

Advances in Mobility Management for IP Networks

Editors:

Aisha Hassan Abdalla Hashim

Othman Khalifa

Shihab A. Hameed



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ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS

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31.1 INTRODUCTION

Routing protocols are an activity or a function that is responsible for exchanging the route information, finding feasible paths between origin and destination and gathering information about the path break[1, 2]. Routing protocols used in traditional wired networks cannot be directly applied in Ad hoc wireless networks. This is due to challenges characteristics of Ad hoc network including dynamic topology, lack of infrastructure, . Bandwidth constraint and shared wireless channel and Limited resources Therefore, routing in Ad hoc networks is a challenging task.

Routing protocols in general have two main different stages; they are routediscovery and data forwarding. In route discovery phase, route to a destination will be discovered by initiating route discovery request. Once the route has been established, data forwarding will be initiated and sent via the discovered routes. There are many routing protocols that have been proposed for Ad hoc networks. Some of the classifications of the routing protocols that are directly related to this research will be reviewed in the following subsections.

31.2. Classifications of Routing Protocols in Ad-Hoc Networks

Routing protocols for Ad-Hoc networks can be classified into several types based on different criteria. In this section we present the classification of routing protocols based on routing topology, information maintained at intermediate nodes, role assigned to the participating nodes and based on type of cast property.

Classification based on routing topology

Ad-Hoc wireless networks routing protocols in general can be classified based on the routing topology into two main categories: *topology-based* and *position-based*[1].

Topology-based routing protocols use information about links that exist in the network to perform packet forwarding. They are, in turn, divided into three categories: proactive (table-driven or periodic) protocols, reactive (demand-driven or source-initiated) protocols, and hybrid (hierarchical or (reactive/proactive)) protocols[3].

In *proactive routing protocols*, the nodes are required to maintain the network topology information in the form of routing tables by exchanging the routing information periodically. In a proactive protocol, the information to determine the routes is immediately available so no additional time is needed to discover the hops in a route, thus