"AN EFFICIENT LOAD BALANCING METHOD FOR CLOUD COMPUTING, BY USING IMPROVED ANT COLONY AND GENETIC METHOD"

Mr. Sachin Shingne, Dr. Umesh K Lilhore, Mrs. Phiza Ambreen Khan

PG Department of Computer Science & Engineering, NRI-IIST Bhopal, MP, India

ABSTRACT

Computer technologies are changing day by day, different hardware's, software's are introducing regularly by various companies. It is quite difficult for an organization to upgrade or changed all the hardware's and software's other issues are related to services and maintenance. Existing load balancing Ant colony optimization can be improved by adding new parameters and combining with the Genetic algorithm. In this research we are presenting, an efficient load balancing method for cloud computing, by using improved ant colony and genetic method (Proposed IACGM). The proposed IACG method uses mainly two strategies of max-min rules and forward-backward rules for quick selection of candidate nodes. IACG also uses a new parameter of moving probability to ensure either forward and backward ants are meeting efficiently to its neighbor or not during searching. The reason behind the selection of GA is that, to ensure select only best fittest Ant in each selection period. Proposed method (IACGM) and existing (Ant Colony) methods are implemented over cloud-sim simulator and various performance measuring parameters such as makespan time, waiting time, response time and a total number of jobs migrated are calculated.

Keywords- *Cloud load balancing, Ant colony optimization, IACGM, Genetic Algorithm, Dynamic LB, Improved Ant Colony*

1. INTRODUCTION

Nowadays, cloud computing has come to be a key era for online allotment of computing property and online storage of person's records in a decrease fee, in which computing resources are available all the time, over the net with pay in keeping with use concept. Cloud computing is an enterprise oriented concept in which computing property are outsourced through cloud issuer to their purchaser, who call for computing online. In cloud computing load balancing plays a vital role in optimum resource utilization. In this work we are presenting an efficient LB method for cloud computing. This complete work is organized in following chapters, Introduction, existing work, cloud computing and Load balancing, problem statement and proposed solution and simulation results and comparison [1,2].

2. CLOUD COMPUTING AND LOAD BALANCING

In the arena of information technology, cloud computing is a current-day style that moves to compute and records far away from the computer and transportable computer systems into huge data centers. Cloud computing allows each person to use software program and computing services on-call for at whenever anywhere and everywhere through the internet [4].

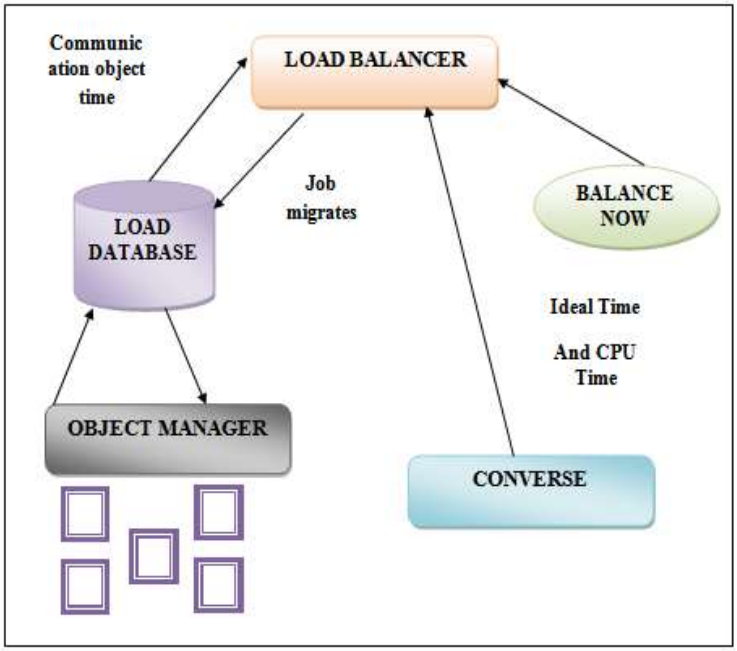


Figure 2.1 Cloud Load balancing [5]

Cloud load balancing is the technique of doling out workloads and computing property in cloud computing surroundings. "Load balancing permits businesses to control software program application software program software program or workload goals via the use of allocating property among multiple laptop structures, networks or servers". Cloud load balancing includes net web hosting the distribution of workload internet net internet net internet web page internet net internet web page on-line internet net internet web page website site visitors and dreams which can be dwelling over the Internet [7].

3. EXISTING WORK

Some of the widely used existing LB methods, suggested by various existing authors are as followed.

LOAD BALANCING ALGORITHM TYPES				
Based on the System States				Based on Process
Static LBM		Dynamic LBM		
Brute Force Algorithm	Based on Completion Time	Based on Biological Phenomenon	Based on Statistics	Sender-Initiated
Round Robin	Min Min	Ant colony	Active Clustering	Receiver-Initiated
Opportunistic Load Balancing Algorithm	Two-phase	Honeybee	Random Biased	Symmetric LB
	Max Min			

Figure 3.1 Cloud LB Methods

3.1 Round-Robin Algorithm (or RRLB)-It is the static load balancing set of rules which makes use of the round robin scheme for allocating interest. It selects the number one node randomly after which, allocates jobs to all specific nodes in a round-robin style.

3.2 Opportunistic Load Balancing Algorithm (or OLB)-It is especially an (SLB) static load balancing method, which set of guidelines. So it does not hold in mind the contemporary workload of the VM.

3.3 Min-Min Load Balancing Algorithm (or MMLB) - The cloud supervisor identifies the execution and final touch time of the unassigned obligations organized in a queue. This is static load balancing set of hints to the parameters related to the interest are recognized in advance. In this form of a set of recommendations, the cloud supervisor first offers with the roles having minimal execution time with the useful useful useful resource of assigning them to the processors every day with the capability of complete the tool mainly very last contact time.

3.4 ANT Colony optimization based load balancing algorithm (or ACO)-The aim of the ant colony optimization is to search around a maximum crucial route. Some of the important tasks are supplying of food, and monitoring of behavior of ants. This technique desires inexperienced distribution of hard art workload a number of the node. When a request is initialized the ant starts off evolved off developed motion inside the course of the shipping of meals from the top node.

3.5 Honeybee Foraging load balancing Algorithm (or HBLB)-It is a nature-inspired decentralized load balancing method which allows accumulating load balancing in the route of the heterogeneous digital tool of cloud computing environment via close by server movement and maximize the throughput. The modern-day-day-day-day workload of the VM has calculated then it involves diffusion the VM states whether or not or no longer or now not or now not or now not or now not or no longer or not or now not or no longer it is overloaded, under loaded or balanced. In accordance to the contemporary-day load of VM, they will be grouped.

4. PROBLEM STATEMENTS & PROPOSED SOLUTION

The maximum vital problem is load balancing problems in cloud computing. A load balancing approach permits load scheduler to distribute all masses amongst all the nodes. It furthermore guarantees that every computing useful aid is dispatched efficaciously and pretty. It permits in preventing bottlenecks of the devices additionally stand up because of load imbalance.
Existing load balancing methods encounters with several issues such as-

- **Higher migration time**
- **Poor response time**
- **Higher waiting time**
- **Poor make spam time**

The taking element heterogeneous assets are managed through the usage of allocating the responsibilities to appropriate assets thru static or dynamic scheduling to make the cloud computing greater inexperienced and as a result, it improves the character pride. In cloud computing green load balancing is continually load balancing is continuously proper. The main of this research is to develop an efficient load balancing method for the cloud computing which will achieve-

- **Improve migration time**
- **Improve response time**
- **Improve waiting time**
- **Improve makespan time**

4.1 PROPOSED METHOD-

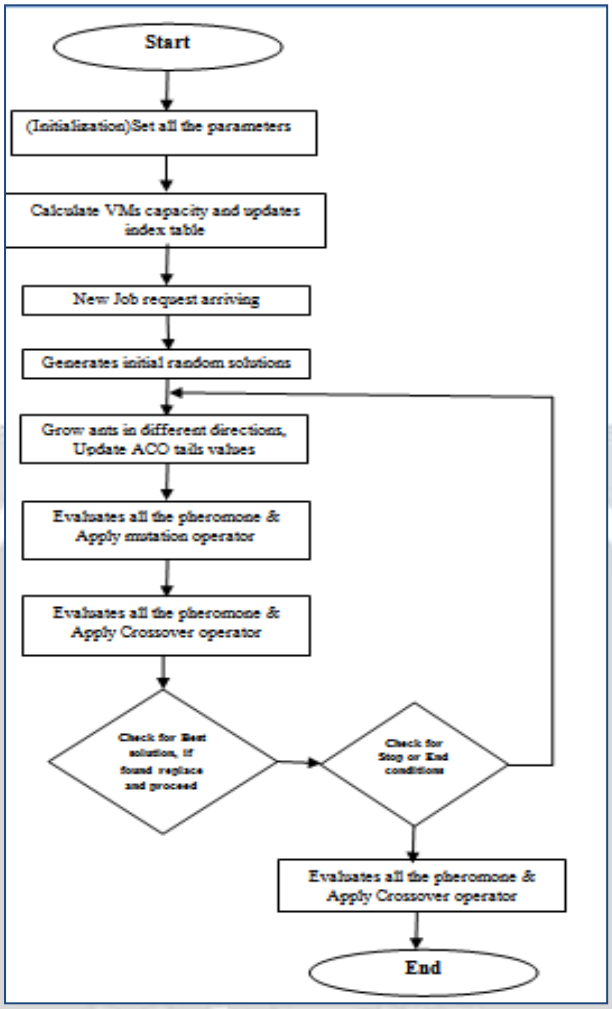


Figure 4.1 4.1 Proposed method

Existing load balancing Ant colony optimization can be improved by adding new parameters and combining with the Genetic algorithm. In this research researchers are presenting, an efficient load balancing method for cloud computing, by using improved ant colony and genetic method (Proposed IACGM). The proposed IACG method uses mainly two strategies of max-min rules and forward-backward rules for quick selection of candidate nodes. IACG Also uses a new parameter of moving probability to ensure either forward and backward ants are meeting efficiently to its neighbor or not during searching. The reason behind the selection of GA is that, to ensure select only best fittest Ant in each selection period.

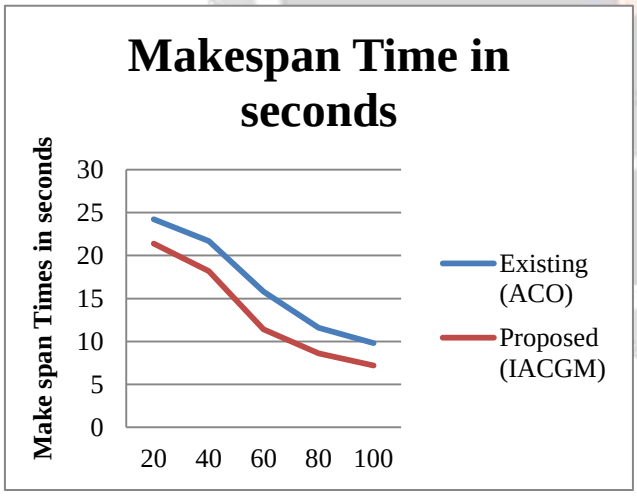
5. SIMULATION RESULTS

In this research researcher is presenting, an efficient load balancing method for cloud computing, by using improved ant colony and genetic method (Proposed IACGM). Proposed method (IACGM) and existing (Ant Colony) methods are implemented over cloud-sim 3.0, simulator and JAVA are used as a programming language.

Figure 5 Simulation results

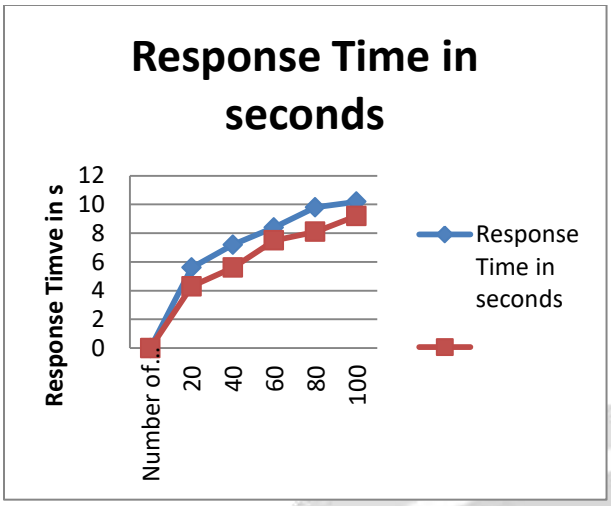
Following comparison, parameters are used to compared existing and proposed methods-

5.1 Makespan time- It is the total time that elapsed from the starting to end of a job completion. Less makespan time shows better performance for a method.



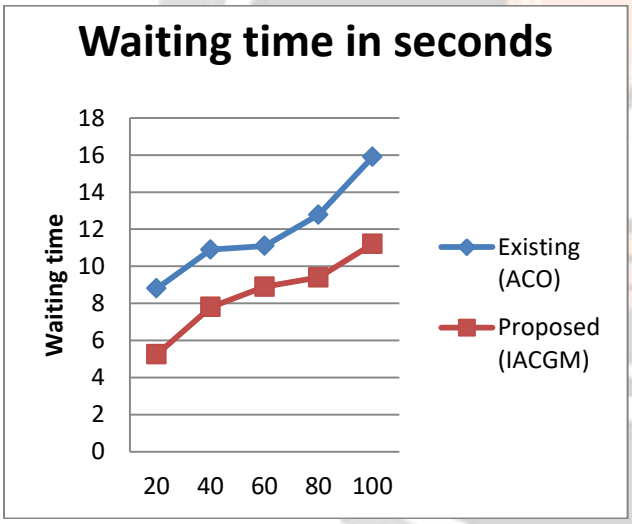
Graph 5.1 Makespan time results

5.2 Response time- Response time is the complete amount of time it takes to reply to a request for the issuer. Lesser the response time shows better performance for a method.



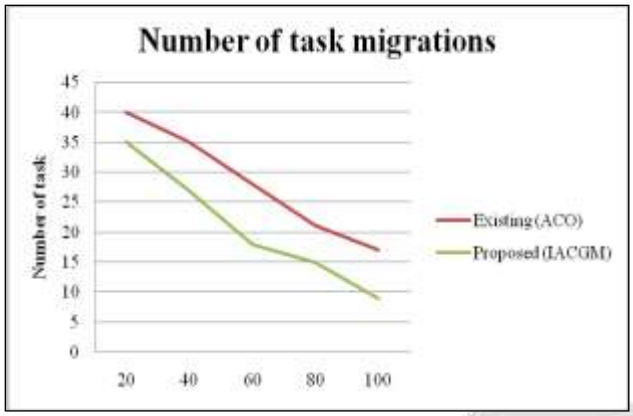
Graph 5.2 Response time

5.3 Waiting time- The method of a process getting into the cloud timetable is typically within the shape of the queue, in order that every person wishes to attend till the earlier users are being served. The total time a job process spends in the queue is referred as waiting time. For any method, less waiting time shows better performance.



Graph 5.3 Waiting time

5.4 No of jobs migration- The total number of jobs which are being migrated from an overloaded Cloud VM to an underloaded cloud VM. For any cloud computing load balancing method, less number of job migrations shows better performances.



Graph 5.4 Results for Job migrations

6. CONCLUSIONS AND FUTURE WORKS

In this research, we have presented an efficient load balancing method for cloud computing, by using improved ant colony and genetic method (Proposed IACGM). The proposed IACG. method uses mainly two strategies of max-min rules and forward-backward rules for quick selection of candidate nodes. IACG Also uses a new parameter of moving probability to ensure either forward and backward ants are meeting efficiently to its neighbor or not during searching. The reason behind the selection of GA is that, to ensure select only best fittest Ant in each selection period. Existing ACO and proposed IACG methods are implemented over cloud-sim simulator. Experimental result analysis clearly shows that proposed method IACG shows better results for migration time, response time, waiting time and less number of job migrations over ACO load balancing method. In future work, we can implement proposed IACG over real-time data set in real time environments and will compare with various new load balancing methods.

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