

# A Fundamental Study of Load Balancing Techniques in Cloud Computing

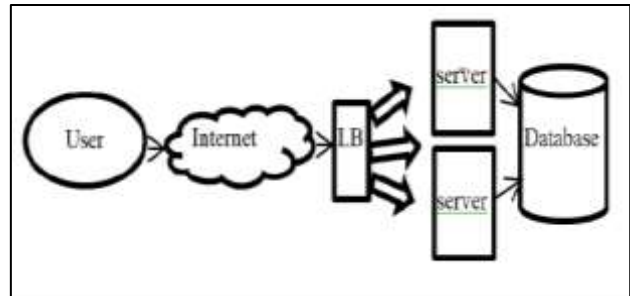
Yogesh Kumar

Department of Computer Science & Engineering

Sanskriti Institute of Management & Technology Mathura, Uttar Pradesh, India

**Abstract**— This paper is leading the research of load balancing techniques in cloud computing. Load balancing techniques are used to distribute load equally among all the servers. Load balancers are used to distribute the load among the different server. Load balancers are play a very important role in cloud computing it takes load as a user’s request and distributes the load to server by using load balancing algorithms.

**Keywords:** Cloud computing, Load balancers, Load balancing techniques



Front End Back End  
Fig. 1: Cloud Computing Architecture

## I. INTRODUCTION

Cloud computing is widely used technology use to store data with unlimited space and accessible from anywhere at any time. Before cloud computing mainly two problem arises one is traffic and maintenance of a server. Servers are very costly and varying load with different time. So it is needed to be managing and storing this load on server by load balancer with the help of load balancing algorithms in cloud computing. As we know in the real world the population is increasing by the time so load on resources is increasing in same manure. Load balancing is a technique used to handle the traffic or load requested by the clients on servers.

## II. NEED OF LOAD BALANCING

Load balancing is needed to distribute the load between the servers equally and optimise resources to get maximum throughput. It is needed of resource utilisation efficiently and balance load on overloaded resources. Client is to want satisfaction towards reducing the energy of the system and response time [1].

## III. APPROACHES OF LOAD BALANCING

- 1) Client side load balancing- This type of load balancing done at client side and it is better than Round Robin algorithms, Netflix uses OSS client side load balancing. Booking service is an example of client side load balancing.
- 2) Server side load balancing- It is software service use to connect client to access the services from internet. Server side load balancing uses Round Robin algorithm to distribute load among servers sequentially. In fig.1 showing cloud computer architecture having LB stand for Load Balancer

## IV. TYPES OF LOAD BALANCING ALGORITHMS

- 1) Static load balancing- Static load balancing used to balance a load to servers equally by using Round Robin algorithm. Round Robin algorithm load balancer distributes the load among the servers in a sequence. In static load balancing information of load required before job started and no change happen after the execution of jobs.
- 2) Dynamic load balancing- This algorithm is used to overcome to static load balancing algorithm. In this algorithm the communication delay reduce by servers. In dynamic load balancing load assigned to the job at execution time and retain the current status of job during execution,
- 3) 3Sender initiative algorithm- In this algorithm sender node is heavily loaded and receiver node is low loaded. Sender node is heavily loaded so no acceptance of request and it send to low loaded receiver.
- 4) Receiver initiative algorithm- In this algorithm receiver node is heavily loaded and sender node is low loaded. Receiver node is heavily loaded so no acceptance of request and it send to low loaded sender
- 5) Symmetric algorithm- Symmetric is the combination of both algorithm sender initiative and receiver initiative algorithm.
- 6) Centralise algorithm- In this algorithm load distributed from centralise location that is called master and distributed to nodes called slave [3].

## V. COMPARISON BETWEEN STATIC LOAD BALANCING AND DYNAMIC LOAD BALANCING

Algorithm Type	Advantages	Disadvantages
Static load balancing	Load decided at compile time	No change at run time
Round Robin algorithm	Easy and small task based	No variation for heavy loaded
Dynamic load balancing	Load decided at run time	Difficult to check node

Honey bee algorithm	Max throughput and min response time	No high priority task schedule
---------------------	--------------------------------------	--------------------------------

Table 1: Advantages and disadvantages of algorithms

## VI. CHALLENGES IN LOAD BALANCING

There are various challenges in load balancing some of them given below

- 1) Overhead-Load balancing algorithm faces the overhead problem in the cloud computing.
- 2) Performance- How is the system works in efficient manner? There are two parameters to measure the performance.
  - 1) Resource utilisation- Load balancing detects resource utilisation whether node is overloaded or under loaded.
  - 2) Response time- this is very important challenge regarding user to wait response from server.
- 3) Fault tolerance- if one node in the system does not work properly then other node works automatically.
- 4) Stability – Static load balancing is more stable than dynamic load balancing [2] [5].

## VII. GOALS OF LOAD BALANCING

- 1) Faster response to client's computation.
- 2) Easy to maintain the system.
- 3) To increase the performance of the system [1].

## VIII. CLOUD MODEL

### A. There are two types of cloud models

- 1) Service model- SaaS, PaaS and IaaS.
- 2) Deployment model- Public cloud, Private cloud and Hybrid cloud.

### B. Cloud computers uses as service model:

- 1) SaaS- It is Software as a service. It means software is used as a service for example Gmail, Drop box uses as software service.
- 2) PaaS- It is Platform as a service. Platform is provides as a service for example application development platform is Google app engine. For example uploading and downloading facility.
- 3) IaaS- It is Infrastructure as a service. This service uses as computer resources for example amazon web services.

Some of them cloud providers are Google cloud platform, IBM cloud, Amazon web services, Microsoft Azure. An Amazon web service is the largest cloud service provider. For example Login facility on websites to use services [5].

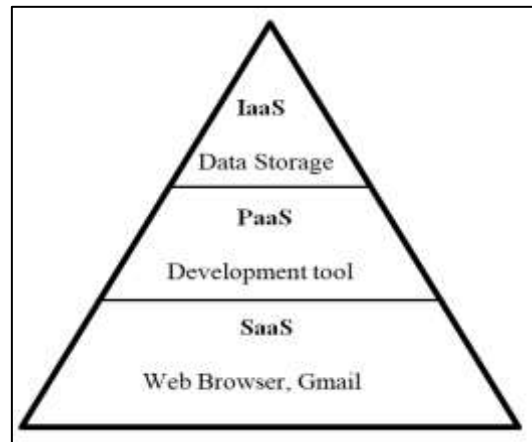


Fig. 2: Service Model Structure

### C. Cloud computers uses as Deployment Model:

- 1) Public cloud- Public cloud uses by the public free to use server. For example Google drive.
- 2) Private cloud- Private cloud servers are not sharable to public. These servers are used in a company or organisation privately.
- 3) Hybrid cloud- Hybrid cloud servers are used by public as well as privately [4].

## IX. CONCLUSION

Cloud computing needed of support the dynamic load balancing to increase the use of server with respect to performance and weight on servers. We use static load balancing to gain stability and we use dynamic load balancing for high performance. Load balancing is use to increase the resource utilisation, maximum throughput and reduce the response time. Load balancing avoid overload on a single server. Parameters are uses to determine for good load balancing overhead, performance, resource utilisation and fault tolerance.

## REFERENCES

- [1] Forum F kherani, Prof Jignesh Vania : Load Balancing in cloud computing vol. 2, issue 1, 2014.
- [2] Dr. V Asha<sup>1</sup>, Bharat Kumar<sup>2</sup>,Grishy<sup>3</sup> Department of master of computer application New Horizion college of engineering and management, 2018.
- [3] Load balancing algorithms Consortium of Educational and Communication New Delhi, India.
- [4] Patel Bhoomi Kiritbhai<sup>1</sup>, Nirav Y. Shah<sup>2</sup> Optimizing Load Balancing Technique for Efficient Load Balancing November 2017, IJIRT Volume 4 Issue 6.
- [5] S. Sankara Narayanan<sup>1</sup> and M. Ramakrishna A Comprehensive Study on Load Balancing Algorithms in Cloud Computing 2016.