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A Review on Load Balancing Techniques in Cloud Computing

Er. Navdeep Kaur¹, Er.Pooja Nagpal², Talwinder Singh³

¹M.Tech Student, ^{2,3}Assistant Professor

^{1,2}Department of Computer Sc. & Engg, Rayat Colleague of Engg. & IT, Ropar, Punjab, India

³Department of Computer Sc. & Engg, Chandigarh University, Mohali, Punjab, India

¹navi301071@yahoo.com, ²poojanagpal48@gmail.com, ³talwinder000@gmail.com

Abstract- Internet has changed the world. It is the most important part and revolutionary creation in the field of technology. Cloud computing is related to internet computing. Cloud computing has benefitted for service provider and clients. Demand of cloud computing is increasing constantly. The main task of cloud computing is to provide the satisfactory level of performance to the user. There are many techniques to handle the large services and operations performed in cloud computing. To improve the performance of user utilization and operations it is very important to research some area in cloud computing. One of the important issues in cloud computing is load balancing. Load balancing is a technique that is used to distribute the load on different nodes. It is a method in which workload on resources of a node spreads to respective resources on other node in network without disturbing the running task. The main aim of load balancing algorithm is to assign a work to the cloud node so that the response time of the request can be minimized and request processing become effective. Average response time, data center request service time and total cost of different data centre will be the parameters considered for performance.

Keywords: Cloud computing, Round Robin, Load Balancing and Throttled.

1. INTRODUCTION

Cloud computing is getting progress constantly as a new type of computing. Cloud computing provides a way to use and access multiple server based computational resources via a digital network internet connection using (www)world wide web. Cloud users can access the server resources using a computer, net book, pad computers, smart phone or other devices. There in cloud computing applications are managed and provided by the cloud server. In cloud computing data is also stored remotely in the cloud configuration. Cloud computing provides a way to delivery of computing resources over the internet. When we store pictures and video online use webmail or a social networking site we uses cloud computing services. Cloud computing makes IT management easier and more responsive and it is cost effective to the changing needs of the business. Cloud computing allows the business to expand their resources accordingly, when there is increase in demand of services. There are three type of services which provided by Cloud computing, (IaaS) Infrastructure as a service, (Paas) Platform as a service and (Saas) Software as a service.

Infrastructure as a service (IaaS):- This type is the basis of cloud computing. Infrastructure as a service (SaaS) provides access to fundamental resources i.e., virtual machines, virtual storage, physical machines etc. Resources can be subscribed by the developer on pay as per usage.

Platform as a service (Paas):- It helps to provide runtime environment for applications, development tools, etc. It (Paas) provides the flexibility to develop and test web based applications in cloud without installing the operating system.

Software as a service (Saas):- Software as a Service is a deployment model which allows to use software applications as a service to users.

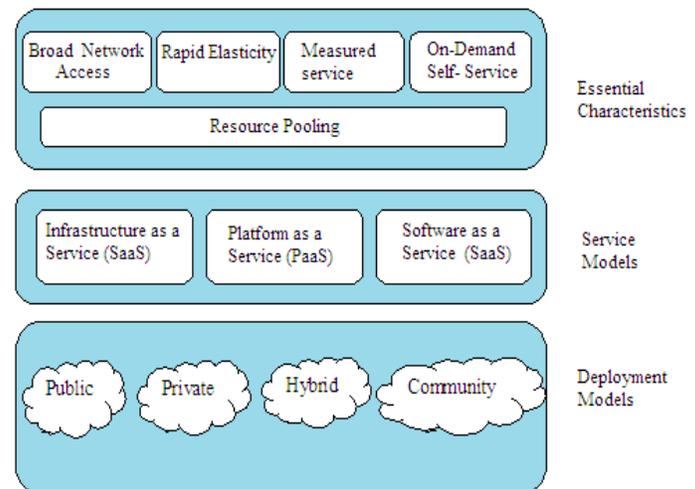


Fig.1: Architecture of Cloud Computing

2. DEPLOYMENT MODELS

This model defines the types of access to the cloud. There are four types of deployment models which are public cloud, private cloud, community cloud and hybrid cloud.

Public cloud: It is a deployment model which provides system and services which are easily accessible by public. It may be less secure because of its openness, for example email.

Private cloud: Private cloud provides systems and services which are accessible within an organization. This type of cloud provides more security because of its privacy.

Community cloud: It provides system and services which are accessible by group of organization. In this type of cloud information is confined to the owner of organization.

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Hybrid cloud: Hybrid cloud includes both public and private cloud. Hybrid cloud is capable of providing flexibility in business and some data deployment options.

Load balancing in cloud computing: In cloud computing load balancing is one of the major issues. It provides internet service to users from multiple servers. Load balancing distribute workloads over multiple computing resources, such as central processing units, computers or network links. It has a main controller and balancer to gather and analyze the information. Load balancer is used to improve the performance of data center. The load balancer determines web server which serve the request. It may be provided either through hardware or software There are various scheduling algorithm to determine which server handle and forward the request to the selected server.

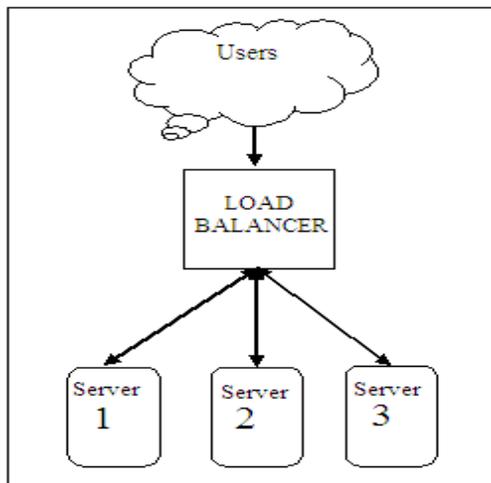


Fig. 2 Load Balancer in Cloud Computing

Types of Load Balancing Algorithm: The main objectives of load balancing are to improve the performance, maintain stability of system and accommodate future changes of server. Load balancing algorithm can be classified in two different ways

I. Static Load balancing algorithm

It refers to load balancing algorithm that distribute the work load on a fixed set of rules related to characteristics of the input work load. Static load balancing is easy to design and implement. The aim of static load balancing algorithm is to decrease the running time and minimize the response delay. Round Robin algorithm is a static load balancing technique. This technique of the static load balancing is used by the Central Processing Unit (CPU) during execution of process. Round Robin algorithm is the modern generation algorithm of First Come First Serve (FCFS).

II. Dynamic Load balancing algorithm

A dynamic load balancing algorithm does not consider the

previous state of the system, for example it depends on the current state of the system. Dynamic load balancing algorithm distributes the load randomly and transferring the lightly load to a virtual machine by first checking the size of process. The dynamic load balancer distributes the load into different nodes. It moves the processes from an over utilized machine to an underutilized machine dynamically for faster execution.

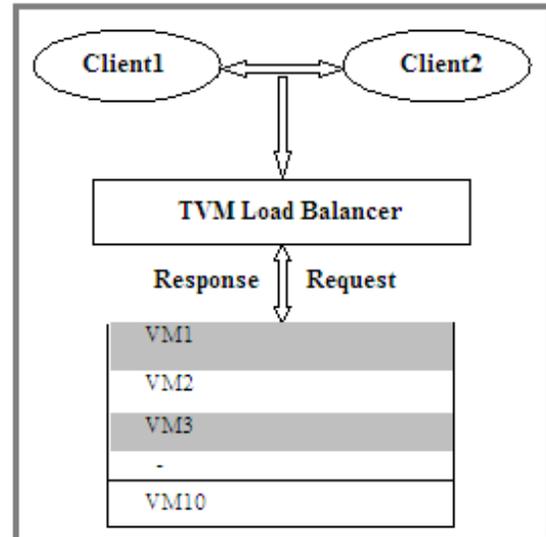


Fig.3 Throttled Algorithm

Throttled algorithm is a Dynamic load balancing technique. There in Throttled algorithm the users find the suitable Virtual machines to perform the required operation through load balancer. There may be many instances of Virtual machine in Cloud computing.

3. LITERATURE SURVEY

Anil kumar and Veerawali Behal (2014) discussed a strategy to analyze the behavior of two different scheduling algorithm in cloud computing. Both algorithms explain their scheduling criteria like data center request service time, total cost and average response time of different data centers. [1]

Hamid Shoja et. Al. (2014) explained that load balancing is a main challenge in cloud computing. To achieve a high user satisfaction and resource utilization ratio it is required to distribute the dynamic local workload across all nodes. To develop products that can enhance the business performance in cloud, cost and time are the key challenges for Information Technology engineers.[2]

Raza Abbas Haidri et. Al. (2014) proposed model manages the load coming from many users among data centers and it offers better resource utilization and high availability in the form of response time and turnaround time.[3]

A.A. Jaiswal and Dr. Sanjeev Jain (2014) said Cloud computing is a great idea and load balancing plays an important role in it. There are many advantages with load balancing for

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information technology environment. Dynamic load balancing helps to protect server failures, distribute traffic across multiple servers etc, with failover capabilities.[4]

Subasish Mohapatra et. Al. (2013) explained four different scheduling algorithm for execute the user request in cloud environment. Each algorithm is find out their scheduling criteria like data center service time, total cost and response time of different data centers. Round Robin algorithm has the best integrate performance according to experiment and analysis. [5]

Jignesh Prajapati and Tushar Desai (2012) discussed many load balancing techniques for cloud computing. The main objective of load balancing is to satisfy the customer requirement in different ways. It helps in increase the performance of system by dividing load dynamically among the nodes and to make maximum resource utilization. [6]

Das Gupta et al. (2013) proposed a novel load balancing strategy using Genetic algorithm. This algorithm tries to manage the load of the server and also try to minimize the time taken to fulfill the processing requests. The author used the genetic algorithm to perform the load balancing by simulating the algorithm in the simulated environment using the cloud Analyst simulator. Also author compared its simulation result with the existing techniques like First come first server (FCFS) and Round Robin (RR) [7].

Yao & He (2012) presented Load Balancing technique of cloud computing based on Artificial Bee Algorithm, which is a bionic method based on the gathering behavior of honeybee. Through imitation of behavior of honey bees, it optimizes the amount of nectar (i.e., system throughput) to reach the maximum throughput [8].

Lu et al. (2011) proposed a novel load balancing algorithm know as Join Idle Queue algorithm for distributed load balancing in large systems. The Join Idle Queue algorithm is the advance of Power-of-two algorithm with no communication overhead between the dispatcher and the processors at job arrival. The author analyzed the JIQ algorithm in large system limit and found the effective results. The author analyzed that the JIG algorithm produces 30 fold reductions in the queuing overhead as compared to the Power-Of-Two algorithm at medium and high load [9].

Subhadra Bose shaw and Dr. A.K.. Singh (2014) discussed the advantage and disadvantage which are associated with several load balancing algorithm. The main purpose of these algorithms is to develop more effective load balancing techniques in future. The main component of load balancing is Virtual Machine because it deals to move the problem of over-utilization and under-utilization of resources. It also helps to reduce the cost of operation and attach more clients toward the cloud computing. [10]

Zhang et al. (2010) introduced a load balancing methodology which is based on ACO and multifaceted based network theory in open cloud computing where the author proposes a load

balancing mechanism on the basis of ant colony and network theory in open cloud. This paper basically deals with the realization of load balancing in distributed system. Here GA is developed over scheduling algorithm to obtain better efficiency in unknown conditions, better schedules and low make span.

4. PROBLEM FORMULATION

4.1. Existing Work

Load balancing mechanism is to dynamically deals with clients request and assigns the available resources in such a way that no resource is overloaded in case any of available resource is free or under loaded. The simplest existing algorithm is Round Robin to schedule all task in defined time slice. There are various other extensions also for improved load balancing.

4.2. Problem in Existing work

The existing work is unable to meet with the requirement of critical work under cloud environment.

To deal with the need of dynamic requirement change in cloud environment and making it more flexible to the end user. We propose a more diversified load balancing algorithm on large available set of virtual machines.

It is unable to deal with run time change in Virtual Machines migration which may result in degraded cloud performance in cloud computing.

5. CONCLUSION

Cloud computing is getting progress constantly as a new type of computing. This paper is based on the capabilities of cloud computing which are endless. Round Robin and Throttled algorithms are taken in consideration and their scheduling criteria like data center request service time, average response time and total cost of different data centers.

REFERENCES

- [1] Anil kumar and Veerawali Behal. "Cloud computing; Performance analysis of load balancing algorithm in cloud Heterogeneous environment" 5th international conference- Confluence The next Generation Information Technology summit IEEE 2014, pp 200-205.
- [2] Hamid Shoja "A Comparatives Survey on Load Balancing Algorithm in Cloud Computing" Fifth ICCCNT 2014, IEEE-33044.
- [3] Raza Abbas Haidri, P.C. Saxena "A Load Balancing Strategy for Cloud Computing environment" International conference on signal propagation and computer technology, IEEE 2014, pp.636-641.
- [4] A.A. Jaiswal and Dr. Sanjeev Jain "An approach towards the dynamic Load Management Techniques in Cloud Computing Environment" IEEE 2014.
- [5] Subasish Mohapatra, K.Smruiti Rekha, "A Comparison of Four Popular Heuristics for Load Balancing of

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY

WINGS TO YOUR THOUGHTS.....

- Virtual Machines in Cloud Computing” International Journal of Computer Applications Volume 68, April 2013.
- [6] Jignesh Prajapati and Tushar Desai, “A Survey of Various Load Balancing Techniques and Challenges in Cloud Computing” International Journal of Computer Science and Technology Volume3 January-March 2012.
- [7] Yao, J., & He, J. H. (2012, April). Load balancing strategy of cloud computing based on artificial bee algorithm. In *Computing Technology and Information Management (ICCM), 2012 8th International Conference on* (Vol. 1, pp. 185-189). IEEE.
- [8] Lu, Y., Xie, Q., Kliot, G., Geller, A., Larus, J. R., & Greenberg, A. (2011). Join-Idle-Queue: A novel load balancing algorithm for dynamically scalable web services. *Performance Evaluation*, 68(11), 1056-1071.
- [9] Subhadra Bose Shaw. and Dr. A.K. Singh. “A Survey on Scheduling and Load Balancing Techniques in Cloud Computing Environment “, 5th International Conference on Computer and Communication Technology (ICCT), IEEE, 2014, pp. 87-95
- [10] Zhang, Z., & Zhang, X. (2010, May). A load balancing mechanism based on ant colony and complex network theory in open cloud computing federation. In *Industrial Mechatronics and Automation (ICIMA), 2010 2nd International Conference on* (Vol. 2, pp. 240-243), IEEE.