Distributed Load Balancing using Dynamic Load Balancing Algorithm.

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ABSTRACT

Cloud computing is one of the most prominent technologies. The fundamental idea behind cloud computing is to distribute an array of computing services by unifying and scheduling a pool of computing resources, thereby minimizing the burden on the users and helping them focus on their core businesses. We can enhance Distributed Dynamic load balancing algorithm by prediction of future load from the past historical data and make efficient utilization of resources.

Keyword: cloud computing,load balancing,Auto scaling,Virtual Machines

1. INTRODUCTION

1.1 Cloud Computing:

Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources (e.g., computer networks, servers, storage, applications and services)

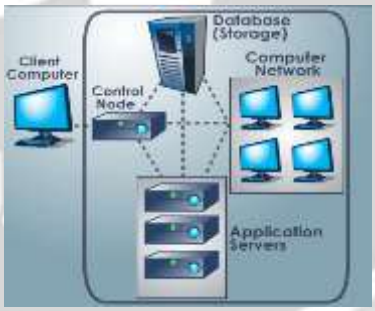


Fig.1 Cloud Computing. [7]

1.2 Load balancing in Cloud Computing:

Load balancing is a technique which is required to distribute the dynamic workload across multiple nodes to ensure that no single node is overloaded. Load balancing techniques help in optimal utilization of resources and hence in enhancing the performance of the system. The goal of load balancing is to minimize the resource consumption which will further reduce energy consumption that is the need of cloud computing.

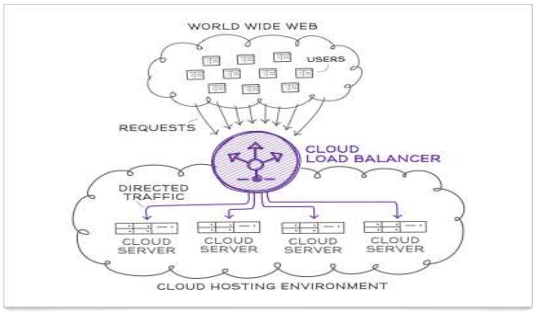


Fig.2 Load balancer[6]

2. RELATED WORK

Agraj Sharma [4] proposed an algorithm that takes preventive approach of load Balancing by considering only the response time of the each request. Based on the response time, the proposed method decides the allocation of next incoming request.

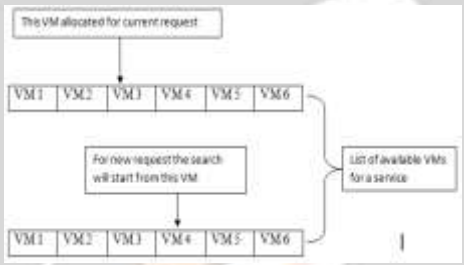


Fig. 3. Allocation Procedure for new request for a particular service.[4]

If VM3 is chosen during the previous request, then for the new request the allocation will start from VM4, and is circular in nature. The first VM that fulfills the criteria of the Average Response Time and Predicted Average Response Time less than Threshold is given the new request.

Youssef FAHIM [3] propose a new improvement of the load balancing by the algorithm estimated finish time load balancer that takes into account, the current load of the virtual machine of a data center and the estimation of the processing finish time of a task before any allocation, in order to overcome the problems caused by the static algorithms.

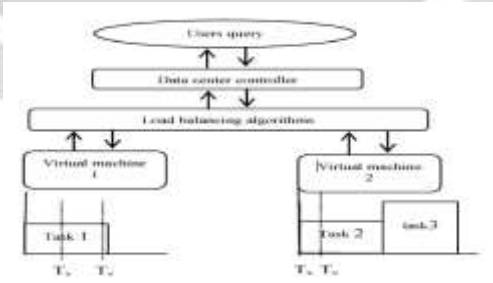


Fig 4. Probable states of allocation minimize waiting time. [3]

Each new allocation, only, on the current virtual machine workload, and not also, on the task characteristics, in order to minimize the waiting time of tasks in queue and decrease the degree of imbalance among the virtual machines.

Gulshan Soni [5] propose "Central Load Balancer" a load balancing algorithm to balance the load among virtual machines in cloud data center. Results show that our algorithm can achieve better load balancing in a large-scale cloud computing environment as compared to previous load balancing algorithms.

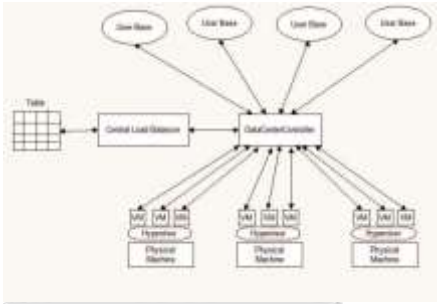


Fig.5 Working of Central Load Balancer Priority and response time. [5]

The Central Load Balancer (CLB) is connected to all users and virtual machines present in cloud data center through Data center Controller. The Central Load Balancer calculates the priorities of virtual machines based on their CPU speed (MIPS) and memory.

Jitendra Bhatia [2] proposed an algorithm for load balancing which will work dynamically for optimal usage of resource utilization. We have compared our algorithm with various existing static load balancers as well as conventional dynamic load balancer also.

Fig 6. Working Model according to Performance and load [2].

Once the queue is generated using HTV performance algorithm the permanent queue will be replaced by temporary queue for next revolution of HTV performance algorithm every time when it is updated after monitoring. So if a new client request arrives it will be assigned to the current node pointer in permanent queue and the pointer moves to the next node in queue and the same allocation procedure will work.

Harshal Trivedi [1] proposed to dynamically handle the incoming user requests for the Amazon EC2 instances. It is also used to dynamically scale the EC2 instances up or down depending on load of incoming user requests on the instances and the CPU utilization of the instances. Along with it a distributed load balancer architecture is proposed to support and implement the proposed algorithm. The proposed algorithm takes into consideration certain CPU utilization metrics of the running EC2 instances for load balancing, serving the incoming requests and scaling the instances up or down.

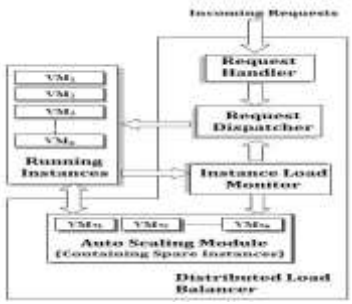


Fig 7 : distributed load balancer architecture. [1]

The algorithm checks for CPU load, CPU memory usage and server response time of all the running instances. It then assigns the incoming request to the instance with the least CPU utilization metrics.

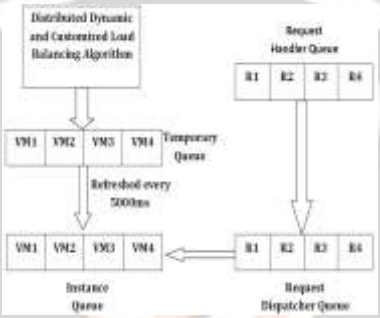
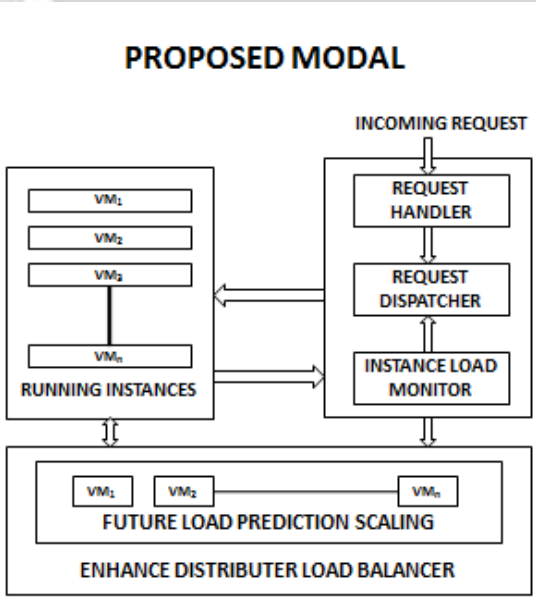


Fig. 8. Working model of the distributed dynamic and customized loadbalancing algorithm. [1]

The Request Handler module stores all the incoming requests in a Request Handler queue. The Request Dispatcher module maintains a Request Dispatcher queue in which it stores the requests which are forwarded to it by the Request Handler module and assigns these requests to the instances present in the Instance Queue sequentially.

3. PROPOSED WORK



4. IMPLEMENTATION & RESULTS

Fig : Implementation snapshot1

Fig : Implementation snapshot2

Fig : Implementation snapshot3

Fig : Implementation snapshot4

5. CONCLUSIONS

Load balancing is one of the main challenges in cloud computing. It is a technique which is required to distribute the dynamic workload across multiple nodes to ensure that no single node is overloaded.Prediction of Future load from the past historical data for efficient resource utilization.

5. REFERENCES

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