

## PREFACE

The ad-hoc network is an infrastructure-less, self-configuring, self-motivated, arbitrary, rapidly changing, and multi-hop network that is composed of bandwidth constrained wireless links without an aid of the centrally controlled routers or servers. Owing to these properties, it has gained potential applications in various fields like tactical and civilian environments, emergency operations etc. The possible applications of the ad-hoc network in many fields as well as its contemporary relevance and future promise in the next generation of wireless communications, which has indeed motivated the thesis's author to select this area as his research work.

The one of the main issues with ad-hoc network operation is stable routing due to its fundamental characteristics such as open medium, dynamic topology, distributed operation and constrained capability etc. However, routing in ad-hoc network is highly complex because of mobility, limited transmission range and security issues. Therefore, the author has been motivated to analyze and observe the routing protocol performance (especially ad-hoc on-demand distance vector (AODV)) in the wide range of scenarios. The AODV routing algorithm is actually motivated due to its limited bandwidth that is available in the media and used for communications, especially in the wireless medium. The idea of getting routes purely on-demand makes AODV routing a very useful and preferred algorithm for the ad-hoc network environment.

As AODV routing protocol comes under the on-demand routing. Hence, in this routing, the route maintenance parameters are one of the key concepts for the route discovery and maintenance process, which basically deals with the topology changes and provides a stable path in the network. Moreover, some available studies concerning to the ad-hoc networks have been reviewed in this thesis. From there, one can easily observe that the thesis research work marks a shift from the previous research work in

which it considers the various route maintenance parameters for the study. Therefore, the main variables of the present work are the number of route maintenance parameters (such as active route timeout (ART) & delete period constant (DPC)) and various determining factors (like mobility, transmission range, network load density (NLD) and active nodes/ source destination pair (ANs/SD pairs)) that may significantly affect the AODV network stability.

The prime purpose of the present thesis is to provide more stable routing in AODV network. In order to do this, it is absolutely essential to take into consideration the timeout value for cached routes and timeout value after which the expired cached routes are completely deleted from the routing table. These two timeout values are called as ART and DP respectively, and they minimize the route failure issues by providing alternative routes for the data packets. In this thesis, ART and DPC are termed as route maintenance parameters and are being used to improve the AODV routing performance. Actually, in AODV routing, it is suggested that the value of ART and DPC should be a constant. In other words, their value is generalized for all kinds of applications or traffic generators. However, it has been observed from the thesis work that the choice of their values according to network behavior and traffic generators may significantly increase the network performance or provide the stable routing in the network.

The research scholar, from time to time, has reported the present work part-wise at national and international conferences as well as in reputed journals, namely, International Journal of Mobile Communications (IJMC), Pensee Journal, IEEE African Journal of Computing & ICTs and one chapter in book series (Smart Innovation, Systems and Technologies (SIST), Publisher: Springer International Publishing, Switzerland).