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A Review on Task Scheduling Approaches Based on Weighted Round Robin Algorithm in Cloud Environment

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Abstract: Cloud computing uses the concepts of scheduling and load balancing to move around tasks to underutilized VMs for effectively sharing the resources. The scheduling of the tasks in the cloud computing environment is an irrecoverable restraint and hence it has to be assigned to the most appropriate VMs at the initial placement itself. Practically, the arrived jobs consist of multiple tasks and they may execute the tasks in multiple VMs or in the same VM's multiple cores. Also, the jobs arrive during the run time of the server in changeable random intervals under various load conditions. The participating various resources are managed by allocating the tasks to appropriate resources by static or dynamic scheduling to make the cloud computing more efficient and thus it improves the user satisfaction. Objective of this work is to introduce and evaluate the proposed scheduling and load balancing algorithm by considering the capability of each virtual machine (VM), the task length of each requested job, and the of multiple tasks. Performance of the proposed algorithm is studied by comparing with the accessible methods.

Key words: cloud computing, scheduling, load balancing, virtual machine

I. INTRODUCTION

The term cloud computing is a model that enabling ubiquitous, convenient on demand network for access to share a pool resource like servers, storage, applications and services these are rapidly provide and release with limited service provider interactions .cloud supports some special characteristics like elasticity, resiliency, multi tenancy, scalability, maturated usage .cloud computing consists of two types of models that are deployment model and service model. Each model has its own sub services are providing for users[1]. A task scheduler can be adopted its own scheduling strategy for changing the environment.

the task scheduling is a typical problem for assigning a task to a particular virtual machine with consisting of those properties are suitable for the specific task .the task properties like file size, total number of tasks, total completion of task[2]. Virtual machine properties are bandwidth, memory, storage, unit cost of vm, number of vm. In this proposed algorithm the task is assign on the bases of task properties and virtual machine. In existing system task is assigned at randomly for a virtual machine[3]. Through existing system some vm's does not have the high capacity for handling the particular weighted tasks. Virtual machine is an execution unit, it can be act as a base for cloud computing environment. Virtualization is a technology that helps to install various types of software in a single hardware. They are totally separated and independent with each other. Virtual machine is created by virtual monitor[4]. in the proposed model the job arrival is randomly and also the capability of each virtual machine properties are different from other. So load balancing is a difficult task lead. The objective is to optimize the performance of vm with the combination of initial place time and run time placement load balancing through identifying the length of job[5]. the "job length" parameter can be help to schedule the job at right virtual machine ,at any position and it is able to deliver the responds in a very minimum make span.

The organize paper is as follows section II will discuss about related work, section III will discuss about scheduling and load balancing with design and algorithms ,section IV will show the model for our design ,section V will show the work of proposed algorithm, section VI will give the final conclusion.

II. RELATED WORK

The load balancing of task on virtual machines is an important characteristic of task scheduling in clouds . In present the cloud computing job scheduling mechanism has not yet forms a unified standard and norms[6] .this proposed algorithm consider the task make span ,cost. The focus on virtual machine of load balancing, and proposed a cloud computing task scheduling algorithm based on improved particular algorithm. That takes make span and total task completion cost, but does not consider the system load balancing.

COMPUTING THE LOAD BALENC FACTORE

In cloud computing task scheduling can be defined as the assign of n independent tasks allocated to m virtual machines implementation[7], which is according to the WRR objective to achieve, now building a correct match in between virtual machine and the particular task to get optimal scheduling.

Now defining the set of task as Ti={t1,t2,t3…..tm},here m represents the number of tasks.VM is defined as the VMs collection VM={vm1,vm2,vm3….vmn},n represents the number of virtual machines. The correct matching relationship of a task on a virtual machine can be represents by a matrix M.

$$M=\begin{pmatrix} m_{11} & m_{12} & m_{23} & \dots & m_{1n} \\ m_{21} & m_{22} & m_{23} & \dots & m_{2n} \\ m_{31} & m_{32} & m_{33} & \dots & m_{3n} \\ \dots & \dots & \dots & \dots & \dots \\ m_{m1} & m_{m2} & m_{m3} & \dots & m_{mn} \end{pmatrix} \quad (1)$$

where Mij represents the allocation relationship between the i-th task and j-th virtual machine .the expected execution time of the task on the virtual machine is represented by the matrix

$$ET=\begin{pmatrix} et_{11} & et_{12} & et_{13} & \dots & et_{1n} \\ et_{21} & et_{22} & et_{23} & \dots & et_{2n} \\ et_{31} & et_{32} & et_{33} & \dots & et_{3n} \\ \dots & \dots & \dots & \dots & \dots \\ et_{m1} & et_{m2} & et_{m3} & \dots & et_{mn} \end{pmatrix}$$

III. SCHEDULING AND LOAD BALENCING

Figure1shows the scheduling and load balancing design, in which the scheduler has the logic to find the most suitable VM and assign the tasks to VMs based on the proposed algorithm[8]. The scheduler places the run time arrival jobs in the most suitable VMs based on the least utilized VM at that particular jobarrivaltime. Load Balancer decides the relocation of task from a lot loaded VM to an at rest VM or least loaded VM at run time, each time it finds an at rest VM or least loaded VM by utilizing the resources present position information. Resource check communicates with all the VMs resource prober The Scientific World Journal and collects the VM capabilities, current load on each VM,and number of jobs in execution/waiting queue in each VM. The task requirement is provided by the user which in cludes the length of the tasks to be executed and transfers the requirements to the scheduler for its operative decisions.

i) Scheduling and Load Balancing Design

The job request is given by user throughout the interface and passed to task manager for dependency and independent task analysis[9]. This component receive the job and verifies whether the job is a complete self-governing task or contains several tasks. If it contains several tasks, then it verifies the lay to rest craving between the several tasks. The dependency task queue and independent task queue are found. The dependent tasks will be notify to the scheduler so that parent tasks are scheduled past child tasks are execute. The dependency task queue will have the tasks, which depends on the other tasks here in the VMs[6]. Once all the child tasks here in this queue finished its carrying out the parent task will be taken for the execution by conveying it to the VM, while independent task queue contains independent tasks. self-governing task queue and dependency task are key in to the scheduler. The scheduler selects the suitable VM based on WRR algorithm[4].

VI. TASK SCHEDULING MODEL

In present cloud computing task scheduling erection has not yet formed a unified a unified standard and norms. it contemplate the job length and resource capabilities. So many life-ratus have studied the task scheduling from the completion task, the optimal span ,the total cost, reliability, the scheduling the main intension on virtual machine load balancing , the organize a cloud computing task scheduling algorithm based on load balancing weight round robin algorithm[8] . organized a scheduling algorithm based on improved swarm intelligence, it brings the total task completion time, and the total completion cost but it not consider the load balancing .it will be focusing on multi-dimensional quality of service and a propose a multidimensional QoS cloud scheduling algorithm based on immune clone to met the resource load and users time requirements[9]. Proposed based on round robin algorithm to overcome the task assign at randomly to a virtual machine. This algorithm contemplates the task enforcement time, expenditure, and utilization of resources like CPU and memory. the organize paper propose a multi-objective task scheduling method by minimizing completion time and cost based on properties of the task and virtual machine[10]. The weighted round robin consider the resources capabilities of the VM"s and assign large number of task to the higher capacity virtual machines based on weightage given to the each of the vm.

ii) Parameter setting of the cloudsim:
The experiment is implemented with 2 Datacenters and 50-250 tasks under the simulation platform. The length of the task is from 500 MI (Million Instructions) to 1000 MI. The parameters setting of cloud simulator are shown in Table 1.The numbers of virtual machine is 10.And every vm has 1-3 pe[9].

V. WORKING OF PROPOSED ALGORITHM

Task Length. Consider as

$$TL=T_{mips} * P_{pe} \quad (1)$$

Job length consider as

$$JL = \sum_{k=1} TL_i \quad (2)$$

Where "*p*" is the number of tasks for the job.
Task Load Ratio. Task load ratio is calculated in (1) and (2) to identify and allocate the tasks to virtual machines. It is defined as

$$TLR_{ij} = \frac{TL_i}{C_{VMJ}}$$

where is the task length which is expected at the beginning of the execution and is the capacity of the VM. Consider.
where TL_i is the task length which is estimated at the beginning of the execution and C_{VM} is the capacity of the VM. Consider

$$\text{if } TLR_{ij} = \begin{cases} 0 & \text{assign the task to vm} \\ \text{Other Wise,} & \text{not assign} \end{cases}$$

WRR queuing supports the distribution of different amounts of bandwidth to different service class by either:

- Allowing higher-bandwidth queues to send more than a single packet every time that they are visited during a service round.
- Allowing each queue to send only a single packet each time that it is visited, but to visit higher-bandwidth queues various times in a single service round.

WRR mechanism (pseudo-code):

```
// calculate number of packets to be served each round by connections

for each flow f
f.normalized_weight = f.weight / f.mean_packet_size

min = findSmallestNormalizedWeight
for each flow f
f.packets_to_be_served = f.normalized_weight / min

// main loop
loop
for each non-empty flow queue f
min(f.packets_to_be_served, f.packets_waiting).times do
servePacket f.getPacket
```

IV. CONCLUSION AND FUTURE ENHANCEMENTS

In this work, the weighted round robin algorithm considers the capabilities of each VM and the task length of each requested job to assign the jobs into the most appropriate VM[12]s. This weighted round robin algorithms are having three different stages to handle the three different scenarios in the environment life cycle. The static scheduler algorithm pays attention to the initial placement of the jobs.

REFERENCES

[1] Z. Xiao, W. Song, and Q. Chen, "Dynamic resource allocation using virtual machines for cloud computing environment," IEEE Transactions on Parallel and Distributed Systems, vol. 24, no. 6, pp. 1107–1117, 2013. View at Publisher · View at Google Scholar · View at Scopus

[2] L. D. Dhinesh Babu and P. Venkata Krishna, "Honey bee behavior inspired load balancing of tasks in cloud computing environments," Applied Soft Computing Journal, vol. 13, no. 5, pp. 2292–2303, 2013.View at Publisher · View at Google Scholar · View at Scopus

[3] J. Cao, K. Li, and I. Stojmenovic, "Optimal power allocation and load distribution for multiple heterogeneous multicore server processors across clouds and data centers," IEEE Transactions on Computers, vol. 63, no. 1, pp. 45–58, 2014. View at Publisher · View at Google Scholar · View at MathSciNet · View at Scopus

[4] R. N. Calheiros and R. Buyya, "Meeting deadlines of scientific workflows in public clouds with tasks replication," IEEE Transactions on Parallel and Distributed Systems, vol. 25, no. 7, pp. 1787–1796, 2014. View at Publisher · View at Google Scholar · View at Scopus

[5] R. Basker, V. Rhymend Uthariaraj, and D. Chitra Devi, "An enhanced scheduling in weighted round robin for the cloud infrastructure services," International Journal of Recent Advance in Engineering & Technology, vol. 2, no. 3, pp. 81–86, 2014. View at Google Scholar

[6] Z. Yu, F. Menng, and H. Chen, "An efficient list scheduling algorithm of dependent task in grid," in Proceedings of the 3rd IEEE International Conference on Computer Science and Information Technology (ICCSIT '10), IEEE, Chengdu, China, July 2010.

[7] H. M. Fard and H. Deldari, "An economic approach for scheduling dependent tasks in grid computing," in Proceedings of the 11th IEEE International Conference on Computational Science and Engineering (CSEWorkshops '08), pp. 71–76, IEEE, San Paulo,

Brazil, July 2008. View at Publisher · View at Google Scholar · View at Scopus

[8] W. Kadri, B. Yagoubi, and M. Meddeber, "Efficient dependent tasks assignment algorithm for grid computing environment," in Proceedings of the 2nd International Symposium on Modelling and Implementation of Complex Systems (MISC '12), Constantine, Algeria, May 2012.

[9] Y. Xu, K. Li, L. He, and T. K. Truong, "A DAG scheduling scheme on heterogeneous computing systems using double molecular structure-based chemical reaction optimization," Journal of Parallel and Distributed Computing, vol. 73, no. 9, pp. 1306–1322, 2013. View at Publisher · View at Google Scholar · View at Scopus

[10] B. Xu, C. Zhao, E. Hu, and B. Hu, "Job scheduling algorithm based on Berger model in cloud environment," Advances in Engineering Software, vol. 42, no. 7, pp. 419–425, 2011. View at Publisher· View at Google Scholar · View at Scopus

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