A Goal-oriented Workflow Scheduling in Heterogeneous Distributed Systems

Abstract

In heterogeneous distributed systems like grid and cloud computing infrastructures, the major problem is the task scheduling which can have much impact on system performance. For some reasons, such as heterogeneous and dynamic features and the dependencies among the requests, this issue is known as a NP-hard problem. In this article a hybrid meta-heuristic method based on Genetic Algorithm (GMSW) is being proposed in order to find a suitable solution for mapping the requests on resources. The proposed method tries to obtain the response quickly, with some goal-oriented operations. It begins, through making a good initial population by merging some features of the Best-Fit and Round Robin methods and a bi-directional tasks prioritization in unbalanced-structured workflow, considering their impact on each other, based on graph topology. Some other operations control and lead the algorithm steps in order to obtain the solution by using efficient parameters in the mentioned systems. Here the focus is on optimizing the makespan and reliability, by considering a good distribution of workload on resources. The experiments here indicate that the GMSW improves the results, with the increasing number of tasks in application graph, for the mentioned objectives. The results are compared with other studied algorithms.
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