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# IMPROVEMENT OF RESPONSE TIME OF LOAD BALANCING ALGORITHM IN CLOUD ENVIROMENT

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**ABSTRACT**

*Cloud Computing can be defined as the use and access of multiple server based computational resources via a digital network (WAN).Cloud resources using computer, users may access the note book, pad computer, smart phone, or other device. Applications are provided in cloud computing and managed by the cloud server and data is also stored remotely in cloud configuration. Load balancing ensures that all the processor in the system or every node in the network work at any instant of time, does approximately the equal amount of. Load balancing can be one of the central issues in cloud computing. It is a mechanism that all the nodes in the cloud load is distributed order to avoid a situation and some of the nodes are heavily loaded while others are idle or doing little work. The Main focus of this Paper is on Improve of Response time of Load balancing algorithm.*

***Keywords: Cloud Computing, Virtual Machine, Host, Cloudlet, Response time.***

## I. INTRODUCTION

Cloud provides resources over internet using hardware access to each virtual machine virtualization, provides abstraction of independent virtualization technology, multi-tenancy, web services, etc. Multi-tenancy allows the same software platform to be shared by multiple applications. Multi-tenancy Provide software as a service application. Applications communicate over the Internet using web services [1].

Load balancing concept is the important in network. The load balancer accepts multiple requests from the client, distributing them across many computers or network devices based on how busy the computer or network device is. Load balancing prevent a server or network device from getting overwhelmed, helps with requests and helps to distribute the work. The client can send application request to the server at that time the server over loaded in another for some time till the serve is idle the current process is waited. Here the client can wait. To avoid this first utilization of the server we check, and process the client request. The CPU utilization do properly by load balancing algorithm. The load balancing algorithm that is dynamic in nature does not consider the previous state or behavior of the system, it depends on the present behavior of the system.

## II. PROBLEM STATEMENT

In cloud computing environment allocation of resource is very important. If resource are not properly allocated the high load on few servers and other servers with few as cloud is scalable from two servers to 1000s of servers, will lead to more energy consumption or more than that it is not possible to analyze the resource

allocation in the cloud which is biggest problem to deploy and test. So the need of simulators arises per our need which save time to test the cloud as, cost, energy.

## III. ISSUES AFFECTING LOAD BALANCING IN CLOUD COMPUTING

There are various issues while dealing on load balancing cloud computing environment. Each load balancing algorithm must be such as to be achieved. Some aims at achieving minimum response time, some other resource aims to achieve maximum the utilization while some aims at achieving a trade-off between all these metrics, and some algorithms aims at achieving higher throughput, Major issues can be considered while designing any load balancing algorithm is as follows:

### 3.1 Geographical Distribution

Distributed system of system in cloud environment is helpful in handling and maintaining the efficiency of the system and fault tolerance, face book, twitter, etc.

### 3.2 Static Vs Dynamic Algorithm

Any algorithm is based on the state or behavior of the system, load balancing is designed, which may be static or dynamic [2]. Static Algorithm these algorithms depend not upon the system current state and have prior knowledge regarding the details of all tasks in an application and system resources. These kinds of algorithms face a major drawback in case of sudden failure of system resource and tasks.

Dynamic Algorithm these algorithms take decisions concerning load of the system and balancing based upon the current state don't need any prior knowledge about the system. This approach can be an improvement. The category of these algorithms are considered complex, but have better fault tolerance and overall performance.

### 3.3 Algorithm Complexity

The overall performance of the system can affect the complexity of any load balancing algorithm. Sometimes the algorithm is complex, but is better in terms of throughput and the algorithms may give poor performance in terms of fault tolerance which are simpler in complexity, resource utilization. On the other hand, migration time and response time. Therefore based on the system requirements, in making a better decision to a suitable load balancing algorithm. A trade-off between all the parameters must be set wisely.

### 3.4 Traffic Analysis over different Geographical Area

For any load balancing algorithm, in real-time scenarios it is very important to know the traffic flow over different geographic regions, and then balance the workload in overall. Regions all over the globe consist of different time zone, peak hours and have certain, during which the network load can be at its peak. Load balancer therefore, must be capable of handling the traffic in peak hours in most of the location so that maximum resource utilization can be achieved and throughput.

### 3.5 Load Balancing Execution Algorithm

Load balancing is a methodology to distribute workload across multiple computers, or other resources over the network links to achieve optimal resource utilization, maximize throughput, minimum response time, and avoid overload. With recent advent of technology, resource control or load balancing in cloud computing is main

challenging issue. A few existing scheduling algorithms can maintain load balancing and provide better strategies through efficient job scheduling and resource allocation techniques as well. [5]

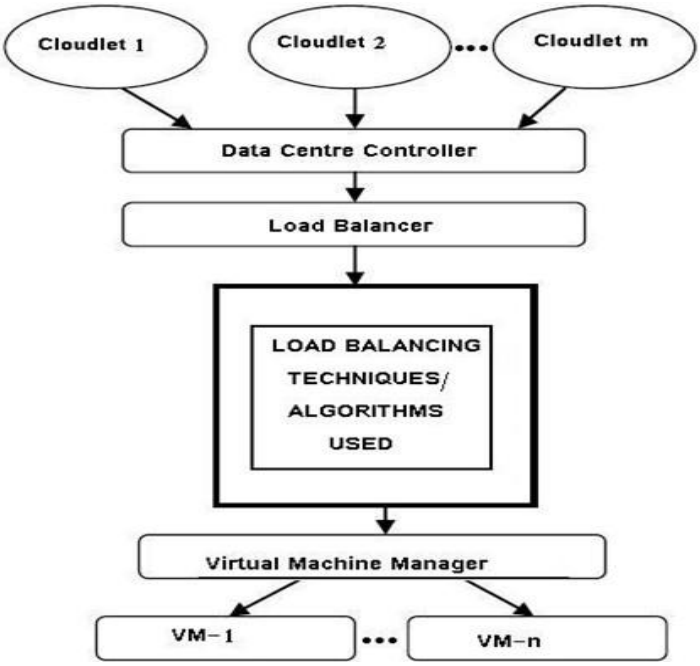


**Figure.1: Load Balancing Algorithms Execution**

## IV. IMPLEMENTATION TECHNIQUE

Simulation means mimicking the actual environment towards benefit of the research. The user or researcher can actually analyze the proposed design or existing algorithms through simulation. They can check the efficiency and merit of the design before the actual system is constructed. Simulation is advantageous to the users, as they can explore the benefit of that design repeatedly. This actually reduces the cost of reconstruct as changes have been made during design time. Simulation technique provides lots of advantages as the experiments can be carried out with voluminous data in different abstraction level. Simulators easily make available various kind of virtual environment for verification and performance evaluation of the experimented system. Even most of the time researchers could carry out benchmark experiments repeatedly in scalable environment for evaluating different aspects. [6]

This research use CloudSim-3.0.1 as a framework in the simulator environment.

Implementation has been started with installation of simulation package CloudSim-3.0.1 on Windows 8.1. Thereafter Java version 7 is installed and class path along with other necessary execution setup requirement is fulfilled. The minimum requirement of this experiment is VM (Virtual machine) memory of 1GB, VM bandwidth of 1000 and local operating system used as a host. In this simulation setup, well-known load balancing algorithms '*round robin*' have been executed with various combinations of millions instructions per second (MIPS) vs. VM and MIPS vs. HOST. Analysis is being carried out with respect to the response time as output. Fig. 3.4; represent various response times based with different combinations of MIPS vs. VM and MIPS vs. Host. It is observed for all the cases, response time is inversely proportionate with MIPS vs. VM and MIPS vs. Host. But optimum response time is achieved with same value of MIPS vs. VM and MIPS vs. Host. This

execution analysis illustrates that nature of each simulation results are similar as this research currently concentrates on improvement of response time with similar setup [5].

### 4.1 Simulation in Cloud: Cloudsim

Resources and software are shared on the basis of client's demand in cloud environment.

Essentially, dynamic utilization of resources is achieved under different conditions with various previous established policies. Sometime it is very much difficult and time consuming to measure performance of the applications in real cloud environment. In this consequence, simulation is very much helpful to allow users or developers with practical feedback in spite of having real environment [3].

### 4.2 Execution of Tasks in Cloudsim

Analysis is being carried out with respect to the response time. Fig. below shows various response time based with different combinations with MIPS vs. VM and MIPS vs. Host. Observation for all the cases, response time is inversely proportionate with MIPS vs. VM together with MIPS vs. Host. Optimum response time is achieved with same value of MIPS vs. VM and MIPS vs. Host. Pertaining to the execution analysis illustrates that nature of each Simulation results are similar as this research currently shows improvement of response time with similar setup.

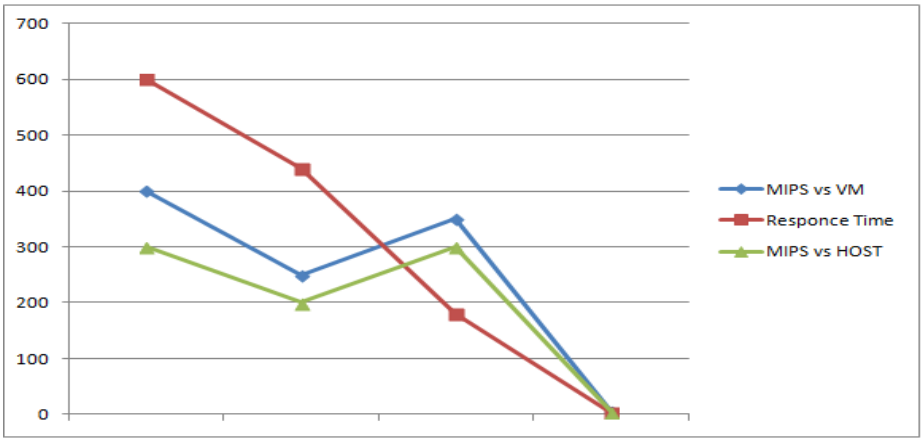


**Figure.2: Existing Response Time of Round Robin Scheduling Algorithm**

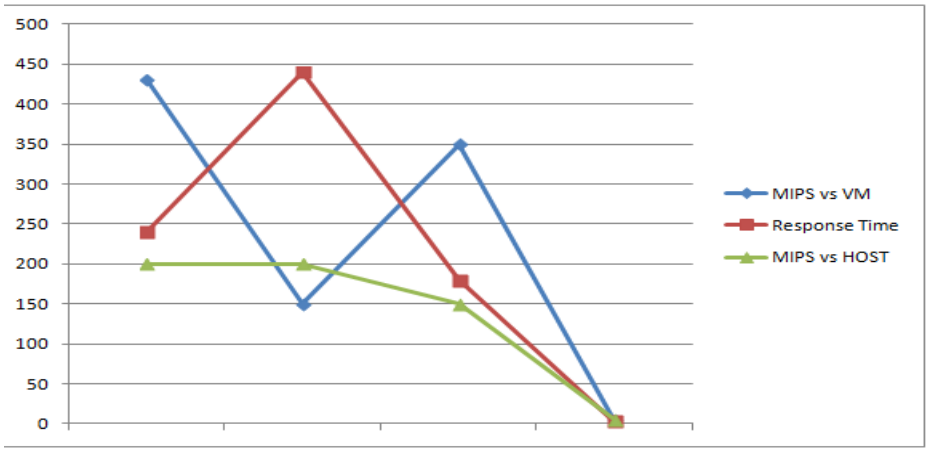


**Figure.3: Improved Response Time of Round Robin Scheduling Algorithm**

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## V. RESULT AND ANALYSIS

Many algorithms are developed and simulated in CloudSim environments for balancing and maintaining load in the cloud environment. Many of the existing researchers concentrate on virtual machine, hosts and response time so that it can be balance in cloud. These research works primarily focus on improving response time activity CloudSim environment mostly. In Rodrigo presents an analysis for minimum amount of time and memory requirement to initialize an experiment while the hosts in the data centre increases. The result indicates that the time and the requirement of memory are linear. Rodrigo shows that the time increases exponentially when the number of hosts/VM is increased in the simulation environment. Warstein emphasizes a model to find the suitable VM within very short period as it arrived with request arrival. He suggests that the least loaded VM would be selected to handle the request and the id of that VM would be sent to the data centre controller for further information processing requirement [5].Kaur showed an algorithm referred to as *active vm load balancer algorithm* to find the suitable VM in a short time period. Emphasis is given to the stressed to count the maximum length of VM for the allocation of new request. If the length of the vm is not at it maximum a new VM would be added. After that all the VM's load needs to be counted and least loaded VM would be selected to handle the new request.

### 5.1 Analysis

It is observed with thorough study that, load balancing algorithm on which situation workload is assigned works on the principle, during compile time or run time. Depending on the compile time it can be static or dynamic. Static algorithms are more stable than dynamic algorithm and it is easy to predict the behavior of static algorithm also.

Fig. 4 below shows Front Page of the Configuring environment. Fig. 5 shows data center configuration. Fig. 6 shows the Host Configuration in a Data Center. Fig. 7 shows Virtual Machine Configurations. Fig. 8 Host Vs MIPS Configuration. Fig. 9 Virtual Machine Vs MIPS Configuration.

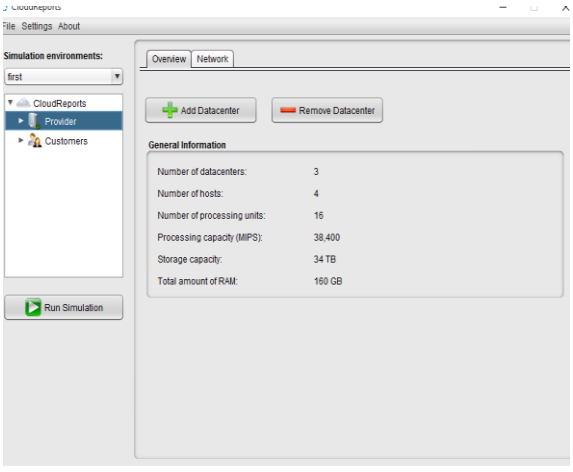


**Figure.4: Front page**

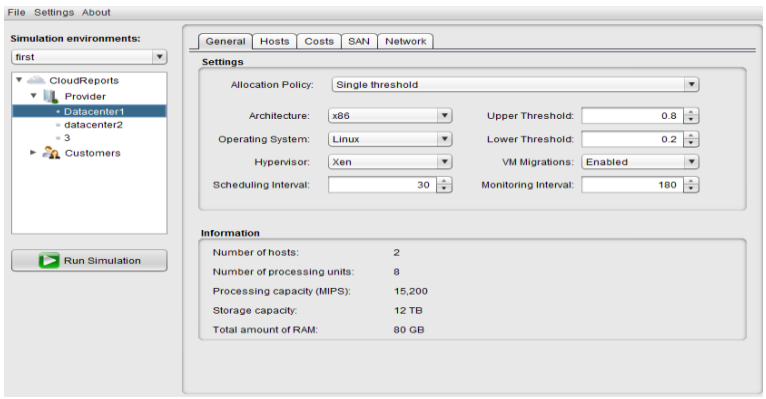


**Figure. 5: Data Center Configurations**

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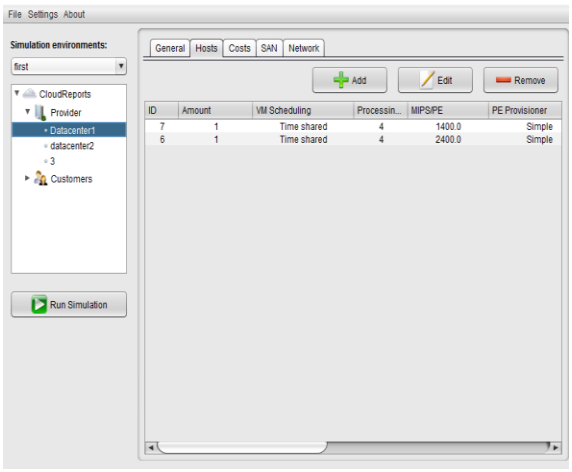


**Figure.6: Host Configuration in a Data Center**

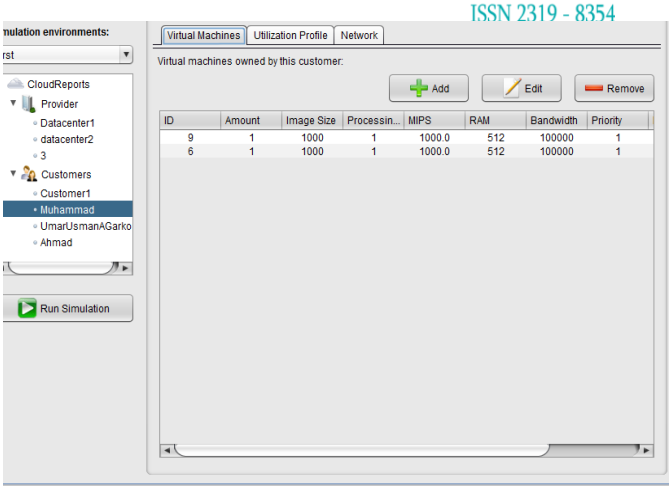


**Figure. 7: Virtual Machine Configurations**

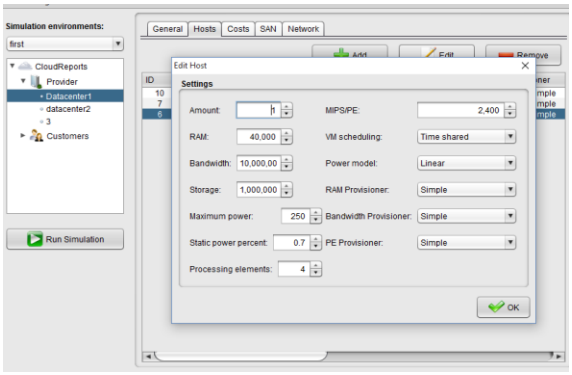


**Figure.8 Host Vs MIPS Configuration**

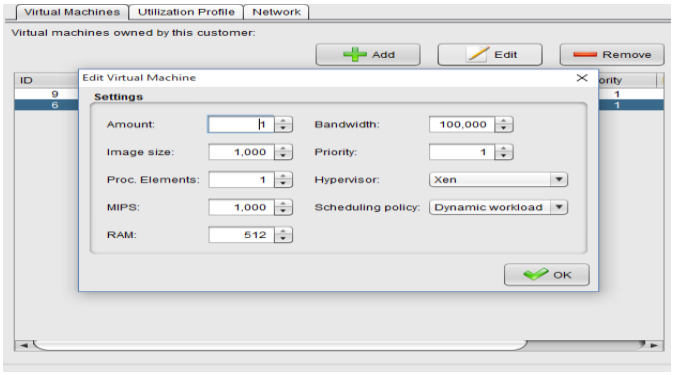


**Figure.9 Virtual Machine Vs MIPS Configuration**

## VI. CONCLUSION

The random coming of load in such an environment can resulted for some server to be heavily loaded while other server is idle or only lightly loaded. This Research presents a concept of Cloud Computing along with research challenges in load balancing this research work aims towards the establishment of performance qualitative analysis on existing VM load balancing algorithm which is implemented using CloudSim and java language. Execution analysis of the simulation shows that change of MIPS will have resulted effect on the response time. Increase in MIPS vs. VM decreases the response time. [9].

## VII. AKNOWLEDGEMENT

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