

Achieve Load Balancing and Avoid Bandwidth Fragmentation in MANET QoS Routing

Bo Rong, Michel Kadoch
LAGRIT, Department of Electrical Engineering
Ecole de technologie superieure, Universite du Quebec
Montreal, Quebec, Canada, H3C 1K3

Ahmed K. Elhakeem
Department of Electrical and Computer Engineering
Concordia University
Montreal, Quebec, Canada, H3G 1M8

ABSTRACT

This paper presents a new approach of integrating prioritized admission control into QoS routing to achieve load balancing and avoid bandwidth fragmentation in MANETs. As a crucial part of this new approach, the prioritized admission control algorithm is defined to give preference to high-bandwidth connections. Since most existing MANET QoS routing protocols are source-initiated on-demand ones, the following process is designed to combine them and prioritized admission control algorithm together. As a preparation, firstly the mobile nodes with large routing table and heavy traffic load select themselves as centrally located nodes. Then, when a source node initiates a path discovery process, the centrally located nodes utilize prioritized admission control algorithm to make bandwidth admission test on their links and pick out the eligible ones. Different from the links of centrally located nodes', all links belonging to non-centrally located nodes are considered as eligible links automatically. At last, a conventional MANET QoS routing protocol is employed to find a QoS guaranteed route based on the eligible links. With this approach, the traffic of high-bandwidth connections is mainly aggregated on the links belonging to centrally located nodes, while the traffic of low-bandwidth connections is distributed evenly in the whole network. In addition, bandwidth fragmentation is avoid as well, since high-bandwidth connections have priority on centrally located nodes.

An algorithm named dynamic bandwidth allocation with differentiated drop rate (*DBA-DDR*) is proposed and investigated as an example of prioritized admission control algorithm in this paper. Because this algorithm is nonlinear and unsolvable by mathematical approach, we employ OPNET simulation to study its performance. The simulation results demonstrate that the algorithm of *DBA-DDR* can control traffics of different bandwidth requirements effectively, and by combining it with MANET QoS routing protocol, the mission of achieving load balancing and preventing bandwidth fragmentation can be accomplished successfully.

THREE SUBJECT AREAS IN ORDER OF PREFERENCE

(1) Communications & Wireless Systems, (2) Mobile & Pervasive Computing, (3) Computer Networks & Systems

CONTACT PERSON

Dr. Bo Rong
LAGRIT, Department of Electrical Engineering, Ecole de technologie superieure, Universite du Quebec
Montreal, Quebec, Canada, H3C 1K3
Email: bo.rong@lagrit.etsmtl.ca Telephone: (514) 396-8800 ext.7982 Fax: (514) 396-8684