An Efficient Scheduling Approach for Reducing Energy Consumption in Cloud Computing

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Abstract - Job scheduling defines an important role in cloud computing systems. Scheduling of jobs can't be completed effectiveness of the entire cloud computing framework. Job scheduling will be a mapping component from clients assignment to the proper determination of assets & its execution. Cloud computing holds different types and large amount of data so it is called as homogeneous system. Nowadays cloud computing is an emerging technology. So to improve utilization of resource in cloud, minimizing the processing cost, increase the performance of the server, minimizing the processing time and completion time it is necessary to schedule tasks in the cloud. Job scheduling of cloud computing refers to dispatch the computing tasks to resource pooling different resource users according to certain rules of resources use under a given cloud circumstances. Resource management and job scheduling are the key technologies of cloud computing that plays a vital role in efficient cloud resource managementon the basis of one criteria but under several rules and guidelines that are the terms as a contract between clients & workers of cloud. The job scheduling difficulties can be studied as the searching or finding a reduce assignment or mapping of set of sub-jobs of dissimilar jobs over the available set of resources. This research work execute qualified study of the different algorithms for appropriateness, probability, flexibility in the context of cloud situation, after it try to propose the hybrid approach that can be adopted to enhance the existing stage further. This research proposal deploys hybridization of weighted round robin & shortest remaining time scheduling algorithm to achieve above problem. Majority of the prior research work done in the area of analyzing power/energy utilization mainly concentrates on job scheduling in the centre with respect to job allocation among the function servers, targeted power saving or the criteria considering thermal factors & hybridization of weighted round robin & shortest remaining time scheduling algorithm only. This work is done in .NET platform & and backend handling with SQL server management. This proposed work was evaluated using the parameters given by network energy consumption and time consumption. The quanative values of the parameter proves that the proposed algorithm is better than existing ones.

Keywords- Job scheduling, hybridization, quality of services, .net platform, & job scheduling techniques.

I.   INTRODUCTION

Cloud computing has developed a vast improvement from the beginning to current. Cloud computing crossed a decade from beginning in conducting research on virtualization, networking SaaS, distributed and grid computing. Cloud computing is a kind of internet based computing that provides shared processing resources and data to computers and other services on demand. In simplest words cloud computing means storing and accessing data and programs over the internet instead of your computer's hard drive.

Job scheduling is the process of allocating system resources to many different tasks by an operating system. Job scheduling identifies the effectiveness of the entire cloud computing   framework. The job management is the fundamental concept of cloud computing systems job scheduling issues are fundamental which identifies with the
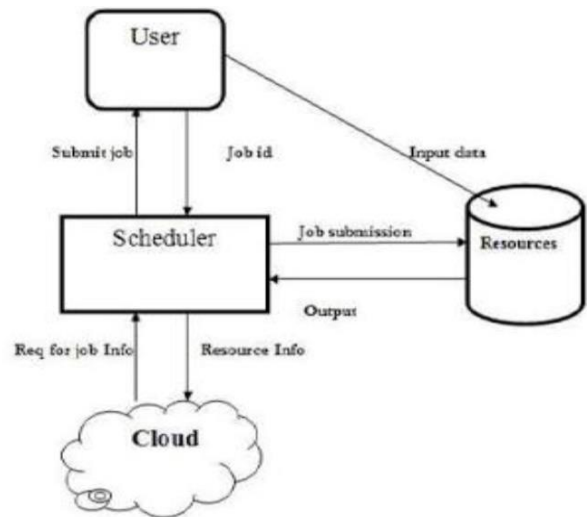
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Fig.1: Job scheduling in cloud computing

Scheduling in cloud

There are so many algorithms for scheduling in cloud computing. The main aim of scheduling is to obtain high performance and user satisfaction. The main examples of scheduling algorithms are FCFS, Round Robin, Min-Min, Max-Min algorithm and many more.

FCFS: First come first serve basis means that task come first will execute first.

Round Robin Algorithm: In this scheduling algorithm time is to be given to resources in a time slice manner.

Min – Min algorithm: This algorithm selects the smaller tasks to be executed first.

In this research work , we vision an efficient scheduling approach for reducing energy consumption in cloud computing. The main aim of this scheduling approach is to reduce energy comsumption over a cloud network & boost the performance in terms of different paramerters. If network will get minimum energy consumption then it will reduce the load of data centres in worst cases when number of users will be more than limit of network.

II.   RELATED WORK

In this section, we describe the related work of job scheduling in cloud computing environment. The author of paper [1] presented a brief description cloud sim toolkit and its functionality. Cloud sim toolkit is a platform where you can test your work before applied into real work.

In paper [4] author proposed an approach for task scheduling algorithm based on load balancing. This paper described two level task scheduling based on the load balancing.

In paper [5] author presented an optimized algorithm for task scheduling based on Activity Based Costing (ABC). This algorithm assigns priority level for each task and user cost drivers.

In paper [11] author is analyzing and evaluating the performance of various CPU scheduling in cloud environment using cloud sim the basic algorithm OS like FCFS, Priority algorithm and shortest job first, we test under different which scheduling policy perform better.

In paper [12] author proposes a priority base dynamic allocation in cloud computing .This   paper considers the multiple SLA parameter and resource pre-emption mechanism for high priority task execution.

III   PROPOSED WORK

The proposed work enhances of reducing energy consumption in cloud computing network by using an cross breed algorithm (weighted round robin+ shortest remaining time scheduling).

A.   WEGHTED ROUND ROBIN ALGORITHM

Weighted round robin algorithm is a network scheduling algorithm. Each packet flow or connection has its own packet queue in a network interface controller. It is the simplest approximation of generalized processor sharing (GPS). While GPS serves infinite amount of data from each non empty queue, WRR serves a number of packets for each non empty queue;

Number= normalized (weight/mean packet size)

B.   SHORTEST   REMAINING   TIME   SCHEDULING   ALGORITHM

Shortest remaining time scheduling is a scheduling technique that is a preemptive process of shortest job next preparation. In this the process with the smallest amount of time remaining until completion is selected to execute. In shortest remaining time a running process may be preempted by a user process with a shorter estimated run time.

C.   METHODOLOGY

The implementation of cross breed algorithm is done on a private cloud. The cross breed algorithm (weighted round robin + shortest remaining time) is used to reduce energy consumption in cloud computing. This algorithm is working on two modules. Weighted round robin works on outer module whereas shortest remaining time is working on inner module. WRR is generating multiple queues and execution pattern. Time slots are generated. SRTS works on single queue and arranges which job has to be executed first.
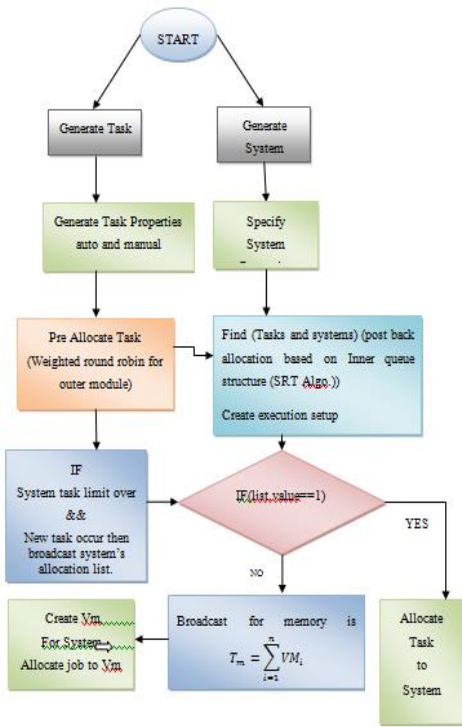
Fig.3 Comparison of energy consumption
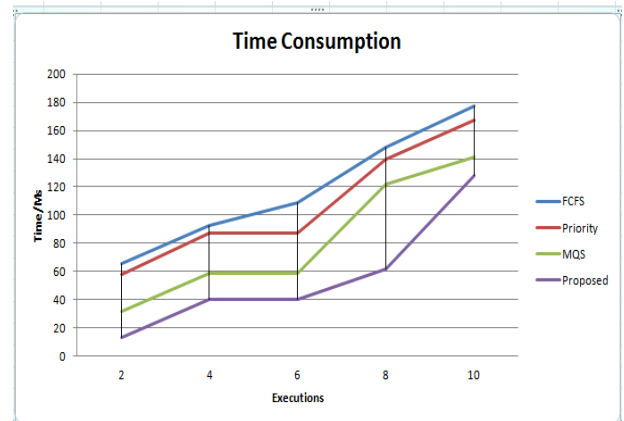

Fig.2 Methodology

Fig.4 Comparison of time consumption

V. CONCLUSION AND FUTURE SCOPE

The overall performance of weighted round robin & shortest remaining time scheduling decreases energy and time consumption. Modifications of these algorithms for better time consumption and less energy consumption to increase client satisfaction can be done.

D. PERFORMANCE ANALYSIS

The result of proposed algorithm is compared with the existing ones using parameters like energy consumption and time consumption. Using cross breed algorithm the time and energy while executing the jobs decreased as comparison to the existing ones. The parameters are compared with first come first serve algorithm, priority algorithm and multiqueue scheduling algorithm we can see results in the following graphs ;

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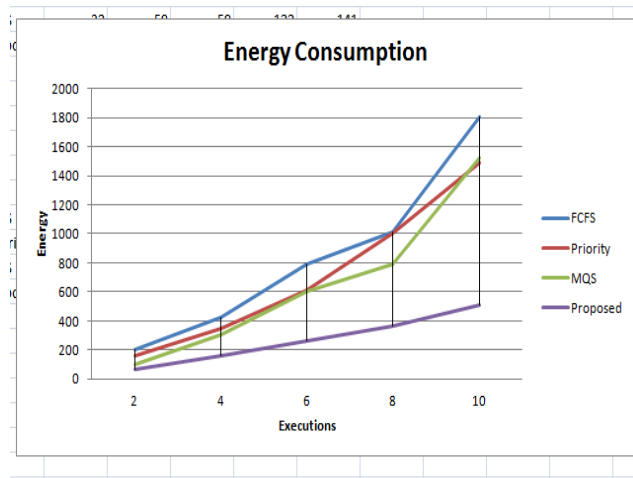
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