TASK SCHEDULING BASED ON EFFICIENT OPTIMAL ALGORITHM IN CLOUD COMPUTING ENVIRONMENT

M. Lawanya Shri[1], M.B.Benjula Anbumalar[2], K. Santhi[3], Deepa.M[4]

[1,2,3,4] *SITE, VIT University, Vellore, Tamil Nadu (India)*

ABSTRACT

Cloud computing is an emerging technology in distributed computing which facilitates pay per model as per user demand and requirement. Cloud consists of a collection of virtual machine which includes both computational and storage facility. The primary aim of cloud computing is to provide efficient access to remote and geographically distributed resources
Cloud is developing day by day and faces many challenges, one of them is scheduling. Scheduling refers to a set of policies to control the order of work to be performed by a computer system. A good scheduler adapts its scheduling strategy according to the changing environment and the type of task. In this research paper we presented a Generalized Priority algorithm for efficient execution of task and comparison with FCFS,SJF and Scheduling. Algorithm should be tested in CloudSim toolkit and result shows that it gives better performance compared to other traditional scheduling algorithm

Keywords: Cloud Computing, Generalized Priority Algorithm, Cloud Sim, Virtual Machine, Scheduling.

I. INTRODUCTION

In cloud computing datacenters will enhance the efficiency of resources. Many VMs (virtual machine) are running on each datacenter to utilize the resources efficiently. Most of the time cloud resources are underutilized due to poor scheduling of task (or application) in datacenter.The proposed algorithm provides an optimal scheduling method. Most of the algorithms schedule tasks based on single criteria (i.e execution time). But in cloud environment it is required to consider various criteria like execution time, cost, bandwidth of user etc. This algorithm is simulated using CloudSim simulator and the result shows better performance and improved throughput.Cloud is developing day by day and faces many challenges, one of them is scheduling. Scheduling refers to a set of policies to control the order of work to be performed by a computer system. A good scheduler adapts its scheduling strategy according to the changing environment and the type of task. In this research paper we presented a Generalized Priority algorithm for efficient execution of task and comparison with FCFS and SJF Scheduling. Algorithm should be tested in cloud Sim toolkit and result shows that it gives better performance compared to other traditional scheduling algorithm.In cloud scheduling plays very important role in determining the effective execution. Scheduling refers to the set of policies to control the order of work to be

performed by a computer system. There have been various types of scheduling algorithm existing in distributed computing system, and job scheduling is one of them. The main advantage of job scheduling algorithm is to achieve a high performance computing and the best system throughput.In Cloud Environment, Using CloudSim Simulator to Analysis Efficient job based Task Scheduling Algorithm for Quick response time and minimum turnaround and high throughput through FCFS, SJF and generalized priority algorithm (GPA).

In Job Scheduling Algorithms are First Come First Serve Scheduling Algorithm, Shortest Job First Scheduling Algorithm and Round-Robin Scheduling Algorithm. In FCFS, it allocates the CPU in the order in which the process arrive. It assumed that ready queue is managed as first in first out which means that the first job will be processed first without other preferences. In SJFS, is a scheduling technique that selects the job with the smallest execution time. The jobs are queued with the smallest execution time placed first and the job with the longest execution time placed last and given the lowest priority. This Scheduling algorithm is deal with different approach in this algorithm CPU is allocated to the process with least burst time. RRS is designed especially for timesharing systems. A small unit of time, called time slices or quantum is defined. All run able processes are kept in a circular queue. The CPU scheduler goes around this queue, allocating the CPU to each process for a time interval of one quantum. New processes are added to the tail of the queue

Drawbacks:

- First Come First Serve algorithm has some disadvantages like processing time of each job must be known in advance and it is suitable only for batch process.
- In Shorts Job First long jobs may wait longer because it has to wait not only for jobs that are in the system at the time of its arrival, but also for all short jobs that are in the system at the time of its arrival

II. LITERATURE SUMMARY

S.NO	TITLE	AUTHOR	Description
1	Modeling and Simulation of Scalable Cloud environment and Cloud Sim tool kit	RajkumarBuyya,Burya Ranjan,2012.	In this paper we propose CloudSim: Simulation Tool kit that enables modeling and simulation of Cloud computing environments. The CloudSim toolkit supports modeling and creation of one or more virtual machines (VMs) on a simulated node of a Data Center, jobs, and their mapping to suitable VMs. It also allows simulation of multiple Data Centers to enable a study on federation and associated policies for migration of VMs for reliability and automatic scaling of applications.
2	Analysis and Performance	MonicaGahlawat, Priyanka	Scheduling refers to a set of policies and mechanisms to control the order of work to be performed by a computer

	Assessment of CPU Scheduling Algorithms in Cloud using Cloud Sim	Sharma,2013	system. This paper is analyzing and evaluating the performance of various CPU scheduling in cloud environment using CloudSim
3	Priority Based Resource Scheduling Algorithm in CloudSim.	Satish Kumar Srivastava1 Kumar Rangasamy	Cloud computing is a technology which provides secured and efficient services. Cloud Computing is a service which provides everything as a service to the consumer. Services. Cloud Computing is a service which provides everything as a service to the consumer. It is "pay as per use" service. Cloud Computing provides services such as Software as a Service (SaaS), Platform as a service (PaaS) and Infrastructure as a service (IaaS). Infrastructure as a Service (IaaS) is one of the service delivery model in which storage or computational resources,
4.	Resource Provisioning based on Preempting Virtual Machines in Distributed Systems	S. K. Sonkar,2014	To reduce the impact of side effects, we propose and compare several policies that determine the proper set of lease(s) for preemption. We evaluate the proposed policies through simulation as well as real experimentation in the context of InterGrid under different working conditions.
5	Survey on Scheduling Algorithms in Cloud Computing	Backialakshmi.M,S athyasofia .A,2014	New scheduling strategies may use some of the conventional scheduling concepts to merge them together with some network aware strategies to provide solutions for better and more efficient job scheduling. Scheduling strategy is the key technology in cloud computing. This paper provides the survey on scheduling algorithms. There working with respect to the resource sharing. We systemize the scheduling problem in cloud computing, and present a cloud scheduling hierarchy.
6	Novel survey on Scheduling Algorithm on CloudSim in Cloud Environment	Nootan Verma1Niranjan Lal,2014	The resources in cloud environment need to be provisioned to the distant end users in an efficient manner so that the terrific capabilities of cloud can be utilized effectively and efficiently. Provisioning involves both allocation and scheduling. Cloud Simulator helps to model various different cloud applications by creating Datacenter, Host, Cloudlet, Users, Virtual Machines and many other utilities which can be added to configure it by making it very easy to analyze cloud computing environment.

III. PROPOSED METHOD

Scheduling manages availability of CPU memory and good scheduling policy gives maximum utilization of resource. We compared three algorithms Time Shared, Space shred and generalizes priority algorithm. In cloud scheduling plays very important role in determining the effective execution. Scheduling refers to the set of policies to control the order of work to be performed by a computer system. There have been various types of scheduling algorithm existing in distributed computing system, and job scheduling is one of them. The main advantage of job scheduling algorithm is to achieve a high performance computing and the best system throughput.

Customer defines the priority according to the user demand you have to define the parameter of cloudlet like size, memory, bandwidth scheduling policy etc. In the proposed strategy, the tasks are initially prioritized according to their size such that one having highest size has highest rank. The Virtual Machines are also ranked (prioritized) according to their MIPS value such that the one having highest MIPS has the highest rank. Thus, the key factor for prioritizing tasks is their size and for VM is their MIPS.

Advantages:

This policy is performing better than FCFS and SJF scheduling. Based on the priority, higher priority job can run first. Suitable for both Batch and time sharing systems

- **Response Time:** A scheduler should minimize the response time for real time applications.
- **Turnaround:** A scheduler should minimize the time batch users must wait for an output.
- **Throughput:** A scheduler should maximize the number of jobs processed per unit time.

IV. PERFORMANCE EVALUATION

We evaluate the efficiency of generalized priority algorithm using CloudSim tool. It is a generalized framework for modelling and simulating the cloud computing environment. We analyzed the efficiency and performance of our proposed algorithm based on the simulation results done in CloudSim environment. The following graph illustrates the comparison of FCFS, SJF and Generalized priority algorithm.

FCFS VS SJF VS PRIORITY
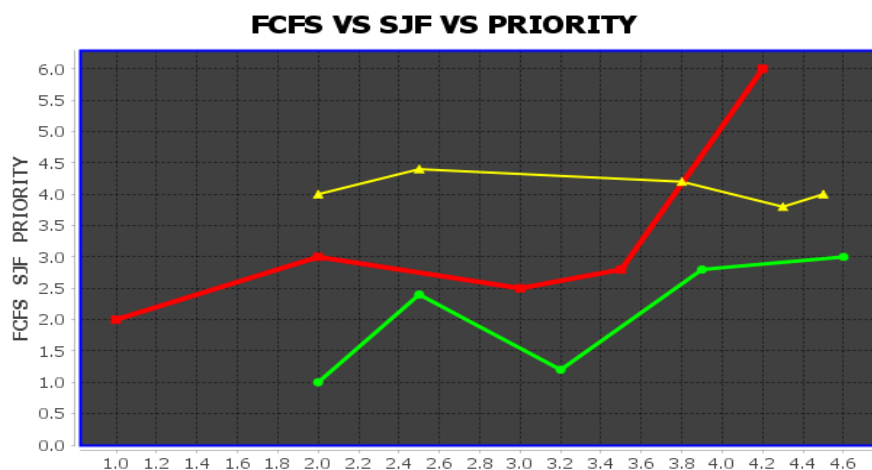
V. CONCLUSION

Scheduling is one of the most important tasks in cloud computing environment. In this paper we have analyzed various scheduling algorithm which efficiently schedules the computational tasks in cloud environment. We have created FCFS, SJF scheduling Algorithm and new proposed Scheduling algorithm is (GPA) generalized priority algorithm.

Priority is an important issue of job scheduling in cloud environments. The experiment is conducted for varying number of Virtual Machines and workload traces. The experiment conducted is compared with FCFS and Round SJF. The result shows that the proposed algorithm is more efficient than FCFS and SJF algorithm.

REFERENCES

[1] Burya R Raman, R. Calheiros, R.N.(2009) "Modeling and Simulation of Scalable Cloud Environment and the Cloud Sim Toolkit: Challenges and Opportunities'', *IEEE publication* 2009,pp1-11

[2] Dr. SudhaSadhasivam, R. Jayarani, Dr. N. Nagaveni, R. Vasanth Ram (2015)"Design and Implementation of an efficient TwolevelScheduler for Cloud Computing Environment" presented at *In Proceedings of International Conference on Advances in Recent Technologies in Communication and Computing,* 2009

[3] Dr. Amit Agarwal, Saloni Jain *(2015)* "Efficient Optimal Algorithm of Task Scheduling in Cloud Computing" presented at *International Journal of Computer Trends and Technology (IJCTT)* – volume 9 number 7– Mar 2015

[4] RajkumarRajavel , Mala T "Achieving Service Level Agreement in Cloud Environment using Job Prioritization in Hierarchical Scheduling" Presented at *International Conference on Information System Design and Intelligent Application*,2012.

[5] Q. Cao, W. Gong and Z. Wei, "An Optimized Algorithm for Task Scheduling Based On Activity Based Costing in Cloud Computing," Presented at *Third International Conference on Bioinformatics and Biomedical Engineering*, 2009.

[6] Jasmin James, Dr. BhupendraVerma"Efficient Vm Load BalancinAlgorithim For A Cloud Computing Environment"Presented at *International Journal on Computer Science and*

Engineering (IJCSE), Sep 2012

[7] Medhat A. Tawfeek, Ashraf El-Sisi, Arabi E. keshk, Fawzy A. Torkey"*Cloud Task Scheduling Based on Ant ColonyOptimization"* Presented at *IEEE International Conference on Computer Engineering & Systems (ICCES)*, 2013

[8] Monica Gahlawat, Priyanka Sharma (2013) " Analysis and Performance Assessment of CPU Scheduling Algorithm in Cloud Sim" International Journal of Applied Information System(IJAIS), Presented at New York, USA, July 2013

[9] Pawar, C. S., &Wagh, R. B. (2012). *"*Priority Based Dynamic resource allocation in Cloud computing*"*, Presented at *InternationalSymposium on Cloud and Services Computing*, IEEE, 2012

[10] RaghavendraAchar_, P. SanthiThilagam, Shwetha D_, Pooja H_, Roshni_ and Andrea "Optimal Scheduling ofComputational Task inCloud using Virtual Machine Tree" Presented at *journal of Emerging Applications of Information Technology (EAIT)*, IEEE Publication , 2012