

# Cloud Computing : An Emerging Computing Paradigm For Delivering Computing Services

Gopi Nath Sahani , Jitender Kumar, Manoj Kumar

*Institute of Technology and Management  
Gorakhpur-273209,India*

**Abstract - For certain type of specific tasks, we may require some specialized resources (H/W and S/W), which may be very costly. So every customer/client cannot afford the price of the computation. This problem gave birth to the Cloud Computing. In this technology such type of resources are placed on the server. Any client can utilize that resources on demand basis, and charged by the service provider for utilizing their resources. The Cloud Computing refers to a infrastructure (model), in which all the overhead of computation and required specific hardware and software are moved to the server side from the client side. Basically the system is based on the client-server architecture, where client's node (system) are treat as the input and output devices. It plays a crucial role in the on-demand and convent network access to a collection of computing resources and services. It serves as a reservoir of computing resources and services. In Cloud Computing, for task scheduling, certain optimized algorithms (such as ABC (Activity Based Costing)) are used in order to measure the cost of cloud resources .There is a vast area of the application of the cloud computing such as security services, enhance efficiency of system by utilizing resources in a effective way, improving the QoS (Quality of the Service) etc. In this paper, we discuss that from where the cloud computing originate, need of the Cloud Computing, its structure and characteristics, development life cycle and services.**

**KEYWORDS - Cloud , Datacenters , Iaas , Naas ,Pass .**

## 1. INTRODUCTION

In Cloud computing, all the computations are based on internet. Here the required software, infrastructure, platform and other resources are provided by Virtual Shared Servers and the customers are charged on the time basis for the use of resources and services. It provide on-demand delivery of the various services like computation, data access and storage services that do not require the knowledge of the physical location and configuration of the system that uses the services. According to The National Institute of Standards and Technology(NIST) and The Cloud Security Alliance, Cloud Computing is defined as "Model for enabling the convenient, on demand network access to a shared pool of configurable computing resources (e.g. Network, Servers, Storage, Application and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".[1] According to the Granter, Cloud Computing is define as "A style of computing ware massively scalable, IT enabled capability are provided as a services across the internet to multiple external customer". Basically the system is based on the Client-Server architecture, since all major processing of hardware and

software are done on the server, so the clients do not have to worry about their software and hardware requirement for the computation. The entire connected node (Consumer's system) seems as a basic display. As the user is charged for the resources used, resources scheduling is important, because it plays a significant role in the Cloud computing environment. By using a optimized resources scheduling algorithm we can save our time, cost for using the special hardware and have improvement in the services such as using the "Activity based scheduling" algorithm.

## 2. ORIGIN OF CLOUD COMPUTING

The idea of "intergalactic computer network" was introduce in the sixties by J.C.R. Licklider, who was responsible for enabling the development of ARPANET(Advanced Research Projects Agency Network) in 1969. Since the sixties, the Cloud Computing has developed along a no of lines, with web2.0 being the most recent evolution. The internet only started to offer significant bandwidth in the nineties, Cloud Computing for the masses has been something for a late developer. One of the first milestones for the Cloud Computing was arrival of Salesforce.com in 1999, which pioneered the concept of delivering enterprise applications via a simple website. The next development was Amazon Web Services in 2002, which provided of suite of cloud-based services including the storage, computation and even human intelligence through the Amazon Mechanical Turk.[2] Then in 2006, Amazon launched its Elastic Compute Cloud(EC2) as a commercial web service that allows small companies and individuals to rent computers on which to run their own computer applications. Another big milestone came in 2009, as Web2.0 hit its stride, and Google and others starts to offer browser-based enterprise applications, throw services such as Google Apps. In 2009, also saw the advent of Microsoft into the cloud computing game with its product Windows Azure(Azure as an operating environment) "designed to manage extremely large pools of computational resources". [3]The simple explanation is that Microsoft wants to customers to run their Window-based application over the internet using Microsoft's data centers, with Azure being the system that organizes resources and handles spikes in demand.

## 3. NEED OF CLOUD COMPUTING

Now days, most organization must continue to use its local resources to operates its daily systems and to sore its data but these organizations do not use their resources and services efficiently and most of time they remain ideal.

This leads to technology where one organization shares its resources, services and store its data on another organization's server known as Cloud techniques. So, whenever capacity of service is required at sort notice it can be accessed by using linked server capacity by paying some considerable fee for such facilities. According to the current statistical data, the average service rate of resource in some systems is just 30%, while some other companies or organizations in the opposite side which need to buy a lot of expensive hardware for the ever growing computing task. Hence it is necessary to insure that the resources are used in the most beneficial manner. By the introduction of Cloud Computing, it has become possible to improve the resource utilization upto 60% to 80%.

#### 4. STRUCTURE OF CLOUD COMPUTING MODEL

The basic structure of Cloud Computing consists of mainly nodes(nodes),networks, servers which is determined by following diagram.

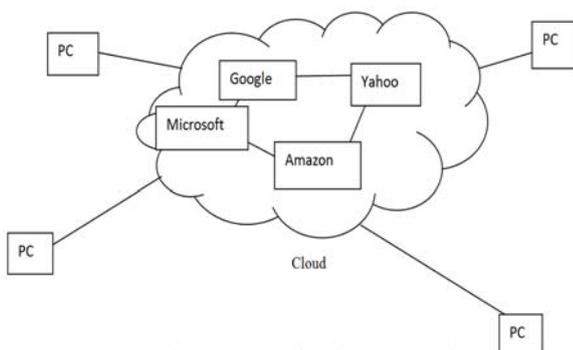


Fig 1: Basic Structure of Cloud Computing Model

Clouds are a large pool of easily usable and accessible virtualized resources such as hardware, development platform and services. Cloud is an internetwork of different types of server which share resources. A cloud may be of four type: public, private, community and hybrid. When a cloud is made available in a pay per use manner to the public and service being sold as Utility Computing, it is known as Public Cloud. The Private Cloud refers to internal datacenters of an organization that are not made available to the public. The Community Cloud is a cloud infrastructure that is shared by several organizations and supports a specific community that has shared concerns around mission, policy and compliance considerations [4].The Hybrid cloud is formed by the private and public cloud that represents a unique entity.

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort [5]. This paradigm relies on a number of existing technologies such as internet, virtualization resource, grid computing, and web services. Thus, Cloud Computing is the combination of "software as a service" and utility computing. The aim of the cloud computing is to provide scalable and inexpensive on-demand computing infrastructures with good quality of service levels [6] [7].

Cloud computing has been identified as emerging computing paradigm for delivering computing service for the upcoming decades and receiving enormous attention in the industry due to result of the current economic crisis, business drove promises and expectations such as lower upfront IT costs, opportunity to create and market a new business model [8]. A coherent methodology, which could support companies to embrace the Cloud, is still lacking. That has held back progress both on provider and on consumer side. This leads to presented innovative approach that has the potential to create transparency for the promising IT paradigm of Cloud Computing.

### 5. CHARACTERISTICS OF CLOUD COMPUTING

#### 5.1. Large-scalability

The scale of cloud is very large. The cloud of Google has owned more than one million servers and service is given to infinite users. Even in Amazon, IBM, Microsoft, Yahoo, they have more than hundreds of thousands servers and they provide much good services.

#### 5.2. Virtualization of cloud computing:

Cloud computing makes user to get service anywhere and anytime, through any kind of interface. You can complete all you want through net service using a computer or a mobile phone. Users can a use or share it safely through an easy way, anytime, anywhere. Users can complete a task quickly that can't be completed in a single computer.

#### 5.3. Good reliability:

Cloud uses data with multiplicity, it has good fault tolerant, the computation of cloud has very ability so it has high reliability of the service. The use of cloud computing is more reliable than local computer.

#### 5.4. Versatility:

Cloud computing can produce different applications running it at the same time with accuracy and good productivity.

#### 5.5. Extendibility:

The scale of cloud can extend dynamically to meet the users. Increasingly, requirement and suggestions.

#### 5.6. Service on demand:

Cloud is a big resource pool that you can buy according to your requirement and specification. Cloud is just like running water, gas, and electric that can be charged by the amount which you used.

### 6. DEVELOPMENT LIFE CYCLE AND SERVICES

**6.1 Cloud Development Life Cycle (CLDC) model** is the simplest and flexible process model, which states that the phases are organized in a linear order and processed in isolated manner. In this model, a cloud development begins with "understand requirement and analysis" phase. Upon successfully demonstrating the requirement, the "Architect" phase begins. The "Quality Assurance and verification" phase starts after the "Implementation and Integration" is complete, and "Monitor, Migrate & Audit" begins after the "Deploy, Testing & Improvement" is complete. The figure-2 depicted the linear order of the various activities of CDLC to obtain desire cloud.

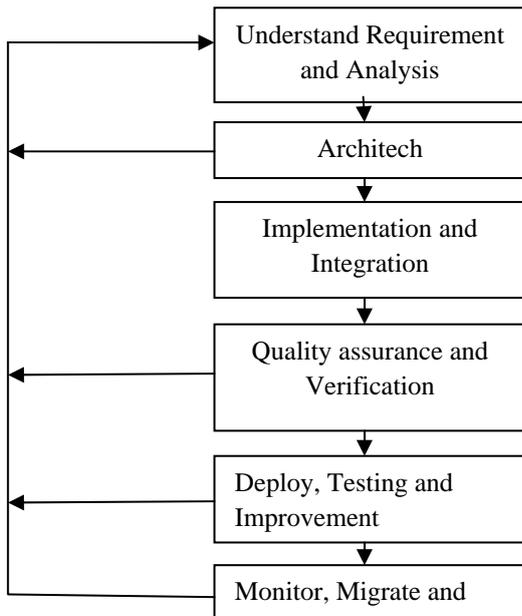


Fig 2: The Cloud Develop Life Cycle

**6.2 Services**

These cloud computing services has much better than the traditional service provisions in context of reduced upfront investment, expected performance, high availability, infinite scalability and tremendous fault tolerance capability. In terms of their provisions, the cloud services are divided into six categories, which are Infrastructure as a service (Iaas), Network as a service (Naas), Platform as a service (Paas), Database as a Service (Daas), Identity and policy management as a service (IPMaas), and software as a service (Saas) [6]. Each Service has several functions and are provided by some vendors.

The function of Iaas is to provide Hardware Components and its vendors are Amazon, Google, window, IBM. The Naas provides Internet and Mobile Services and its vendors are Verizon, Vodafone, Telstra, AT&T. Operating System and System Softwares are provided by Paas and its vendors are Gogrid, Force, Amazon, Google. The Daas provides and manages Set of Data and its vendors are Datadirect, Strikeiron. IPMaas manage Users' Identity and Service Policy and its vendors are Pingidentity, Tricipher, IBM and finally the application Software are provided by Saas and its vendors are CISCO, Microsoft, Flicker, Workday. Cloud service is application running in the cloud and accessed through the internet or intranet. Cloud computing allows services providers to develop, deploy and run application that can easily grow in capacity, work rapidly and never fail.

**7. CONCLUSION**

The concept of cloud computing is very versatile and huge. It has very wide number of features and enhancements which are the focusing points for end user. The clouds will

grow in size as soon as available bandwidth and the corresponding service model goes on updated, cloud computing will bring a revolutionary change in the Internet which will be a pool of success in the security domain. Cloud computing has a low-cost services to provide the possibility, while there are a large number of manufacturers and establisher behind core concept of cloud computing, here is no doubt that cloud computing has a bright future. But among all above the scenario, security and data integrity are the very vital aspect which has to be in deep considerations. Because user used to put his private data on cloud and expects that his data is in the secured condition. So, for the enterprises, it is very important to overcome the user demands and try to enhance them. The cloud development life cycle (CDLC) is emerging as a new development life cycle model like the System development life cycle model (SDLC). There is also need of practical issues which affect data migration and specify policies on data migration.

**REFERENCES**

[1]www.nist.org  
 [2]www.computerweekly.com  
 [3]www.crn.com  
 [4] SearchVirtualDataCenter.co.UK, available at <http://searchvirtualdatacentre.techtarget.co.uk/news/1510117/Community-cloud-Benefits-and-drawbacks>  
 [5] Michael glas and paul Andres. Oct 2010. An Oracle white paper in enterprise architecture- achieving the cloud computing vision. CA-U.S.A.  
 [6] Harjit Singh Lamba and Gurdev Singh. July 2011 Cloud Computing- Future Framework for e-management of NGO's. IJoAT ISSN 0976-4860. Vol 2 No 3. Department Of Computer Science, Eternal University, Baru Sahib, HP, India.  
 [7] Dr. Gurdev Singh, Shanu Sood, Amit Sharma. June 2011. CM-Measurement Facets for Cloud Performance. IJCA. Volume 23 No.3. Lecturer, Computer science & Engineering, Eternal University, Baru Sahib (India).  
 [8] Joachim Schaper. 2010. Cloud Services. 4th IEEE International Conference on DEST, Germany.  
 [9] Liladhar R. Rewatkar, Ujwal A. Lanjewar, June 2010, Implementation of Cloud Computing on Web Application", International Journal of Computer Applications, Volume 2 – No.8, Zulekha College of Commerce, Science and Technology, RTM, Nagpur University, Nagpur, INDIA.  
 [10] Bo Peng, Bin Cui and Xiaoming Li, IEEE 2009, Implementation Issues of A Cloud Computing Platform, Department of Computer Science and Technology, Peking University.  
 [11] Five Integration Tips to Cloud Computing Success, [http://www.jitterbit.com/News/Press\\_Room/cloud-computing-integration-tips-041509.php](http://www.jitterbit.com/News/Press_Room/cloud-computing-integration-tips-041509.php)  
 [12] Cloud computing - Wikipedia, the free encyclopedia.htm  
 [13] K.Mukherjee, G.Sahoo, "Development of Mathematical Model for Market-Oriented Cloud Computing", International Journal of Computer Applications (0975 –8887), Volume 9– No.11, November 2010.  
 [14] Rajkumar Buyya, Chee Shin Yeo and Srikumar Venugopal, "Market-Oriented Cloud Computing: Vision, Hype, and Reality for Delivering IT Services as Computing Utilities", The 10th IEEE International Conference on High Performance Computing and Communications, IEEEComputer Society, 2008, pages 5-13.  
 [15] P. Mell and T. Grance, "Draft NIST working definition of cloudcomputing," Referenced on June. 3rd, 2009 Online at <http://csrc.nist.gov/groups/SNS/cloudcomputing/index.html>, 2009.