

Performance Evaluation of Queue Based Job Sheduling Algorithms for Cloud Computing

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Abstract: *The job scheduling is to allocate certain jobs to particular resources in a particular amount of time. The job scheduling is to achieve a high performance computing and the best system throughput. In cloud computing there are many jobs requires to be executed by the available resources to achieve best performance ,minimal total time for completion ,shortest response time, utilization of resource usage etc. Because of these different objectives and high performance of computing environment we need to design, develop, propose a scheduling algorithm to outperform appropriate allocation map of jobs due to different factors. This paper is showing results on the basis of number of parameters for organizing the number of different jobs, to identify job completion times on current resource provision. And to adopt a dynamic algorithm for VM scaling. To evaluate results CLOUDSIM is simulator is used*

Keywords: *Cloud computing, Job Scheduling, Load balancing*

1. INTRODUCTION

Cloud computing is an old technology and its use is increasing day by day due to its variety of facilities. A numerous type of applications are running through cloud which are stored in data centers. Data centers are combination of storage place which acts like database. For example applications like we chat are running using cloud. All data is stored in data centers and user just retrieve information from these data centers which is required and other information is available for other users an high security is also possible for end user using cloud. As cloud use internet connection it shares all connecting devices such that server, printer, central processing unit etc. Cloud is provided by many companies but it can be created by connecting different machines with each other through a link via data transfer is possible.

Cloud uses different concepts of computing such that distribution and virtualization. To perform better cloud needs a good scheduling algorithm. Using scheduling bandwidth of network can be utilized efficiently and response time can be deducted. Scheduling is the process to schedule data during transmission for uploading and downloading. Scheduling schedule application jobs and distribute load between machines to avoid circumstances of hanging. If proper scheduling is not achieved according to our requirement several errors can occur and it will produce errors like a few numbers of resources as their full capacity is not used and it is going vain. Scheduling is not an easy task in cloud and it is because several users can request for same application at a same time. Each user need to get access at same time without any interruption and for this scheduling becomes an important issue in cloud computing environment. To choose a scheduling algorithm for cloud computing environment a better scheduling algorithm is proposed in order to quality of service. First section is giving introduction to cloud computing and scheduling, second section is presenting related work, in section 3 proposed algorithm, section 4 is example for proposed algorithm, last section is about conclusion and future scope.

2. RELATED WORK

Some algorithms have been analyzed, improved and simulated in cloudsim to achieve the load balancing, which mainly focus on the minimum response time in cloud computing environment.

Li Y et al., 2011 job scheduling algorithms in cloud computing categorized into two main groups; Batch Mode Heuristic Algorithms (BMHA) and Online Mode Heuristic Scheduling Algorithms.

a) In BMHA, jobs are queued and collected into a set when they arrive in the system. The scheduling

algorithm will start after a fixed period of time. The main examples are. First Come First Served FCFS), Round Robin (RR), Min-Min algorithm and Max-Min algorithm.

b) By Online mode heuristic scheduling algorithm, jobs are scheduled when they arrive in the system. Since the cloud environment is a heterogeneous system and the speed of each processor varies quickly, the on-line mode heuristic scheduling algorithms are more appropriate for cloud environment .Most fit task scheduling algorithm(MFTF) is suitable example of Online mode heuristic scheduling algorithm(Li Y et al.,2012)[3].

(Wanqing You,Kai Qian,and Ying Qian 2014)The hierarchical queue based task scheduling algorithm [4]is based on the history of new coming jobs, tries to dispatch unscheduled jobs in global queue actively to avoid a long idle time on virtual machine. To do dispatching, first compare completion time of each virtual machine .Finally allocate a job to particular virtual machine whose completion time is minimum.

In [5], Ajay proposed a Dynamic Round Robin algorithm to optimize the load. Their contributions include two parts: using CloudSim to set up the cloud computing simulation platform, and varying the vital parameters, which shade important impact on load balancing. The result showed that the load had been optimized.

Amit [6] adopted an adaptive QoS (Quality of Service) aware virtual machine provision to achieve a full utilization of resources. By allocating tasks to different queues and set a high priority for urgent tasks, it reached a high throughput compared to other ways. The work of Amit as well as the work of Stefan [7] were focusing on the scheduling of virtual machines. Others may emphasize on CPU [8].

3. SCHEDULING ALGORITHM

Inspired by the concept of multiqueue here we present queue based scheduling algorithm to achieve a minimum completion time for a job on a virtual machine, in this the following assumptions are considered

1) The central node is considered as a job queue plays role of taking jobs from users and storing them in queue. The jobs are ordered based on priority and jobs are numbered from 1 to n for each priority. Then time quantum is calculated for all the jobs in parallel. Then, the jobs with lower quantum time are allocated. Here the time quantum is calculated based on average of burst time for user 1 to user n in parallel, due to the fact that we queued the jobs and that time quantum is calculated in parallel for all users, hence, this method results in improved waiting time and response time and acts better than FCFS, RR, and SJF scheduling algorithms.

2) Consider the completion time for each job on each virtual machine by using the formula $t=N_i/C_i$ Where N is the whole list of instruction that machine i need to process, and C is the capacity of machine i.If the maximum completion time is shorter than the average waiting time and average processing time then the job is scheduled.

In our algorithm, there are four different virtual machines, the power and capacity of which are shown in Fig. 1.It will shows the rough idea about the configuration we will implement in the algorithm. The pseudo code is shown in Fig. 2. Take an example suppose job i has a length of 30 MI,first calculate its completion on four virtual machine. To do dispatching, first compare the completion time of each virtual machine by using the formulation $t_i=P_i/(L_i-C_i)$.In this example virtual machine 2 has the minimum completion time among four virtual machines. Therefore job I is allocated to virtual machine 2.

Virtual machine	MIPS	
Ram		
Virtual machine1	100	2048
Virtual machine2	300	1024
Virtual machine3	200	512
Virtual machine4	250	512

Fig 1. VM configuration

Step 1: Number of virtual machines ‘N’(Configurable value)

Loads of the virtual machines take MIPS(Million Instruction Per Second) as a units L is the maximum capacity of virtual machine.

Step 2: To find virtual machine operation, current load of virtual machine and number of jobs.

NN job’s are in queue

CN is number of virtual machines operated $CN \leq N$

C_i is current load of the i th machine of CN

Step 3: for $k=1$ to NN

Calculate the processing time T_i

Initialize T_i

For $i=1$ to CN

If $(P_i \leq (L_i - C_i))$ (P_i is processing capacity i th machine) $((L_i > C_i)$ and $(P_i \leq (L_i - C_i))$

$T_i = P_i / (L_i - C_i)$

Allocate job to minimum load virtual machine based on minimum T_i 's

Else

Increase virtual machine if $CN < N$

Allocate job to new virtual machine

$CN = CN + 1$

If $(k \leq CN)$ go to step 3

Else

Go to step 2

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Fig 2: Pseudo Code

4. CONCLUSION

In this proposed scheduling algorithm we consider different parameters for scheduling in order to improve high performance, better throughput and we also evaluate the performance of various scheduling algorithms with this proposed algorithm. As a **more comprehensive view consider some** more parameters and simulate in real world environment to improve in throughput parameter SLA should be taken into consideration.

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