

Solving the Wireless Mesh Network Design Problem Using Genetic Algorithm and Simulated Annealing Optimization Methods

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Abstract : Mesh clients, mesh routers and gateways are components of Wireless Mesh Network (WMN). In WMN, gateways connect to Internet using wireline links and supply Internet access services for users. We usually need multiple gateways, which takes time and costs a lot of money set up, due to the limited wireless channel bit rate. WMN is a highly developed technology that offers to end users a wireless broadband access. It offers a high degree of flexibility contrasted to conventional networks; however, this attribute comes at the expense of a more complex construction. Therefore, a challenge is the planning and optimization of WMNs. In this paper, we concentrate on this challenge using a genetic algorithm and simulated annealing. The genetic algorithm and simulated annealing enable searching for a low-cost WMN configuration with constraints and determine the number of used gateways. Experimental results proved that the performance of the genetic algorithm and simulated annealing in minimizing WMN network costs while satisfying quality of service. The proposed models are presented to significantly outperform the existing solutions.

Keywords : wireless mesh networks, genetic algorithms, simulated annealing, topology design

Conference Title : ICNCC 2014 : International Conference on Network, Communication and Computing

Conference Location : Penang, Malaysia

Conference Dates : December 04-05, 2014