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A Performance Booster for Load Balancing In Cloud Computing With My Load Balancer Techinique

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Abstract : Load balancing is the central piece of open distributed computing. The procedure of load balancing increments the execution of cloud-based administrations. Cloud based administrations gives equipment's, programming and stage as administration. Usage of data is increasing day by day and we are in need for an efficient load balancer in cloud computing world. There are a lot of algorithms and techniques which are currently used in this field to increase efficiency, reliability and many more parameters. Here an algorithm is proposed which allocates the job to VM based on current job and average of all the jobs. In this paper, we have developed a technique and compared with the Round Robin and Equally Spread current execution load techniques. Cloud analyst is developed in java platform and is free to be used by anyone for research. All the techniques, including the proposed technique is simulated in cloud analyst and used in windows operating system as a platform. Our load balancing technique is more efficient in response time than the other two.

Keywords: Cloud computing, Cloud Sim, Cloud Analyst, Distributed Computing, Round Robin, Virtual Machine

I.INTRODUCTION

Distributed computing gives power to an effective computing by centralized memory, processing, storage and bandwidth. It should ensure that, no single VM is stacked vigorously and moreover guarantee that some VMs don't stay inactive or potentially under stacked. Cloud computing has been increasing in massive where client can pay (as you use) for software and hardware. To enhance the reaction time of the client's submitted application or requests, all the accessible assets are utilized with the help of load calculations. Load adjusting strategies means to accelerate the execution of utilization by expelling undertakings from over stacked VMs and assigning them to under stacked VMs, Load adjusting is the way towards enhancing the execution of parallel and circulated framework through a redistribution of load among the processors or hubs, as load balancing is one of the serious issues identified with distributed computing, the load may be dependent upon CPU limit, memory, arrange stack and so forth. It is important to circulate the load similarly, among the hubs in a system. Hence the strategy avoids heavily loading or under loading of nodes in a network. Load adjusting helps in reasonable distribution of tasks or jobs to accomplish a high user fulfilment and appropriate resource usage.

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For example, there are 100 users and these 100 users need to be treated equally in the system and satisfied by the provider, hence a load balancer should be used in between. One of the major issues faced in cloud computing is Load Balancing. CPU capacity, Network, memory etc. may represent the load. Distribution of load is equally important and necessary to a VM in a network. Efficient performance and agility of the system can be achieved, hence heavy loading and under loading can be avoided in a network.

The common objective of using load balancing technique is to

- To maintain system productivity efficiently.
- To ensure a fair distribution of load among virtual machines.
- To improve the performance through utilizing the resources.
- Less response time.
- Less cost.

When a user makes a request for any application or service, efficient use of resources should be done, and this could be achieved using load balancing algorithms(LBA). Load balancing algorithms(LBA) targets itself to speed up the complete process by allocating the jobs to all the under stacked VMs and by removing the jobs from over stacked VMs.

II.RELATED WORK

Santosh Anand et al. 2018,the paper discusses about the effective utilization energy [1] in WSN, the study is based on ad hoc network, the simulation results are done using NS2 simulator.[11] The design of the network is built using a Flat Grid topology. It contains n nodes. With the [12] help of the primary routing protocols and WIFI medium the structure of ad hoc network is [13]designed. Every node is designated with a x, y and z positions to find out the distance. Packet loss in the network will be determined using a sink hole. [14]The Information passage between the source and the destination is done using "route request" and "route reply messages". To determine the [15]particular path to route the data a unique is color is used. Once the first transmission is done it will help to find the distance and this gives a chance in discovering the neighbors and non-neighbors. Path [16]optimization technique is used for this research, the important use of this algorithm is calculating the shortest path also finding the optimized [17]distance for the intervening adjoining nodes in-between neighboring and non-neighboring[18] nodes.

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With the help of the least threshold distance as well as the incidental distance is merged to find[19] the shortest route. A color determines the desired path, in[20] case the path is not existing then the working will be ended considering the next [21]node. From the study it discusses about the characteristics of the sensor models also finds different [22]methods to enhance the network capability.

Manishankar Sankar et al. 2016, the paper discusses an optimal method to produce [2] effective scheduling also to gain ideal load balancing. It uses an algorithm called the VISTA scheduling algorithm to achieve an effective result with least use of process measures. This is used to suffice the requests made by the clients. The general cloud paradigm will be divided and is used. The prototype is done based on the preceding mechanisms and suggests the foremost partition in the cloud. Using the proposed algorithm, the scheduling of jobs is prioritized. If the client sends a request for a file existing in the public cloud then the file server will respond to the request by computing the Load Degree, this is calculated that consists the factors such as the amount of CPU used, RAM used and the bandwidth. This result will be sent to the balancer. This in return will maintain and update a status table. Based on the status table criteria two different process will take place, if the partition is either idle or with less load then the Scheduling algorithm responds to the request or if the partition is with a moderate load then Assignment algorithm comes to picture. Hence, we see that the proposed system the job will be assigned to the ideal processor. In regard will make an effective use of the resources given and increase the performance. Hemant S. Mahalleet al. 2013 have proposed “Active monitoring load balancer technique” [3] which contains all the data about every Virtual Machine(VM) and the figure of requests currently assigned to which particular Virtual Machine. It looks for least stacked Virtual machine and identifies it, when request is made to allocated to a new Virtual Machine(VM) arrives. If in case it is found that there are more than one, the very first identified Virtual machine is selected. Data center Controller gets the Virtual machine ID, which is returned by Active VM Load Balancer and leads the request to the identified VM by that identification. “Data Center Controller” notifies the Active VM LB (Load Balancer) of the new allocated division. Raza Abbas Haidri et al. 2012, Nature of scheduling algorithm used is Heuristic based algorithm [4]. The type of algorithmused in this work are “Round Robin Algorithm”, “Throttled load Balancing Algorithm”,” Min-Max and Max-Min Algorithm”, LJFR-SJFR Heuristic Based Algorithm, Suffrage Heuristic Based Algorithm. The goal of this work is to provide an efficient load balancing algorithm that ensures fair dispersal of load between virtual machines and better supply utilization. The parameters used are estimates of bandwidth, storage efficiency, processing power, and memory utilization. This work proposes a heuristic-based scheduling system for efficient accomplishment of tasks. The projected model will balance the load from several handlers between different data centers, which will result in high performance and improved resource utilization in the form of improved turnaround time and response time. The system is implemented using the Cloud-Sim simulator. This work is implemented in a cloud environment. The advantage of this work is that it prevents increased turnaround time, response time and underutilized resources. It also has higher supply utilization, and even if the number of cloudlets is increased, the remaining capacity of the VM can be effectively used. S M S Suntharam,2013,has proposed load balancing by Maxi-Min Algorithm [5] in private cloud environment. The objective is to use max-min algorithm in Cloud sim to show how to balance the load across the different storage nodes in the private cloud, which reduce the make span and data traffic. Max-Min algorithm is also used to reduce idle time and so efficient in mapping the load across the nodes. The parameters considered are VM processing power, bandwidth, memory. The result obtained is algorithm consumes less time in storing a job in node and decreases problem of deadlock in cloud environment. Thus, algorithm attains high sufficiency and scheduling efficiency to all jobs in the private cloud. In future work, considered to improve the complexity and fault forbearance. Kousik Dasgupta et al. 2013,has projected a “novel load balancing strategy” using “Genetic Algorithm (GA)” [6]. Objective of the work is to balance the incoming load of the cloud setup while trying to reduce the make span of a specified tasks set using the mechanism of natural selection strategy and performance of the algorithm is compared with Round Robin, FCFS and local search algorithm. The parameters considered are average response time, processing power and performance. The result obtained by genetic novel load balancing algorithm, it outperforms the existing algorithms and achieve the system performance by maximum resource utilization. It also guarantees the quality of service required. In future work, single point of crossover and variation in selection strategy can be considered. K. Venkata Subba Reddy et al. 2014, proposes “Dynamic hierarchical load balancing service” architecture [7] for cloud information centers. Objective of the work is to enhance the incoming load from the simulated component of cloud datacenter and offers a generic assessment matrix to estimate the efficiency of cloud datacenters. The various parameters are based on availability, computational speed, storage and redundancy. This work improves the performance of load balancing algorithm using virtual migration policy and evaluated the validity of virtual machine and physical host using performance evaluation matrix. Reena Panwar et al. (2015),projected a dynamic load management technique [8], intended for load distribution among different Virtual machines, and could sim toolkit was used for the simulation, to get some improved changes in average response time and processing time. The proposed technique was simulated using 4 data centers and 25 virtual machines. It was observed that the above parameters were improved when compared to other techniques. Sridhar G Domanal et al. (2014), VM-assign Load balancer algorithm [9], the projected algorithm will assign all the arriving request to the existing virtual machines in a proficient manner. The proposed technique was simulated with the help of “Cloud Sim Simulator” and then related with the existing “Active-VM Load Balance Algorithm”. It was observed that VM allocated the Tasks without over /under used VM Klaithem Al Nuaimi et al. [2012] Dynamic Load Balancing Algorithm [10] is used here as a scheduling algorithm, WLC, DDFTP, LBMM are the various algorithms used in it. Objectives of this work is to have maximum Resource Utilization by enhancing the overall Cloud performance by doing a fair distribution of resources from heavy stacked server.

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The various parameter is Reliability, Flexibility, Throughput, privacy and security. The work is implemented in Cloud environment. The work is implemented in cloud Environment.

III.PROPOSED METHODOLOGY

MYLOADBALANCER:

AvgCount =

$$\frac{\text{current Allocation Count of VM1} + \ldots\ldots + \text{current Allocation Count of VMn}}{\text{Number of VMs}}$$

Input: Count of inbound requests $Q_1, Q_2, \ldots\ldots, Q_m$.

VacantVM: $VMa_1, VMa_2, \ldots\ldots VMa_n$.
Output: All inbound requests $Q_1, Q_2 \ldots Q_m$ are allocated available $VM_1, VM_2, \ldots\ldots VM_n$ in such way that optimize response time of system.

Step 1: At the starting all machines are in available state. currentAllocationCounts.get(VMs)==0;

Step 2: Load balancer maintains the two maps

A. One comprising Virtual machines(VMs) ID and existing allocation count of VMs.
B. Second with virtual machine ID and stateof virtual machine(VM) (Busy / Available).

Step 3: All request will be passed to load balancer when new one arrive at the data center controller.

Step 4: Random VM is selected fromvmStatesListmap for further execution.

Step 5: Compute current allocation count of selected VM.currCount= currentAllocationCounts.get(VmId);

Step 6: If (currCount<AvgCount) then
Goto step 8 else
Goto step 7
Step 7: Select VM with minimum allocation.
Step 8: Assign VM to current request mark it busy.
Step 9: Update current allocation count of VM.

IV.EXPERIMENTAL RESULTS

The experimental results showcase that my load balancer technique has lesser response and the data center processing time than the "round robin" and "Equally Spread current execution load" techniques. From Table 1, Table 2 and Table3, it is very clear that overall response time and data center processing time is efficient and lesser in my load balancer technique.

Table 1. Results of Round Robin balancing technique

Constraint	Average(ms)	Minimum(ms)	Maximum(ms)
Overall Response Time(ORT)	4565.29	391.12	14327.87
Data Center Processing Time(DCPT)	4307.94	184.45	13757.77

Table 2. Results of Equally Spread current execution load technique

Constraint	Average(ms)	Minimum(ms)	Maximum(ms)
Overall Response Time(ORT)	4573.33	391.12	14322.28
Data Center Processing Time(DCPT)	4316.25	184.45	13924.35

Table 3. Results of My Load Balancer technique

Constraint	Average(ms)	Minimum(ms)	Maximum(ms)
Overall Response Time(ORT)	4520.24	343.96	14300.13
Data Center Processing Time(DCPT)	4263.10	157.93	13694.10

Figure 1 shows maximum(ms) of the Overall Response Time from Table 1,Table 2 and Table 3 and it is very evident that My Load Balancer is having lesser response time compared to others.

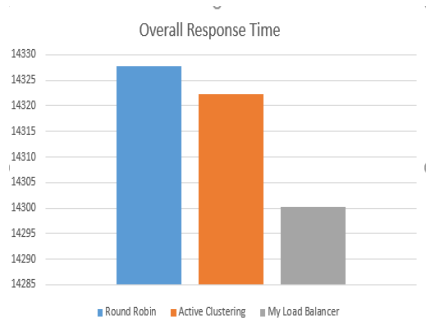

Figure :- 1

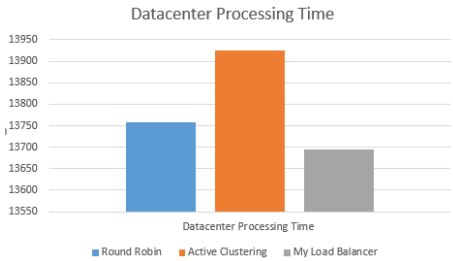

Figure :- 2

Figure 2 shows maximum(ms) of the Datacenter Processing Time from Table 1, Table 2 and Table 3 and it is very evident that My Load Balancer is having lesser processing time compared to others.

V.CONCLUSION

In the proposed work, Load balancer using My Load Balancer optimization technique has been compared with the two most famous load balancer technique i.e., Round Robin and Equally Spread Current Execution Load also known as Active Monitoring Load balancer. All these Techniques are simulated in Java based Cloud analyst toolkit.

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Graph forms has been used to demonstrate the comparative analysis. Finally, after all the continuous simulation, results were found exceptional and good on behalf of My Load Balancer technique. These simulations were mainly compared on the basis of“overall response time” and “Data Center Processing
Time”. From the simulation results, it was profoundly noted that response time was very less for My Load Balancer. The parameters which are mainly targeted here are overall response time and Data Center Processing Time.

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