

# A REVIEW SECURE ROUTING TECHNIQUE FOR MANETS

Er Shalika , Dr Jatinder Singh Bal, Dr Vijay Dhir  
Research scholar , Professor(CSE), Professor(CSE)  
Computer Science Engineering  
Sant Baba Bhag Singh University, Jalandhar, India

**Abstract-** The mobile ad hoc networks are the decentralized type of network where connectivity between the different nodes depend on themselves. They can leave or connect to the network. Two attacks are possible in this network due to self configuring property of network. The active attacks are those which reduce network performance in terms of various parameters. The jelly fish is the active type of attack which reduce network performance and in this paper various secure routing techniques are reviewed and discussed.

**Index Terms-** Manet, gray hole attack

## I. INTRODUCTION

In day-to-day communication wireless networks plays a prominent role. There are many applications where it has prominent use such as in health appliances and military instruments. Due to its simplicity of installation, scalability, flexibility it is very popular in other applications also. In the case of wired network it has fixed infrastructure like cell phones, microwave and RADAR etc. Wireless network has further two categories: Infrastructure and Infrastructure less. Infrastructure wireless networks, the base stations are fixed, the mobile node can move while communicating. Moreover when nodes go out of the range of one base station it comes to the range of other base stations. In infrastructure less network or an adhoc network, base station is not fixed and router moves in any direction during communication. So this network makes their own route for flu using routing protocol. In coming generation, MANET will be widely used in various applications due to its independent nature. It can join and leave network any time. Topology of the network changes dynamically and covers wide geographically area of network for communication. Because of its decentralized nature its scalability is better than infrastructure network. Ad hoc networks provide better services as they require minimum configurations and infrastructure. They provide help in crucial conditions such as natural disaster and military conflict. On the basis of different application they are categorised into three parts such as Mobile Ad-hoc Networks (MANETs), Wireless Mesh Networks (WMNs) and Wireless Sensor Networks (WSN).

### 1.1 MANET

A self configuring network where dynamic topology is utilized is known as MANETs. There are various issues that hinder the working process of a node such as interference of multi-user, fading in multi-path and effect of radio communication channels. The design of routing protocols for MANET is very difficult to achieve best results. There is need of efficient algorithm in order to determine the connectivity between the network organizations. Wireless connection is used to connect different mobiles where there is no restriction on the mobility of a mobile. Hence, there is no central controller available in this network. The proficiency and best route are the two parameters to determine the efficiency of a routing algorithm. In static networks the best way to find the route is shortest path algorithm but it is not feasible in case of MANETs. Routing in this network depends on the various factors. Networks should work according to different circumstances so that they can change their routing path in order to improve the affects.

### 1.2 MANET Architecture

The collection of various nodes in a network is known as ad hoc network. This is a decentralized type of wireless network where there is no pre-existing infrastructure. Every node within the range knows other nodes. They are organized in different ways. As shown in Fig 1.2 Nodes which are close to each other can communicate directly but in case of other nodes that are far to each other a wireless link is used to convey messages. Hence there are many routes to transfer messages from one node to other. Examples of a ad hoc network is Mobile phones, laptop, computers and so on. In MANETs nodes are frequently movable but it can consist of fixed nodes as well such as access points to Internet.



simple mobile ad hoc networks

Multi-hop communication is used to connect the different nodes in MANETs. In the procedure of delivering packets from source to destination all the hops participate. Packets are travel through multiple paths. A single file is divided into several data packets, after which they are forwarded to their destination using different paths. All these received packets at the destination node are collected and merged to form the single original file.

### 1.3 Ad Hoc Routing Protocols

These protocols are utilized to provide optimal results in finding best pathway. The main objective of using these protocols is to minimize the intermediary nodes that present between source and destination. For the transformation of packets the chosen path should have less bandwidth consumption as well as less overhead.

The protocol should be able to perform in an effective & efficient manner throughout the networking environment consisting of heterogeneous ad hoc networks i.e., from small to large Multi-hop networks. There are three categories of these routing protocols, which include proactive routing protocols, reactive routing protocols and hybrid routing protocols with respect to the routing topology used in MANET. These routing protocols constantly retain the updated state of the network topology by creating a routing table and having the routing information before it is needed. The Proactive routing protocols includes DSDV, OLSR routing protocols. The second category includes reactive routing protocols also known as source-initiated on-demand routing protocols, these are demand driven reactive protocols. Therefore they do not follow the procedure creating & updating routing tables with routing information at regular intervals. As they are on demand routing protocols, so they start route discovery only when they are asked to. DSR & AODV are example of these types of routing protocols. Hybrid protocols are the one which utilizes the advantages of both reactive and proactive approaches. It includes Zone Routing Protocol.

#### 1.3.1 Proactive Routing Protocol

These routing protocols constantly retain the updated state of the network topology by creating a routing table and having the routing information before it is needed. They are also known as Table-driven protocols. They continuously evaluate all the routers in a given network therefore this protocol maintain the routing table or list up to date about its destination and their routes. These tables are not suitable for maintaining larger networks as it consumes more energy. Due to which it affects the working of protocol such as increase in overhead, cost, and bandwidth consumption. Therefore, these protocols are required to maintain accurate information in their routing table and actively find out the layout of the network.

#### 1.3.2 Reactive Routing Protocol

Reactive protocols are initiated when there is any demand or requirement that leads to create different routes. It is also known as On-Demand routing protocols and to find the best path for its destination discovery mechanisms protocol is used. It is not necessary to update routing table all the time with updated information. As they are on demand routing protocols, so they start route discovery only when they are asked. In order to send a packet to another node in the network using this protocol, then this protocol initiates a route discovery process for finding the suitable route to the destination and establishing the connection in order to transmit and receive the packet. In this process the RREQ packet is broadcasted throughout the network which adds a significant amount of control traffic to the network due to query flooding.

#### 1.3.3 Hybrid Routing Protocol

These types of protocols make use of the strengths of both the previously discussed protocols by combining them together to obtain better results. Hybrid routing protocol is use both proactive and reactive protocols as both these methods are best in their field. It can be said as enhanced version of both as it maintains the balance between the two protocols. In this routing firstly it is initialized using some proactive routes because they are restricted to small domains and then serve the demands through reactive flooding protocol which are used to locate nodes outside those domains. Hence, each node within the network has its zone centre in terms of hops. The maintenance of routing information is not permanent when the node lies outside its zone. In order to gain inter- zone connections the reactive routing strategy is utilized.

### 1.4 Attacks in MANET

MANETs consist of various attacks that can be classified into two categories such as active or passive attacks and internal or external attacks. On the basis of protocols different attacks are classified. Passive attacks are the attacks in which they obtained the data secretly without creating any disturbance in the system. The passive attacks are difficult to detection. In this, operations are not affected. Malicious node is used to perform various functions and used to recover valuable data which is lost in the procedure of channel listen. For Examples, Attacks are snooping and eavesdropping. Active attacks are used to harm the operation and violate information into the network by inserting any false data or information. They affect the operation of network by involving modification, fabrication and disruption in the existing network. This attack can be internal or external. External attacks are the attacks which perform its operation on the outer nodes which do not form the network. It may cause congestion by sending false information for the network. Internal attack effect the internal area of the network, node gain the unauthorized access due to which it gives false results. They are the set of connections to perform various functions in order to degrade the data. It is difficult to detect internal attack in the network as compared to external attack. The main objective of providing such solutions in MANETs is to secure network such authentication, non-repudiation, confidentiality and so on. The various possible attacks are

## Classification of attacks in MANET

|                 |  |
|-----------------|--|
| Active Attacks  | Black hole attack, modifications, wormhole, byzantine, Sybil etc |
| Passive Attacks | Eavesdropping, jamming, traffic analysis and monitoring          |

**1.5 Jelly Fish Attack**

JellyFish attack occurs at the transport layer in the stack of MANETs. This attack disturbs the functioning of TCP connection which is utilized for the communication purpose. In this attack delay occurs as attacker interrupts forwarding of packets within the group due to which data packets do not reach on time to its destination node. It causes end-to-end delay in the network. Hence, it degrades the performance of network such as effects on throughput. Transmission Control Protocol provides the reliable transfer of file and congestion free delivery. The performances of real time applications become inferior as this attack interrupts the functionality of TCP. Further this attack is divided into three parts these parts are JF Reorder Attack, JF Periodic Dropping Attack, JF Delay Variance Attack.

The main target of Jelly fish attack is against closed-loop flows. Main purpose of this attack is to drop the packets in order to mitigate the good output of the network. A forwarding rejection attack is launched by the present malicious nodes due to which packets cause delays in the network. Jellyfish attack also worked on this principal where a malicious node hampers the working of both route discovery and forwarding of data packets. This is done to prevent attackers being diagnosed and identified. Malicious node affects the network by dropping packets, sending again and again same packet and so on. It mainly affects the TCP traffic as it is difficult to determine these attacks from the network congestion. They also hamper the working of directional antenna and dynamic power techniques so that they cannot be recognized easily. Closed-loop flow causes delay in packets and loss which is the main target of this attack such as control mechanism of TCP's congestion.

**II.LITERATURE SURVEY**

| Author                   | Year | Description   | Outcome  |
|--------------------------|------|---|--|
| S.S. Tyagi, R.K. Chauhan | 2010 | Performance analysis of ProActive and ReActive routing protocols for ad hoc networks                            | AODV and DSR are proved to be better than DSDV.  |
| K. Pandey, A. Swaroop    | 2011 | A widespread Performance Analysis of various routing protocols such as Reactive, Proactive and Hybrid in MANETs | In terms of throughput, AODV performance is better than other protocols. Furthermore, DSDV performs poorly from time to time. ZRP throughput does not change even with a change in mobility or pause time because of its hybrid nature |

|  |      |  |   |
|--|------|--|---|
| Mohammad Wazid, Vipin Kumar and RH Goudar      | 2012 | Comparative Performance Analysis of Routing Protocols in Mobile Ad Hoc Networks under JellyFish Attack | Under JF attack DSR protocol shows maximum time efficiency and TORA protocol shows highest throughput.                |
| ManjotKaur , Malti Rani, AnandNayyar           | 2014 | A Comprehensive Study of Jelly Fish Attack in Mobile Ad hoc Networks                                   | JellyFish Attack exploits the end to end congestion control mechanism of Transmission Control Protocol (TCP).         |
| S. Mohseni, R. Hassan, A. Patel, and R. Razali | 2010 | Studied comparison between different protocols such as Reactive and Proactive in MANETs.               | Every algorithm has its own advantages and disadvantages hence it is difficult to determine which protocol is better. |

### III. CONCLUSION

In this work, it has been concluded that due to decentralized nature of the mobile adhoc network, malicious nodes enter the network which trigger various type of active and passive attacks. The secure and efficient routing technique has been reviewed in this paper. In future technique will be proposed which detected and isolate malicious nodes from the network

### REFERENCES

- [1] S.S. Tyagi, R.K. Chauhan, "Performance analysis of ProActive and ReActive routing protocols for ad hoc networks", International journal of computer applications, Vol. 1No.-14, 2010, pp. 27-30
- [2] K. Pandey, A. Swaroop, "A Comprehensive Performance Analysis Of Proactive,Reactive and Hybrid MANETs Routing Protocols", International Journal of computerScience Issues, Vol. 8, Issue 6, No 3, November 2011, pp. 432-441.
- [3] Internet Engineering Task Force, MANET working group charter.Available from IETF MANET group Character Sector , Jan. 2010.
- [4] K. Majumder and S.K. Sarkar, "Performance analysis of AODV and DSR Routing Protocols in Hybrid Network Scenario", Proc. IEEE transactions on networking, Dec. 2009, pp. 1-4.
- [5] Mohammad Wazid, Vipin Kumar and RH Goudar, "Comparative Performance Analysis of Routing Protocols in Mobile Ad Hoc Networks under JellyFish Attack", 2nd IEEE International Conference on Parallel, Distributed and Grid Computing, 2012
- [6] ManjotKaur , Malti Rani, AnandNayyar, "A Comprehensive Study of Jelly Fish Attack in Mobile Ad hoc Networks", , International Journal of Computer Science and Mobile Computing, Vol.3 Issue.4, April- 2014, pg. 199-203
- [7] S.A. Adel& P.A. Tijare, "Performance Comparison of AODV, DSDV, OLSR and DSR Routing Protocols in MANET", International Journal of Information Technology and Knowledge Management, Vol. 2, No. 2, , Dec. 2010, pp. 545-548

- [8] S. Mohseni, R. Hassan, A. Patel, and R. Razali, "Comparative Review Study of Reactive and Proactive Routing Protocols in MANETs", 4th IEEE International Conference on Digital Ecosystems and Technologies 2010 IEEE, Apr. 2010, pp.- 304-309.
- [9] S.S. Tyagi, R.K. Chauhan, "Performance analysis of ProActive and ReActive routing protocols for ad hoc networks", International journal of computer applications, Vol. 1No.-14, 2010, pp. 27-30
- [10] T.P. Singh, Dr. R.K. Singh, J. Vats, "Effect of quality parameters on energy efficient Routing protocols in MANETs", Vol. 3 No-7, July 2011, pp. 2620-2626.
- [11] W. Kiess, M. Mauve, "A survey on real-world implementations of mobile ad-hoc networks", Vol. 5, Issue 3, Apr. 2007, pp 324-339.
- [12] X. Hong, K. Xu, M. Gerla, " Scalable routing protocols for mobile ad hoc networks", Network IEEE, Vol. 16, Issue 4, July 2002, pp. 11-21.
- [13] Gurpreet Singh, Prof. (Dr.) Jatinder Singh Bal "A Review of Ant Colony System Algorithm and its models", International Journal of Advanced Research in Computer science, Volume 8, No. 4, May 2017.
- [14] Rupinder Singh, Jatinder Singh, Ravinder Singh, "TBSD: A Defend Against Sybil Attack in Wireless Sensor Networks", IJCSNS International Journal of Computer Science and Network Security, VOL.16 No.11, November 2016.
- [15] Rupinder singh, Jatinder simgh, Ravinder singh, "WRHT: A Hybrid Technique for Detection of Wormhole Attack in Wireless Sensor Networks" Mobile Information Systems Volume 2016 (2016).
- [16] OPINDER SINGH†, DR. JATINDER SINGH‡, AND DR. RAVINDER SINGH, "MRWDP: MULTIPOINT RELAYS BASED WATCH DOG MONITORING AND PREVENTION FOR BLACKHOLE ATTACK IN MOBILE ADHOC NETWORKS", Journal of Theoretical and Applied information technology, 31 march 2017, vol.95.no.6.
- [17] opinder singh, Jatinder singh, Ravinder singh" An intelligent Intrusion Detection and Prevention System for Safeguard Mobile Adhoc Networks against Malicious Nodes", Volume 10, Issue 14 April 2017.
- [18] Er. Harpreet Kaur, "Local maximum edge coocurance patterns for image indexing and retrieval" in International Conference on Signal and Information Processing (iconsip) 2016 in IEEE Xplore 16 February 2017.
- [19] Harpreet Kaur, Vijay Dhir "Color and Texture Based Image Retrieval Feature Descriptor using Local Mesh Maximum Edge Co-occurrence Pattern" International Journal of Applied Engineering Research ISSN 0973-4562 Volume 12, Number 19 (2017).
- [20] Harpreet Kaur, Mandeep Kaur "An Empirical Study on Texture Feature Extraction Methods for Image Retrival" International Journal of Advanced Research in Computer Science, Volume 8, No. 4, May 2017.
- [21] Dr. Vijay Dhir, Sanjeev Kumar " Review of Various Image Contrast Enhancement Techniques" International Journal of Advanced Research in Computer Science and Software Engineering, Volume 4, Issue 8, August 2014.
- [22] Gurpreet Rathore , Dr. Vijay Dhir "Image Registration for Dental X-Ray images using Hybrid Technique" , International Journal of Innovative Research in Science, Engineering and Technology Vol. 2, Issue 11, November 2013.

