



## Review on Task Scheduling Algorithms in Cloud Computing Environment

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**Abstract-** Cloud computing is a type of Internet based computing that provides shared computer processing resources and data to computers and other devices on demand. As It process huge amount of data so scheduling mechanism works as a vital role in the cloud computing. Scheduling means the order in which the set of tasks to be executed. In Cloud computing environment there are large number of resource available but to allocate the tasks in such a way so that we can utilize more resources is the main challenge. Before task allocation to the virtual machine we require more efficient task selection methods. Cloud computing provides various scheduling algorithms considering various parameters that can increase the performance of the system. This paper reviews task scheduling in cloud environment and also different types of job scheduling algorithms.

**Keywords-** Cloud Computing, Priority Based Scheduling, Parallel processing, Scheduling, Job Scheduling Algorithms, SJF, Round Robin, FCFS.

### 1. INTRODUCTION

Parallel processing is a promising approach to meet the computational requirements of a large number of current and emerging applications. [2] Many complex applications require parallel processing to execute the jobs effectively. Due to the communication and synchronization among parallel processes there is a decrease in utilization of CPU resources. It is necessary for a data center to achieve the utilization of nodes while maintaining the level of responsiveness of parallel jobs. Several algorithms & protocols are proposed regarding the scheduling mechanism of the cloud computing. The main goal of scheduling in clouds computing is to

- Improve the utilization of servers allocated to the jobs.
- To process the job having higher priority.
- Improve the resource utilization. Minimizes the completion time
- Minimizing the waiting time

Cloud Computing [2] is an emerging technique. Recently it is found that researchers are interested in using cloud for performing scientific applications and even the big organizations are on the verge of switching over to hybrid cloud. The main goal of [1] cloud computing is to provide an efficient and easy access to remote and geographically distributed resources. Therefore the allocation of the resources and scheduling plays an important role on the performance and efficiency of the system. An efficient scheduling is a way to

proper selection and allocation of the tasks to different virtual machine. User tasks need to be schedule properly with the resources for maximum utilization of the available resources.

The paper is organized as follows. In the next section, an overview of task scheduling is given. In section 3, basic parameters for scheduling algorithms are discussed. Cloud Network Model is discussed in section 4. Various Job Scheduling algorithms are classified in section 5. In last section, conclusion is given.

### II. OVERVIEW: TASK SCHEDULING

Cloud [7] consists of a number of resources that are different with one other via some means and cost of performing tasks in cloud using resources of cloud is different so scheduling of tasks in cloud is different from the traditional methods of scheduling and so scheduling of tasks in cloud need better attention to be paid because services of cloud depends on them. Task scheduling plays a key role to improve flexibility and reliability of systems in cloud.

The scheduling of tasks in cloud means choose the best suitable resource available for execution of tasks or to allocate computer machines to tasks in such a manner that the completion time is minimized as possible. In scheduling algorithms list of tasks is created by giving priority to each and every tasks where setting of priority to different tasks can be based on various parameters.

Tasks are then chosen according to their priorities and assigned to available processors and computer machines which satisfy a predefined objective function [12].

#### Scheduling Types

A. Static scheduling schedule tasks in known environment i.e. it already has the information about complete structure of tasks and mapping of resources before execution, estimates of task execution/running time.

B. Dynamic scheduling must depend on not only the submitted tasks to cloud environment but also the current states of system and computer machines to make scheduling decision.

### III.PARAMETERS FOR SCHEDULING

Various parameters used to compare various scheduling algorithms are discussed in this section:

**Makespan :** Makespan is defined as the completion time of the algorithm. It is calculated by measuring the finishing time of the exit task by the algorithm.

**Load balancing:** It is the method of distributing the entire load in a cloud network across different nodes so that at a time no nodes remain under loaded. The load should be balanced to increase the efficiency of the system.

**Processor Utilization :** It means that how processors are being utilized by different processes. It is good when maximum number processors are utilized.

**Deadline:** It is the period of time from submitting a task to the time by which it must be completed.

**Execution time:** The exact time taken to execute the given task is known as execution time. The ultimate goal of any scheduling algorithm is minimizing the execution time.

**Completion time:** The time taken to complete the whole execution of a job. It also includes the execution time and the delay caused by the cloud system.

**Scalability:** It is the ability of the system to function well when it is changed in size to satisfy the user need.

### IV. CLOUD NETWORK MODEL

Cloud [5] differs in size according to service provider and its use. Cloud can be used for private organizations such that private cloud and for public use as public cloud. It also can be used as a combination of both public and private cloud as hybrid cloud according to requirement. Cloud can be accessed using several types of devices such that via computer, laptop and multimedia cell phones. Below a diagram is shown that is used as cloud computing network for our evaluation. Figure 1 is containing several equipments:

**User:** User is generating request for application. Task is generated at this end.

**Switch:** Switch is used to joint several connections at a single point.

**Cloud:** Cloud is working like a long distance internet connection.

**Load balancer:** Load balancer is used to distribute load randomly to servers.

**Server:** Servers are used to execute user requests and applications are running at this point.

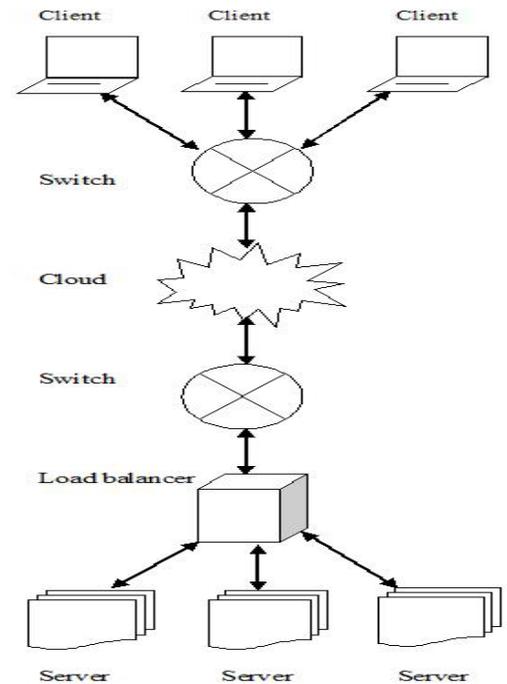


Fig 1: Cloud Network Model

### V. JOB SCHEDULING ALGORITHMS

Some of the Job Scheduling Algorithms are given below :

**First Come First Serve Scheduling Algorithm (FCFS)** [13]– Also known as First in First out. It is one amongst best and simplest Scheduling algorithms. we have it allocate the Central Processing Unit in the order in which the process arrive. It assumed that ready queue is managed as first in first out which implies that the first job are going to be processed first with no other preferences.

**Shortest Job First Scheduling Algorithm (SJF)** [14] - It is a scheduling technique that selects the task 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.

**Round-Robin Scheduling Algorithm (RR)** [15] - It is one of the simplest and broadly used scheduling algorithms. A small unit of time, called time slices is defined. All runnable processes are reserved in a circular queue. The processor 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. The processor scheduler picks the first process from the queue, sets a timer to interrupt after one quantum, and dispatches the process .If the process is still running at the end of the quantum, the CPU is preempted and

the process is added to the tail of the queue. If the process finishes before the end of the quantum, the process itself releases the CPU.

**Priority Scheduling Algorithm [16]** - This algorithm is preemptive in which all things are based on the priority. Each process in the system is based on the priority whereas highest priority job can run first whereas lower priority job can be made to wait. The biggest problem of this algorithm is starvation of a process.

TABLE I.

Algorithm	Parameters/Factors	Objectives
FCFS	Simplest scheduling algorithm	Allocation of CPU according to the task Arrival
Shortest Job Scheduling	Arrival time and process time of task	Effective Resource allocation
Cost based algorithm	Cost, grouping of tasks	Measures the cost and performance
Round Robin Algorithm	Time based	Preemption after fixed time

**CONCLUSION**

Scheduling mechanism is an important issue in case of cloud computing. It is necessary to check server and resource utilization to increase the performance of the system. A good scheduler fit its scheduling policy according to the varying situation and the type of task. To efficiently increase the working of cloud computing environments, job scheduling is one the main job performed in order to get highest profit. More efficient algorithms can be applied to increase the performance of the system.

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