A Multipath Energy-Efficient Probability Routing Protocol in Ad Hoc Networks

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***Abstract*—Ad hoc networks are decentralized type of wireless networks. Moreover, ad hoc networks are characterized by random, multi-hop topologies that may change rapidly over time because of mobile nodes. However, since nodes in ad hoc networks operate on limited battery energy and it is impractical to recharge or replace the battery, an energy-efficient protocol is important in the design of ad hoc networks. By conventional routing protocols, a shortest path is always selected in ad hoc networks. Without considering the energy consumption, some nodes will exhaust very soon and ad hoc networks will become partitioned. Improving routing protocols to prolong the lifetime of ad hoc networks has been a hot research area in the past few years. However, most of protocols only focus on the constrained battery energy. In this paper, a new protocol is proposed. It is a multipath energy-efficient probability routing protocol based on AODV (MEP-AODV). In MEP-AODV, not only battery energy consumption but also multipath selection is considered. By the proposed protocol, when an intermediate node received a request packet (RREQ), it won't relay the RREQ immediately. It will relay the RREQ with a probability which is based on its remaining battery energy. After the RREQ arrived at the destination node, it won't trigger a reply packet (RREP) at once until the expiry of a delay timer. The destination will select multiple paths with sufficient battery energy from the collected paths after the timer expired. Then the destination node initiates the corresponding RREPs. The source node can send data packets via the selected multiple paths by a probability function which is based on the minimum node remaining battery energy of one path. This proposed protocol is implemented in QualNet to evaluate the performance. From the results, MEP-AODV shows the good energy efficiency in terms of the maximizing the lifetime of ad hoc networks.**

***Keyword*—Ad hoc networks, Energy, MEP-AODV, Multipath**

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