

A Load Balancing Model for Task Scheduling Using Integrated CGT and BEE Scout

Ashutosh Daharwal

Department of Computer Science &
Engineering,
Patel College of Science & Technology,
Bhopal (M.P.)
daharwal.ashutoshkumar@gmail.com

Prof. Niharika Sahu

Department of Computer Science &
Engineering
Patel College of Science & Technology,
Bhopal (M.P.)
niharika_sahu23@gmail.com

ABSTRACT

The load balancing is important area of cloud computing environment. The process of balancing balanced the limited number of resource and unlimited number of job arrival. The process of balancing of workload improved the performance of cloud environment. The process of load balancing undergone in two different scenario static and dynamic. The static balancing technique used the process of CPU scheduling and some common data searching technique. The dynamic load balancing adds some extra process and increase the cost of balancer. Now a day the dynamic load balancing technique used heuristic based function. The heuristic based function swarm intelligence for the purpose of balancing. The efficiency and proper utilization of cloud environments depends on the balancing of load. The limited number of resource and on demand access of resource creates the situation of overloading. The proposed model simulated in cloudsim simulator and used various parameters such as data center, number of user base and many more. The proposed model simulates in cloudsim simulator.

Keywords: - Cloud Computing, Load Balancing, Virtual Machine, BEE Scout, CGT.

INTRODUCTION

Cloud computing is the best in class development in current day circumstance. It has ascended as an answer giving enlisting resources as a support of the purchasers as system, stage and programming[2]. National Institute of Standards and Technology

(NIST) definition says, "Circulated processing is a model for engaging all inclusive, supportive, on-demand compose access to a typical pool of configurable enrolling resources that can be immediately provisioned and released with immaterial organization effort or pro association[3-5]." This cloud model is made out of five key qualities, three organization models and four courses of action models. Five key properties are: on-demand self-advantage, wide framework get to, resource pooling, quick adaptability, and measured organization[12-13]. Four sending models consolidate private, gathering, open and blend cloud. Three organization models are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS)[7].

For load adjusting and undertaking booking of cloud computing utilized meta-heuristic capacity worried with the plan of astute multi-specialist framework by taking motivation from the aggregate practices of social creepy crawlies and other creature social orders[6]. They are portrayed by a decentralized method for working that copies the conduct of the swarm. The enhancement needs a level of arrangement approach of multi-criteria of issue definition. Some enhancement of asset strategy talks about here. Hereditary Algorithm or Genetic calculation is pursuit calculations in view of the instrument of common determination, better known by the developmental procedures [8-11]. During the time spent advancement, the individual is ceaselessly changing qualities to adjust to the earth of his life. Just person who are solid can survive[15]. Rest of this paper is organized as follows in Section 2 discusses about CGT Balancing Algorithm in cloud computing environment description, Section 3 discusses about the proposed algorithm. Sections 4 describe the simulation process of proposed model and finally discuss the conclusion & future scope in Section 5.

2. CGT BALANCING ALGORITHM

In this section describe the CGT load balancing algorithm based on queuing system[9].

1. All the type- m jobs that arrive in time-slot t are routed to the server with the shortest queue for type- m jobs, i.e., the server

$$i_m^*(t) = \arg_{i \in \{1,2,\dots,L\}}^{\min} Q_{mi}(t).$$

Therefore, the arrivals to Q_{mi} in time-slot are given by $A_{mi}(t) = \begin{cases} A_{mi}(t) & \text{if } i = i_m^*(t) \\ 0, & \text{otherwise.} \end{cases}$ (1)

2. For each server i : Let $N_m^{(i)}(t)$ denote a configuration chosen in each time-slot. If the time-slot is a refresh time (i.e., if none of the servers are serving any jobs at the beginning of the time-slot), $N_m^{(i)}(t)$ is chosen per the MaxWeight policy, i.e.,

$$N_m^{(i)}(t) \in \arg \max_{N \in N_i} \sum_m g(Q_{mi}(t)) N_m \quad (2)$$

If it is not a refresh time, $N_m^{(i)}(t) = N_m^{(i)}(t-1)$. However, $N_m^{(i)}(t)$ jobs of type $-m$ may not be present at server i , in which case all the jobs in the queue that are not yet being served will be included in the new configuration[14]. If $N_m^{(i)}(t)$ denotes the actual number of type- m jobs selected at server i , then the configuration at time t is $N^{(i)}(t) = N^{(i)}(t)$ Otherwise, i.e., if there are enough number of jobs at server i , $N^{(i)}(t) = N^{(i)}(t)$.

Assumption (1) means that when the job sizes are not bounded, they have geometric tails. For example, truncated heavy-tailed distributions with arbitrarily high variance would be allowed, but purely heavy-tailed distributions would not be allowed under JSQ model[10].

3. PROPOSED METHODOLOGY

In this area examine the heap adjusting model utilizing bumble bee Scout handle. The bumble bee scout goes before the committed load for the preparing of employment booking. The booking of employment separation into two three segment, one is perfect condition, another is under load condition and other is over-burden condition.

1. Find capacity loads of all VMs based on the three conditions define in Bee Scout job is under load.

If $SE \leq TL$
 Loader is balanced.
 Exit

- 2 Create the decision node for allocation

If $TD_{ij} >$ maximum capacity // if the total load of request matrix is maximum, then the balancer is not working

Load balancer not working

Else

Call allocation process. // call function of Bee Scout for decision of request load.

1. Share all virtual machine capacity // coupling of virtual machine
2. Call decision factor: // call resource manager for mapping

Create node of VMs

$supply\ of\ VMS = Maximumm\ Capacity - \frac{Load}{Capacity}$ //estimate total capacity of couple virtual machine

Demand of each machine in node is

$demand\ of\ w_{ij} =$

$\frac{Load}{Capacity} - Maximumm\ Capacity //SE_{ij}$ request matrix load per their request.

While $T_a \neq \varphi$ and $W_{ij} \neq \varphi$ // if total capacity and request matrix of load is null

For $s=1$ to # (Ta) do //couple all virtual machine
 Sort all VMs

For each task T in VMs find machine $VM_d \in Ta$ such as

$T_a \rightarrow VM_d \mid \min(\sum T) \in VM_d \text{ and } Load_{VM_d} \leq Capacity_{VM_d}$ // allocate request load to their resource.

If (T is allocated time)

$T_u \rightarrow VM_d \mid \min(\sum T_h) \in VM_d$ // single machine allocation

$T_o \rightarrow VM_d \mid \min(\sum T_h + \sum T_m) \in VM_d$
 coupled machine allocation

Finally, T_u and T_o is combined and transfer to data center for the execution of job.

4. EXPERIMENTAL RESULT

In this section we perform experimental process of cloud computing techniques with simulation tools. To interact with various services in the cloud and to

maintain the resources in a balanced manner to fulfill the requirement of resources/infrastructure by those services, several techniques are required[8]. To evaluate the performance of cloud computing techniques in cloud computing environment for the load balance and resource management, here we are using various numbers of techniques such as Round Robin, CGT and BEE as a proposed method. For the further implementation and comparison for performance evaluation we used java programming languages with NetBeans IDE 8.0.1 tools for complete implementation/results process.

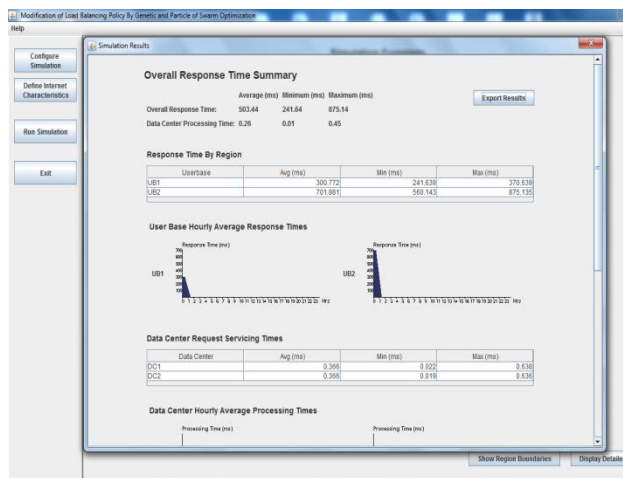


Figure 1: Shows the Overall Response Time and Data Center Processing Time for CGT method in Cloud Computing Environment.

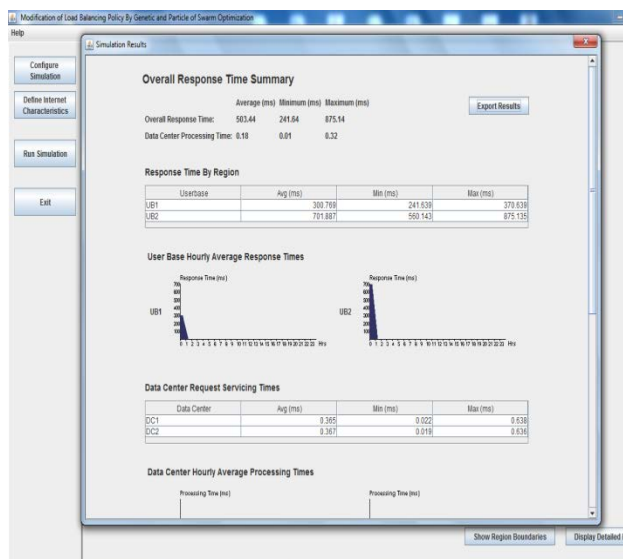


Figure 2: Shows the Overall Response Time and Data Center Processing Time for BEE Method in Cloud Computing Environment.

For ROUND ROBIN Method Used UB1-DC1 Dataset		
	Overall Response	Data Center Processing
Average Time	300.772	0.366
Minimum Time	241.639	0.022
Maximum Time	370.639	0.638

Table 1: Shows the Response Time and Processing Time analysis for Round Robin Method.

For CGT Method Used UB1-DC1 Dataset		
	Overall Response	Data Center Processing
Average Time	295.392	0.269
Minimum Time	236.639	0.020
Maximum Time	365.392	0.511

Table 2: Shows the Response Time and Processing Time analysis for CGT Method.

For BEE Method Used UB1-DC1 Dataset		
	Overall Response	Data Center Processing
Average Time	293.212	0.245
Minimum Time	232.269	0.018
Maximum Time	361.396	0.488

Table 3: Shows the Response Time and Processing Time analysis for BEE Method.

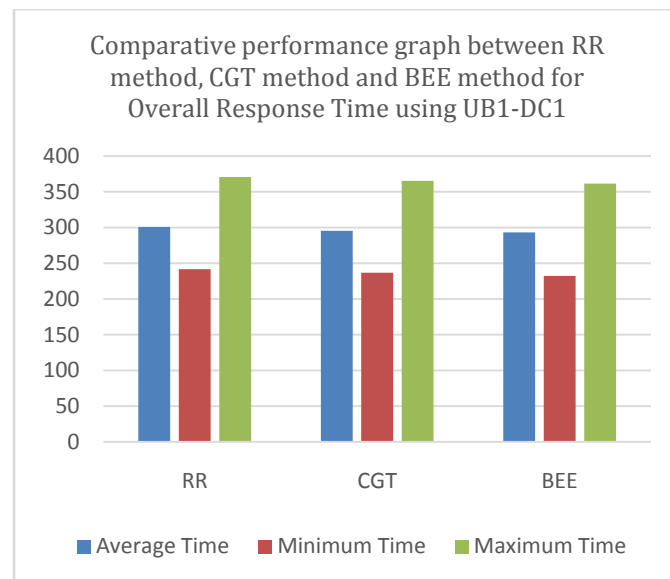


Figure 3: Shows the comparative performance between Round Robin, CGT and BEE method using UB1 and DC1 for overall response time in terms of Average, Minimum and Maximum values in milli-seconds.

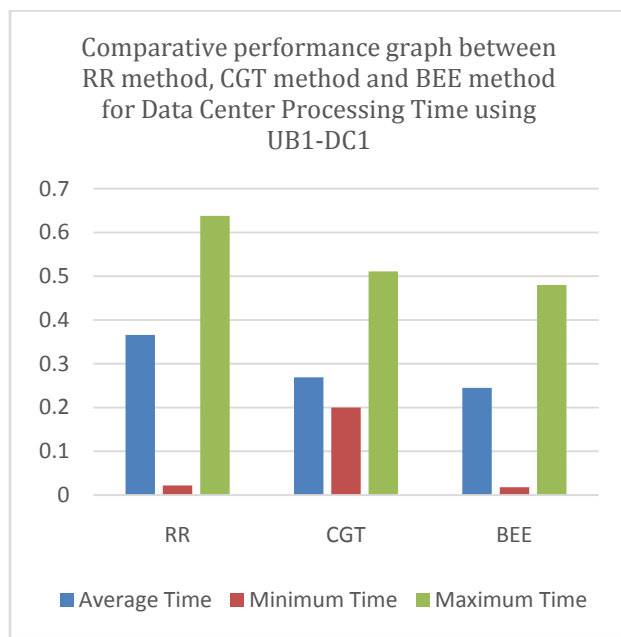


Figure 4: Shows the comparative performance between Round Robin, CGT and BEE method using UB1 and DC1 for data center processing time in terms of Average, Minimum and Maximum values in milli-seconds.

6. CONCLUSION AND FUTURE WORK

The proficiency of cloud construct foundation based with respect to load adjusting variable of various part of distributed computing. The heap balancer assumes a noteworthy part in cloud based administrations. The cloud based administrations cooperate with client and committed cloud framework. The connection of client and cloud operation demand to exchange the heap to virtual machine and different assets. Fundamentally, BEE calculation offices the all undertaking in two segments one is occupation portion process and other is employment choice process. The occupation determination process is characterized by the predefined imperatives work. For the assessment of execution utilized cloud test system programming such is called cloud expert. The cloud investigation programming is pack of arrangement of cloud environment and load adjusting strategy. In situation of arrangement outline two administrations one is hereditary calculation

approach and other is BEE based strategy. The BEE based arrangement decreases the heap impact approx. 22-25% in pressure of CGT. The adjusted load adjusting approach is exceptionally proficient for open distributed computing.

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