



An Enhanced Round Robin and Greedy Approach in Cloud Load Balancing

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Abstract— *Cloud computing is a new paradigm and it is becoming more popular due to its features. The term cloud in cloud computing refers to resource provider, providing different types of services such as storage, software and hardware. In cloud computing load balancing has an imperative effect on execution. In this paper presents an improved load balance model for public cloud in view of the cloud separation idea with change mechanisms to pick diverse procedures for distinctive circumstances. Apply round robin and greedy approach in combination to deal with the problem of load balancing to enhance the proficiency in people in public cloud environment.*

Keywords— *Cloud Computing, Load balancing, Cloud Sim, Round robin, Greedy approach.*

I. INTRODUCTION

Cloud computing is the outsourcing of IT communications by the use of the Internet and maintaining own hardware and software environment. Cloud computing facilitates computing assets (processor compute time and data storage) on demand by the use of a service provider. In this technology almost everything like hardware, software and platform are provided as a service. In Cloud Computing the term Cloud is used for the service provider, which holds all types of resources for storage, computing etc. Cloud computing provides three types of service model i.e Iaas, Paas and Saas. Iaas provides infrastructure (storage space) for user request on demand for various purposes include resource computation. Another one is Platform as a service (Paas), which provide the platform to user on the basis of request, so that a user can develop their application and deploy on this platform. The last is Software as services (SaaS), it provides users to use software directly without the need of installing software on their machine and used directly the service of cloud [1]. Due to large no of user increases day by day the volume of data in the cloud also increased. By this user face how to manage this data. Therefore, number of researcher work continuously to manage the problem of database in the cloud platform has been proposed. As the number of users increases the consumption of resource such as demand on storage space as well as the executing database engine for service and management of the database. On the practical application, a host often serves more than one database application systems concurrently [2].

Due to a great diversity and large volume of data in the cloud, the databases are spread across a broad range of hosts to serve numerous of users and must have sufficient scalability and management capabilities to face any specific data needs in real time. Therefore, several researches on how to efficiently manage databases in cloud platform have been proposed. A database management system on the database server to serve a large number of users is quite resource consumption, such as the demand on storage space and memory as well as the executing database engine for service and management of the database. On the practical application, a host often serves more than one database application systems concurrently [2].

II. LOAD BALANCING

Load balancing is the procedure of enhancing the execution of a parallel and circulated distributed system a redistribution of burden among the processor [4]. The primary objective of load balancing is to even out the workload among the nodes by minimizing execution time, minimizing correspondence delays, maximizing asset use and expanding throughput. A general load balancing example in our daily life is use of websites. The user could experience long delays, long system responses and timeout without use of load balancing. The solution of load balancing usually includes redundant servers which provide a good distribution of communication traffic so that website availability is conclusively settled [5].

In a distributed computer system environment, as described in [6], where two or more independent PCs are associated by means of a correspondence system, resource sharing is a most attractive feature. Aside from sharing information and I/O devices nodes of a distributed system could further enhance system execution by sharing their computational force. Burden Load balancing is a mechanism that empowers jobs to move starting with one PC then onto the next inside of the appropriated framework. This makes quicker jobs service e.g., minimize job response time and improves resources use. Different studies have demonstrated that load balancing among nodes of a distributed system enhances system execution and increases resource use.

III. LITERATURE REVIEW

Gaochao Xu, Junjie Pang, and Xiaodong Fu [7] Load balancing in the distributed computing environment has an essential effect on the performance. Great load balancing makes distributed computing more proficient and enhances client fulfillment. This paper presents a superior load balance model for the public cloud based on the cloud partitioning concept with a change system mechanism to pick diverse methodologies for distinctive circumstances. The algorithm applies the game theory to the load balancing technique to enhance the effectiveness in public cloud environment.

Vikas Kumar and Shiva Prakash [8] in this paper they have surveyed the load balancing issue in cloud computing and analyzed various strategies utilized as a part of load balancing. In cloud computing load balancing is the primary issue. Load balancing is needed to circulate the extra dynamic local workload uniformly to the whole node in the entire cloud to accomplish a high client fulfillment and resource usage proportion. It additionally guarantees that each computing resource is appropriated productively and fairly. There are many researchers who have utilized the load balancing systems to propose new procedures. Their work done in the domain of load balancing is examined and thought about. Be that as it may, the issue of load balancing is still open for research work so that high user fulfillment and resource usage can be accomplished.

Mayank Patwal and Tanushri Mittal [9] cloud computing is the outsourcing of IT communications by the use of the Internet and maintaining own hardware and software environment. Cloud computing provide resources on demand by the use of a service provider. It is available whenever you want it, as much you require, and you use only for what you pay. In this paper, they present a survey on cryptographic based security algorithms for cloud computing.

Sajjad Hashemi [10] in this paper attempt to review and highlight security challenges, especially the security of data storage in a cloud domain. Additionally, gives a few offers to improve the security of information data storage in the cloud computing systems that by utilizing the opinions can be overcome to some degree on the issues. In the computerized world utilizing technology and new technologies require protected and solid environment, and it additionally needed thought to every one of the difficulties that innovation faces with them and location these difficulties. Distributed computing is additionally one of the new innovations in the IT world in this rule there is no exception.

Nayandeep Sran and Navdeep Kaur [11] in this paper, they have added to a Load Balancer Algorithm that controls the flow of payload in based on the safety thresholds, which may be static or dynamic in nature, depending upon the accessible machines and data transfer capacity also. they had examine the current algorithms of Load Balancing, for example, Round Robin, Throttled, Equally Spread and Biased Random Sampling and they have proposed another algorithm which will improve the current Load Balancing Approach, by diminishing the general asking for time and handling time when contrasted with the current calculations and consequently will diminish the expense which is demonstrated through thorough reproduction study. Their proposed Algorithm will likewise give security to the information in cloud during Load Balancing process by utilizing Zero Proof Algorithm.

Nusrat Pashaet. [2]al in this paper review on existing scheduling algorithm. The proposed algorithm for VM load balancing implemented in cloudSim toolkit. Assuming the application is deployed in one data centres having virtual machine (with 2048 Mb of memory in each VM running on physical processor capable of speed of 1000 MIPS). The results showed that Round Robin VM load balancing improves the performance by consume less time for scheduling virtual machine.

IV. PROBLEM DOMAIN

Load balancing was notorious as a major worry and it leads to degrade the performance of the resource allocation in dynamic nature. This also makes more difficulty to dispatch the job to resource from the queue and one more difficulty is in provisioning or allocating the Job in cloud data centre. In the existing system more resource overload and energy consumption.

V. PROPOSED WORK

In the proposed method combine technique of round robin and greedy approach to resolve the problem with the existing load balancing work. For our proposed work static and dynamic parameters consider that includes no. of CPU, memory size, bandwidth, Ram usage, CPU and memory utilization etc. In the beginning of process load balancer check the processing speed of CPU, also check availability of memory, no of system connected to network. Now calculate the degree of load (no of jobs) on each virtual machine. After this, calculate average load (each cloud partition) on the basis of load degree. On the basis of average load set the level of nodes i.e. high, idle, and normal. We apply round robin with greedy approach for idle and normal condition that balance the load on cloud.

1. Round Robin:

In round robin approach, the processes are distributed between all processors. Every process is assigned in round robin order to processor. The allocation of process is totally independent of remote processor. The load distribution time of every process are same but differ in job processing time. At this time some nodes in idle condition and some nodes in heavily loaded condition. This approach is mostly used in web servers where Http requests are of similar nature and distributed equally.

2. Greedy Algorithm

A **greedy algorithm** is an algorithm that follows the problem solving heuristic of making the locally optimal choice at each stage with the hope of finding a global optimum path. For a set of jobs and the virtual machines, Greedy Based Algorithm depends on the local optimal method to allocate resources. So we called Greedy- based algorithm rely on greedy algorithm.

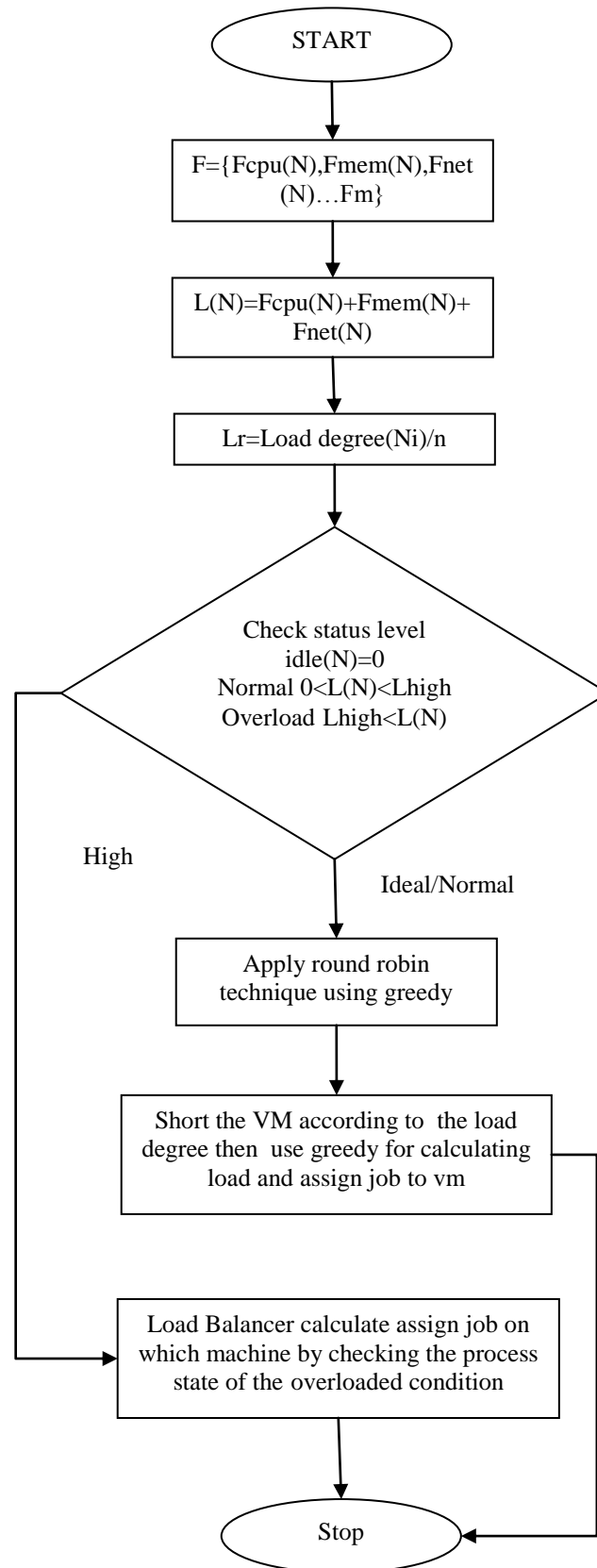


Fig1: Flow Chart of Proposed Work

Proposed Algorithm:

Load degree related to various static and dynamic parameters.

Static – No. of CPU's, the CPU Processing speeds, the memory size, RAM usage.

Dynamic – CPU utilization ratio, memory utilization ratio, network bandwidth.

- 1). Balancer check the speed, RAM, Bandwidth and number of CPU of the machines which is connected to the network. Load Parameter set

$$F = \{F_{CPU}(N), F_{mem}(N), F_{net}(N) \dots F_m\}$$

M = total no. of parameters

2) Compute the load degree

$$L(N) = \alpha \times F_{CPU}(N) + F_{mem}(N) + F_{net}(N)$$

α is the weight parameter reflecting different kinds of jobs configured by user.

3).The integrated (avg) load L_r of one kind of partition refers to the load average value of all virtual nodes in this partition given as-

$$L_r = \frac{\sum_{i=1}^n Load_De_i}{n}$$

4).Node status label

- a) Idle $L(N) = 0$.
- b) Normal $0 < L(N) \leq L_{high}$
- c) Overload $L_{high} < L(N)$

5).Then we will apply a new round robin technique using greedy approach for load balancing. First we sort the VMs according to the load degree then applied the greedy approach for calculating the load and assign job to the virtual machine. Load balancer calculates assign a job on which machine by checking the process states of the machines in the overloaded condition. Balancers always maintain the processes states in the form of sorted way and updated it continuously.

VI. EXPERIMENTAL RESULTS

Load Balancing TASK TO VM		
HID	VMID	TASKID
0	1	0
		6
	6	5
1	2	1
		7
	4	9
2	3	3
		2
	3	8
3	5	10
		4

Fig 2: load balancing task to VM for base

In this figure show load balancing task to VM for base result based on the parameter of HID, VMID and TASKID.

Load Balancing TASK TO VM		
BID	VMID	TASKID
0	1	1
		5
	6	3
1	2	8
		2
	4	7
2	3	9
		0
	3	10
3	5	4
		6

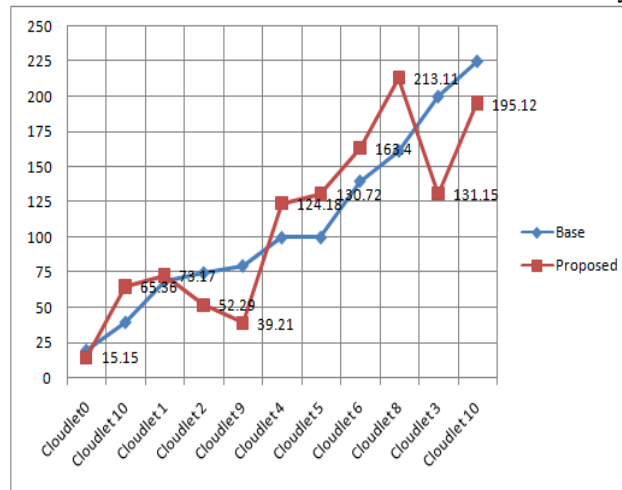
Fig 3: load balancing task to VM for proposed

In this figure show load balancing task to VM for proposed result based on the parameter of HID, VMID and TASKID

Table 1: Comparison table between Base and Proposed

Cloudlet ID	Base			Proposed		
	Start time	Finish time	Difference	Start time	Finish time	Difference
0	20.1	40.1	20	20.1	35.25	35.15
10	20.1	60.1	40	20.1	85.46	65.36
2	20.1	89.33	69.23	20.1	93.27	73.17
1	20.1	95.1	75	20.1	72.39	52.29
9	20.1	100.1	80	20.1	59.31	39.21
4	20.1	120.1	100	20.1	144.28	124.18
5	20.1	120.21	100.11	20.1	150.82	130.72
6	20.1	160.21	140	20.1	183.5	163.4
8	20.1	181.64	161.54	20.1	233.21	213.11
3	20.1	220.1	200	20.1	151.25	131.15
7	20.1	245.1	225	20.1	215.22	195.12

In this table we show the comparison between the base and proposed work in terms of cloudlet ids, start time and finish time. The simulation results shows that proposed work is better in compare to base work. Start time between base and proposed is same but the finish time is different and finish time show the result efficiency of proposed work.



In this graph we show compare between base and proposed result in terms of cloudlet ids and time. Here Base System Avg. difference time is: 121.088 Proposed System Avg. difference time is: 120.286

VII. CONCLUSIONS

In this paper we proposed a new Load Balancing Algorithm which efficiently balances load by reducing the overall requesting time and reduce average difference time of different cloudlets. It is clear from the outcomes that the proposed method in paper has the capacity adjust the load to a more extent than the analyzed algorithms. In this paper we have studied the load balancing issue in cloud computing and examined different systems utilized as a part of load balancing. In distributed computing burden adjusting is the primary issue. Load balancing is needed to distribute the extra dynamic local workload equally to the whole nodes in the entire cloud to accomplish a high user fulfillment and resource usage proportion. It likewise guarantees that each registering resource is appropriated productively and fairly. There are different scientists who have utilized the load balancing procedures to propose new methodologies. Their work done in the space of load balancing is examined and compared. Experiment results showed that proposed average load degree value is better from previous technique.

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