A REVIEW PAPER ON LOAD BALANCING AND ITS DIFFERENT ALGORITHMS

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Abstract: In this REVIEW PAPER, we explained Load balancing Algorithms with the reference to cloud computing. Cloud Computing is based on Internet by which shared resources, software and information are present to computer and other devices on demand. Cloud computing supports technology infrastructure "in the cloud" that hides the details from the users. Cloud Computing is win-win situations for users as well as providers. The main aim of the Load balancing is to balancing the workload or web traffic among all the nodes such that no nodes will be overloaded or under loaded. Nodes are termed as servers. In this paper, we explained Round Robin, Weighted Round Robin, Least Connection and Weighted Least Connection algorithms and describe the similarities and dissimilarities of ROUND ROBIN and WEIGHTED ROUND ROBIN Algorithms and also describe the dissimilarities of LEAST CONNECTION AND WEIGHTED LEAST CONNECTION Algorithm and at last we compare all the algorithms using some parameters. As comparison of Load balancing algorithms, Weighted Least Connection algorithm is best because it handles the number of active client requests for the server where each server has its own specific numerical weight-age. Active Client Requests are decomposed between servers faster according to weight that increases the efficiency of the systems.

Keywords: - Cloud Computing, Load balancing, Load balancing algorithms.

I.INTRODUCTION

Cloud Computing provides services to all over the world. Cloud computing is one of the vast and widely used technology in the Information Technology. Cloud Computing provides resources to the customers as per their need. Cloud Computing has the systems that are connected via Internet. Cloud Computing reduces the cost of infrastructure and maintenance. Cloud Computing refers to maintaining, configuring and accessing the online applications. Cloud Computing model is used everywhere and provide on demand access to shared pool of resources such as network, servers, applications etc. CLOUD is something which is placed at remote location. Cloud resources are dynamically allotted to the users. The examples of cloud computing used in daily life are FACEBOOK, YOUTUBE or GMAIL etc. The benefits of cloud computing are Cost saving, enhanced security, flexibility. It is important for the cloud service

provider to provide best services to the clients [1].

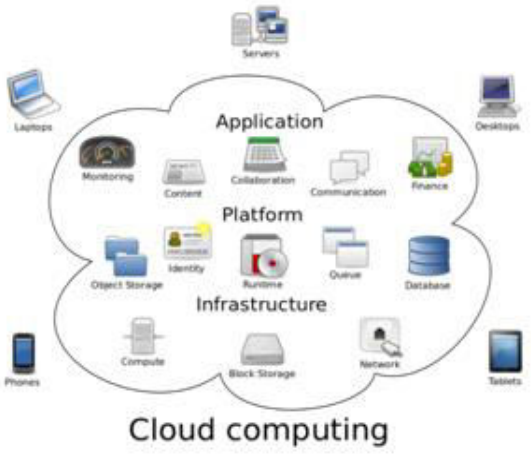

Fig no-1

The infrastructures (Compute, block storage, network), platform (Object storage, Queues, Database) and applications (Monitoring, collaboration, Finance) are kept on to the cloud. These services are used by various components such as mobile phones, servers, laptops, desktops. The user uses these services as per their need and and pay for these very less amount.

II. LOAD BALANCING IN CLOUD COMPUTING

Load balancing refers to the process of distributing the web traffic or workload across the group of various nodes. Nodes are termed as **servers**. Load balancing improves the performance of the system by shifting the traffic or workload among different servers [2]. Without Load Balancing, users can delays. The load can be of any type like network load, CPU load or memory load. Load balancing will ensures the uniform distribution of load on nodes, faster response, and system stability. Load balancing is used to produce high user happiness and resource utilization ensures that no node is blocked [6]. Load balancing improves the system's performance.

Following are the load balancing parameters [2] :-

- **Throughput**: - It is the amount of work to be done in the given amount of time.
- **Fault tolerance**: - It is the ability to handling the faults in the system.
- **Resource Utilization**: - It is ability to check the proper utilization of the various resources.

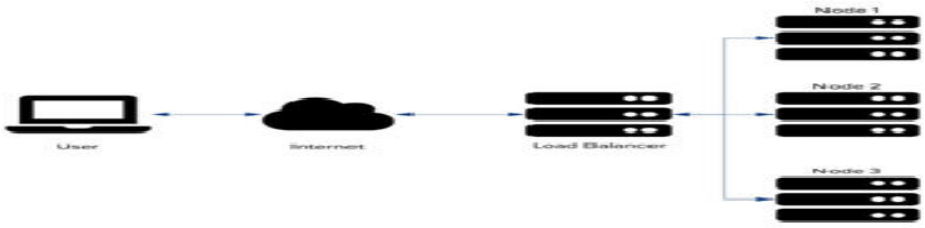

Fig no-2

The hardware and software that supports the load balancing is called as Load Balancer. Load Balancer acts as "TRAFFIC POLICE" placed in front of servers and give path to clients requests over all the servers capable of accomplish these requests in such a manner that maximizes speed of the system and ensures that no server is overloaded or under loaded. If one server goes down, the load balancers switch the traffic or workload to the pending online servers. When a new node or server is attached to the server group, the load balancer automatically starts to send the requests to the new server. The group of the servers is called **Load Balanced Dedicated Servers**. The dedicated servers equipped with a hardware and software load balancer.

III LOAD BALANCING ALGORITHMS

ROUND ROBIN: - Round Robin algorithm is simple, understandable and easy to implement. In the Round Robin algorithm, all the client requests are decomposed between all the web servers present in front of Load balancer in such a way that the web traffic between the servers are distributed equally. The client requests are onwards to each serve in turn. Different servers have different processing time. In case of equal workload distribution, round robin algorithm provides faster response. Some of the nodes are heavily loaded and others are lightly loaded [3]. Suppose you have two servers, server1 and server2. The entire client requests are forwarded to these servers in cyclic order. If server1 has more CPU than server2 then server1 is able to handle higher workload than server2. Server2 is overloaded much faster than Server1 and it will goes down [4].

WEIGHTED ROUND ROBIN: - Weighted Round Robin is similar to Round Robin .Weighted Round Robin is used to simplify controlled sharing of web traffic. Weighted Round Robin assigns a numerical weight to each server, that value is then used to determine the amount of request allocated to servers. In weighted round robin, each server to service in a set of order, sending a limited amount of client requests before moving on to the next server [3]. Servers are weighted according to their capability and requests arrive to server in order to high to low weighted servers. Suppose you have two servers, server 1 and server 2 and both servers having some numerical weight. Weight of server 1 is 5 and server 2 is 1 [4]. You can assign total six number of client requests to both servers. First five requests are assigning to server 1 and sixth request is assign to server 2.

LEAST CONNECTIONS: - Least connection approach targets on balancing the number of active client's requests for the servers. When the new client request reaches, load balancer chooses the server with least number of active connections. It calculates the number of the active connections for each server to search its load [3]. Suppose you have two servers, server 1 and server 2 and client requests are send to these servers in the cyclic order. When some of the clients are disconnects then on that server, least number of active connections is present. At times any new request receives it will send to server that has least number of active connections [4].

WEIGHTED LEAST CONNECTIONS: - Weighted Least Connections is an extent of the least connections strategy where each server having specific numerical weight-age. The server with numerical weight 0 will not accept any active connections [3]. Suppose you have two servers, server 1 and server 2 and both servers

having some numerical weight. Weight of server 1 is 5 and server 2 is 3. Client requests are sending to these servers in the cyclic order. Three clients are disconnects then on server1 and there is 2 least number of active connections is present. At times any new request receives it will send to server 1 that has least number of active connections [4].

IV COMPARISON OF LOAD BALANCING ALGORITHMS

ROUND ROBIN AND WEIGHTED ROUND ROBIN [7]

SIMILARITIES: - In the following table, we describe the similarities between **Round Robin** and **Weighted Round Robin.**

Table no-1:-

ROUND ROBIN	WEIGHTED ROUND ROBIN
Easy to implement and understand.	Improved version of round robin and it is easy to implement and understand.
Client Requests are decomposed between all dedicated servers in circular manner.	Client Requests are decomposed between all dedicated servers also in circular manner.

DISSIMILARITIES: - In the following table, we describes the dissimilarities between **Round Robin** and **Weighted Round Robin.**

Table n0-2:-

ROUND ROBIN	WEIGHTED ROUND ROBIN
Waiting time is more in round robin.	Waiting time is less in weighted round robin.
Slow Response Time.	Faster Response Time.
Client Requests are decomposed between all the nodes according to priority of the requests.	Client Requests are decomposed between all nodes according to the weight-age of the node that is given by the administrator.

LEAST CONNECTIONS AND WEIGHTED LEAST CONNECTION

DISSIMILARITIES: - In the following table, we describes the dissimilarities between **Least Connection and Weighted Least Connection.**

Table no-3:-

ALGORITHMS	NATURE	PARAMETERS
ROUND ROBIN	Static	More Waiting Time
WEIGHTED ROUND ROBIN	Static	Less Waiting Time
LEAST CONNECTION	Dynamic	Less Throughput
WEIGHTED LEAST CONNECTION	Dynamic	High Performance

Table no-4:-

LEAST CONNECTION	WEIGHTED LEAST CONNECTION
Least Connection algorithm balances the active client requests for the servers.	Weighted Least Connection algorithm also balances the active client requests for the servers but each server has its own specific weight that is given by administrator.
Least connection algorithm calculates the number of active connection.	Weighted Least Connection algorithm also calculates the number of active connections.
Waiting time is less.	In this, there is also less waiting time for requests.

COMPARISON OF LOAD BALANCING ALGORITHMS: - In the following table, we compare all the algorithms using some parameters [5].

CONCLUSION: - In this paper we have done the analysis of load balancing algorithms and compare all the algorithms using some parameters. As comparison of Load balancing algorithms, Weighted Least Connection algorithm is best because it handles the number of active client requests for the server where each server has its own specific numerical weight-age. Active Client Requests are decomposed between servers faster according to weight that increases the efficiency of the systems.

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