

A Novel Heuristic Based Scheduling Strategy for Resource Management in Cloud Computing

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Cloud computing is a new computing paradigm that let users to access services over the internet. Cloud provides scalable and on-demand resources to cloud consumers. They charge their customers only for the usage. Cloud platform offers huge computing capabilities with numerous configurable variations. Resource Management plays a major role in optimizing the underlying system of the cloud platform. There are many techniques for resource management in Cloud. Task scheduling and workflow scheduling are two major open problems considered under resource management in the Cloud. Scheduling a task to an appropriate resource cloud is an NP-complete problem. Hence heuristic techniques can be used to derive a better solution for scheduling tasks. Many heuristics were proposed for addressing the task scheduling and workflow scheduling problem in the cloud environment. These heuristics have considered different scheduling parameters in finding a better schedule. None of them has considered the total execution time of the virtual machine as a factor for finding a better schedule. In this research, we propose a novel heuristic, Total Resource Execution Time Aware Algorithm (TRET), that considers the total execution time of the virtual machine in scheduling workloads for the computing resources in Cloud. The algorithm is compared with the existing state of the art heuristics Min-Min, Min-Max, FCFS, DHEFT and MCT heuristics for Makespan, Degree of Imbalance, and System Throughput using synthetic workload traces and real-world workload traces of Nasa Ames iPSC/860 and HPC2N for task scheduling and real-world traces of the CyberShake workflow for heterogeneous environments. The proposed algorithm was implemented using CloudSim and WorkflowSim simulators. The algorithm shows significant improvements in Makespan, Degree of Imbalance, and System throughput compared to other existing heuristics for task scheduling and better results for workflow scheduling.

Keywords: *Task scheduling, Workflow scheduling, Total resource execution Time aware algorithm, Heuristics, Makespan*