

ANALYSIS OF ROUTING TECHNIQUES IN MOBILE AD-HOC NETWORKS

Claudia HLOPEANICOV*

Technical University of Moldova, Chisinau, Republic of Moldova

*Corresponding author: Claudia Hlopeanico, claudiahlopeanico@gmail.com

Mobile ad hoc networks (MANET) are self-configuring networks of nodes connected by wireless connections without any form of centralized management. They are currently one of the most important research subjects due to the large number of different applications (military, rescue, etc.). In MANET networks, each node is both a terminal and a router. Therefore, each node must be able to forward packets to other nodes. Due to the mobility of the topology nodes, these networks tend to be frequent changes. Traditional routing protocols developed for cable networks cannot work effectively in MANET networks, so they are for them special routing protocols developed. Routing protocols are classified according to the way forwarding of packets in point-to-point, point-to-multipoint, and broadcast routing protocols.

The Mobile Ad Hoc Network (MANET) is a dynamic network that enables wireless networking on the go without the need for a pre-built network infrastructure. It consists of moving nodes, wherein the node may be a human carrying a handheld computer equipped with a suitable wireless communication device, a laptop computer, an unmanned robot, or anyone equipped with suitable wireless communication equipment.

An ad hoc routing protocol is a convention, or standard, that controls on how nodes decide how to forward data packets among other nodes in the MANET network. Effective mechanisms for routing protocols within MANET networks have been the subject of much research, some of which have become widely accepted standards.

Routing protocols intended for use in traditional cable networks cannot be used in MANET networks. The specific characteristics of these networks require special routing protocols that address the identified challenges in these networks.

The topology of mobile ad hoc networks can be dynamic and unpredictable. Traditional routing protocols used with cable networks cannot be directly applied to mobile ad hoc wireless networks, since many of the assumptions adopted are not valid in a mobile wireless environment. Thus, for example, one assumption is that a node can receive any broadcast message from other nodes within the same subnet. However, this is not the case for nodes in the wireless MANET network, due to the fact that bandwidth is limited in this type of network. Thus, the MANET network model introduces a number of challenges to routing protocols.

References

1. Murthy, C. Siva Ram, and B. S. Manoj. Ad hoc wireless networks: Architectures and protocols. Pearson education, 2004.
2. Remondo, David. «Tutorial on wireless ad hoc networks». In International Working Conference in Performance Modelling and Evaluation of Heterogeneous Networks (HET-NET), vol. 2. 2004.
3. Goldsmith, Andrea J., and Stephen B. Wicker. «Design challenges for energy-constrained ad hoc wireless networks». *Wireless Communications, IEEE9*, no. 4 (2002): 8–27.
4. Jones, Christine E., Krishna M. Sivalingam, Prathima Agrawal, and Jyh Cheng Chen. «A survey of energy efficient network protocols for wireless networks». *wireless networks 7*, no. 4 (2001): 343–358.

5. Zhang, Xiaoying, Thomas Kunz, Li Li, and Oliver Yang. «An energy-efficient broadcast protocol in manets: Design and evaluation». In Communication Networks and Services Research Conference (CNSR), 2010 Eighth Annual, pp.199–206. IEEE, 2010.
6. Yu, Chansu, Ben Lee, and Hee Yong Youn. «Energy efficient routing protocols for mobile ad hoc networks». *Wireless communications and mobile computing*, no. 8 (2003): 959–973.
7. Chang, Jae-Hwan, and Leandros Tassiulas. «Energy conserving routing in wireless ad-hoc networks». In INFOCOM 2000. Nineteenth Annual Joint Conference of the IEEE Computer and Communications Societies. Proceedings. IEEE, vol. 1, pp. 22–31. IEEE, 2000.
8. Li, Qun, Javed Aslam, and Daniela Rus. «Online power-aware routing in wireless ad-hoc networks». In Proceedings of the 7th annual international conference on Mobile computing and networking, pp. 97–107. ACM, 2001.
9. Toh, Chai-Keong. «Maximum battery life routing to support ubiquitous mobile computing in wireless ad hoc networks». *Communications Magazine*, IEEE39, no. 6 (2001): 138–147.
10. Bergamo, Pierpaolo, Alessandra Giovanardi, Andrea Travasoni, Daniela Maniezzo, Gianluca Mazzini, and Michele Zorzi. «Distributed power control for energy efficient routing in ad hoc networks». *Wireless Networks* 10, no. 1 (2004): 29–42.
11. Woo, Kyungtae, Chansu Yu, Dongman Lee, Hee Yong Youn, and Ben Lee. «Non-blocking, localized routing algorithm for balanced energy consumption in mobile ad hoc networks». In Modeling, Analysis and Simulation of Computer and Telecommunication Systems, 2001. Proceedings. Ninth International Symposium on, pp. 117–124. IEEE, 2001.
12. Yu, Wei, and Jangwon Lee. «DSR-based energy-aware routing protocols in ad hoc networks». In Proc. of the 2002 International Conference on Wireless Networks. 2002.
13. Gupta, Nishant, and Samir R. Das. «Energy-aware on-demand routing for mobile ad hoc networks». In Distributed Computing, pp. 164–173. Springer Berlin Heidelberg, 2002.