LOAD BALANCING IN CLOUD COMPUTING BY HYBRID APPROACH USING STATIC AND DYNAMIC LOAD MANAGEMENT ALGORITHM

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Abstract : Cloud Computing is further generation technology for IT enterprise. Cloud processing has turned out to be basic popular expression in the Information Technology and is a next stage in the advancement of Internet, The Load adjusting issue of cloud processing is a vital issue and basic segment for satisfactory operations in distributed computing framework and it can likewise keep the fast improvement of distributed computing. Numerous customers from all around the globe are requesting the different administrations at quick rate in the current time. Albeit different load adjusting calculations have been outlined that are productive in ask designation by the choice of right virtual machines. In this proposed work, a hybrid load administration calculation has been proposed for circulation of the whole approaching solicitation among the virtual machines viably. Both Static and Dynamic load is to be mixed and this algorithm improved sufficiently and incorporating the paradigm of parallel and high performance computing response time and utilization of VMs further optimized.

Keywords - Cloud computing; virtual machine; Load balancing; static – dynamic load.

I. INTRODUCTION

Cloud Computing has become an emerging and fastest technology in the world. Cloud Computing is one of the most talked about technologies and due to the various opportunities offered by it has got lots of attention from media and analysts. Cloud computing is an on demand service[1] in which shared resources[1], information services, software and other services are given to specific users according to the need at exact time.

Cloud Computing system are heavily rely on term virtualization that improves the power efficiency of datacenters and enables virtual machines to single physical server All services through the internet are distributed whenever user demands, such as operating system, network, storage, software, hardware and resources. These are three types of services that are divided into these types: Infrastructure as a Service (IaaS) [1], Platform as a Service [1] (PaaS) and Software as a Service (SaaS).

Cloud Computing has become one of the popular technology adopted by both industry academia Providing a flexible and efficient way to store and retrieve files [2]. The major problem is scheduling of the incoming request so minimum response time is obtained, efficient resourse utilization. Cloud computing system[3] are heavily rely on term virtualization[2] that improves the power efficiency of data centers and enable virtual machines to single physical server. Many algorithms FCFS, honeybee based load balancing technique, Round Robin, Active clustering, Active monitoring load balancer, Throttled load balancer, Random sampling have been designed to carry out the client's request towards the cloud nodes but to ensure effective utilization of resources and response time minimum the term load balancing comes into effect. The paper included some algorithms of load balancing algorithms in cloud computing which is analyzed on a specific environment of virtual machine.

In this paper, we proposed a Dynamic and Static Load Management algorithm which will hybrid the load at the servers by considering the current status of all the available virtual machines intelligently and later response time of this algorithm is compared with the existing Dynamic Load Management Algorithm and Hybrid Algorithm.

II. LITERATURE REVIEW

Reena Panwar , Prof. Dr. Bhawna Mallick, proposed a “Load Balancing in Cloud Computing Using Dynamic Load Management Algorithm” describe the response time of virtual machine improved efficiently but everytime algorithm is consider all the virtual machine to check the availability of assigning new load. which is published on 2015 of International Conference on Green Computing and Internet of Things - IEEE [1]

Shikha Garg, Dr. D.V. Gupta, Dr. Rakesh Kumar Dwivedi, proposed a “Enhanced Active Monitoring Load Balancing Algorithm For Virtual Machines in Cloud Computing” describe the algorithm is improve the response time better than round robin and active monitoring. Which is published on 5th International Conference on System Modeling & Advancement in Research Trends – 2016 [2]

Navtej Singh Ghumman, Rajwinder Kaur, proposed a “Dynamic Combination of Improved Max-Min and Ant Colony Algorithm for load balancing In Cloud System” describe Improved Max-Min and Ant Colony Optimization Algorithm which is improve both

resource utilization and job response time. It is published on 6th ICCCNT – IEEE 2015 [3]

Umang Thakkar, Prof. Indr jeet Rajput, proposed a "A Novel approach for Dynamic Selection of Load Balancing Algorithm in Cloud computing" describe load balancing improved min-min algorithm which is increase response time. It is published on International Conference on Global Trends in Signal Processing, Information Computing and Communication 2016[4]

III. PROPOSED WORK

Here in our system we take Dynamic load management and Round robin algorithm where load is managed by the server by considering the present status of present VMs for request assignment sharply. Seed block diagram is good for VMs. Our system architecture is shown in bellow fig. 1.

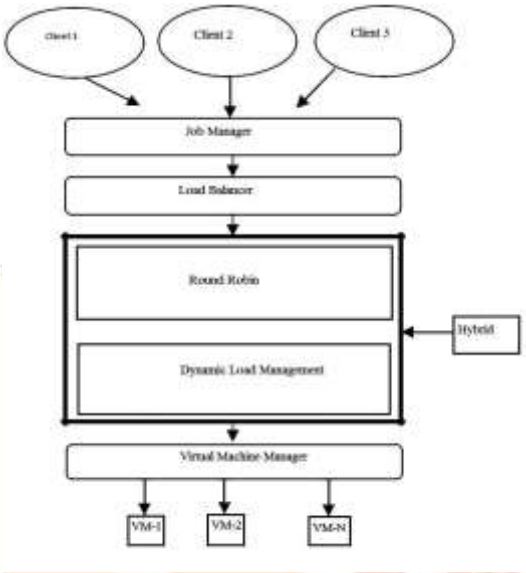


Fig.-1 System Architecture

Algorithm: Hybrid Load Management Algorithm

Input: Number of incoming jobs is il, i2. . . . . in Available VM jl, j2. . . . . jn

Output: All coming task ii, i2 . . . in are assigned to virtual machines which are having minimum load WIth the present J l, j2…… jn.

1. VmLoad Balancer manages symbol table of all the present VMs and the status of VM (i.e. BUSY/AV AILABLE). All VM's are free in starting.
2. A new query has been received by the Datacenter Controller.
3. A query is received by VmLoad Balancer through datacenter Controller for the next allotment.
4. Allocation table has been parsed by VmLoad Balancer from top to bottom till the time when first and free available VM is found.
5. Here then to check that present allocation total is less than that of maximum limit of VM list and RoundRobinVmLoadBalancer returns the VM id to the Datacenter Controller.
6. Active load has been counted for all VM. Then return id of least loaded VM. And then a request is assigned by VM Load Balancer to present VM. .
7. RoundRobinVmLoadBalancer updates the allocation table accordingly If not found Then The RoundRobinVmLoadBalancer returns -1.
8. A few task will be assigned to VM which is least loaded if sometimes VM i.e. overloaded for equal allotment of load to every VM. If VM not found, VmLoadBalancer returns -1 then DataCenterController queue up the incoming request.
9. When VM end with taking the query and the Datacenter Controller get the response of cloudlet it alerts the VmLoadBalancer of the particular VM deallocation.
10. The Data Center Controller focuses on checking if any requests that are in their waiting queue, it will continue from start of step 3.
11. Continue from step 2.

The VM-Assign [1] load balancer mainly target on the effective usage of the resources VM [2]. In proposed algorithm employs that Hybrid Load Management takes the set of available virtual machines in an available group or block. When a new request comes we check for best suited virtual machine. Once the request is bound with the virtual machine, we remove this VM index from the group

of available virtual machines so it will not be considered for any future request until it finish its assigned workload and becomes available again by setting its status to be free. If the next upcoming task is received then it checks for the table of VM if it is overloaded then a request will be assigned to and returns the id of that particular VM to the Data Center, else -1 is obtained. When Vm completes its work, the Data Center Controller receives the reply of Datacenter.

IV. INTRODUCTION TO CLOUD ANALYST

The simulation of problem, result and perfonnance analysis is carried out by using this simulator cloud analyst tool.

4.1 Cloud Analyst

Cloud Analyst is a GUI [5] based tool based on Cloud Sim architecture. It has been developed at University of Melbourne that aims is to support assessment of tools of social networking tools according to the geographic distribution [2] of clients and different data centers. CloudSim is a tool which was developed in the University of Melbourne of GRIDS laboratory which enables modeling[19], simulation [19] and experimenting [5] on designing the infrastructure of Cloud computing.

Cloud Analyst tool detached programming from the simulation [5] experimentation, such as modeler has to focus on the simulation complexities. The Cloud Analyst grants modeler to work into various experiments.

4.2 Cloud Analyst Design

The tool Cloud Analyst has created on topmost of Cloud Sim [19] tool kit [5], by continuing some functionality of Cloud Sim with the internet modelling and behavior of Internet Application by introducing the concepts.

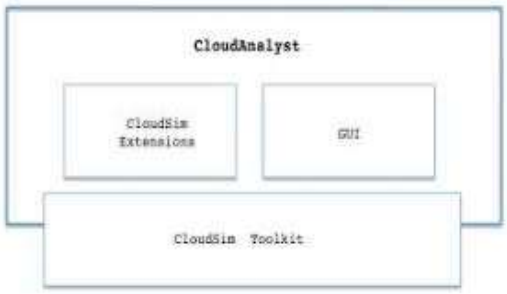


Fig-2 Cloud Analyst Architecture

The basic constituents of the tool cloud analyst [9] are:

a) GUI Packages: It is mainly responsible for the graphical user Interface.

b) User Base[J9}: It models a different clients who are treated as individual entity in the simulation and generates traffic for the simulation.

c) Internet- By introducing delay for transmission and data transfer,It can models routing scheme for Internet traffic .

d) DataCenterController: It generally controls Datacenter activities.

e) VmLoadBalancer: A VmLoadBalancer is used by Data center controller for determination of which particular VM is to be used for assignment to which datacenter and models load balancing policies.

f) Simulation: Simulation accepts requests and then execute request.

g) CloudAppServiceBroker: This component broker handles the traffic routing between data centers and user base.

V. RESULTS AND DISCUSSION

Now we will analyse the two load balancing policies by setting the configurations of components of the cloud analyst tool [5].The parameters have been set for the application deployment, configuring user base [7], In Fig 2-5 we have shown the Data center configuration and load balancing policy [8]. As shown in the Fig 2, the six regions have been defined for locations of various user bases in the world. We consider the four data centers to serve the requests of users. First data center is located in region 0, second one is in region 1, third one is in region 2 and fourth one is in region 4 and fifth one is in region 5. There are total 25 VMs in each of DCl to DC5. As shown in Fig 5[7], you can select a load balancing policy; first VM-Assign algorithm is selected. Time for simulation is

about 24hrs. Cloud analyst tool permits the users to repeatedly executing the simulation when change of the parameters time to time. Few of user Base configurations are shown below.

5.1 Configure Simulation

Figure 5.1: Userbase Configuration

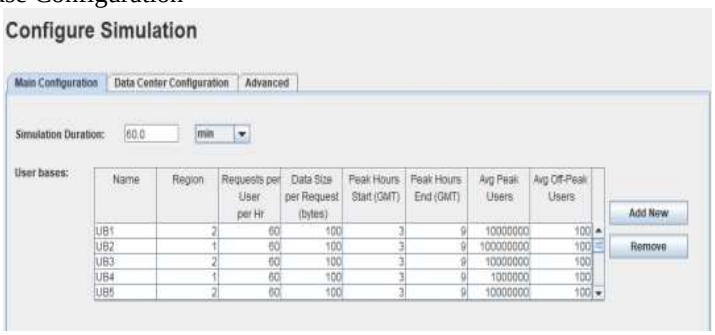


Figure 5.2: Application Deployment Configuration

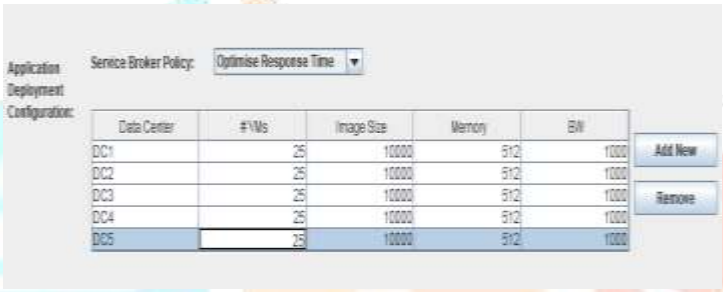


Figure 5.3: Datacenter Configuration

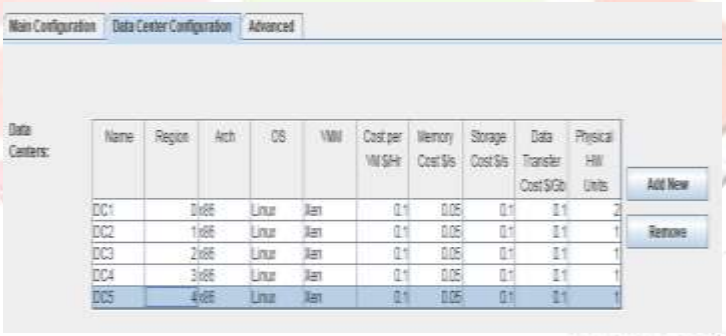


Figure 5.4: Load balancing Policy

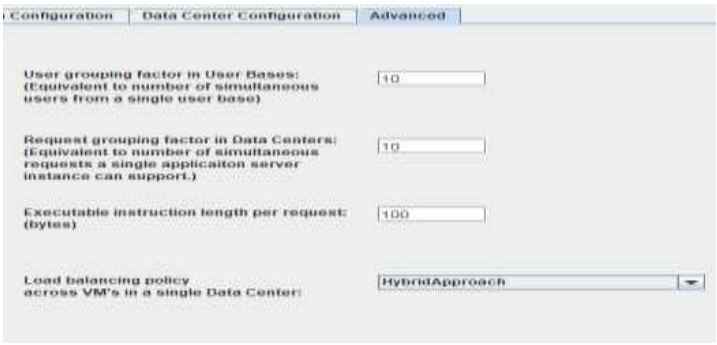
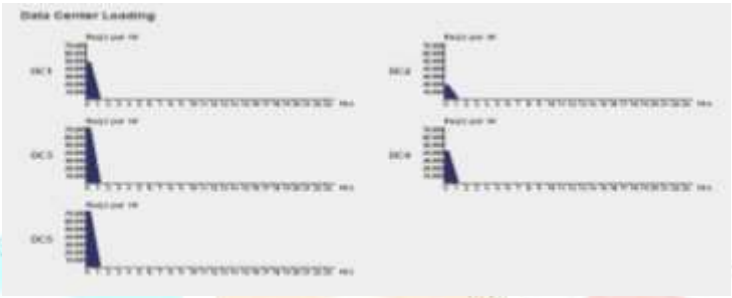


Figure 5.5: Output Screen of Cloud Analyst

Here after execution simulation result has been shown by cloud analyst has shown in Fig.6. The above defined configuration [7] has been set for individual load balancing policy one after the other and finally the result has been calculated for metrics i.e. request processing time[9], response time and total cost required in achieving the task are shown in Tables I, II, III.



5.2 Datacenter Servicing Times

Data center [7] Request Servicing Time has analyzed by the cloud analyst by the selection of loading policy one by one are given in the Table I.

Data Center	Dynamic(ms)	Hybrid(ms)
DC1	.35	.34
DC2	.51	.42
DC3	.30	.28
DC4	.37	.35

5.3 Cost

In Table II the cost for particular load balancing policies analyzed by the tool cloud analyst are given as:

DataCenter	Dynamic($)	Hybrid($)
DC1	.40	.35
DC2	.10	.10
DC3	.10	.10
DC4	.50	.49
DC5	.50	.49

5.4 Overall Response Time

The overall responding time for Hybrid algorithms estimated by the simulation of cloud analyst as shown in Fig.

Algorithm	Overall Response Time (ms)
Dynamic	80.51
Hybrid	74.96

VI. Conclusion

In this paper, we reviewed both dynamic and static load is to be mixed then the hybrid of Dynamic load management algorithm and Round robin algorithm can be improved sufficiently and also by incorporating the paradigms of parallel and high performance computing response time and utilization of VMs optimized. Here these paper focus to response time of VMs. Hence our proposed algorithm distributes the load nearly efficiently among VMs with improved time in comparison to the previous algorithm[1] and solves all the issues of ineffective usage of the present VMs.

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