

Scalable workflow scheduling algorithm for minimizing makespan and failure probability

ABSTRACT

This paper presents an algorithm called Failure-Aware Workflow Scheduling (FAWS). The proposed algorithm discussed in this paper schedules parallel applications on homogeneous systems without sacrificing the two conflicting objectives: reliability and makespan. The proposed algorithm handles unexpected failure causes rescheduling of the failed task to available resources. In order to analyse the performance of the FAWS algorithm, it will be compared with the popular scheduling algorithm namely Heterogeneous Earliest Finish Time (or HEFT) and Critical Path (CP). A simulation-driven analysis based on realistic workflow application was demonstrated using DAG graph as a continuation of the Layered Workflow Scheduling Algorithm (LWFS). The FAWS algorithm aims to minimize the makespan, increases reliability and therefore boosts the performance of the whole system. A workflow generator was developed to generate large task graphs randomly and scheduled the parallel applications. Based on the simulation results, the proposed algorithm has improved the overall workflow scheduling effectiveness in comparison with existing algorithms.

Keyword: Makespan; Reliability; Workflow scheduling.