International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 02 Issue: 05 | Aug-2015 www.irjet.net p-ISSN: 2395-0072

Hybridization of algorithms for Cloud Computing

Loopy Bhatti[1], Gureshpal Singh[2], Sanjeev Mahajan[3]

[1] *M.Tech Scholar, Computer Science and Engg., B.C.E.T Gurdaspur, Punjab, India*
[2] *Associate Professor, Information and Technology, B.C.E.T Gurdaspur, Punjab, India*
[3] *Associate Professor, Computer Science and Engg., B.C.E.T Gurdaspur, Punjab, India*

Abstract - *"Cloud Computing" is a term, which involves virtualization, distributed computing, networking, software and web services. A cloud consists of several elements such as clients, data center and distributed servers. It consists of various advantages like fault tolerance, high availability, scalability, flexibility, reduced overhead for users by reducing the cost of ownership, on demand services etc. Cloud computing can be described as a model of Internet-based computing due to Internet based development and utilization of computer technology. Scheduling is a critical problem in Cloud computing, because a cloud service provider has to serve many users in Cloud Computing System. So job scheduling is the main issue in establishing Cloud Computing Systems. The main goal of scheduling is to maximize the resource utilization, to reduce waiting time, execution time. In this thesis, an efficient Hybrid scheduling approach has been proposed in computational cloud. Proposed work is grouping the tasks before resource allocation according to job priority to reduce the communication overhead. Here tasks are grouped together based on the chosen resources characteristics, to maximize resource utilization and minimize processing time. Hence in this thesis, we have specifically focused on improving computational cloud performance in terms of CPU utilization time, Executed task and Response time. A simulation of proposed algorithm is conducted on real time cloud server. Experimental results show that proposed hybrid algorithm performs better than FCFS and Priority algorithms.*

Key Words: *Scheduling, FCFS, ROUND ROBIN, Priority, Cloud Computing*

1. Introduction

Cloud computing is well-known as a provider of vibrant services using very large scalable and virtualized resources above the Internet. Various definitions and interpretations of "clouds" or "cloud computing" exist. With fastidious respect to the different usage scopes the term is engaged to, we will try to give a agent (as opposed to complete) set of definitions as proposal towards future usage in the cloud computing linked research space. We try to capture a summary term in a way that best represents the technical aspects and issues related to it. In its broadest form, we can define a 'cloud' is a flexible execution environment of resources concerning multiple stakeholders and providing a metered service at multiple granularities for a individual level of quality of service. To be more precise, a cloud is a policy or infrastructure that enables implementation of code (services, applications etc.), in a managed and elastic fashion, whereas "managed" means that consistency according to pre defined quality parameters is routinely ensured and "elastic" implies that the resources are put to use according to actual current requirements observing overarching requirement definitions – implicitly, elasticity includes both up- and downward scalability of resources and data, but also load-balancing of data throughput.

1.1 Job scheduling

Job scheduling issues are fundamental which identify with the effectiveness of the entire cloud computing framework. Job scheduling will be a mapping component from client's assignments to the proper determination of assets and its execution. Job scheduling is adaptable and

helpful. Jobs and job streams can be planned to run at whatever point needed, taking into account business capacities, needs, and needs. Job streams and procedures can set up every day, week after week, month to month, and yearly ahead of time, and keep running on-interest jobs without need for help from support staff.

1.2 Need of job scheduling

The objective of job scheduling in Cloud computing is give ideal tasks scheduling for clients, and to give good throughput and QoS at the same time. Subsequent are the needs of job scheduling in cloud computing:

i. **Load Balance**-Load balancing and task scheduling has nearly related with one another in the cloud environment, task planning system capable for the optimal matching of tasks and assets. Task scheduling algorithm can keep up load balancing. So load balancing get to be another imperative measure in the cloud.

ii. **Quality of Service**-The cloud is primarily to give clients computing and distributed storage administrations, asset interest for clients and assets supplied by supplier to the clients in such a route along these lines, to the point that quality of service can be accomplished. At the point when job scheduling administration comes to job assignment, it is important to ensure about QoS of assets.

iii. **Economic Principles**-Cloud computing assets are generally conveyed all through the world. These assets may fit in with diverse associations. They have their own particular administration strategies. As a plan of action, distributed computing as indicated by the distinctive prerequisites, give applicable administrations. So the demand charges are sensible.

iv. **The best running time** -jobs can be partitioned into diverse classes as indicated by the needs of clients, and after that set the best running time on the premise of distinctive objectives for every job. It will enhance the QoS of task scheduling indirectly in a cloud environment.

v. **The throughput of the system**-Mainly for distributed computing frameworks, throughput is a measure of framework undertaking planning streamlining execution, and it is likewise an objective which must be considered in plan of action advancement. Build throughput for clients and cloud suppliers would be advantage for both of them.

2. Proposed Work

In cloud computing environments, there are two players: cloud providers and cloud users. On one hand, providers hold massive computing resources in their large datacenters and rent resources out to users on a per-usage basis. On the other hand, there are users who have applications with fluctuating loads and lease resources from providers to run their applications. First, a user sends a request for resources to a provider. When the provider receives the request, it looks for resources to satisfy the request and assigns the resources to the requesting user. Then the user uses the assigned resources to run applications and pays for the resources that are used. When the user's job is completed then the resources are free and returned to the service provider. Proper scheduling is needed to meet user's requirements and satisfies the Qos parameters. In this thesis, an efficient hybrid scheduling approach is proposed in computational cloud. Proposed work is grouping the tasks before resource allocation according to job priority to reduce the communication overhead. The purpose work has been divided into three sessions namely job creation, system creation and the schedule.

Following are the metrics on the basis of which results are evaluated:-

1. CPU Utilization: - The CPU time is measured in clock ticks or seconds. Often, it is useful to measure CPU time as a percentage of the CPU's capacity, which is called the CPU usage.

2. Response time:- The elapsed time between the end of an inquiry or demand on a cloud and the beginning of a response is called the Response time.

3. Time to complete a batch of jobs:-This is the total time taken by the cloud to complete the execution of submitted batch of jobs from beginning to ending by the different algorithms. To analyze the time to complete the execution of submitted jobs, first we select 10 jobs from the selection part and initialize the server configuration.

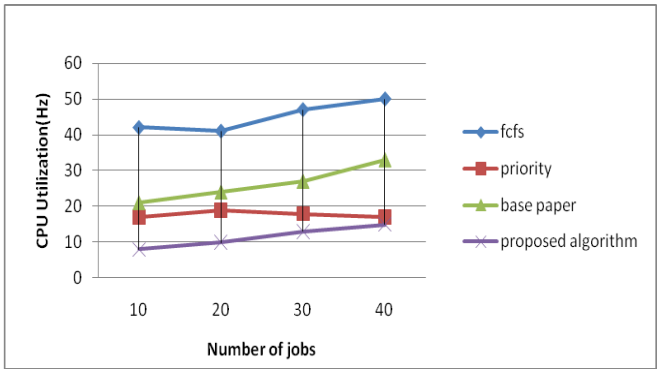

Chart -1: **CPU Utilization verses number of jobs.**

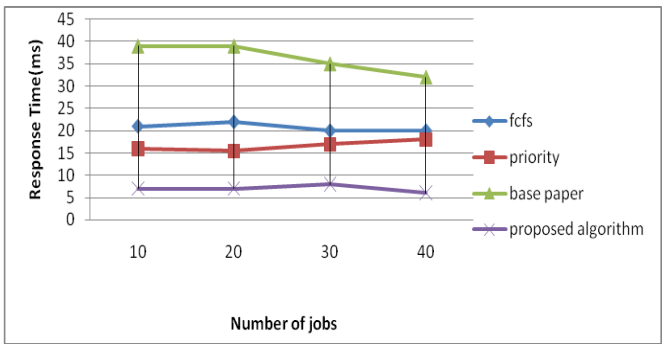

Chart -2: **Response time versus number of jobs**

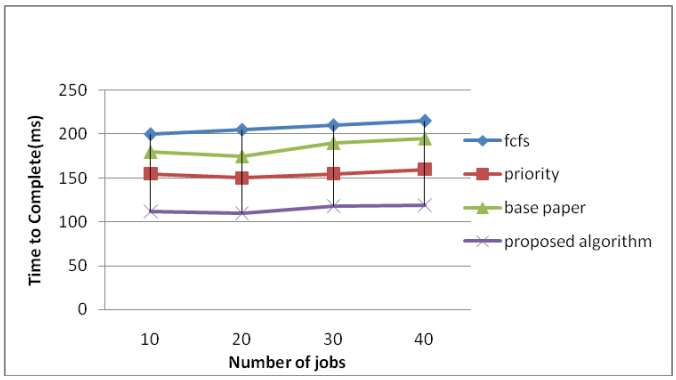

Chart -3: **Total Time to complete verses Jobs**

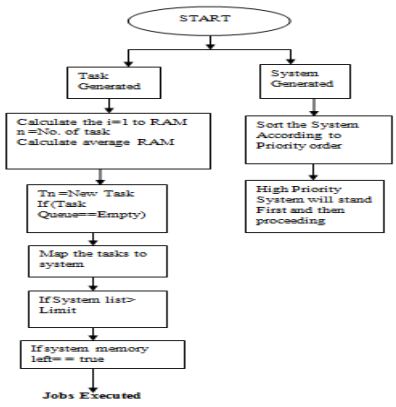

Fig -1: Proposed algorithm

To analyze the performance of proposed algorithm, 48 simulations have been performed in the cloud and results are obtained. First of all, the cloud is started by choosing the configuration and the jobs are created with different requirements. During the simulation, first we select ten jobs, then the system checks all the selected jobs that are to be executed by the scheduler. It creates the groups of jobs for execution and set the priority on the basis of CPU utilization by each group. Now we have task groups to execute by the scheduler. Here hybrid algorithm performs their function to optimize the execution of jobs. Then priority algorithm will sort the groups according to their priority. The priority is set on the basis of system threshold value which is evaluated on the basis of CPU utilization. All the jobs in each group will be executed by FCFS algorithm. When the jobs under each group are executed completely then performance parameters are evaluated.

3. CONCLUSIONS

Job scheduling is an essential requirement in cloud computing environment with the given constraints. Some intensive researches have been done in the area of job scheduling of cloud computing. The scheduling algorithms should order the jobs in a way where balance between improving the performance and quality of service and at the same time maintaining the efficiency and fairness among the jobs. This thesis proposed the solution to

scheduling problem based on FCFS and priority based algorithms. From the experimental results, it has been proved that Proposed Hybrid is more efficient than FCFS, Priority and other hybrid algorithms. Results show that this algorithm not only improve the Response time but also reduces the total time to complete all the jobs. This algorithm is more powerful and can be used in dynamic applications.

REFERENCES

[1] Omer khalid, Ivo Maljevic, Richard Antony, Miltos Petridis, Kevin Parott, Markus Schulz (2010)**, "Deadline Aware Virtual Machine Scheduler for Grid and Cloud Computing"** IEEE 24'th International conference on Advanced Information Networking and Applications Workshop, pp: 85-90 , April 2010.

[2] Monika Choudhary, Sateesh kumar peddoju (2012)**,"Dynamic Optimization Algorithm for Task Scheduling in Cloud Environment"** International Journal of Engineering Research and Applications (IJERA)Vol. 2, Issue 3, pp.2564-2568 May-Jun 2012.

[3]Mrs.S.Selvarani,Dr.G.SudhaSadhasivam(2010),**"Improved Cost-Based Algorithm for Task Scheduling In Cloud Computing"** IEEE International Conference on Computational Intelligence and Research(ICCIC), pp.1-5, Dec 2010.

[4] Jaspreet kaur (2012), **"Comparison of load balancing algorithms in a Cloud"** International Journal of Engineering Research and Applications (IJERA) Vol. 2, Issue 3, pp.1169-1173, May-Jun 2012.

[5] Supreeth S, Shobha Biradar, (2013)**, "Scheduling Virtual Machines for Load Balancing in Cloud Computing Platform"** International Journal of Science and Research (IJSR), Vol.2,Issue:6, pp: 437-441,june 2013.

[6] Jinho Hwang, Timothy Wood (2012)**, "Adaptive Dynamic Priority Scheduling for Virtual Desktop Infrastructures"** in the proceedings of IEEE 20th International Workshop on Quality of Services,4-5 June 2012.

[7] Kushal Dutta ,Ramendu Bikash Guin, Sourav Banerjee, Sayan Chakrabarti, Utpal Biswas(2012), **"A Smart Job Scheduling System For Cloud Computing Service Providers and Users:Modeling and Simulation"** Ist International Conference on Recent Advances in Information Technology(RAIT),pp.346-351, March 2012.

[8] Ying Chang-tian, Yu Jiong(2012), **"Energy-aware Genetic Algorithms for Task Scheduling in Cloud Computing",** IEEE Seventh China Grid Annual Confrence,pp.43-48,Sep. 2012.

[9] Bo Yang, Xiao fei, Feng Tan, Dong Ho Park(2011),**"An Utility–Based Job Scheduling Algorithm for Cloud Computing considering Reliability Factor"**IEEE International Conference on Cloud and Service Computing(CSC), pp.95-102, Dec. 2011.

[10] Gaochao Xu, Junjie Pang, and Xiaodong Fu,(2013)**, " A Load Balancing Model Based on Cloud Partitioning for the Public Cloud"** IEEE Transactions on Cloud Computing,Vol.18, No.1,pp.34-39,Feb. 2013.

[11] Pinal Salot (2013),"**A Survey of Various scheduling algorithm in cloud computing environment**" International Journal of Research in Engineering and Technology (IJRET) Vol.2, Issue.2, pp.131-135,Feb. 2013.

[12] T.Desai, J. Prajapati(2013),"**A Survey Of Various Load Balancing Techniques And Challenges In Cloud Computing**" International Journal of Scientific & Technology Research, VoL.2, Issue.11, pp.158-161, Nov. 2013.

[13] Luqun Li, "**An Optimistic Differentiated Service Job Scheduling System for Cloud Computing Service Users and Providers",** IEEE Third International Conference on Multimedia and Ubiquitous Engineering, pp.295-299,4-6 june 2009.

[14] Yujia Ge, Guiyi Wei(2010),"**GA-Based Task Scheduler for the Cloud Computing Systems",** IEEE

International Conference on Web Information Systems and Mining,pp.181-186,24-25 Oct 2010.

[15] Amandeep Kaur Sidhu, Supriya Kinger(2013), "**A Sophisticated Approach for Job Scheduling in Cloud Server**"International Journal of Computer Trends and Technology (IJCTT) – volume 4 Issue 7–July 2013.