Chapter IX
Routing Protocols for Ad-Hoc Networks

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ABSTRACT

Ad-hoc networks have been the focus of research interest in wireless networks since 1990. Nodes in an ad-hoc network can connect to each other dynamically in an arbitrary manner. The dynamic features of ad-hoc networks demand a new set of routing protocols that are different from the routing schemes used in traditional wired networks. A wide range of routing protocols has been proposed to overcome the limitations of wired routing protocols. This chapter outlines the working mechanisms of state-of-the-art ad-hoc routing protocols. These protocols are evaluated by comparing their functionalities and characteristics. Related research challenges are also discussed.

INTRODUCTION

An ad-hoc network consists of a set of nodes that communicate using a wireless medium over single or multiple hops and do not need any pre-existing infrastructure such as access points or base stations. Ad-hoc networks can comprise of mobile, static, or both types of nodes. Ad-hoc networks containing mobile nodes are known as MANETs (mobile ad-hoc networks). An example of ad-hoc networks with static nodes is SAHN (suburban ad-hoc network) (Kopp & Pose, 1998).

Since ad-hoc networks can be rapidly deployed, they are attractive for digital communication in battlefields, rescue operations after a disaster, and so forth. Ad-hoc networks are also useful in civilian forums for running demanding multimedia applications such as video conferencing.

The topology of an ad-hoc network can change dynamically due to dynamic link failure

Figure 1. Classification of ad-hoc routing protocols based on routing strategy and network structure