

基于 TCBSA-ACO 算法在云计算任务分配中的研究

聂清彬^{1,2}, 霍敏霞¹, 曹耀钦¹

(1 重庆邮电大学 移通学院, 重庆 合川 401520; 2 四川大学 锦江学院, 四川 眉山 620860)

摘要: 针对云计算中的任务分配问题, 提出一种基于建立时间成本负载约束函数的模拟退火蚁群算法(a restraint Function of Time Cost Load based on the Simulated Annealing ant colony Algorithm, TCBSA-ACO), 该算法结合云计算中任务分配的特点, 创新地通过建立时间成本约束函数和负载标准差函数分别改进信息素的更新和启发信息, 并用模拟退火算法对求出的解进行全局寻优. 利用 CloudSim 工具进行仿真测试, 与标准的蚁群算法 BACO 和最新的改进蚁群算法 DSFACO 做仿真对比, 实验结果表明 TCBSA-ACO 算法在云任务的执行时间, 成本, 系统负载均衡率方面均优于这两种算法, 提高了系统资源利用率.

关键词: 云计算; 蚁群算法; 负载均衡; 任务调度; 模拟退火

A Research of Time Cost Balance Simulated Annealing Ant

Colony Algorithm for Task Allocation in Cloud Computing

NIE Qing-bin^{1,2}, HUO Min-xia¹, CAO Yao-qin¹

(1 College of Mobile Communication, Chongqing University of Posts and Telecom, Chongqing 401520, China;

2 Jinjiang College, Sichuan University, Meishan 620860, China)

Abstract: Aiming at solving the problem of task allocation in cloud computing, this paper proposes a restraint function of Time Cost Balance Simulated Annealing Ant Colony Algorithm (TCBSA-ACO). The TCBSA-ACO, combined with features of task allocation in cloud computing, improves information elements updating and inspiring factors creatively by establishing a time cost restraint function and a load standard deviation function, and achieves global optimization of all the answers by adopting the simulated annealing algorithm. Some simulation experiments are done by the tool CloudSim, and the results are compared with those of the standard ant colony algorithms BACO and the latest ant colony algorithm DSFACO. The comparison shows that this TCBSA-ACO algorithm is more efficient than the other two algorithms both in reducing time and cost of task execution and in keeping load balance, thus improves resource utilization in the system.

Key words: cloud computing; ant colony algorithm; load balance; task allocation; simulated annealing

作者简介:

聂清彬 男, (1982-), 硕士, 讲师. 研究方向为计算机软件与理论、云计算与物联网. E-mail: 270104318@qq.com.

霍敏霞 女, (1983-), 硕士, 讲师. 研究方向为软件测试.

曹耀钦 男, (1962-), 博士, 教授, 博士生导师. 研究方向为计算机网络.