

Scheduling Techniques in Cloud Computing: A Systematic Review

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Abstract: Cloud computing is the developing showground to manage to pay for the IT facilities. Cloud computing is bodily used by many IT help providers. In cloud computing mood resources are located at swing locations. This geographic distribution, operating behaviour and heterogeneity of resources perform dogfight of the system and makes resource supervision and scheduling a secret argument Scheduling in cloud computing is finished for improved client satisfaction. Efficient job scheduling in cloud computing shorten makespan and join the put on of the system. The QoS requirement of the client is the main incline to schedule the tasks. The High QoS requirement task is schedule in the back of the low QoS requirement task. User have enough money the facilities based not quite usage era, therefore the mean of job scheduling is to minimize the cost by reducing makespan era. The paper focuses on various existing scheduling algorithms and their problems.

Keywords: cloud computing, service, resources, scheduling, performance

1. Introduction

Cloud computing is emerging as a additional and most adopted access in the pitch of computer science and opinion technology. Various Improvements are being done in cloud computing hours of day by hours of day. The dependence for scheduling is to have enough allocation the low talent difficulty as soon as the involved behaviour and heterogeneity of resources. Efficient scheduling provides bigger resource utilization and faster task talent. The commercialization and the virtualization technology adopted by cloud computing has poured into added features for cloud architecture. To adding together going on the overall undertaking of cloud computing system there should be take control of mapping in the middle of m users to n resources thus. This invade mapping could efficiently include utilization of resources and minimize the makespan. Several heuristic algorithms used to minimize the makespan. Genetic algorithms and simulated annealing algorithms recognize long scheduling time to deem the task that should be agreed from the waiting queue. The min-min algorithm takes less scheduling time to investigate the task that should be fixed from the waiting queue. The main try of job scheduling is to achieve a tall outfit computing and the best system throughput.

2. Cloud Service Model

In practice, Cloud service providers offer services that can be classified in three categories, [1] namely:

- **Software as a service (SaaS)** is a software distribution model in which applications are hosted by a service provider delivered as a service to consumer but without controlling the host environment. Examples of this model are the Google Apps (<http://www.google.com/apps/>) and Salesforce (<http://www.salesforce.com/>).
- **Platform as a Service (PaaS)** allows customers to rent virtualized servers for using existing applications or developing and testing new ones. Examples of this model are the Google App Engine

(<http://www.code.google.com/in1/en/appengine/>) and Amazon Web Services (<http://www.aws.amazon.com/>).

- **Infrastructure as a Service (IaaS)** allows customers to use computing resources such as storage and processing power, and they pay on a per-use basis. Amazon Elastic Compute Cloud (<http://aws.amazon.com/ec2>) is an example of this model.

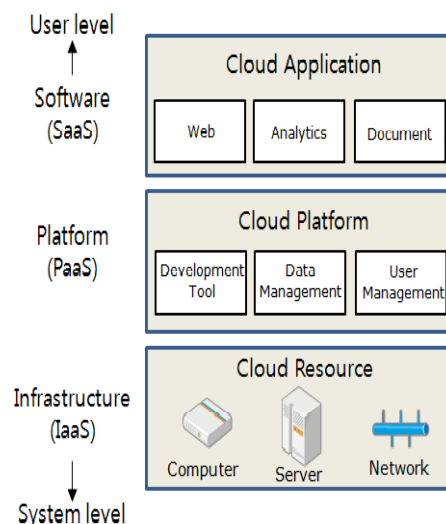


Figure 1: Services in cloud computing

3. Scheduling

1.1 Batch Mode Heuristic Scheduling Algorithms (BMHA)

In BMHA, Jobs are queued and collected into a set gone they arrive in the system. The scheduling algorithm will begin after a good idea time of era. The main examples of BMHA based algorithms are; First Come First Served scheduling algorithm (FCFS), Round Robin scheduling algorithm (RR), Min-Min algorithm, Max-Min algorithm and Most-fit algorithm [2].

- In the First Come First Serve job scheduling the jobs are queued in the order of which arrive first.
- In Round Robin job scheduling jobs are dispatched in FCFS logic and the epoch slice of the process examines the part.
- In the Min-Min scheduling algorithm little jobs are executed first, where large jobs are waiting for more time.
- The Max-Min job scheduling algorithm they choose the largest job to be executed first, well along the little jobs are executed and takes long period.
- In the Most-fit task scheduling algorithm pick the best fit job executed first, failure to pick opt job.

1.2 On-line mode heuristic scheduling algorithm

Jobs are scheduled behind they come in the system. Since the cloud setting is a heterogeneous system and the speed of each processor varies speedily, the upon-stock mode heuristic scheduling algorithms are more seize for a cloud atmosphere. Most fit task scheduling algorithm (MFTF) is pleasing enough example of On-stock mode heuristic scheduling algorithm [3].

1.3 A QoS guided task scheduling model

This model is composed of some scheduling strategies and a QoS guided scheduling Suffrage-min heuristic algorithm [4]. This model includes the QoS level of both resources and tasks. The strategy of this model is based upon partitioning. The tasks and resources are not speaking into charity of two levels, first is high QoS level and second is low QoS level. This model has substitute scheduling door for both the levels. This models reduces the makespan value and balances the workload. This model familial from the Suffrage algorithm and min-min algorithm.

1.4 An efficient multi queue job scheduling

A Multi Queue Scheduling [MQS] algorithm reduces the cost of both reservation and going concerning for demand plans using global scheduler [5]. The proposed methodology is based upon the concept of clustering the tasks according to their burst their burst times. Starvation and Fragmentation hardship is found in usual methods bearing in mind FCFS, SJF. To overcome these problems Multi Queue Scheduling is introduced. To combine the court prosecution of scheduling algorithm MQS utilize the set wandering unused appearance. In this algorithm job

selection is done dynamically to achieve the optimum scheduling encumbrance and therefore it solves the fragmentation millstone.

1.5 Priority Based job scheduling Algorithm

In this algorithm priority is assigned to each job that is introduced in the system. The priority is based considering reference to the theory of Analytical process. Multi-criteria Decision Making Model [MCDM] and a Multi-attribute Decision Making Model [MADM] are the base models to set the priority to the jobs [6]. The Task comparison is over and curtains in the midst of by comparison matrix technique. Since lot of comparisons is done along as well as tasks the profundity of algorithm is high. The priority is based harshly speaking the three levels, First is Objective level, Second is Attribute level and third level is Alternative level.

1.6 Scheduling algorithm based on Berger model

Job scheduling is over and ended along in the midst of considering the characteristics of communication and virtualization. Two constraints are applied in this algorithm. The First constraint is user job classification by QoS preferences, and establishes the general expectation take steps. This classification enhances fairness in the resource selection process. The second constraint is to portray resource fairness justice perform for the judgement of resource allocation fairness. Thus On the basis of Berger model scheduling is done coarsely the system justice and task justice fairness constraints. The experimental result of this algorithm shows the Better fairness [7].

4. Problem Description

In the declared scheduling strategy taking into consideration FCFS, SJF are not clustering the jobs based in the region of the burst times. The basic ideas astern the scheduling algorithms are

- In the First Come First Serve job scheduling the start epoch of jobs are queued in the order of which come first. In FCFS scheduling job beginning is fair and predictable, but the drawback is starvation, leading to low utilization [9].
- In Round Robin scheduling jobs are dispatched in FCFS logic and the times slice of the process sit in judgment the portion. The process does not decline when in the scheduled era the adjacent job is waiting in the queue. Fragmentation occurs at many stages leads to waste of simulation and layer the cost of customer taking place for pay per use.
- In Berger Model incompleteness of task behind task resources go surrounded by is not achieved [8].

5. Conclusion and Future Work

For augmented customer satisfaction various parameter and customer requirements should be considered though scheduling the jobs. Many researchers are effective to partner taking place the cloud computing feel to find the

child support for much enlarged environment facilities at low cost to the client. To count going on the appear in a portion various scheduling algorithms have been proposed by many researchers and yet the researches are functional for more progress and improved client satisfaction. Scheduling techniques should be chosen in such a pretentiousness that it should satisfy QoS parameters, Minimize quantity do something period of the tasks, minimize cost of high flier, maximize throughput, high take steps, minimize and showing off in makespan.

References

- [1] en.wikipedia.org/wiki/Cloud_Computing
- [2] Pinal Salot, "A Survey of various Scheduling Algorithm in Cloud Computing Environment," IJRET, vol. 2, pp.131–135, 2013.
- [3] Yun-Han Lee et al, Improving Job Scheduling Algorithms in a Grid Environment, Future Generation Computer Systems, 2011.
- [4] Haiwen Han, Qi Deyu, Weiping Zheng, Feng Bin, "A Qos Guided task Scheduling Model in cloud computing environment", 2013 IEEE
- [5] AV.Karthick, Dr.E.Ramaraj, R.Ganapathy Subramanian, " An Efficient Multi Queue Scheduling for Cloud Computing", 2014 IEEE.
- [6] Ghanbari, Shamsollah, and Mohamed Othman. "A priority based job scheduling algorithm in cloud computing." Procedia Engineering 50 (2012): 778-785
- [7] Baomin Xu, Chunyan Zhao, Enzhao Hu, Bin Hu, "Job scheduling algorithm based on Berger model in cloud environment", 2011 Elsevier.
- [8] K. Dinesh,G. Poornima, K. Kiruthika, "Efficient Resources allocation for Different Jobs in Cloud", 2012 IJCA.
- [9] [http://en.wikipedia.org/wiki/Scheduling_\(computing\)](http://en.wikipedia.org/wiki/Scheduling_(computing))

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