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AN IDEA TO SCHEDULE TASK (VM) USING HONEY BEE FOREGER BEHAVIOUR IN CLOUD COMPUTING

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ABSTRACT

In virtualization data server consist a number of virtual machine, allocation of this virtual machine or in other word we can say that the resource allocation is NP hard problem. In preemptive allocation many of virtual machines are overloaded and some VMs remain free this problem consumes a lot of energy because in this environment the load is balanced because there no uniform allocation of resources or task to VMs that's why some VM overloaded and some remain free. In this paper, we propose an algorithm which is inspired by a load balancing algorithm names honey bee behavior algorithm for load balancing, this algorithm focus on achieve load balancing over the virtual machine for reducing the energy consumption and increase the throughput. We have also compared the proposed algorithms with the previous and the experimental result shows the modification in previous algorithm gave better result than previous one. Our method shows that there is a effective improvement in average execution time and reduction power consumption.

INTRODUCTION

Cloud computing is internet based computing where all the data is distributed over virtualized data server. Files and applications are hosted over thousands of interconnected distributed server. Basically cloud computing is a combined form of parallel, grid and distributed computing which provide hardware (infrastructure), software and platform as a service to the consumer system on demand the services of cloud based on pay for use. The consumer need not to purchase license to use software, they even don't need to build a complex infrastructure for computing. With the help of internet the customer can use the computation resources and power by paying money only for the time duration of used services. This changes the traditional software licensing policy and avoiding the amount of investment.

Consumer wants to reduce the execution time of task on the system so that he can save power and make computing environmental friendly. As we know cloud is virtualized environment and the virtual machines are the processing unit in this virtualized environment. From the power saving point of view machine should run parallel and execute the task as soon as it can. Or the resources/ virtual machine should be allocated as early as possible so that task can be executed and the server state turns into idle state. This turns into the problem of scheduling the task in given resources.

The scheduler should do the work of scheduling efficiently in order to use all the available resources fully. Virtual machine should be effectively assign to one or more task it should make sure that the tasks are not loaded on a single VM while other VMs are in idle situation. In this condition the load on server machine is not balanced so there is a need of load balancing algorithm which can balance the load of task and all VM are equally loaded and resources can be utilized properly.

There are two kinds of load balancing algorithm one is static algorithm. Static algorithms work properly only when nodes have low load variation. This algorithm cannot be fit properly in cloud environment because in cloud environment load is varying with respect to the time. While in other algorithm which is known as dynamic algorithm we need to consider the cost associated with load information for gain the advantage we need some extra cost for collecting and maintain the load information.Dynamic techniques are highly successful for load balancing of tasks among heterogeneous resources. Our proposed load balancing technique is also a dynamic technique which will not only balance the load but also take into account the priorities of tasks in the waiting queues of VMs.

The main motive of load balancing approaches is to speed up the execution of applications on resources whose workload changes drastically with run time [1].

This approach suggests that load balancing in cloud environment is possible this approach is based on honey bees behavior, bee have some scout bees and forager bees which follow the scout bees. Scout bees search for food source then come back to their beehive then forager bee follow the scout bees to collect the food they then return to the beehive and do a vibration dance to other bees in the hive giving an idea of how much food is left on the same manner the algorithm the task considered as a bee. The higher priority task on the overloaded virtual machine is migrated over the virtual machine having minimum number of task so that the important task can be run or executed as soon as possible.

This paper is a study about load balancing algorithm and virtual machine allocation policy in cloud environment as well as here is a modification in artificial honey bee colony algorithm for load balancing and virtual machine allocation, modification in previous approach will give an idea which Virtual machine is assigned to which task according to the assigned VM and load over them so that the load would be balanced and there is less power consumed in the cloud environment.

RELATED STUDY

Load balancing in cloud computing or in network is to remove the task from the overloaded node or virtual machine and move that task to the under loaded virtual machine or node. There are two policies or algorithm of load balancing 1. Static and other one is Dynamic [2] In static load balancing algorithm the resource requirement is estimated ad balancing related decisions are taken at compile time advantage of this algorithm is that these algorithms are easy in comparison to dynamic algorithm but there is a draw back too of this algorithm, this algorithm cannot be used with cloud computing environment because load is vary according to the variation of time.

Dynamic load balancing algorithms: Dynamic load balancing algorithms make changes to the distribution of work load among virtual machine at run-time rather than compile time; they use current load information when making distribution decisions which increases the cost and complexity of this algorithm [3].

Research paper [4], is about a load balancing strategy for grid computing environment. In this paper, a hierarchical load balancing policy and associated algorithms based on neighborhood Property is discussed. In this study the load is balanced locally first means the load is balanced within the sites without any communication in between the sites

Then, upper hierarchical balancing will take place and so on. The main benefit of this idea is the decrease in the amount of messages exchanged between Grid resources. This system creates a hierarchical architecture that is totally independent of Grid architecture. Like the above study research [5] titled “Dynamic Load Balancing in Grid Computing”, presents a task load balancing policy in Grid environment. It uses task level balancing it also reduces the communication this strategy is distributed with local decision making. In this model the grid is transformed into tree structure which has no grid topological structure complexity the transformed tree is used for load balancing in grid computing.

In [6], is based on Time Optimizing Probabilistic policy and in this paper a new time optimization Load Balancing Algorithm is presented in grid computing. This algorithm chooses the resources based on their previous performance and completion time. The main objective of this work is to achieve load balancing and reduce the response time.

Comparative Study into Distributed Load Balancing Algorithms is shown in [7] for Cloud Computing. This paper considers three methods for load balancing in large cloud environment first one is nature inspired algo for self organization and in second the sampling is performed of system domain which balance the load across all the nodes and lastly the system is restructured to feasible job assignment In [8] honey bee foraging solution is investigated a distributed random sampling method measure mean is examine in this at the last an method used for connecting similar services by local rewiring, in case of load balancing the services assigned dynamically as the request for server is increases or decreases. The server has virtual servers and each virtual server have own services queue. The virtual server process a request according to its services queue after calculating a profit or a reward, which is analogous to the quality like bees have in waggle dance.

The artificial bee colony algorithm (ABC), an optimization algorithm which is a part of intelligent foraging behavior of honey bee was suggested by Karaboga in 2005 [9]. The method shown in the work is for numerical function

optimization. The profit of Artificaial Bee Colony is that the global search ability implemented with the help of neighborhood source production mechanism's introduction [10]. Leaf-constrained minimum spanning tree problem [11], flow shop scheduling problem [12], block matching algorithm for motion estimation [13], optimization [14] and inverse analysis problems [15]. Tsai et al. present an interactive artificial bee colony supported passive continuous authentication system [16].

In basic version of honey bee colony, algorithm performs a type of neighborhood search combination with alternate random search and can be used for combinatorial optimization and for functional optimization too. The chosen nectar source provides a maximum ratio of gain compared to costs [17].

LOAD BALANCING AND VIRTUAL MACHINE ALLOCATION

In cloud environment the task is assigned to any machine from a lot of virtual machines dynamically or it may be allocated statically according to need of the user or requirement of system. The services required by clients can be routed at any data server to end virtualized server. The routing of services or assignment of task is based on management policies which depend on load of each server or virtual machine.

For managing the load and assign the task we have to find out overload and under loaded VM form VM groups then migrate the task according to priority to the under loaded VM so that it can completed as soon as possible here is a small modification in the concept of honey bees behavior algorithm [18] is suggested in few steps in the below algorithm. For finding out load over the VM we have to calculate capacity and actual load of VM which is calculated by processing element and number of processors. The procedural algorithm shows the concept.

The proposed scheme uses another similar method for estimating the new allocation of VM. If this method is consumed than the power consumption of VM reduced significantly.

Step 1: First of all virtual machines capacity is calculated by following mathematical formula

Number of processor and all processors instruction executed per million sec in VM is multiplied then the result value will be added with guest OS and then resultant value is added memory of Vm and with the time required by processor to process in VM. Final result value will be added with communication bandwidth.

Step 2: capacity of all VMs calculated by above formula. Then resultant load added for all machines.

Step 3: load of VM calculated as given below.

VMs divided queue by service rate of VM on time t has no. of task at given time t

Step 4: total load of all VMs go from the above formula for each VM then integrated.

Step 5: processing time of VM

Ratio/division of load of a VM and capacity of a VM

Step 6: processing time of all VMs calculated as in step 4

Step 7: standard deviation of load is calculated

Step 8: find state of VM

```
If
    {
      Standard deviation of a VM load is under or equal to the threshold condition set (TS) [0-1]
    }
  System is balanced state
Else
    {
      System is imbalanced state
    }
```

Step 9: finding overloaded group When the current workload of VM group exceeds the maximum capacity of the group, then the group is overloaded, load balancing is not possible in that cas

Step 10: In VM grouping, each set contain the no. of VMs, we schedule the task from overloaded VM to underloaded VM using kmean with using of vm availability

Step 11: if we found waiting on the que of the task then find out the process which take less time as compare to other process.

CONCLUSION

In this paper, we have suggested a load balancing and task transfer policy with virtual machine allocation for cloud computing which is based on previous honey bee artificial strategy. The above concept balance the load as well as it save the power and improve the efficiency by allocation the task on the basis of priority. It also transfer task execution load from the heavily loaded machine to idle or less loaded machine. The tasks removed from VMs groups are treated as honey bees. The above concept may also reduce the response time of VM. In future, we compare the results of this concept with previous method.

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