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Resource-Constrained Heterogeneous Workflow Scheduling Algorithms in Heterogeneous Computing Clusters

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Abstract : The development of heterogeneous computing clusters provides a strong computility guarantee for large-scale workflows (e.g., scientific computing, artificial intelligence (AI), etc.). However, the tasks within large-scale workflows have also gradually become heterogeneous due to different demands on computing resources, which leads to the addition of a task resource-restricted constraint to the workflow scheduling problem on heterogeneous computing platform. In this paper, we propose a heterogeneous constrained minimum makespan scheduling algorithm based on the idea of greedy strategy, which provides an efficient solution to the heterogeneous workflow scheduling problem in a heterogeneous platform. In this paper, we test the effectiveness of our proposed scheduling algorithm by randomly generating heterogeneous workflows with heterogeneous computing platform, and the experiments show that our method improves 15.2% over the state-of-the-art methods.

Keywords : heterogeneous computing, workflow scheduling, constrained resources, minimal makespan
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