



# A REVIEW PAPER ON LOAD BALANCING AMONG VIRTUAL SERVERS IN CLOUD COMPUTING USING CAT SWARM OPTIMIZATION

Upasana Mittal<sup>1</sup>, Yogesh Kumar<sup>2</sup>

<sup>1</sup>C.S.E Student, Department of Computer Science, SUSCET, Mohali, (India)

<sup>2</sup>Head of Department, Department of CSE, CIET, Fatehgarh Sahib, (India)

## ABSTRACT

*In a large scale cloud computing environment Cloud Computing is very vast technology among new generation. It is Very Popular because of its new features. Cloud Computing is also known as Internet based computing because in this technology Resources are shared over the internet so it is called "Internet Based Computing". Cloud Computing is very much similar to Grid Computing but the difference is in Grid Computing resources are shared over the grid like Structure but in cloud computing Resources are shared over the internet. In Cloud Computing Load balancing has a great role. To allocate and balance the load of the resources among the various components and nodes load balancing is required. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource. For Load balancing Load balancer is Use that is use for balancing the load. In this research we propose "cat swarm optimization" a load balancing algorithm to balance the load among virtual machines in cloud data centers. Result shows that our algorithm can show better load balancing in large scale cloud computing environment as compare to previous load balancing algorithm.*

**Keywords:** *Cloud Computing, Load Balancing, Central Load Balancer, Cat Swarm Optimization, Virtual Server.*

## I. INTRODUCTION

In cloud computing load balancing has a great role.[7]To allocate and balance the load of resources among the various components and nodes load balancing is required. Load balancing aims to optimize resource use, maximize throughput, minimize response time and avoid overload of any single resource. For load balancing load balancer [2] is use that is use for balancing the load. Load balancing is the major challenge in the cloud computing. Load balancing can be static or dynamic.

A) Static Load Balancing: In this load is distributed evenly across all the nodes. This Algorithm must know about the system resources beforehand.

B) Dynamic Load balancing: It depends upon the current state of the System. If any load is overloaded then its load is shifted to the under loaded node. So real time Communication is performed Here [2].



**1.1 Goals of Load balancing:** The goals of load balancing are:

- Optimum resource utilization
- Maximum throughput
- Minimum response time
- Avoiding overhead.

For cloud computing various load balancing algorithms has been used such as honey bee load balancing algorithm,[3] Active clustering optimization,ACO,PSO,BFO,firefly algorithm etc.

The rest of the paper is organized as follows: Section II gives a review problem formulation. Section III proposed objective of the research. Section IV proposed the methodology of the research work. Section V proposed the future work.

## **1.2 Literature Work**

Load balancing in the cloud computing environment has an important impact on the performance. Good Load balancing makes cloud computing more efficient and improves user satisfaction.

**Gulshan Soni[1] et al. have presented “A Novel Approach for Load Balancing In Cloud Data Center”.** In this paper researcher proposed the idea of central Load balancer that manage the load on the cloud and assign the load corresponding to their priority and the response time is less as compare to other algorithm.

**Ruhi Gupta[2] have presented the “Review on Existing load balancing techniques in Cloud Computing”.** There are various techniques of load balancing in cloud computing. The researcher had comparison among these techniques and light has been thrown on the latest techniques of load balancing and compared various parameters.

**Vikas Kumar [3] et al. proposed “A load balancing based cloud Computing Techniques and Challenges”** presented load balancing is the main issue. Load balancing is required to distribute the excess dynamic local workload evenly to entire load in the whole cloud to achieve a high user satisfaction and resource utilization ratio. The work of various researchers is analyzed and compared.

**Foram F.Kherani[4] et al. presented “Load balancing in cloud computing”** described the load balancing in cloud computing and how to improve and maintain the performance of cloud computing and also discuss the comparison of various existing static load balancer and conventional dynamic load balancer also. The paper describes the three algorithms round robin, equally spread current execution load and throttled load balancing.

**Suriya Begum et al. [5] presented “Review of Load balancing in Cloud Computing”** have described the random arrival of load in such an environment can cause some server to heavily loaded while other server is idle or only lightly loaded. Equally load distributing enhances performance by transferring load from heavily server. Efficient scheduling and resource allocation is a critical characteristic of cloud computing based on which performance can be estimated.

## **II. PROBLEM FORMULATION**

In a large Scale cloud computing environment the cloud data centers and end users are geographically distributed across the globe. The biggest challenge for cloud data centers is how to handle and service millions of requests that are arriving very frequently and correctly. In cloud computing Load balancing is required to



distribute the dynamic workload evenly across the all nodes. Load balancing helps to achieve a high user satisfaction and resource utilization ration by ensuring and efficient and fair allocation of every computer resource. Load Balancing is defined as a process of making effective resource utilization by reassigning the total load to the individual nodes of the collective system and thereby minimizing the response time of the job. Proper load balancing aids in minimizing resource consumption, implementing fail over, avoiding bottlenecks etc. In the research work, we proposed an algorithm for load distribution of workloads on a cloud by the use of Cat Swarm Optimization in Cloud Computing.

- **Central Load Balancer:** Central Load Balancer [1] will balance the load among virtual machines having different hardware configurations and will distribute the load based on hardware configuration and states of virtual machines in data center. The central load balancer balance load through utilization of all virtual machines according to their computing capabilities.
- **Proposed Algorithm: Cat Swarm Optimization:** Cat Swarm Optimization (CSO) is generated by observing the behavior of cats and composed of two sub models [11] that are Tracing Mode and seeking model which model upon the behavior of cats.CSO is one of the new heuristic optimization algorithms which is based on the Swarm Intelligence. This algorithm has better performance compared to other heuristic optimization algorithm.CSO is one of the new Swarm intelligence algorithm finding the best global solution because of complexity. Pure CSO takes a [11] long time to converge and can't achieve the accurate solution.

The behavior of the cat is

- a) Rest indolently most of time when they are awake.
- b) Move speedily when they are tracing some targets.
- c) Curious about all type of moving things.

There are two modes of CSO: Seeking mode and tracing [11] mode.

- **Seeking Mode:** This Mode is the time for thinking and deciding about next mode. To model the situation of the cat, which is resting, looking around and seeking the next position to move to.
- **Tracing Mode:** In this mode Cats desire to trace the targets and foods. For modeling the case of the cat is tracing some targets.

### III. OBJECTIVE OF RESEARCH WORK

Load balancing in cloud is a mechanism that distributes the excess dynamic local work load evenly across all the nodes. It is used to achieve a high user satisfaction and resource utilization ratio, making sure that no single node is overwhelmed, hence improving the overall performance of the system. Overloaded nodes across the server and storage side often lead to performance degradation and are more vulnerable to various failures. To remove this limitation the load must be migrated from the overloaded resource to an underutilized one without causing harm and disruption to the application workload. Objectives for research work are:

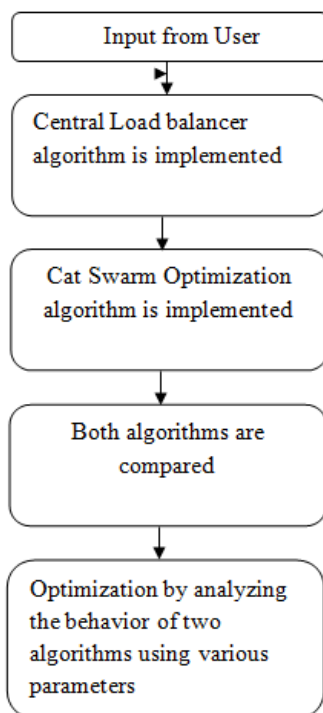
- a) To Study [1] and implement the CLB(Central Load balancing).
  - b) To implement the Cat Swarm optimization method (CSO).
  - c) To analyze and compare the algorithm using various parameters for the load balancing in cloud behavior.
- Total number of task/resources



- Arrival time of the task
- Processing time of the task
- Response time of the task
- Execution time
- Throughput

## IV. METHODOLOGY OF RESEARCH WORK

Improves load balancing at cloud with better response time, data processing time and throughput.



## V.FUTURE WORK

In cloud computing environment random arrival of load among processor can cause some server to be heavily loaded while others remain idle or lightly loaded. Therefore an efficient load balancing algorithm can enhance the performance of the system and resource utilization making sure that each virtual machine is distributing efficiently and fairly. Therefore in this research we are proposing a load balancing algorithm based on swarm intelligence. In proposed cat swarm optimization technique (CSO), we are trying to avoid the situation of over loading and under loading of virtual machines. The cat swarm optimization technique will balance the load among virtual machines. CSO is one of the new heuristic optimization algorithms which are based on the Swarm Intelligence. In this way this technique will effectively balance the load among virtual machines.

## REFERENCES

- [1] Gulshan Soni, Mala Kalra, "A Novel Approach For Load Balancing In cloud data center", 978-1-4799-272-8/14/\$31.00, IEEE 2014.

- [2] Ruhi Gupta “Review on Existing load balancing techniques in Cloud Computing”, Volume 4, Issue 2, ISSN: 2277, February 2014.
- [3] Vikas Kumar and Shiva Kumar” A load balancing based cloud Computing Techniques and Challenges”, IJSRM volume 2 issue 5 May 2014.
- [4] Foram F.Kherani and Prof Jignesh Vania “Load Balancing in cloud computing” , Vol-1,issue 1,ISSN 2321-999, January 2014.
- [5] Rajesh Gorge Rajan and V.Jeyakrishnan “A Survey on Load Balancing in Cloud Computing Environments”Vol-2.Issue-12,December 2013.
- [6] Dongliang Zhang,Changjun Jiang,Shu Li, “ A fast Adaptive Load balancing method for parallel practical based simulations”, Simulation Modeling Practice and theory 17(2009) 1032-1042.
- [7] M.Randles,D.Lamb and A.Bendiab, “A Comparative Study into distributed load balancing algorithm for cloud computing” IEEE 24<sup>th</sup> International Conference on Advanced Information and Networking and Applications Workshops,pp.551-556,April 2010.
- [8] Suriya Begum, Dr. Prashanth C.S.R, “Review of load balancing in cloud Computing”. 10, Issue 1, No 2, January 2013
- [9] Rahul Bhoyar,“Cloud Computing: Service Models ,Types,database and Issues”,Volume 3, Issue 3, March 2013.
- [10] Argha Roy, Diptam Dutta, "Dynamic Load balancing: Improve efficiency in cloud Computing”, Vol 15, issue 2, ISSN: 2278-9359,December 2013.[
- [11] Meysam Orouskhani “Novel Cat Swarm Optimization algorithm for Unconstraint Optimization Problem”, IIJTCs, vol.5, no.11, pp.32- 41, 2013.
- [12] Mohiuddin Ahmed, Abu Sina Md. Raju Chowdhury, Mustaq Ahmed, Md. Mahmudul, “An Advanced Survey on Cloud Computing and State-of-the-art”, Issue 1, No 1, January 2012.