

云 workflow 任务调度的模拟退火遗传改进算法

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摘 要: 提出一种模拟退火(simulated annealing, SA)算法和遗传算法(genetic algorithm, GA)相结合的任务完成时间-可靠性的多目标优化算法. 该算法首先利用任务的影响程度生成合适的初始种群; 其次对交叉、变异等遗传操作产生出的个体分别进行模拟退火操作, 避免随机算法引起的早熟收敛问题; 最后, 在变异阶段引入失败率, 提高调度结果的可靠性. 实验分析表明, 该算法在解决早熟收敛和结果不可靠方面比 GA 性能更优.

关键词: 遗传算法; 云平台; 任务调度; 模拟退火算法; 多目标优化

中图分类号: TP338.8

文献标识码: A

文章编号: 1000-7180(2016)01-0042-05

An Improved Simulated Annealing Genetic Algorithm for Workflow Scheduling in Cloud Platform

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Abstract: This paper proposed a multi-objective optimization algorithm combining simulated annealing algorithm with the genetic algorithm concerning makespan and reliability. Firstly, this algorithm makes tasks prioritization considering their influence degree tasks schedule policy to generates a suitable initial population. Secondly, for individuals which produced through crossover and mutation genetic operations to perform simulated annealing operation, in order to avoid the premature convergence problem caused by random algorithm. Then, it introduced failure rate in mutation phase to increase the reliability of the scheduling results. Experimental analysis indicates that the algorithm in solving the problem of premature convergence and result unreliable better than GA.

Key words: genetic algorithm; cloud platform; task scheduling; simulated annealing algorithm; multi-objective optimization

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