

Multi-Commodity Flow, Multiple Paths Load Balanced Routing in Ad-hoc Networks

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Abstract— An Ad Hoc Network is an infrastructure-less network. Data exchange is supported by multi-hop routing between the nodes on the network. Most ad hoc routing schemes are based on shortest path metric or least hop count. These approaches result in using the same path for several commodities. Load balanced routing is one of the approaches that can be used to distribute traffic load over different network nodes hence decreasing the overall network delay. Balancing load among the network distributes the power consumption per node, increasing the network life time by avoiding the failure of a specific node. Such features work out on enhancing the network quality of service. However, the shared medium between the wireless nodes causes interference at the MAC layer which poses a major challenge to load balancing. This paper proposes the use of a multi-commodity flow, multiple paths load balanced routing scheme. The proposed scheme uses a new path length metric that is indicative of the interference seen by nodes across this path. The method requires very little storage capabilities which does not consume much power, in addition the scheme reduces signal forwarding since it mostly depends on node-aware data. Results show that the approach is capable of balancing the network load and that network delay drops significantly compared to existing routing schemes.

Keywords— Routing, Load balancing, Multiple Paths, Multi-Commodity, Ad-hoc, Flow Deviation



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