# A Review on Cloud Based Load Balancing Algorithms

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**ABSTRACT**

Cloud computing plays the major roles in Load Balancing, a pool of resources in the cloud are utilized by the users through the internet. it is a pay-per process model, in cloud there are three major services involved and the deployment models are also implemented .There are different types of load balancing algorithms which does their jobs effectively the round robin algorithm is one of the main algorithm used in balancing the loads in a circular manner and utilizes the resources efficiently without making the nodes inactive. The virtualization technique is used to make the process execute in a successful manner using the load balancer and the Virtual Machines which can be implemented by the CloudSim Simulator in an effective way to balance the loads without making the nodes unused.

*Keywords:* Cloud Computing, Virtualization, Virtual Machine (VM), Load Balancer, CloudSim, Datacenter.

## 1. INTRODUCTION

Cloud computing is an approaching technology used currently. There are many resources like memory, CPU, network, storage etc., which are being shared by the customers from the service providers. The virtualization is the base of cloud technology in which it separates the cloud computing function and the technology implementation from the physical hardware. Cloud computing forms the virtualization of computer program via the internet connection rather than installing the application everywhere. Using virtualization any user can access server or storage without knowing the specific storage purpose. Virtualization can be implemented to the various types of resources [1].

### A. Types of Cloud Services

The cloud services are: Software as a Service, Platform as a Service, and Infrastructure as a Service [3, 4 and 5].

### Software as a Service [SaaS]

It is a multitenant service model. Since multiple users make use of the applications maintained in the cloud infrastructure, it is also termed as multitenant service model. The cloud infrastructure is maintained by the service providers. Some of the service providers are SalesForce.com, Netsuite, IBM, Microsoft and Oracle.

### Platform as a Service [PaaS]

The provider delivers the platforms in terms of system and environment for software development to the users. The user does not have control over the servers, networks, operating systems and storage [3, 4 and 5]. Some of the providers are Microsoft's Azure, GAE.

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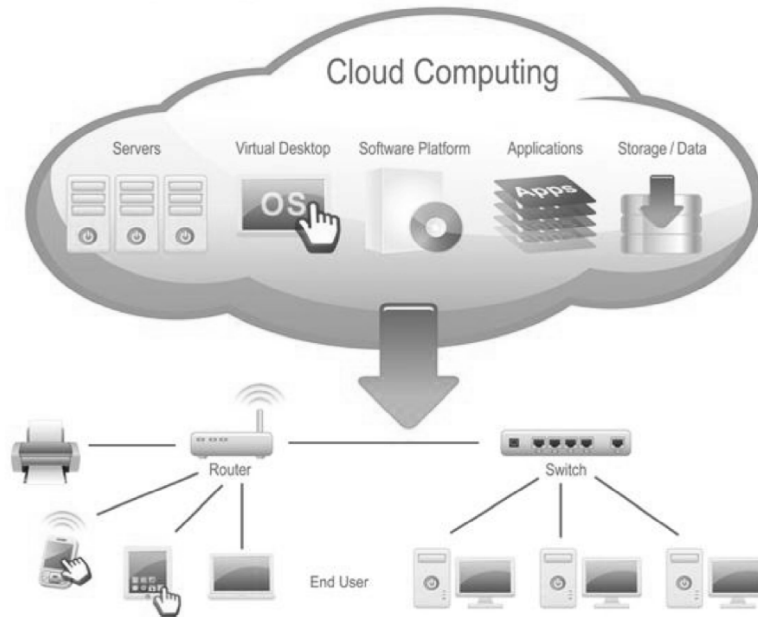
**Figure 1: Virtualization of Cloud Computing[6]**

### *Infrastructure as a Service [IaaS]*

The provider delivers the infrastructure to the users through the internet [3, 5]. The providers are GoGrid, etc.

In Infrastructure as a Service (IaaS), the physical resources are split into a number of logical slices called Virtual Machine (VM's). The VM Load Balancing methods determine which Virtual Machine is assigned to the next cloudlet task units. These

VM are modeled using different tools like Cloudsim - it is a Simulation framework for allocation to the applications [1, 2 and 3].

### B.  Deployment Models of Cloud

The deployment models of a cloud are *Public Cloud* makes services available to the clients on the basis of pay-per-use process; the services can be storage, computing, using applications. The public cloud providers are Amazon, Microsoft and Google. *Private Cloud* is a cloud infrastructure that is used within an organization. *Community Cloud* is a shared infrastructure used by many organizations with common concerns like jurisdiction, colleges, communities, policy. *Hybrid Cloud* is the combination of two or more clouds. Example: Public, Private or Community clouds.

### 2. THE CLOUDSIM

The Cloudsim is a framework which enables modeling, simulation, experimenting and designing on the Cloud computing infrastructure. This toolkit was developed in GRIDS laboratory at the University of Melbourne. Cloudsim is a self-contained platform which can be used to model data centers, hosts, service brokers, scheduling and allocation policies of a large scaled cloud platform. CloudSim supports VM allocation at two levels [6, 7] .The Host level specify how much overall processing power of each core will be assigned to each VM, which is known as VM allocation policy. In VM level it allots a fixed amount of the available processing power to the individual application service that is hosted within its execution engine, known as VM Scheduling.
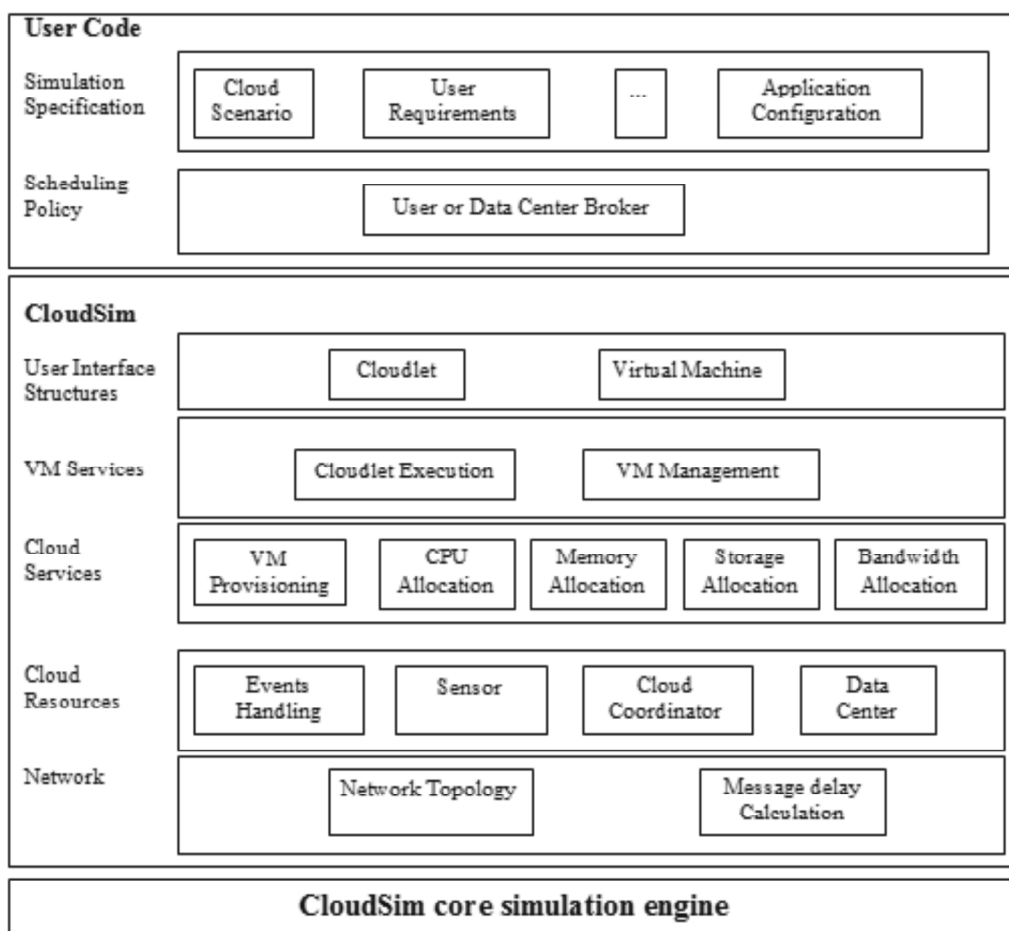
**Figure 2: Layers of Cloud Sim[1]**

The various components, relationship and their executions are described as follows,

### Data Centre

Data centre has a number of hosts in homogeneous or heterogeneous configurations. It creates the bandwidth, memory, and storage devices allocation.

### Virtual Machine (VM)

VM comprises of memory, processor, storage, and VM scheduling policy. Multiple VM's can execute on a single hosts simultaneously.

### Host

It can allocate sufficient memory and bandwidth to the process elements to execute them within the VM. It is also responsible for creation and destruction of the VMs.

### Cloudlet

It is an application component which is in-charge of delivering the data in the cloud service model. The length and the output file size parameter of the Cloudlet should be greater than or equal to 1. It also contains various ids for data transfer and application hosting policy.

## 3. LOAD BALANCING

Load Balancing is a technique used to distribute the workload on the multiple computers or a computer cluster through the network links to achieve optimal resource utilization for maximizing throughput and minimizing the overall response time. Load Balancing is used for avoiding too much overload on the resources and divides the traffic between servers and data. Data can be sent and received without maximum delays. This type of mechanisms can be implemented in the cloudsim tool Load Balancing is used for minimizing the total waiting time of the resources. The load balancing is used for balancing the loads on virtual machines [6, 7].

There are three types of VMLoadBalancers they are Round Robin Algorithm, Throttled Algorithm and Active Monitoring Load Balancing Algorithms.

### 1. Round Robin Algorithm (RR Load balancer)

It is one of the simplest scheduling technique that utilize the time slices. In this process the time is divided into multiple slices and each node is set with a particular time slice, every node is given a quantum and its operation. The resources of the service provider are assigned to the requesting client based on time slice.

### 2. Throttled Load Balancer

In This algorithm it  ensures the pre-defined number of cloudlets that  are allocated to a single VM at any given time. If there are more number of  job request than the available VM's then allocate the jobs in a queue till the next VM is available, here the TVM is the Throttled Virtual Machine which is used as a load balancer for balancing the jobs [6, 9 and 11].

### 3. Active Monitoring Load Balancer

It maintains the information about each VM's and the number of job request that are currently allocated to which VM, when a request is allocated to a new VM when it arrives. If there are more than one VM, the first identified is selected and it returns the VM id to the data centre controller. The data centre controller sends the id by a request to the VM .It also notifies the load balancer and allocates to the cloudlets [6, 10 and 11].
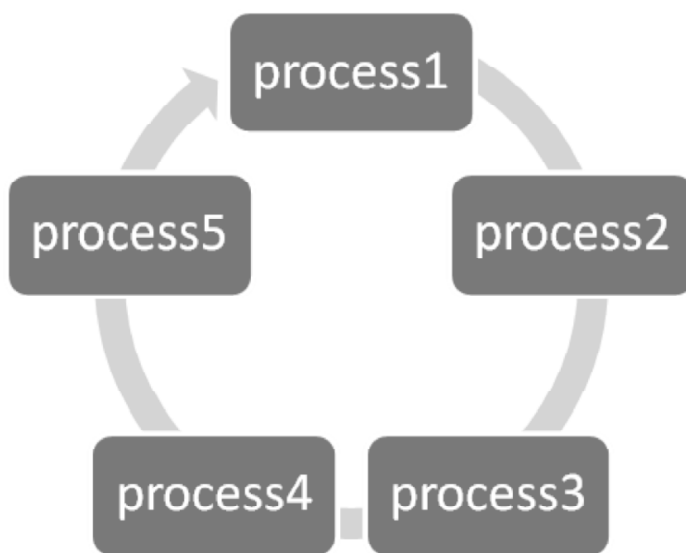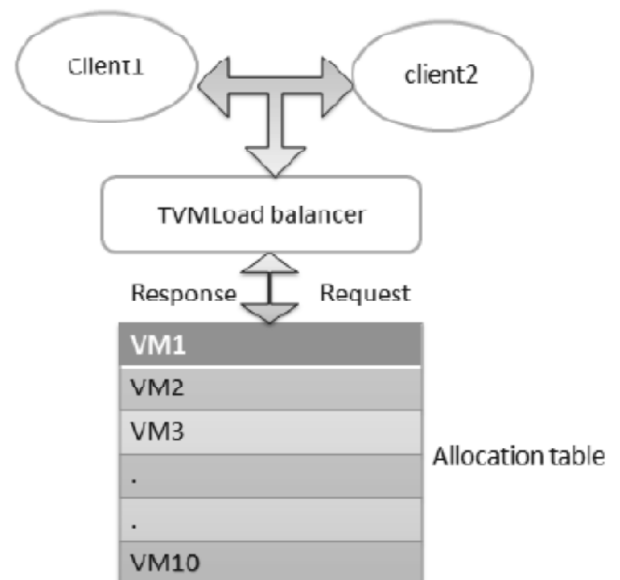


Figure 3: RR Load Balancer                    Figure 4: Throttled Load Balancer[6]
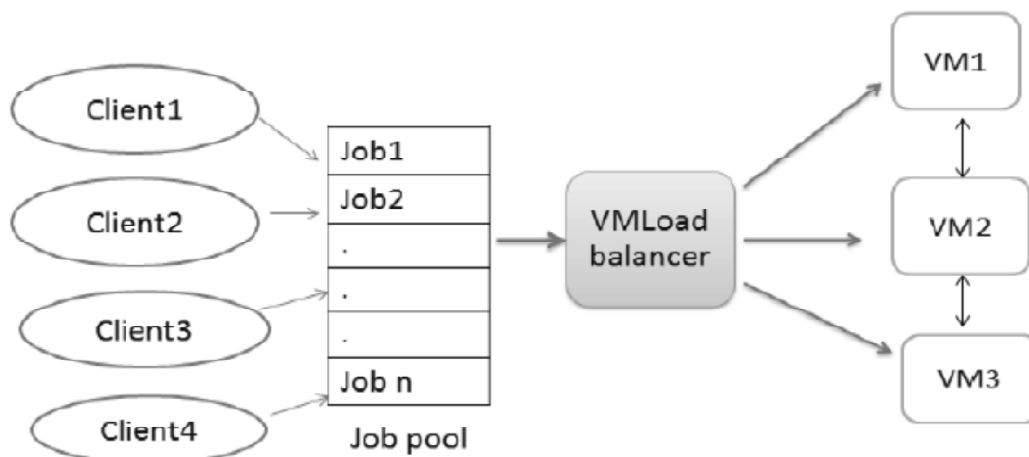
**Figure 5: Active Monitoring Load Balancer[6]**

## 4.  CONCLUSIONS

Cloud computing is used for the purpose of resource allocation from the pool of resources. if there are more request then the load balancer is allowed to control the traffic and make all the nodes to have equal number of jobs. The round robin plays the major role in allocating the jobs in a circular manner with the time slice assigned to the VM's .This paper concludes that by using CloudSim simulator the VM's can be allocated with the jobs in which they are distributed equally with the time slice allocated to them. Using many virtual machines the request can be sent to the clients quickly and efficiently without any delay. In future this paper can be implemented using cloudsim tool.

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