ISSN 2393-8021

International Advanced Research Journal in Science, Engineering and Technology
Vol. 1, Issue 1, September 2014

Optimization Of Resources in Cloud Computing Using Effective Load Balancing Algorithms

B Preethi[1], Professor C. Kamalanathan[2], Dr. S.M Ramesh[3], S Shanmathi[4], P Sathiya Bama[5]

Department of ECE, Bannari Amman Institute of Technology, Sathyamangalam, India[1,2,3,4,5]

Abstract: Load balancing is essential for optimization of resources in distributed environments. The major goal of the cloud computing service providers is to use cloud computing resources efficiently to enhance the overall performance. Load balancing in cloud computing environment is a methodology to distribute workload across multiple computers to achieve optimal resource utilization with minimum response time. The proposed system pave the way for the green computing by allocating the virtual machine based on the load its processing for the optimization of number of servers in use. The performance of the algorithm is analyzed using Cloudsim simulator .The simulation result ensures that all the processors in the system as well as in the network does approximately equal amount of work at any instant of time by comparing with other algorithms by its spoofing abilities.

Keywords Cloud Analyst, Cloud computing, Load Balancing, Resource Utilization, Virtual Machines

I. INTRODUCTION

Cloud Computing is a new technology used by industry and in many areas for storing and retrieving the files and necessary documents where distributed computing forms the basis. The main issues in Cloud Computing lies in scheduling the incoming request in an efficient way with minimum response time and also the resources should not be underutilized. Algorithms like Round Robin, FCFS and Throttled are good in serving the client request with minimum response time. But the problem of high communication delays and underutilization of resources are not fulfilled in executing the client request which leads to imbalance of cloud system. Load balancing is very much essential for increasing the throughput and minimizing the response time. Therefore every virtual machine in cloud system should do the same amount of work throughout in processing the request. The load balancing can be done by dynamically forwarding the incoming client request to remote nodes or machines which are less utilized. This load balancing improves by maximizing the user satisfaction, minimizing response time, increasing resource utilization, reducing number of job rejections and thus overall performance of the system is enhanced. Dynamic resource management can be efficiently done in cloud system by virtualization technology. Therefore power efficiency can be improved by assigning multiple virtual machines to a single physical server. Consequently power consumption can be lowered by turning off some of the servers or putting them in sleep mode. In this paper, we present a novel VM assign algorithm which allocates incoming client request to available virtual machines depending on the load i.e. VM with least work load is found and then new request is allocated.

II. EXISTING ALGORITHM IN CLOUD COMPUTING

In this section load balancing algorithms used in cloud computing environment are briefly summarized. The Active load balancing algorithm maintains all the current information about the virtual machines and number of requests currently allocated. Initially when a request arrives, it selects the VM based on which machine is least loaded and returns id of the VM to the data center controller. When there are more than one VM is found, the first identified is returned. Data center controller notifies the Active VM load balancer of the new allocation.

The allocation using Throttled algorithm is completely based on the virtual machine. The client first sends requests to the load balancer to check for the availability of VM which is capable of handling and processing the request. The Active Monitoring Load Balancer maintains information about each VM's and the number of request currently allocated to which VM when a request is allocate a new VM arrives. If there are more than one VM, the first identified is selected AMLB returns the VM id to the data centres controller. The data centres controller send the request to the VM identified by that id. The data centre controller notifies the AMLB to new allocation and cloudlets is sent to it.

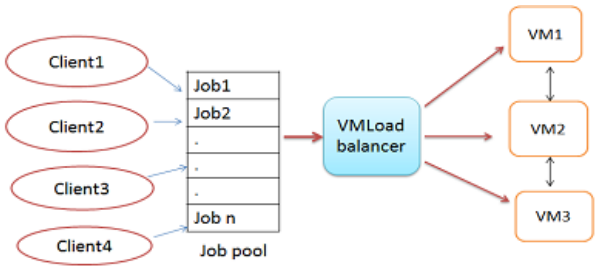


FIG 1.THROTTLED ALGORITHM

III.PROPOSED ALGORITHM DESCRIPTION

The proposed work least VM assign algorithm is compared with Active VM load balancer algorithm. The main aim is to distribute the load to the available VM efficiently so that the resources are not over or under utilized. Initially all the VM are assigned to zero. If the VM is used already used then its value is incremented.

ISSN 2393-8021

International Advanced Research Journal in Science, Engineering and Technology
Vol. 1, Issue 1, September 2014

Then the VM having least value is assigned the load. If the selected VM is not free then it is excluded from the VM list.

ALGORITHM

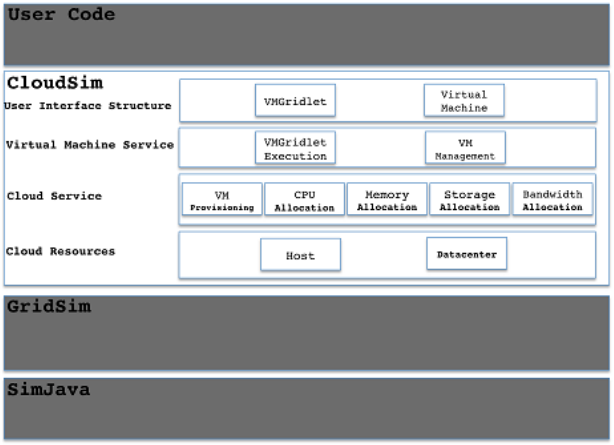
Least VM assign algorithm()
{
Inputs: Job= $X_1, X_2, \ldots\ldots\ldots X_n$
Initialize all the available VM to zero
Old VM $OVM_1, OVM_2, \ldots\ldots\ldots\ldots\ldots, OVM_n=0$;
New VM $NVM_1, NVM_2, \ldots\ldots\ldots\ldots\ldots, NVM_N=0$;

If (OVM_1==1)
{
NVM_1+=1;
}
Else if
{
NVM_1+=1;
}
SelectedVM=LeastVMof($NVM_1, NVM_2, \ldots\ldots\ldots\ldots\ldots, NVM_N$)
If(Selected VM is free)
{
Selected VM=req($X_1, X_2, \ldots\ldots\ldots X_n$)
}

Else
{
Least VM =exclude(selected VM)
}
goto selected VM

IV. SIMULATORS

To The main aim of simulator is to test the implementation work in the absence of the required environment. Thus in the cloud environment two simulator are used CloudSim and Vcloud. CloudSim is the open source. Some simulators available for the distributed field such as SimGrid, GridSim, etc such simulators are not valid for the cloud computing as the cloud environment having multiple layers while SimGrid and GridSim are made for the single layer environment.



CloudSim is a new generalized and extensible simulation framework that enables seamless modeling, simulation, experimentation of emerging Cloud computing infrastructures and management services. The simulation framework has the following novel features: (i) support for modeling and instantiation of large scale Cloud computing infrastructure, including data centers on a single physical computing node and java virtual machine; (ii) a self-contained platform for modeling data centers, service brokers, scheduling, and allocations policies; (iii) availability of virtualization engine, which aids in creation and management of multiple, independent, and co-hosted virtualized services on a data center node; and (iv) flexibility to switch between space-shared and time-shared allocation of processing cores to virtualized services.

Cloud computing provides opportunity to dynamically scale the computing resources for applications. These Resources are shared among customers using virtualization technology. Using these resources efficiently is an open challenge. Since, cloud computing consists of large number of resources, testing these new policies on real world is time consuming and difficult. To ease the problem of modeling and testing policies, Virtual Cloud is being proposed, for cloud computing environment. Virtual Cloud helps developers to model and test, their policies to utilize the cloud computing resources efficiently. Developed as multi-layered architecture, this simulator helps to test new approaches, find the bottlenecks before implementing in real world cloud computing environment. We can use cloudsim for the implementation work as it is open source and much beneficial for our research work.

V. CONCLUSION

Choosing right load balancer at the beginning is imperative to the success of complex implementations later. So far we studied about the various load balancing algorithms. The proposed algorithm least VM assign method distribute workload across multiple computers to achieve optimal resource utilization with minimum response time. Thus problems in existing algorithms are overcome in proposed method thus achieving increased resource utilization, minimum response time and maximum user satisfaction. Cloudsim simulator is used for algorithm implementations. Cloud sim is a framework which enables modelling and simulation and experimenting on designing Cloud computing infrastructure self-contained platform which can be used to model data centres, hosts, service brokers, scheduling and allocation policies

ACKNOWLEDGMENT

This work is supported by my guide Prof.C Kamalanathan and my institution

REFERENCES

[1]. Amandeep Kaur sidhu1and Supriya Kinger2, "Analysis of Load Balancing Techniques in Cloud Computing", International Journal of Computers & Technology, volume 4, No. 2, March- April 2013, pg 737- 741.

[2]. Shridhar G. Domanal and G. Ram Mohana Reddy," Load Balancing in Cloud Computing Using Modified Throttled Algorithm"IEEE, International conference. CCEM 2013. In press.

[3]. Klaithem Al Nuaimi, Nader Mohamed, Mariam Al Nuaimi and Jameela AI-Jaroodi, "A Survey of Load Balancing in Cloud Computing: Challenges and Algorithms", in Second Symposium on Network Cloud Computing and Applications, 978-0-7695-4943-9/12, IEEE 2012.

[4]. Mr.Manan D. Shah, "Allocation Of Virtual Machines In Cloud Computing Using Load Balancing Algorithm" in International Journal of Computer Science and Information Technology & Security (lJCSlTS), ISSN: 2249-9555 Vol. 3, No.1, February 2013.

[5]. Pooja Samal1and Pranati Mishra2, "Analysis of Variants in Round Robin Algorithms for Load Balancing in Cloud Computing", (IJCSIT) International Journals of Computer Science and Information Technologies, Volume 4 (3), 2013, pg. no. 416-419.

[6]. Sonika Matele1, Dr, K James2 and Navneet Singh3, "A Study of Load Balancing Issue Among Multifarious Issues of Cloud Computing Environment", International Journals of Emerging Technolog Computational and Applied Science (IJETCAS), volume 13- 142, 2013, pg. 236- 241.

[7]. Prof Meenakshi Sharma1 and Pankaj Sharma2, "Performance Evaluation of Adaptive Virtual Machine Load Balancing Algorithm", International Journal of Advanced Computer Science and Applications, volume 3, no. 2, 2012, pp. 86-88.

[8]. Martin Randles, Enas Odat, David Lamb, Osama Abu- Rahmeh and A. Taleb-Bendiab,"A Comparative Experiment in Distributed Load Balancing", 2009 Second Interna-tional Conference on Developments in eSystems Engineering.

[9]. Hemant S. Mahalle, Parag R. Kaveri and Vinay Chavan, "Load Balancing On Cloud Data Centres" in International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, issue 1, January 2013.

[10]. Hung-Chang Hsiao, Hsueh-Yi Chung, Haiying Shen, and Yu-Chang Chao, "Load Rebalancing for Distributed File Systems in Clouds" IEEE transactions on parallel and distributed systems, vol. 24, no. 5, may 2013.