

Hybrid Algorithm for Dual-Homing Cell Assignment Problem in Wireless ATM

Din, Der-Rong

Abstract

In this paper, the optimal assignment problem which assigns cells in PCS (Personal Communication Service) to switches on ATM (Asynchronous Transfer Mode) network is investigated. The cost considered in this paper has two components: one is the cost of handoff that involves two switches, and the other is the cost of cabling. This problem assumes that each cell in PCS can be assigned to two switches in ATM network. This problem is modelled as dual-homing cell assignment problem, which is a complex integral linear programming (ILP) problem. Since finding an optimal solution of this problem is NP-hard, a hybrid method which combines several heuristics and a stochastic search method (based on a simulated annealing(SA) approach) is proposed to solve this problem. The solution method consists of three phases: Primary Assignment Decision Phase (PADP), Secondary Assignment Decision Phase (SADP) and Refinement Phase (RP). The PADP and SADP are used to find good initial assignment, then domain-dependent heuristics are encoded into perturbations of SA in Refinement Phase to improve the result. Simulation results show that the proposed hybrid method is robust for this problem.

Key words : Cell assignment;Dual-homing;Heuristic algorithm;NP-hard;Simulated annealing;Wireless ATM