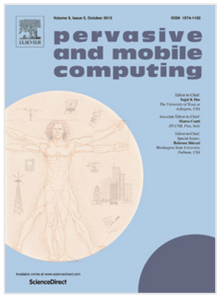
Accepted Manuscript



Triangle-based routing for mobile ad hoc networks

Qiangfeng Jiang, D. Manivannan

PII: S1574-1192(16)30078-5
DOI: http://dx.doi.org/10.1016/j.pmcj.2016.06.010
Reference: PMCJ 716

To appear in: *Pervasive and Mobile Computing*

Received date: 2 October 2015
Revised date: 27 April 2016
Accepted date: 21 June 2016

Please cite this article as: Q. Jiang, D. Manivannan, Triangle-based routing for mobile ad hoc networks, *Pervasive and Mobile Computing* (2016), http://dx.doi.org/10.1016/j.pmcj.2016.06.010

Triangle-based Routing for Mobile ad hoc Networks

Qiangfeng Jiang
Citrix Systems
4988 Great America Pkwy
Santa Clara, CA 95054.
richardjqf@gmail.com

D. Manivannan
Department of Computer Science
University of Kentucky
Lexington, KY 40506
mani@cs.uky.edu

Abstract

Routing protocols for Mobile Ad Hoc Networks (MANETs) have been studied extensively in the past decade. Routing protocols for MANETs can be broadly classified as reactive (on-demand), proactive, hybrid and position-based. Reactive routing protocols are attractive because a route between a source and a destination is established only when it is needed. Such protocols, unlike proactive protocols, do not have high overhead for route maintenance and are especially suitable for networks in which not all nodes communicate frequently. One problem with existing reactive routing protocols is the propagation of redundant route request messages during route discovery. In this paper, we present a low-overhead reactive routing protocol which reduces propagation of redundant route request messages. We also compare its performance with the well-known reactive routing protocol AODV.

Keywords: Mobile ad hoc Networks, Routing in MANETs, Wireless Networks, MANETs.

I. Introduction

Mobile ad hoc networks (MANETs) are composed of mobile nodes which communicate with each other wirelessly without the support of any fixed infrastructure. Unlike traditional networks, MANETs do not have dedicated routers. Each participating node acts as an end system as well as a router. A node can directly communicate with its immediate neighbors within its transmission range. When two nodes that are not within the transmission range of each other need to communicate with each other, intermediate nodes act as routers to forward the packets. Routing algorithms for MANETs can be classified into two categories: topology-based and position-based. Topology-based routing algorithms use the information about the existing links in the network to route packets. Examples of popular topology-based routing algorithms are AODV [1], WRP [2], DSR [3], DSDV [4]. Some of the recently proposed on-demand protocols include Talooki et al.'s protocol [5], Cacciapuotia et al.'s reactive routing protocol [6], self-Adaptive on-demand routing protocol proposed by Xiang et al. [7]. In topology-based routing algorithms, a node typically floods route request message in the network to find a route to a given destination node. Position-based routing algorithms use the geographic position information of nodes in the network to perform packet forwarding. Examples of position-based routing algorithms are Compass [8], MFR [9], Face-2 [10], GPSR [11], AFR [12], ALERT [13], Li et al's load-aware geographic routing [14], Macintosh et al's position-based routing protocol [15]. A survey of Geographic routing protocols can be found in [16].

Under topology-based routing, a node wishing to establish a route to a destination broadcasts a route request message; each node receiving this route request message rebroadcasts this request once and this process is repeated by every node in the network except the destination node which upon receiving the route request broadcasts a route reply and route reply travels along the path traveled by the route request in the reverse direction and reaches the source which initiated the route request. This approach leads to great number of redundant rebroadcasting of route request messages. In dense networks, this may result in high network contention, high network load, and high network delay. To reduce the number