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Energy Aware on demand VM Allocation for a Green Cloud Environment

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Abstract
In recent years Cloud Computing attract the people from industry and academic communities. Cloud Computing provides the storage service, movement of computing elements and software delivery. It delivers the next generation computing infrastructures hosted by large companies. A Data Center keeps all the computing facilities like routers, servers, switches, and firewalls. The energy utilization and size of the server farms have been expanded because of the cloud data center framework. Typically, high energy utilization prompts high working expense and high fossil fuel emission. High fossil fuel emission isn't a climate benevolent. So this is the significant worry of the cloud environment. This is a major test for research networks. Allocation of resources in an efficient way is unique of the foremostdifficulties in the cloud computing environment. So, effective resource allocation is required to solve this problem. Here, we proposed the bee's algorithm for resource allocation problem.

Keywords: Cloud Computing, Virtualization, Resource Allocation

I. INTRODUCTION

Distributed computing administration is the compensation per-use plan of action and the capital speculation can be changed by distributed computing [1]. Cloud specialist organizations have enormous scope cloud server farms wherever on the planet. The energy utilization and size of the server farms have been expanded because of the cloud data center framework. Generally, high energy utilization prompts high working expense and high carbon (CO2) emanation. High fossil fuel result isn't a climate cordial. Along these lines, this is the significant worry of the cloud environment. This is a major test for research networks. From 2007 to 2030, the electricity consumption is agreed to rise 76% is the fact [2]. Gartner report [3] and McKinsey report [4] says that the average energy bill of the data center is 11.5 billion and it can be double each five years. When the servers are not in use, still it consumes 70% of its peak power.

In order to face this concern, the researchers have to find energy-aware resource allocation techniques and also they have to consider the Quality of Service (QoS). The necessities of the QoS are framed based on Service Level Agreements (SLA). This SLA describes the minimum throughput, the maximum response time of the system. The main challenge for the researches is to allocate the resources without extraordinary energy ingesting and also satisfy the QoS requirements.

Some researches had attempted to shrink the energy intake of the data centers. Nowadays active server provisioning and Virtual Machine merging are the two main strategies are adopted for reducing the energy consumption and also they have allocated the limited number of resources to be used when the demand is decreased. The unnecessary servers can be put in low power mode or switched off in this period. On other hand, when the demand increased, the extra servers are switched on and can be put in high power mode. This is called a Dynamic Power Management Technique. Another efficient way to allocate resources is dynamic Virtual Machine consolidation [5]. It adopts the Virtual Machine that shares the Physical Machines (PM) among multiple platforms.

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That technology is known as Virtualization Technology [6]. The sharing of the physical machine can be monitoring by the Virtual Machine Monitor. Through this, the diverserequests can be allocated on the same physical machine to expand the resource utilization in instruction to decrease the energy intake [7].

II. RELATED WORK

Stillwell et al. [8] have discussed about the High Performance Computing (HPC) applications in virtualized homogeneous clusters and also the problematic of resource allocation in HPC. They have fixed their objective as to increase the resource utilization [19]. The authors defined this problem as Mixed Integer Programming model (MIP) model. For that they fixed the computational power and recollectionsupplies of the applications are fixed and called as priori. The authors have used some heuristics to rectify the problem. The multi-capacity bin packing algorithm has been used to sort the tasks established on the largest resource requests in descending order [23]. To handle the variability of the workload, dynamic workloads allow the applications of virtual machine migration. One problem will arise here, that is VM migration overhead. To avoid that problem, they have fixed the amount of bytes to be transferred in a particular time. The major limitation in this work is that there is no solution provided for large scale problem and they have considered only the resource CPU for optimization [20].

Now a day the researchers have used load balancing, greedy balancing and round robin for resource allocation. These algorithms are used by Open Nebula [9], Eucalyptus [10] and Open Stack [11], but the energy efficiency was not addressed. Karuppasamy et al. [12] have proposed a simple energy aware policy that adopted some allocation schemes such as first fit and round robin etc. In order to save energy, the servers are putting in low power consumption state when the servers are not host virtual machines. Michele Mazzucco et al. [13] have presented some policies to save energy and queuing models and heuristic-based models are used for achieving their goal.

Gregor von Laszewski et al. [14] proposed Dynamic Voltage Frequency Scaling (DVFS) based approach for efficient resource allocation. Dang Minh Quan et al. [15] have stated some policies based on some energy efficient algorithms and minimum servers have been used to manage all requested VMs. ShekharSrikantaiah et al. [16] have recommendedaninvestigative approach for multidimensional bin packing problem and they have used minimum number of physical hosts to save energy. Ying Song et al. [17] introduced a global resource flowing algorithm to allocate the resources this approach is fit for both Software and Platform as a Service.

III. PROPOSED SYSTEM

Bee's algorithm is based on the life of bee. Here, a job which requires the lowest memory, processor and input-output can be identified by meta-scheduler. This job is named as scout bee and assigned the job to find a suitable site. Scout job has been allocated to the location which requires the resource right now. The scout jobs identify the location with the help of fitness function. The fitness function finds the task whether it is memory or processor dependent and also finds the location.

Once the resources and location are identified then the scout job returns back to the scheduler. Next step is to perform waggle function. The waggle function is used to separate the tasks based on cast, memory requirements and processor requirement [18].

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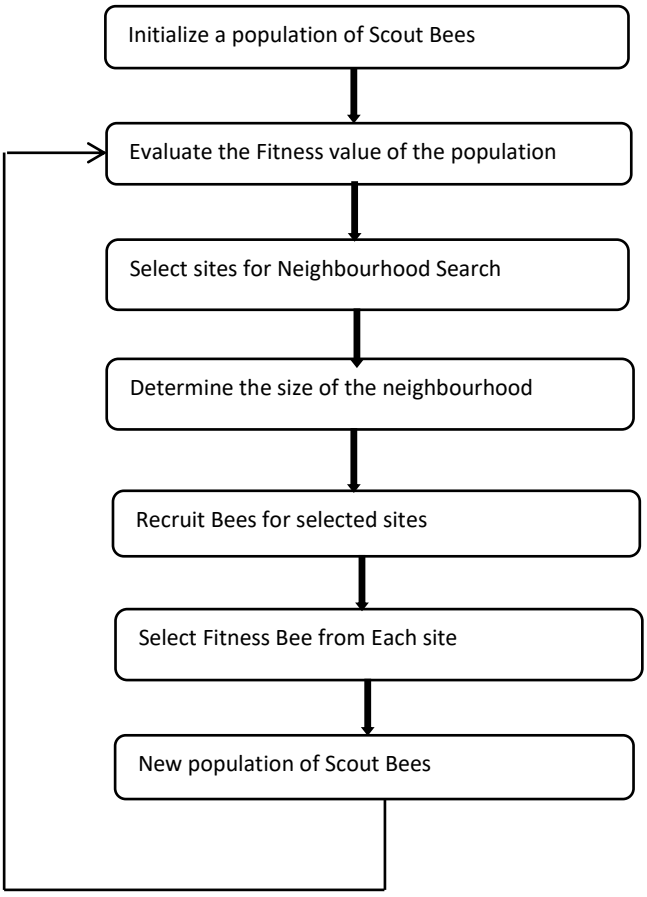

Fig.1. Flow chart for algorithm

The scout bees are given as input to the bee's procedure initially. The scout bees are selected casually. Then the fitness of the positions visited by the scout bees is calculated. The bees which have the high capability value will be a number of for the next step. Those bees are "selected bees" and the visited sites are selected for neighborhood search. Assign more bees to search for best e sites. The fitness value is recycled to find the possibility of the bees being a selection of to the next step. The fitness is associated with the sites that the bees have visited. Searches in the zone of the best e sites will give additionalhopefulresults. From each group, select the bee which has the maximum fitness value to form the new population. The outstanding bees in the population are allocated casually around the exploration space scouting for innovativepossibleclarifications. The above phases are continual until the stopping criteria met.

IV. CONCLUSION

The energy mindful resources portion has accomplished the objective of restricting the amount of active resources, improving the resources use, unsteadiness the various resources and diminished force utilization. The ideal possessions assignment has been accomplished with the base sum of dynamic possessions and by turning off the inactive resources. In this paper, virtual machine allocation problematic in the distributed computing has been studied and a unique population-based metaheuristic called Bees Life Algorithm which is stimulated by environment life of bees has been used to solve this problem.

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