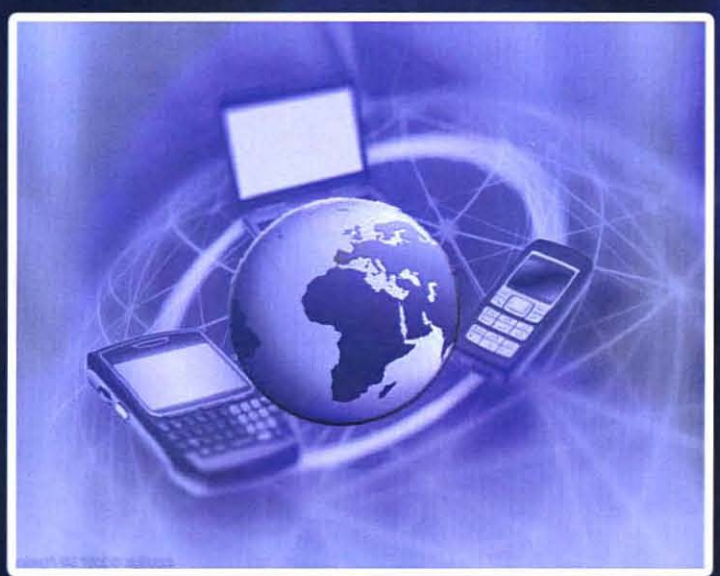
Research Issues in Wireless

Communications and Networking

Farhat Anwar
Wajdi Al-Khateeb



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CHAPTER 12

QOS MULTICAST ROUTING IN MANETS

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12.1 INTRODUCTION

Mobile Ad hoc Networks (MANETs) are composed of collection of mobile nodes that communicate with each other over wireless links. The most important features of these networks include dynamic self-configurable, self-organized, self-administration and multi-hop [1]. In MANETs, each node acts as a host and a router at the same time. They intercommunicate through single-hop and multi-hop paths to forward messages to other nodes, which require cooperation between nodes to relay packets to their targets. MANETs face several challenges that have to be addressed including dynamic topology changes, lack of infrastructure, bandwidth constraint and limited resources. These features make working in MANETs more complex than their wired counterpart [2].

MANETs are considered for many commercial applications that involve point-to-multipoint or multipoint-to-multipoint communication patterns, where robustness and reliability are essential. Disaster recovery, search and rescue efforts, military battlefields, temporary offices and multi-partiy gaming are common examples of these applications [3] [4]. As a consequence, multicast routing has received significant attention over the recent days. Multicast communication is emerged to support applications that facilitate effective and collaborative communication among groups of users with the same interest. Multicasting is a scheme for delivering the same data from a source to a group of destinations. Multicasting is efficient in saving the bandwidth and improving the scalability, which are essential requirements in MANETs [3] [5]. Also, it reduces the transmission overhead both on the source as well as on the network nodes and speeds up the delivery of information at the receivers [6].

The increasing popularity of using multimedia and real-time in different potential commercial applications and the widespread of wireless and mobile devices make it a logical step to support Quality of Service (QoS) over wireless mobile networks. QoS support is tightly related to resource allocation and reservation to satisfy the application requirement [5]. Furthermore, supporting QoS over MANETs requires cooperation between many components including QoS routing protocol, QoS MAC (medium access control) protocol and QoS signaling [9]. In the network layer, QoS routing protocol attempts to determine and choose routes that obey the constraints requested by the application. At MAC layer, QoS MAC protocol is responsible of providing fair access to the wireless medium. While, QoS signaling protocol bears the responsibility of resource reservation over the selected routes.

QoS routing in wired networks and QoS unicast routing in wireless ones have been well studied, but QoS multicast routing still need further efforts. Combining QoS to multicast Ad hoc networks is not a trivial task. So, supporting QoS for multicast protocols has to be designed in a way different from unicast protocols. The difference is that, in unicast QoS protocols the resource reservation is done between a source and a destination. While multicast QoS routing protocols should provide suitable QoS paths to all destinations of the