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Improved AMCBF

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Abstract: ***In this research work we have proposed an algorithm that is improved version of AMCBF. This algorithm is priority-based scheduling algorithm and helps to consolidate parallel workloads in the cloud. This scheduling algorithm provides two tier VMs for parallel jobs. By using two tier VMs for scheduling, the responsiveness of the parallel jobs improve. The experiments show that this parallel scheduling algorithm significantly outperforms and is very effective for consolidating parallel workloads in data centers.***

Keywords: AMCBF, Parallel workload, VM, Data center

1. Introduction

The term "cloud computing" describes the services provided over the Internet. The need of computing and storage resources is rapidly increasing with the growth of IT technologies. As in Cloud Computing all type of IT facilities are provided to the users as a service so Cloud it has become a widely accepted paradigm for high performance computing. It is found that big organizations and researchers are interested in using cloud. In many complex applications parallel processing is required to execute the jobs effectively. But there is a need of communication and synchronization among parallel processes. And due to this there is a decrease in utilization of CPU resources. So the main job of the data center is to achieve the utilization of nodes as well as maintaining the level of responsiveness of the jobs. There are a number of applications which require to run in the remote data centers and cloud computing provides this facility to various kind of applications. Sometimes if the jobs are not scheduled correctly then with the increase in parallelism the utilization of CPU resources decreases and thus results in reducing the system performance. To solve these issues in cloud computing, several algorithms & protocols are proposed. But there are very few algorithms which detect the scheduling mechanism in cloud computing. Some of the algorithms consider a regular monitoring region in the protocol but it is not a real life scenario. As the clouds are randomly deployed so practically the monitoring region is always irregular. So we provide a priority-based scheduling algorithm that helps in consolidating the workloads in clouds.

2. Related Work

Various These days all business and scientific workflows are getting cloud enabled, but due to inherent nature of cloud computing and its characteristics (like elasticity), it runs into management issues related to load balancing and load consolidation (i.e. issues related to job scheduling). Lot of research work has been done in this direction, where some scheduling algorithms provide advantages with limitations that they did not consider both resource matching, resource availability as well as broker performance. In some approaches node utilization is too low and is not up to the mark as per the job requirements, and at times, the data center's assets as per their health status are not classified as 'k' tier. Due to this the overall health of the data center could not match in terms of quality of service. In some algorithms the waiting time of the jobs increased and dummy activities are created and overall working of the cloud/ computing entities is affected by overloading (occurred due to unnecessary migration). In some approaches, there may be a requirement for broker that a particular task/job to be performed should be based on urgency/importance or as per its own preferences. N. Doan Man et al. discussed that the extension of the local computing platforms required a huge investment of both finance and human power. The key component of this framework was the cost with finish time-based scheduling algorithm, which provided the balance between performance of application schedule and the mandatory cost for the use of cloud resources [14]. L. Zhou et al. discussed that the scheduling of massive multimedia flows with heterogeneous QoS guarantees became an important issue for the mobile cloud. The highlight of this article lied in developing a blind online scheduling algorithm (BOSA) [11]. R. Santhosh et al. discussed that a new scheduling approach to focus on providing a solution for online scheduling problem of real-time tasks using "Infrastructure as a Service" model offered by cloud computing. In traditional approach, the task was scheduled non-preemptively with two different types of Time Utility Functions (TUFs) – a profit time utility function and a penalty time utility function. This scheduling method sensibly aborted the task when it missed its deadline and affected the overall system performance and response time of a task [15]. S. Min Jung et al. discussed that there was no consideration of data priority in Cloudsim. Therefore, it was needed to research a scheduling algorithm to support priority of Cloudsim [17]. C. Chi Huang et al. discussed that in order to develop a scheduling system considering manufacturing quality, it was necessary to immediately build up different layout mode of production lines. A cloud computing based scheduling system using optimized layout method was proposed [3]. D. Ding et al. discussed that Scheduling mechanism in cloud computing environment concerned more about the needs of users due to the commercial purpose of cloud computing. An Adaptive Resource Scheduling Mechanism based on User Behavior Feedback (ARSM-UBF) was developed to schedule cloud resources from the perspective of users [6]. K. Singh Patel et al. discussed that as the number of users increased, allocation of resources and scheduling became a complex task in a cloud. Based on two types of pricing models for VMs, on-demand and reserved, two problems were considered in this paper: 1) users to reduce SLA violation and 2) cloud providers to balance the load [10]. W. Chen et

al. discussed that the cloud workflow scheduling problem that addresses different QoS requirements of users had become an important and challenging problem for workflow management in cloud computing. A set-based PSO (S-PSO) approach was provided for scheduling [20]. B. Yang et al. (2011) introduced the job scheduling scenario in the Cloud Computing and its existing solutions. There was no well-defined job scheduling algorithm for the cloud under overloading circumstances and existing algorithms did not take hardware/software failure and recovery in the cloud into account, therefore to address these challenges a Reinforcement Learning framework was introduced which would consider long-term optimization of the scheduling algorithm and tend to be fault-aware as well as productive [2].

3. Proposed Methodology

The Many of the schedulers are based on the characteristics of job but as the research proceeds it is proved that job characteristics are not only the right choice for the schedulers to decide the job schedule algorithm. Therefore, there is need to develop an algorithm that would consider these issues during job scheduling and perform better than the existing algorithms.

The following steps are proposed to achieve these objectives:

- **Initialize simulation parameters:** First of all we have to initialize all the specified parameters to start the simulation process with the minimal number of hosts and clients. After initializing parameters, the actual process of scheduling will start with the workload.
- **Load Work Load:** Load the workload is the first step of implementation process. A workflow is an ordered sequence of activities. These activities are designed to achieve a defined objective. In Cloud Computing different applications have different types of workload. Mainly two types of workload models are considered for simulation: FWorkload and JWorkload.
- **Broker Creation:** After loading the workload, the task of broker starts. A cloud broker is a third-party individual that acts as an intermediary between the seller and purchaser of a cloud computing service.
- **Submit Workload:** After collecting all workload from user base, the broker submits the workload to Data center.
- **Data Center:** Data Center is the heart of Network Cloud. It processes all work, which submitted by various brokers. Data Center will process all the data according to its own policy.
- **Schedule Work:** In this methodology, Improved AMCBF algorithm is used for scheduling of the workload. All the workload submitted to the data center is scheduled according to Improved AMCBF.
- **Evaluate Performance:** To evaluate the performance of implemented method some factors like Request time, Arrival time and Execution time are considered. On the basis of these factors the performance of above said method is evaluated.
- **End Simulation:** After evaluation, the implementation process completes.

4. Flow Graph

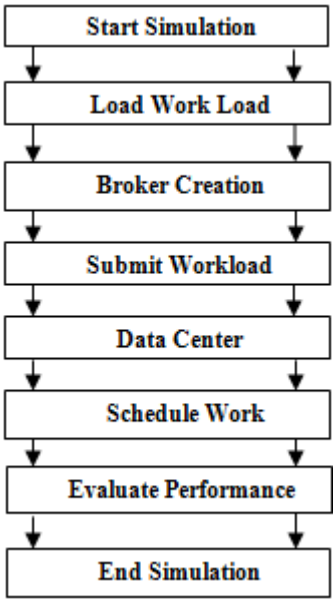
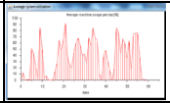
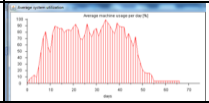
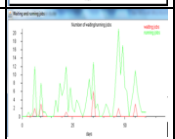
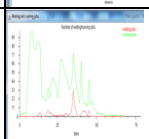
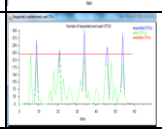
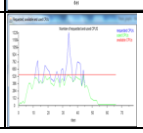
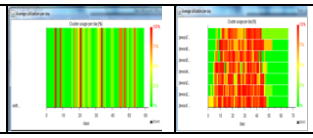


Figure 1: Flow of scheduling [12]

5. Simulation and Results

For simulation process Cloudsim is used and the results so produced are compared for both the AMCBF and Improved AMCBF. On the basis of these results we can show that our algorithm performs better.

Sr. No.	Graph	AMCBF	Improved AMCBF	Description
1.	**Average system utilization**			Improved AMCBF is showing better utilization of system units and higher level of utilization of system units.
2.	**Waiting and running jobs**			From this we can infer that there will be some level of waiting time for jobs having similar nature when we run the scheduling but improved AMCBF is able to reduce the waiting time more as compare to AMCBF.
3.	**Requested, available and used CPUs**			It can be inferred from the graph that improved AMCBF is able to facilitate the resource availability more , as it , in this case response times are shorter and matching of supply and demand and resources is better as compared to AMCBF.

4.	**Average utilization per day**		The graph shows that utilization in case of improved AMCBF is better as there are darker rectangles.

6. Conclusion

We have designed and tested an algorithm that is able to schedule multiple jobs on multiple machines. The proposed algorithm schedules the jobs in very efficient manner as a result of which the execution time of the jobs decrease. This algorithm can be adapted in the cloud computing systems so that there should be better scheduling of tasks to resources and the users' tasks can be completed in as minimum time as possible.

7. Future Scope

The cloud resource utilization is the factor that most of the organizations and IT industries demand. So apart from scheduling the task and resources, there is a need to monitor the factors such as time, and wastage of demanded resources from every client. By doing so the throughput will increase and usage of the resources will also increase than the existing cloud resource services. Our future work deals in involving few techniques that will further result in better resource allocation and also improve resource utilization.

8. Acknowledgement

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