

# An Empirical Research Study On Mobile Ad-Hoc Networks: Issues and Challenges on its Routing and Security Provisioning Protocols

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**Abstract**—In the last few decades, Wireless industry has seen exponential growth, and the use of Mobile Phones, PDAs and handheld computer systems have been increasing in a rocket high. Mobile Ad Hoc Network is a special kind of Wireless Network as it is equipped not only with wireless communications and networking capability, but also with mobility. Due to its infrastructure-less nature, MANETs poses many challenges in designing protocols and managing its network operations. It is evident from recent research studies that among all the available wireless network architectures, Mobile Ad Hoc Networks have got the attention of academicians and researchers across the world due to its dynamic topology and de-centralized connectivity which challenges the researchers in designing a reliable, energy efficient and secure routing protocol with QoS Provisioning. The primary objective of this research paper is to highlight the strengths and weakness points of popular energy aware and secure routing protocols of MANETs to date. This research paper also discuss about the current trends and the direction of future research work on Mobile Ad Hoc Networks and its applications

**Index Terms**—Mobile Ad hoc Networks, Energy Efficient routing, Secure routing and Quality of Service Provisioning.

## I. MOBILE AD-HOC NETWORKS

**M**obile Ad Hoc Network(MANET) is a special type of wireless network which have the ability to develop an on Demand, temporary, self organizing and rapidly deployable network without any centralized administration. It is featured by dynamic topology, Mobility, limited resources (Battery, Bandwidth, etc.) where each nodes communicates with other nodes either directly or though the intermediate nodes (1). Basically, all the intermediate nodes in MANET functions as mobile routers and some dedicated routing protocol takes control of deciding and maintaining the routes. MANETs are useful in a situation where a temporary network connectivity is needed such as special outdoor events, natural disaster and rescue operations and decision making in the battlefield etc. (2,3).

## II. ROUTING IN MANET

From the very beginning of the concept of MANET, the researchers took the issue of routing as a major challenge. The characteristics of MANET puts special challenges in designing an efficient routing protocol. As discussed earlier, one of the key challenges in designing a routing protocol is to minimize the energy consumption rate of the mobile nodes (4). In MANETs, function of a mobile node solely depends upon its battery level, so the energy consumption must be effectively managed (5). The major challenge in protocol design is resource constraints of MANETs as the devices used in MANETs require portability (in most cases) which have size and weight constraints along with the limited battery power(6). In addition, due to the mobility of nodes participating in the

TABLE I  
COMPARISON BETWEEN PROACTIVE AND REACTIVE ROUTING PROTOCOLS IN MANET(9)

Proactive Routing Protocols
The highest percent of node's battery is likely to be utilized in updating and maintaining
This approach results in increased overhead
Delay is reduced as it maintains updated routing table
Interference is low

network, connectivity between any two nodes in the network considered intermittent (7). MANET poses many challenges in designing an efficient routing protocol for its operations and the primary objective of these protocols are to maximize throughput, maximize network life time and minimize delay by minimizing the energy consumption rate, increasing security and improving QoS Provisioning. MANET routing protocols are generally categorized as Table driven and on Demand driven based on the timing of route updating or route discovery. In table driven approach, the routing table of the nodes would be updated and propagated to its neighbours in response to changes in the network. With on-demand routing, routes are only discovered when a source node desired to do so. The source node will initiate the route discovery process (only if a route is unknown) by sending route-request message to its neighbours and the intermediate nodes forward the packet till it reaches the destination node. The route will be established when the destination node responds with the route-reply message back to the sender via intermediate nodes (8). Hybrid approach combines both of these approaches to offer better routing protocol for MANETs.

### A. Subsection Heading Here

Subsection text here.

*1) Subsubsection Heading Here*

Subsubsection text here.

III. CONCLUSION

The conclusion goes here.

APPENDIX A

PROOF OF THE FIRST ZONKLAR EQUATION

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APPENDIX B

Appendix two text goes here.

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**Michael Shell** Biography text here.

**John Doe** Biography text here.

**Jane Doe** Biography text here.