Job Scheduling based on Harmonization between the Requested and Available Processing Power in The Cloud Computing Environment

Volume 125  
Number 13  
Year of Publication: 2015

Authors:
Elhossiny Ibrahim, Nirmeen A. El-Bahnasawy, Fatma A. Omara

Abstract

The Cloud Computing is a most recent computing paradigm where IT services are provided and delivered over the Internet on demand and pay as you go. On the other hands, the task scheduling problem is considered one of the main challenges in the Cloud Computing environment, where a good mapping between the available resources and the users's tasks is needed to reduce the execution time of the users' tasks (i.e., reduce make-span), in the same time, increase the degree of capitalization from resources (i.e., increase resource utilization).

In this paper, a new task scheduling algorithm has been proposed and implemented to reduce the make-span, as well as, increase the resources utilization by considering independent tasks. The proposed algorithm is based on calculating the total processing power of the available resources (i.e., VMs) and the total requested processing power by the users' tasks, then allocating a group of users' tasks to each VM according to the ratio of its needed power corresponding to the total processing power of all VMs.
To evaluate the performance of the proposed algorithm, a comparative study has been done among the proposed algorithm, and the existed GA, and PSO algorithms. The experimental results show that the proposed algorithm outperforms other algorithms by reducing make-span and increasing the resources utilization.

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**Index Terms**

Computer Science  
Distributed Systems

**Keywords**

Cloud Computing; Task scheduling; Particle swarm optimization; Genetic Algorithm.