Research on QoS-weighted multipath routing technique for mobile ad hoc networks

Tran Thi Thanh Dung

Abstract: This study proposes and evaluates a weighted Quality of Service (QoS) routing technique for Mobile Ad Hoc Networks (MANETs). The inherent challenges of MANETs, including dynamic topology, limited bandwidth, and node energy constraints, render traditional single-path routing protocols inadequate for supporting diverse multimedia applications with stringent QoS requirements. To address this, a novel multipath routing algorithm is developed that computes multiple disjoint or partially disjoint paths between source and destination nodes. The algorithm employs a weighted metric that integrates key QoS parameters, specifically end-to-end delay, available bandwidth, and residual energy. By dynamically adjusting the weights assigned to these parameters based on application demands and network conditions, the protocol selects and prioritizes paths that best satisfy the required service level. Simulation results demonstrate that the proposed technique significantly improves packet delivery ratio and reduces average end-to-end delay compared to conventional single-path and unweighted multipath approaches. Furthermore, the balanced consideration of energy consumption effectively prolongs the overall network lifetime, making the protocol suitable for real-time and critical applications in dynamic ad hoc environments.

Keywords: QoS routing, multi-path routing, mobile ad hoc network, weighted routing