computing services and infrastructure to execute **high-performance computing** (HPC) applications[15]. These applications consume considerable amount of computing power and memory and are traditionally executed on **clusters** of computers. In 2016 a handful of companies, including **R-HPC**, **Amazon Web Services**, **Univa**, **Silicon Graphics International**, **Sabalcore**, **Gomput**, and **Penguin Computing** offered a high performance computing cloud. The Penguin On Demand (POD) cloud was one of the first non-virtualized remote HPC services offered on a **pay-as-you-go** basis.[16]

6. BENEFITS OF CLOUD COMPUTING

1. Cost Saving: In cloud computing users have to only pay for the services they consumed. Maintenance cost is low as user do not need to purchase the infrastructure [2].

2. Flexibility: Cloud computing is scalable. The rapid scale up and down in the operations of your business may require quick adjustment of hardware and resources so in order to manage this variations cloud computing provide flexibility.

3. Enhanced Security: Cloud computing provide high security by using the data encryption, strong access controls, key management, and security intelligence.

7. CONCLUSION

In this review paper we described in short to the introduction, evolution, types and components of the cloud computing and also the different approaches of the cloud computing and some of its advantages. The application area of cloud computing will continuously be increasing. Today approximately all small and big industries are using cloud computing to manage storage, traffic, hardware requirements. So, it is clear that there is major impact of cloud computing on businesses and societies.

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