

Review on Credit Based Scheduling Algorithm for Cloud Computing Environment

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Abstract— Cloud computing has been built upon the development of distributed computing, grid computing and virtualization. Since value of individual task in cloud resources is distinct with one another, scheduling of user tasks in cloud is different from traditional scheduling methods. The task scheduling problem can be viewed as the finding or searching an optimal set of resources (processors/computer machines) so that we can achieve the desired goals for tasks. Simple Credit Based Scheduling Algorithm is used to reduce make span of the task by counting credit of the task by considering task length and task priority. The techniques like min-min algorithm, priority based, cost based resource scheduling, resource scheduling based on energy efficient methods, scheduling based on reliability factor, scheduling based on activity based costing, context aware scheduling, dynamic slot based scheduling. This paper provides brief introduction to this technique of a credit based task scheduling.

Keywords—Cloud computing; task priority; task length; scheduling algorithm

I. INTRODUCTION

This Cloud computing is a model which provides ubiquitous, suitable, on-demand access to a shared pool which enables configurable computing resources. Cloud computing and repository solutions handover various capabilities to store and process their data to users and enterprises with in third-party data centers. Cloud computing provides delivery of computing resources over the Internet. By using cloud we do not have to worry about storage of our data.

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models.

Scheduling means the set of policies for supervising the order of work to be complete by a computing system. Scheduling is a major task in cloud computing environment^[1]. In cloud computing environment datacenter take care of this task. Simple cloud architecture is shown in figure. The datacenter receives task from the datacenter brokers which arrived from different user. For some cases these tasks may be

co-related with priorities. In such cases broker should also focus on these priorities and it is important for assigning the task.

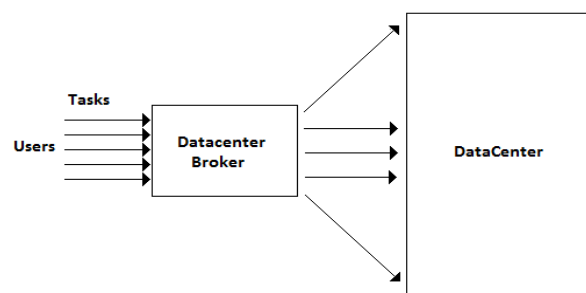


Fig.1 A simple cloud architecture^[1]

II. TASK SCHEDULING

The scheduling of tasks in cloud means choose the best suitable resource available for execution of tasks or to allocate appropriate computer machines to tasks in such a way that the completion time is decreased. List of tasks is created by considering priority in scheduling algorithms. Selecting of Task are held according to their priorities and assigned to feasible processors and computer machines which satisfy a predefined objective function^[2].

A. Scheduling Categories^[2]

- 1) Static scheduling schedule tasks in known environment i.e. all the information about entire structure of tasks is already stored. Resources are mapped before execution and estimation of task execution/running time are calculated.
- 2) Dynamic scheduling depends not only the submitted tasks to cloud environment but also the current states of system and computer machines to make scheduling decision.

There are so many scheduling algorithms are available today for cloud computing. But their attainment is suspicious. Various parameters are to be advised for scheduling. Two leading parameters are task size and priority studied in the proposed approach. But these are not the only ones. There are

some other parameters which influence the scheduling of tasks and utilization of resources.

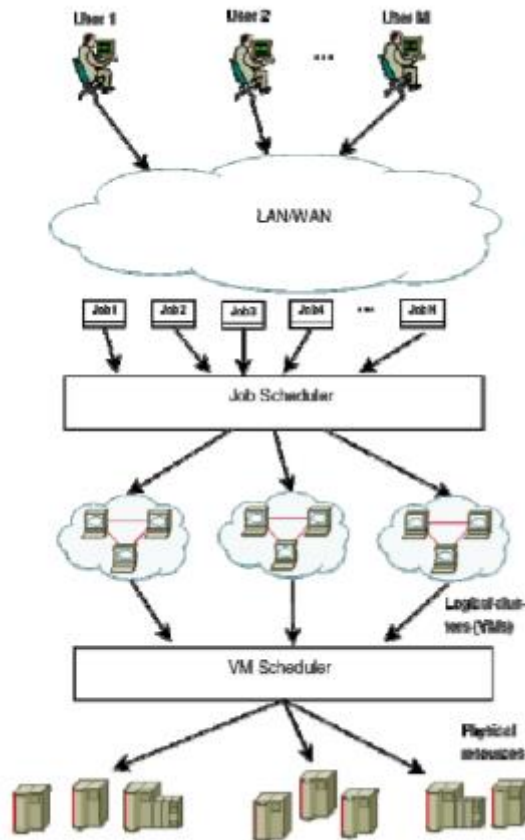


Fig.2 General View of Task Scheduling [2]

III. RELATED WORK

Lot of studies is taking place in this area. Some of the studies are Cost based scheduling [3], Energy efficient optimization methods [4], Activity based costing [5], [10], Reliability Factor Based [6], Context aware scheduling [7], and Dynamic slot based scheduling [8], [9]. Among these parameters task length and priority are relevant.

Task Size (Min Min Algorithm)

The effective usage of resources can be maximized by using a load balancing algorithm. This is carried out by making use of resources of an idle (vacant) processor while release the resources of processors having heavy load. The algorithm distributes the load among all the resources which are available. This type of algorithm also minimizes the makespan with the valuable use of resources. Min-min algorithm begins with a set of task set T. There are some resources also available along with the task set. Allocating or mapping of task set with resources is done after implementing the algorithm. The minimum sized tasks are chose in this algorithm.

Priority Based

Users' priority of the task is considered in this technique. But there are chances to arise some other problems. In optimal

conditions, the cloud system gets good results when shortest job is executed first. But this won't always be the case in this technique. In some cases task with larger length is allotted highest priority. This is considerable issue in priority based algorithm.

Cost Based Resource Scheduling

This method proposes a scheduling scheme based on the availability of resources and cost of each resource. Each resource contains its cost. Tasks are assigned to the resource having lowest cost. It is difficult to serve resource having highest price when user demands for their need. In this situation user will not get the resource. So cost based resource scheduling also has limitations.

Resource Scheduling Based on Energy Efficient Methods

This method describes to schedule the resources such that energy consumption is minimum. There are so many hardware component required to accomplish the needs of user. Energy consumption of a cloud computing is under trying to reduced by cloud providers. Energy consumption and task scheduling doesn't have any direct relationship. The method doesn't describe the actual scheduling of tasks.

Scheduling Based on Reliability Factor

Elimination of the overload conditions while utilization of resources needs proper scheduling. This method provides feasibility to tackle overloaded conditions by scheduling the jobs. It also explains how to handle a failure. This kind of Failure issue is not relevant. It may held in any system. More thoughts are required for the important parameters.

Scheduling Based on Activity Based Costing

This method describes a task scheduling scheme based on the cost of the resources. Varieties of resources have to be used in order to execute a task. The usage of resources is considered by cloud service provider to apply the charges to the users. This method doesn't tell about the parameters that are essential for scheduling. Proper scheduling reduces the cost on each resource.

Context Aware Scheduling

This method describes how to utilize the resources fully in order to avoid the resource wastage. Effective utilization of resource can be helpful for this kind of situation. There is some situation where execution of the client request in the client side without moving to the server, this method is used.

Dynamic Slot Based Scheduling

To deals with big data hadoop concept is used which handle the data with MapReduce functionality. In this method each task gets a time slot. Tasks are getting executed during that period. This approach checks the utilization of resources. Migration of a task is required for dynamic slot based scheduling. In case of big data task migration is very difficult.

IV. COMPARATIVE ANALYSIS

The main issue with min min algorithm is its consideration is only the task length and not to user priority. The problem with Priority based algorithm is task with larger is associated with a high priority so at that time it doesn't work properly. Cost Based Resource Scheduling algorithm deals with cost of task only, so when user needs resource having highest price in this

situation user will not get the resource. Energy consumption and task scheduling doesn't have any direct relationship. When scheduling based on reliability factor is used at that of scheduling. Context aware scheduling executes the client request in the client side itself without moving into the server, so the cost of server execution is reduced. For dynamic slot based scheduling the task length and priority are considered as the parameter for detailed investigation.

CONCLUSION

Each method is having its own advantages and disadvantages. So any method that is used with proper application will provide better result. For scheduling task length and user priority are two main parameters to get the best result. But to improve the efficiency of the algorithm other parameters like speed of virtual machine and deadline may be considered. By using these parameters makespan of the algorithm can be reduced.

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REFERENCES

- [1] A. Thomasa, Krishnalal Ga, Jagathy Raj V Pb, "Credit Based Scheduling Algorithm in Cloud Computing Environment", ICICT 2014 pp. 913 – 920 2015.
- [2] A. Radulescu, A. Gemund, "Fast and effective task scheduling in heterogeneous systems," Proceedings of the 9th heterogeneous computing workshop (HCW 2000), pp. 229-238, 2000.
- [3] Zhi Yang, Changqin Yin, Yan Liu. "A Cost-based Resource Scheduling Paradigm in Cloud Computing". 2011-12th International Conference on Parallel and Distributed Computing. Applications and Technologies.
- [4] Liang Luo, Wenjun Wu, Dichen Di, Fei Zhang, Yizhou Yan, Yaokuan Mao. "A Resource Scheduling Algorithm of Cloud Computing based on Energy Efficient Optimization Methods".
- [5] Qi cao, Zhi-bo Wei, Wen-mao Gong. "An Optimized Algorithm for Task Scheduling Based On Activity Based Costing in Cloud Computing".
- [6] Bo Yang, Xiaofei Xu, Feng Tan, Dong Ho Park. "An Utility-Based Job Scheduling Algorithm for Cloud Computing Considering Reliability Factor"; 2011 International Conference on Cloud and Service Computing.
- [7] Marcos D. Assuncao, Marco A. S. Netto, Fernando Koch, Silvia Bianchi. "Context-aware Job Scheduling for Cloud Computing Environments". 2012 IEEE/ACM Fifth International Conference on Utility and Cloud Computing.
- [8] Hsin-Yu Shih, Jih-Jia Huang, Jenq-Shiou Leu. "Dynamic Slot-based Task Scheduling Based on Node Workload in a MapReduce Computation Model".
- [9] K. Kambatla, A. Pathak, and H. Pucha. "Towards optimizing Hadoop provisioning in the cloud in USENIX Workshop on Hot Topics in Cloud Computing (HotCloud09)"; 2009.
- [10] J Blythe, S Jain, E Deelman, Y Gil, K Vahi. "Task scheduling strategies for workflow-based applications in grids". Cluster Computing and the Grid; 2005.

time the parameter that are more important need more thought. Activity based costing needs proper scheduling to reduce cost

[11] "Applying Scheduling Algorithms with QoS in the Cloud Computing" Sung-Min Jung, Nam-Uk Kim, Tai-Myoung Chung Dept. Electrical and Computer Engineering

[12] CloudSim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms. Rodrigo N. Calheiros¹, Rajiv Ranjan², Anton Beloglazov, C'esar A. F. De Rose and Rajkumar Buyya.

[13] Vijayalakshmi A. Lepakshi, Dr. Prashanth C S R, "A Study on Task Scheduling Algorithms in Cloud Computing" International Journal of Engineering and Innovative Technology (IJET) Volume 2, Issue 11, May 2013

[14] Mythry Vuyyuru, Pulipati Annapurna, K. Ganapathi Babu, A.S.K Ratnam, "An Overview of Cloud Computing Technology", International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-3, July 2012.