

Abstract—Advances in computer and telecommunication industries have made wireless networks increasingly popular and ubiquitous. Basically, there are two types of systems for wireless networks. One is base-station (BS) oriented and the other is the ad hoc wireless network. In BS-oriented wireless networks, the mobile hosts communicate with base stations, while in the ad hoc wireless networks, the mobile hosts communicate with one another directly. The BS-oriented wireless network has better performance and is more reliable. However, the ad hoc wireless network topology is more desirable because of its low cost, plug -and-play convenience, and flexibility. Its usage of bandwidth and battery power is more efficient. The disadvantage is that the route and communication connectivity is fairly weak. Any migration by mobile hosts participating in one or more routes could make the route invalid. It incurs a lot of cost in keeping communication among them. Thus, the ad hoc wireless network is only suitable for applications in a small geographical area.

In this paper, we propose hybrid wireless network protocols to combine the advantages of BS-oriented and ad hoc wireless networks. We allow two mobile hosts to communicate directly (one-hop direct transmission) or through another mobile host (two-hop direct transmission) within the BS-oriented networks. The hybrid protocols are more flexible, reliable, and have better performance than the traditional wireless network protocols. The simulation results show that two-hop direct-transmission has a lower noncomplete probability. If the communicating parties were always within a two-hop direct-transmission area, the rate of complete communication would improve about 20%.

Index Terms—Ad hoc networks, base-station (BS)-oriented networks, mobility,

wireless networks.