

A Distributed and Cooperative Algorithm for the Detection and Elimination of Multiple Black Hole Nodes in Ad Hoc Networks

Chang Wu Yu, Tung-Kuang Wu, Rei-Heng Cheng, 游坤明, Shun Chao Chang

Computer Science & Information Engineering

Computer Science and Informatics

yu@chu.edu.tw

Abstract

A mobile node in ad hoc networks may move arbitrarily and act as a router and a host simultaneously. Such a characteristic makes nodes in MANET vulnerable to potential attacks. The black hole problem, in which some malicious nodes pretend to be intermediate nodes of a route to some given destinations and drop packets that pass through it, is one of the major types of attack. In this paper, we propose a distributed and cooperative mechanism to tackle the black hole problem. The mechanism is distributed so that it suits the ad hoc nature of network, and nodes in the protocol cooperate so that they can analyze, detect, and eliminate possible multiple black-hole nodes in a more reliable fashion. Simulation results show that our method achieves a high black hole detection rate and good packet delivery rate, while the overhead is comparatively lower as the network traffic increases.

Keyword : ad hoc networks, black hole, wireless networks, security