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# Load Balancing by Using Algorithm

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***Abstract—***
*The rapid growth of the World Wide Web has brought huge increase in traffic to popular web sites. As a consequence, end users often experience poor response time or denial of service. A cluster of multiple servers that behaves like a single host can be used to improve the throughput and alleviate the server bottlenecks. To achieve such a cluster, we need robust routing algorithms that provide scalability, effective load balancing and high availability in a constantly changing environment. Concept of Balancing Load in cloud computing has an important effect on the performance. A cloud computing system which does not use load balancing has numerous drawbacks. Now-a-days the usage of internet and related resources has increased widely. Due to this there is tremendous increase in workload. So there is uneven distribution of this workload which results in server overloading and may crash. In such systems the resources are not optimally used. Due to this the performance degrades and efficiency reduces. Cloud computing is made more efficient by better load balancing methods. User satisfaction also improves. This paper introduces a better load balancing model for the public cloud based on the cloud partitioning concept. A switch mechanism is introduced here to choose different strategies for different situations. The public cloud is divided into cloud partitions and different strategies are applied to balance the load on clouds. This paper introduces a system which has main controller, balancers and servers. The main controller selects the appropriate balancer for a particular job. The balancer further selects the server having minimum load. Hence, this system will help dynamically allocate jobs (data) to the least loaded server which will result in an efficiently balanced cloud system.*
Keywords— Cloud; Load balancing; Main controller; Balancers; Servers; Load Monitoring Server

## I. INTRODUCTION

Cloud computing involves virtualization, distributed computing, networking, software and web services. It is emerging field because of its performance, high availability, least cost, and many more qualities. It is easy, on-demand, variable and safe to use. Major characteristics: on-demand service, wide network access, resource pooling, flexible, measurable service, reduced cost of ownership etc. Cloud computing is very efficient but maintaining the stability of processing many jobs in the cloud computing is difficult. Each node in cloud has different capacities and the pattern of arriving job is unpredictable. Hence for load balancing, it is important to control workloads, which will improve system performance and maintain stability. To deal with unbalanced load on clouds and to increase its efficiency, we implement this load balancing system.

## II. BACKGROUND STUDY

In clouds the data and resources are stored in an open environment. So the amount of data can increase quickly. Thus to manage this large amount of data, the concept of load balancing is very important. Load balancing distributes the workload dynamically and helps to utilize the resources optimally. This paper discusses some of the existing load balancing algorithms and their challenges. Factors like scalability, resource utilization, performance, response time etc are addressed here [3].

The cloud computing is a dynamic environment. The availability of cloud systems is analyzed in this

paper. The load balancing model is applied across different data centers to ensure the network availability. This paper highlights the load balancing techniques that help to improve performance, resource utilization and availability of cloud computing environment. It tries to reduce the cost of cloud systems.

Cloud computing is an ever evolving concept. The NIST definition describes important characteristics of cloud computing. This paper compares cloud services and various deployment strategies in order to understand what exactly cloud computing is. It also describes some methods of using cloud computing in the best possible ways. This article describes essential characteristics, service and deployment models.

## III. METHODS

There are many nodes in a public cloud which are at different locations. The cloud has a main controller (MC) which chooses the suitable partitions for arriving jobs. The appropriate partition is selected by using best load balancing strategy.

All the status information is gathered and analyzed by main controller and balancers. They also perform the load balancing operations. The system status then provides a basis for choosing the right load balancing strategy.

In this paper we will use approximately 4 different servers, which are partitioned into small clouds called balancers (each balancer will have some servers). Cloud Service Provider (CSP) is used to handle a Main cloud (which is made up of small Clouds) called Main Controller or Controller main. Client interacts with cloud using a web application called client Site.

When client uploads file it will be stored in the server. The cloud will take care that it will be loaded into the server which has minimum load.

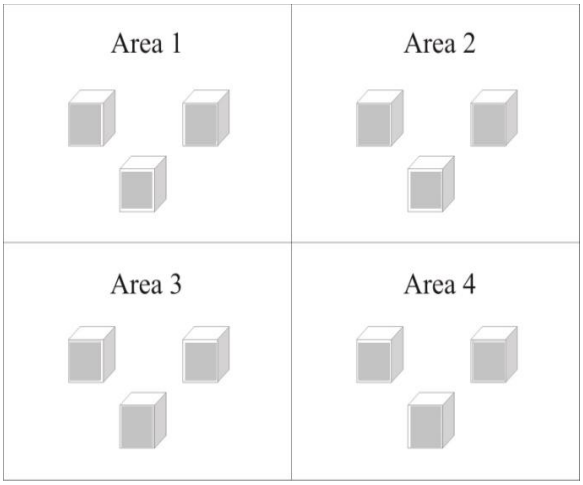


**Figure 1: Cloud Partitions**

*Modules :*

A public cloud has innumerable nodes placed at various physical locations. A small part of this cloud is called partition. Our system has a main controller, balancers and multiple servers. Main Controller helps to select the partition. The partition is selected by applying best partition search strategy. Balancer has multiple servers attached to it. It keeps the record of all status information. Initially a request arrives at the system. The best partition search strategy helps to decide to which partition the request has to be assigned. The status information is then checked. And the request is assigned to the server having minimum load. The servers will have following states: Idle, Normal, Overloaded. For overloaded condition another partition is searched.

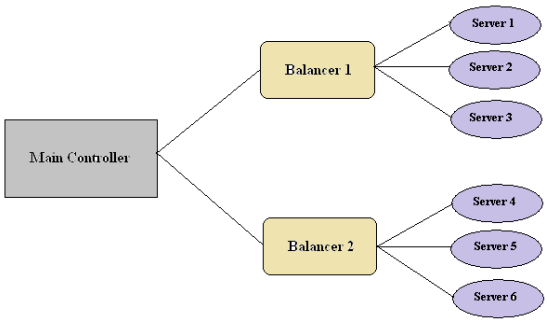


**Figure 2: Block diagram of system**

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## IV. LOAD BALANCING ALGORITHMS

Load balancing algorithm directly influences the effect of balancing the server workloads. Its main task is to decide how to choose the next server and transfer a new connection request to it. There are four basic steps that that algorithms should follow:

1) Monitoring server performance (load monitoring)

2) Exchanging this information between servers (synchronization with load-balancer)

3) Calculating new distributions and making the balancing decision. (Rebalancing criteria)

4) Actual request serve (fulfilling demand)

*Algorithm:*

The status of every server is updated by the balancers and depending on the status the partition is selected. The cloud partition status can be divided into three types:

(1) Idle: When the load exceeds alpha

(2) Normal: When the load exceeds beta

(3) Overload: When the load exceeds gamma

The parameters alpha, beta, and gamma are set by the cloud partition balancers.

Best Partition
Searching Algorithm:
Begin
WhileUser_requestdo
Best_partition_searching_strategy (User_request);
If partition_status == idle OR partition_status == normal then
Assign user_ request to Partition;
Else
Search for another Part;
End if
End while
End

The MC communicates with the balancers at regular intervals of time to obtain the status information. Best partition is selected using best partition searching strategy. Round robin algorithm helps to select the suitable node. We are creating our private cloud for this project. This cloud uses web services and SOAP (Simple Object Access Protocol).

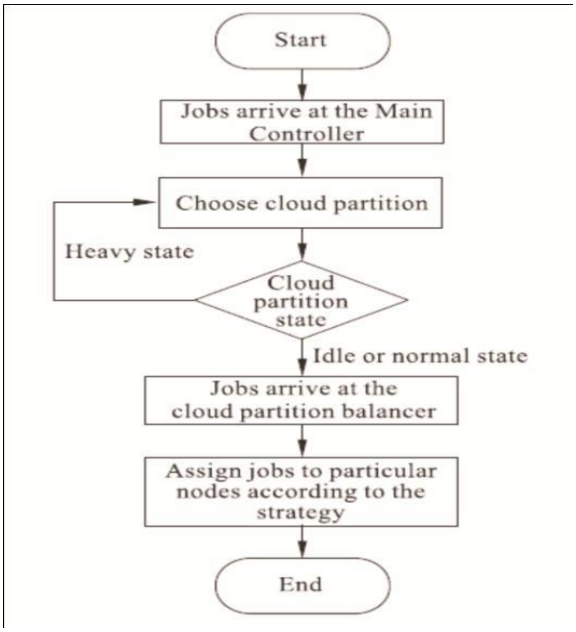


**Figure 3 Process workflow**

## V. CONCLUSION

The overall goal of this project is to balance the load on clouds. Balancing load on the cloud will hopefully improve the performance of cloud services substantially. It will prevent overloading of servers, which would otherwise degrade the performance. The response time will also improve. This software maybe used for efficient data storage on clouds and load balancing. This software will help dynamically allocate jobs (data) to the least loaded server. Thus overall performance of cloud services will not be affected. It aims at having a backup plan in case the system fails even partially. Also work is done to maintain the system stability. There are provisions to accommodate future modifications in the system. Thus, we have successfully gathered information of project and hopefully we will implement Load Balancing Model for better utilization and performance of cloud services.

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