MATRIX ACADEMIC INTERNATIONAL ONLINE JOURNAL OF ENGINEERING AND TECHNOLOGY
ISSN: 2348-3326

Volume 3, Issue 2

Review of Various Scheduling Algorithms in Cloud Environment

Richa Dixit
Phd Scholar
Dr.AKT University,Lucknow
richavyadav@gmail.com

Dr.Vibhash Yadav
Associate Professor
KIOT,Kanpur
vibhashds10@yahoo.com

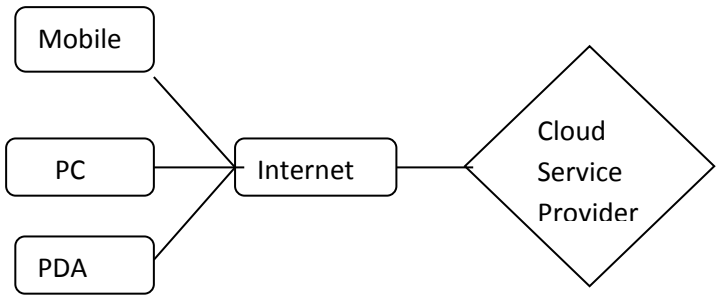
Dr.Rahul Singhai
Sr.Asst. Professor
IIPS,Davi Ahilya University,
Indore,(MP) ,India
singhai_rahul@hotmail.com

***Abstract* - Cloud computing is an arriving technology and used to describe a new class of network based computing that takes place over the internet. Due to its application scalability it is quite beneficial for those techniques which are sharing their resources on different nodes. In the cloud environment, it is very necessary to schedule all the tasks for improving the utilization of resources in cloud, minimizing the processing cost, increase the performance of the server, minimize the processing time and completion time. Scheduling strategy is the key in cloud computing. This paper provides a review of various scheduling algorithms which are proposed & used in cloud environment.**

***Keywords*: Scheduling; Cloud computing; Resource allocation; scheduling Efficiency, Utility Computing, Performance, QOS.**

I. INTERODUCTION

Cloud computing is an arriving technology in distributed computing which expedite pay per model as per user demand and requirement., Cloud subsist of a collection of virtual machine which consists both computational and storage facilities. The primary aim of cloud computing is to provide decisive access to remote and geographically distributed resources. A Cloud is a type of parallel and distributed system subsisting of a collection of interconnected and virtualized computers that are dynamically equipped and presented as one or more undivided computing resources based on Service Level Agreements (SLA) entrenched through bargaining between the service providers and consumers. Cloud computing comes in target development of grid computing, virtualization and web based technologies. There are four deployment models in cloud computing environment such as Public, Private, Community and Hybrid cloud. Private Clouds resources are under the legal and contractual region of the organization thus permanent applications compelling high control over data, security and QoS are most appropriate for private Clouds. Public Clouds are owned and managed by third parties. It has less security than private cloud. However, Hybrid Clouds combine the advantages of both approaches to accommodate high workloads. Cloud computing is an internet based computing that bears infrastructure as a service (IaaS), platform as a service (PaaS), and software as services (SaaS). In SaaS, software application is made accessible by the cloud provider. In PaaS an application development platform is provided as a facility to the developer to create a web based application. In IaaS computing infrastructure is provided as a service to the applicant in the form of Virtual Machine(VM).



ISSN: 2348-3326

Volume 3, Issue 2

II. EXISTING SCHEDULING ALOGRITHMS

According to a simple arrangement, job scheduling algorithms in cloud computing can be categorized into two main groups are

A. Batch mode heuristic scheduling algorithms (BMHA)
B. Online mode heuristic algorithms(OMHA)

In BMHA, Jobs are lined up and collected into a set when they enter in the system. The job scheduling algorithm will begin after a fixed span of time. Some of the common BMHA based algorithms are:

- First Come First Served scheduling algorithm(FCFS): Jobs are served in queue on first come first served basis. When the current job is either completed or ceases to execute, the oldest job in the queue is selected for operation.

- The Round Rubin (RR) task scheduling algorithm distributes the selected task over the available Virtual Machines in a round order where each job is equally controlled. The idea of the RR algorithm is that it pursuit to sends the elected jobs to the available VMs in a round form.

- Min–Min algorithm: This algorithm opt small jobs to be accomplished firstly, which in turn increases the risk of starvation or big task delays for longer tasks.

- Max–Min algorithm: This algorithm chooses massive tasks to be executed firstly, which in turn increases the risk of small task delays for long time.

In OMHA the jobs are executed individually. The online mode is primarily used in cloud computing environment.

Despite the online mode heuristic job scheduling algorithms are more appropriate for a cloud environment because of the environment's array and differing processor speed. Some of the common On-line mode heuristic scheduling algorithms are:

- Most fit job scheduling algorithm: In the given algorithm task which best fit in queue are executed first. This algorithm has high collapse ratio.
- Priority scheduling algorithm: The basic idea of this algorithms is that each task has labeled a priority and the higher priority task is permitted to run firstly. Equal-Priority task are scheduled in FCFS order. The shortest-Job-First (SJF) algorithm is a unique case of general priority scheduling algorithm.

III. Literature Review:

The Following are some of the scheduling algorithms currently prevalent in clouds.

1. A Compromised-Time-Cost Scheduling Algorithm:
   Liu et al. (2010) proposed a novel compromised-time-cost scheduling algorithm which grants the characteristics of cloud computing to acclimate instance-intensive cost-constrained workflows by negotiating execution time and cost with user input enabled on the fly. The simulation has exhibited that CTC (compromised-time-

cost) algorithm can attain lower cost than others while meeting the user-designated deadline or trim the mean execution time than others within the user-entitled execution cost. The tool used for simulation is SwinDeW-C (Swinburne Decentralised Workflow for Cloud).

2. A Particle Swarm Optimization-based Heuristic for Scheduling Workflow Applications:
   Pandey et al.(2010) has presented a particle swarm optimization (PSO) based heuristic to schedule applications to cloud supplies that takes into account both estimation cost and data transmission cost. It is used for workflow application by fluctuating its computing and communication costs. The empirical result shows that PSO can achieve cost savings and good dispersion of workload onto resources.

3. Improved Cost-Based Algorithm for job Scheduling:
   Cost-based job scheduling algorithm proposed by Selvarani and Sadhasivam (2010) for making decisive mapping of the tasks to the available resources in cloud computing environment. new task scheduling planned the costing based on extemporization of classic activity for cloud, where the relation exist between the aloft application base and the way that different tasks cause upward cost of resources or may not. This scheduling algorithm segments all user jobs depending on preference of each job into three diverse lists . Resource cost and computation performance both counted by the algorithm. it also enhances the computation/communication ratio.

4. Resource-Aware-Scheduling algorithm (RASA):
   Saeed Parsa and Reza Entezari-Maleki proposed et al. (1995) a new task scheduling algorithm RASA. It is possessed of two traditional scheduling algorithms; Min-min & Max-min. RASA uses the leverage of Max-min and Min-min algorithms and covers their disadvantages. Nevertheless the deadline of each task, arriving rate of the tasks, outlay of the task execution on each of the resource, outlay of the communication is not considered. The empirical results show that RASA is outperforms the existing scheduling algorithms in large extent distributed systems.

5. Innovative transaction intensive cost-constraint scheduling algorithm:
   Yun Yang et al. (2008) presented a scheduling algorithm which consider most cost and time. The simulation has exhibited that this algorithm can obtain lower cost than others while meeting the user entitled deadline.

6. Scalable Heterogeneous Earliest-Finish-Time Algorithm (SHEFT):
   Cui Lin, Shiyong Lu (2011) proposed an SHEFT workflow scheduling algorithm to schedule a workflow flexibly on a Cloud computing environment. The empirical results show that SHEFT not only surpass several representative workflow scheduling algorithms in amending workflow execution time, but also enables resources to scale

elastically at runtime.

7. Multiple QoS Constrained Scheduling Strategy of Multi-Workflows (MQMW): Meng Xu et al. (2009) worked on multiple workflows and multiple QoS.They has a blueprint implemented for multiple workflow management system with multiple QoS. The task scheduling access rate is enhanced by using this strategy. This strategy minimizes the make span and cost of the workflows for cloud computing platform. The following table summarizes above scheduling strategies on scheduling technique, parameters, other factors, the environment of application of strategy and tool used for empirical purpose.

8. RSDC (RELIABLE SCHEDULING DISTRIBUTED IN CLOUD COMPUTING):
   Arash Ghorbannia Delavar,Mahdi Javanmard et al (2012) proposed a reliable scheduling algorithm in cloud computing environment. In this algorithm major job is separated to sub jobs. In order to balance the jobs the request and acknowledge time are calculated separately. The scheduling of each job is completed by calculating the request and acknowledges time in the form of a shared job. So that efficiency of the system is increased.

9. An Optimal Model for Priority based Service Scheduling Policy for Cloud Computing Environment: Dr. M. Dakshayini, Dr. H. S. Guruprasad (2011) presented a algorithm which was based on admission restriction and priority. In this scheduling algo priority is allotted to every admitted queue. By calculating bearable delay and service cost admission has been decided for each queue. The advantage by this policy in the proposed cloud computing architecture is to achieve very high (99%) service completion rate with guaranteed QoS.Overall service cost for the cloud environment also enhances due to policy provides the highest precedence for highly paid consumer service-requests.

10. A Priority based Job Scheduling Algorithm in Cloud Computing: Shamsollah Ghanbari, Mohamed Othman (2012) proposed a new scheduling algorithm relay on multi – benchmark and multi - decision priority driven scheduling algorithm. This scheduling algorithm subsist three level of scheduling: object level, attribute level and alternate level. In this algorithm priority can be define by job resource ratio. Then priority vector can be compared with each queue. This algorithm has higher throughput and less finish time.

11. Extended Max-Min Scheduling Using Petri Net and Load Balancing: El-Sayed T et al. (2012) has proposed a diffrent algorithm based on effects of RASA algorithm. Improved Max-min algorithm is based on the expected execution time despite of completion time as a selection basis. Petri nets are used to model the concurrent behavior of distributed systems. Max-min explained achieving schedules with

comparable lower makespan rather than RASA and original Max-min.

12. An Optimistic categorized Job Scheduling System for Cloud Computing: Shalmali Ambike et al. (2012) has presented a categorized algorithm model for activities performed by cloud user, algorithm was based on non-preemptive priority queuing. For this a web application is created to do some client server activity like web uploading and downloading and for this an efficient algorithm is needed to do this .Two goals has been achieved by this algorithm a. the maximum profits of the cloud computing service provider b. the Qos requirements of the cloud computing user.

IV. Conclusion

In the cloud computing environment scheduling is one of the most important task .In this survey paper we have analyzed many algorithms on the basis of the different category & diverse parameters. We observed that in the implicit environment of cloud computing disk space mgmt is the most critical issue. Most of the scheduling algorithm provide high throughput and cost effective but somewhere they ignore availability and reliability. For that we require an algorithm which can improve these aspects too.

V. **References**:

[1]K. Liu; Y. Yang; J. Chen, X. Liu; D. Yuan; H. Jin, "A Compromised-Time- Cost Scheduling Algorithm in SwinDeW-C for Instance-intensive Cost-Constrained Workflows on Cloud Computing Platform", International Journal of High Performance Computing Applications, vol.24 no.4 445-456,May,2010.

[2] Suraj Pandey1; LinlinWu1; Siddeswara Mayura Guru; Rajkumar Buyya," A Particle Swarm Optimization-based Heuristic for Scheduling Workflow Applications in Cloud Computing Environments".

[3]Mrs.S.Selvarani1; Dr.G.Sudha Sadhasivam, "improved cost-based algorithm for task scheduling in Cloud computing" ,IEEE 2010.

[4]. Saeed Parsa and Reza Entezari-Maleki," RASA: A New Task Scheduling Algorithm in Grid Environment" in World Applied Sciences Journal 7 (Special Issue of Computer & IT): 152-160, 2009.Berry M. W., Dumais S. T., O'Brien G. W. Using linear algebra for intelligent information retrieval, SIAM Review, 1995, 37, pp. 573-595.

[5]. Y. Yang, K. Liu, J. Chen, X. Liu, D. Yuan and H. Jin, An Algorithm in SwinDeW-C for Scheduling Transaction-Intensive Cost-Constrained Cloud Workflows, Proc. of 4th IEEE International Conference on e-Science, 374-375, Indianapolis, USA, December 2008.

[6]Cui Lin, Shiyong Lu," Scheduling ScientificWorkflows Elastically for Cloud Computing" in IEEE 4th International Conference on Cloud Computing, 2011.

[7]Meng Xu, Lizhen Cui, Haiyang Wang, Yanbing Bi, "A Multiple QoS Constrained Scheduling Strategy of Multiple Workflows for Cloud Computing", in 2009 IEEE International Symposium on Parallel and Distributed Processing.

[8] Arash Ghorbannia Delavar,Mahdi Javanmard , Mehrdad Barzegar Shabestari and Marjan Khosravi Talebi "RSDC (RELIABLE SCHEDULING DISTRIBUTED IN CLOUD COMPUTING)" in International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.2, No.3, June 2012

[9] Dr. M. Dakshayini, Dr. H. S. Guruprasad "An Optimal Model for Priority based Service Scheduling Policy for Cloud Computing Environment" International Journal of Computer Applications (0975 – 8887) Volume 32– No.9, October 2011

[10] Shamsollah Ghanbari, Mohamed Othman "A Priority based Job Scheduling Algorithm in Cloud Computing" International Conference on Advances Science and Contemporary Engineering 2012 (ICASCE 2012)

[11] El-Sayed T. El-kenawy, Ali Ibraheem El-Desoky, Mohamed F. Al-rahamawy "Extended Max-Min Scheduling Using Petri Net and Load Balancing" International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-4, September 2012

[12] Shalmali Ambike, Dipti Bhansali, Jaee Kshirsagar, Juhi Bansiwal " An Optimistic Differentiated Job Scheduling System for Cloud Computing" International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 2, Issue 2,Mar-Apr 2012, pp.1212-1214

[13]http://cloud.cio.gov/topics/cloudcomputingservicemodels

[14]en.wikipedia.org/wiki/Cloud_computing