Advances in Mobility Management for IP Networks

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QUALITY OF SERVICE (QOS) ISSUES IN MANETS

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32.1 INTRODUCTION

Mobile Ad hoc NETworks (MANETs) are collections of mobile nodes that communicate with each other over wireless links in the absence of any infrastructure or centralized administration [1]. QoS is usually defined as a set of service requirements that needs to be met by the network while transmitting a stream of packets from a source to its destination [2]. The QoS requirements include delay, delay variance (jitter), bandwidth and probability of packet loss. QoS provision aims to achieve more deterministic network behavior, so that the carried information can be better delivered and the network resources can be efficiently utilized [1, 3].

The increasing popularity of using multimedia and real-time in different potential commercial applications in MANETs makes it a logical step to support QoS over wireless mobile networks. QoS support is tightly related to resource allocation and reservation to satisfy the application requirement [4-6]. The role of QoS routing protocol is to find suitable loop-free paths that have enough resources available from the source to the destination to satisfy the desired QoS requirements.

QoS is more difficult to guarantee in Ad hoc networks than in most other types of networks like wireline network or the cellular network, because the state information is usually imprecise due to the channel characteristics and frequent topology changes as the nodes move [3, 7]. In MANETs, the wireless bandwidth is shared among neighboring nodes and the network topology continuously changes with node mobility. Also, since Ad hoc networks lack to infrastructure, there is no dedicated administrator to manage the channel resources for the network nodes. This condition requires extensive collaboration between the nodes, both to establish the route and to secure the resourcesnecessary to provide the QOS. Moreover, if the QoS request includes two independent path constraints, path searching becomes NP-complete [3, 8].

32.2 QoS Components

Supporting QoS in Ad hoc wireless networks requires cooperation between many components. These components include a QoS model, QoS routing protocol, QoS MAC protocol and QoS signaling protocol [9, 10].

QoS Model

The QoS Model aims to specify which kinds of services to be included in the network, this will enable the network to offer services that operate better than the best-effort model