

An detailed overview of Mobile Adhoc Networks (MANET): Features, Characteristics and Applications

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Abstract:

MANETs are wireless network which are characterized by the lack of permanent infrastructure. It is a self-motivated and dynamic network that comprises a group of wireless mobile nodes that correspond with each other without the use of any centralized power. The devices belonging to the network should be able not only to transmit and receive data, but also to handle all the function of network in a concerned. Due to basic features like, disturbed services, wireless medium, dynamic topology, the MANETs are vulnerable to diverse kinds of security attacks such as worm hole, black hole, rushing attacks etc. In this paper we are going to study mobile ad-hoc networks, characteristics, challenges, advantages, applications and various attacks in MANET.

Keywords — MANET, Attacks, military and commercial sectors, features of Manet.

I. INTRODUCTION

The Manet is an ad hoc network which does not need any road and rail network support for carrying data packets between any two nodes. MANET is an ad hoc network for mobile or much merely called as mobile ad hoc network which is a uninterrupted infrastructure-less, self ordered network of mobile devices linked wirelessly [2]. Mobile ad hoc networks obtain a flat network infrastructure [1]. It has a common medium which is extremely demandable for radio communication. In MANET architecture, every node or computer or means any device is a router as well as end host. The devices or nodes in the MANET architecture are in common self-governing. MANET has a forceful topology architecture which greatly promotes mobility [4]. In the MANET architecture, every node also works as a router as they route packets for other nodes(Figure.1).

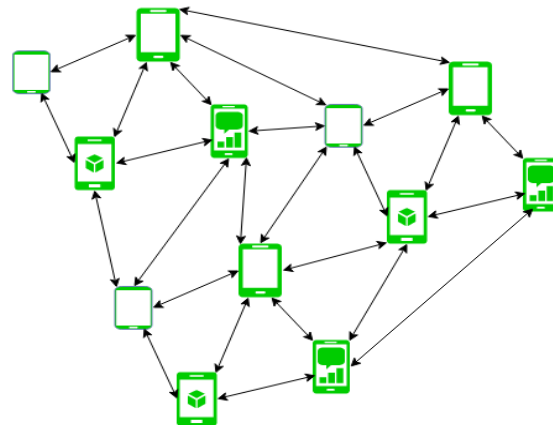


Figure - Mobile Ad Hoc Network

Figure.1.Mobile Ad hoc Network

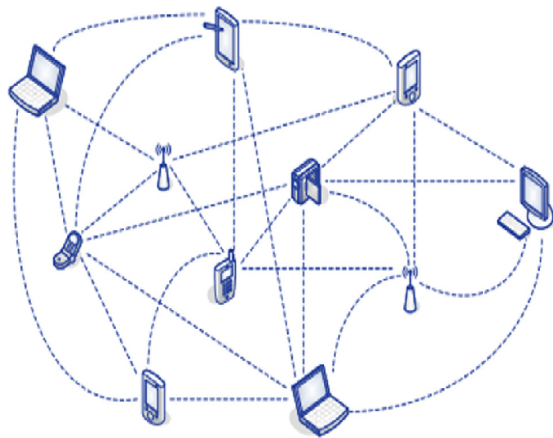


Figure.2. Architecture of Mobile Ad hoc Network

II. FEATURES OF MANET

There are various features of MANET as listed below:

1. Dynamic network topology
2. Fluctuating link capacity
3. Light weight terminal
4. Partitioned operations
5. Autonomous terminal
6. Multi hop routing

III. Challenges in MANET:

There are many challenges in MANET which are listed below:

- A. Autonomous
- B. Dynamic topology-
- C. Device discovery
- D. Bandwidth optimization
- E. Limited resources
- F. Scalability-
- G. Limited physical security.
- H. Infrastructure-less and self operated
- I. Poor Transmission Quality-
- J. Ad hoc addressing

- K. Network configuration
- L. Topology maintenance

IV. Applications of MANET:

With the enlargement of portable devices as well as development in wireless communication(WC), the adhoc networking is ahead significance with the increasing number of extensive applications in the military, private and commercial sectors. MANET allow users to contact and exchange information in spite of of their geographic position or closeness to infrastructure [5]. In dissimilarity to the infrastructure networks, all nodes in MANETs are movable and their connections are dynamic. Disparate other mobile networks, MANETs do not need a fixed infrastructure. This offers a beneficial decentralized character to the network. Decentralization makes the networks stretcher and stronger [3].

Commercial Sector: Ad hoc can be used in rescue/emergency operations for tragedy reprieve efforts, for e.g. in or earthquake fire or flood (Figure.2). This may be due to all of the equipment was damaged, or conceivably because the region is too distant. Rescuers must be able to correspond in order to make the best use of their energy, however to sustain safety [9].

Military Sector: Military equipment now regularly consists some kind of computer equipment. Ad- hoc networking may allow the military to take gain of ordinary network technology to preserve an information network between the, and military information headquarters, soldiers, and vehicles. The necessary techniques of ad hoc network came from this area [6].

Sensor Networks: This equipment is a network consists of a extremely large amount of small

sensors [8]. These can be used to discover any number of properties of an region [7]. The examples are pressure, toxins, pollutions and temperature etc. The capability of each sensor is very inadequate, and each have to rely on others in order to promote data to a central computer. Mobile ad-hoc sensor networks might be the key to future motherland security.

Data Networks: A profitable application for MANETs includes everywhere computing. By allowing computers to forward data for others, data networks may be unmitigated far beyond the normal reach of installed infrastructure [10]. Networks may be made more extensively accessible and easier to use.

V. Conclusion:

A incredible progression has been witnessed in the field of mobile communication in the earlier period. Therefore diverse opportunities are opened up in the area of ad hoc networks these days. Mobile adhoc networks is a group of wireless mobile hosts which builds a momentary network devoid of the obligation of any centralized management or backbone support services. MANET proved itself a adaptable network these days however is quite unpredictable due to its less attack managing ability i.e. it is less resistant to attacks. Routing is the greatest part of any network which also retains its importance in any MANET architecture.

REFERENCES

[1]. Mary, J. V., & Gomathi, K. (2019). A Study on MANET and its Security Concepts.

[2]. Sharma, M., & Rashid, M. (2020). Security Attacks In MANET–A Comprehensive Study. Available at SSRN 3565860.

[3]. Rath, M., Pati, B., & Swain, J. (2020). Communiqué Issues in MANET and VANET Protocols With Network Security Disquiet. In *Forensic Investigations and Risk Management in Mobile and Wireless Communications* (pp. 195-220). IGI Global.

[4]. Pathan, A. S. K. (Ed.). (2016). *Security of self-organizing networks: MANET, WSN, WMN, VANET*. CRC press.

[5]. Kaur, I., & Rao, A. L. N. (2017). A Framework to improve the Network Security with Less Mobility in MANET. *International Journal of Computer Applications*, 167(10), 0975-8887.

[6]. Rath, M., Swain, J., Pati, B., & Pattanayak, B. K. (2018). Network security: attacks and control in MANET. In *Handbook of Research on Network Forensics and Analysis Techniques* (pp. 19-37). IGI Global.

[7]. Paul, S. (2016). *Introduction to MANET and Clustering in MANET*. Anchor Academic Publishing.

[8]. Mirza, S., & Bakshi, S. Z. (2018). Introduction to MANET. *International Research Journal of Engineering and Technology*, 5(1), 17-20.

[9]. Nazir, M. K., Rehman, R. U., & Nazir, A. (2016). A novel review on security and routing protocols in MANET. *Communications and Network*, 8(4), 205-218.

[10]. Mr. L Raja, Capt. Dr. S Santhosh Baboo, “An Overview of MANET: Applications, Attacks and Challenges” *International Journal of Computer Science and Mobile Computing*, Vol.3 Issue.1, January- 2014.