

Contact-Based Architecture for Resource Discovery (*CARD*) in Large Scale MANets

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Abstract

In this paper we propose a novel architecture, CARD, for resource discovery in large scale MANets that may scale up to thousands of nodes. Our mechanism is suitable for resource discovery as well as routing very small data transfers or transactions in which the cost of data transfer is much smaller than the cost of route discovery. Our architecture avoids expensive mechanisms such as global flooding or complex hierarchy formation and does not require any location information. In CARD resources within the vicinity of a node, up to a limited number of hops, are discovered using a proactive scheme. For resources beyond the vicinity, each node maintains a few distant nodes called contacts. Contacts help in creating a small world in the network and provide an efficient way to query for distant resources. As the number of contacts increases, the network view (reachability) of the node also increases, increasing the discovery success rate. Paths to contacts are validated periodically to adapt to mobility. We present mechanisms for contact selection and maintenance that attempt to increase reachability with reduced overhead. Our simulation results show that CARD can be configured to provide desirable performance for various network sizes. Comparisons with other schemes show overhead savings reaching 87% (vs. flooding) and 79% (vs. bordercasting) for high query rates in large-scale networks.

Keywords

Mobile Ad Hoc Networks, Resource Discovery, Small World, Small Transactions, Short Flows, Routing Protocol, Contact-based Architecture, Self-configuration, Scalability, Network Simulation

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