

Enhancing MANET network performance based on deploying routing information maintenance techniques in clustered mobile networks

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Abstract: This study proposes a novel approach to enhance the performance of Mobile Ad Hoc Networks (MANETs) by optimizing routing information maintenance within a clustered mobile network architecture. The inherent mobility and dynamic topology of MANETs often lead to frequent route failures, increased overhead, and degraded throughput. To address these challenges, this research introduces an advanced routing maintenance technique specifically designed for cluster-based networks. The proposed method leverages the hierarchical structure of clustered nodes to localize route recovery and reduce the propagation of control messages. By intelligently managing routing tables and employing predictive maintenance strategies, the scheme minimizes packet loss and end-to-end delay. Simulation results demonstrate that the proposed technique significantly improves network stability and throughput compared to conventional reactive and proactive protocols. The findings confirm that targeted maintenance of routing information within clusters effectively mitigates the adverse effects of node mobility, offering a robust solution for scalable and high-performance MANET deployments.

Keywords: MANET, routing, clustering, information maintenance