The Literature Survey on Manet, Routing Protocols and Metrics

Parvinder Kaur[1] and Dr. Dalveer Kaur[2]

1

Abstract

Mobile Adhoc Network (MANET) is a collection of nodes or devices with wireless communications and nodes communicate with each other without any centralized support. Each node acts as a router in Mobile Adhoc Network. No wired infrastructure is required to form a network. Nodes form a wireless environment where nodes can communicate with each other without the restriction of the network topology. Examples of Mobile Adhoc Networks are laptops, mobile phones, PDA, Digital Cameras etc. It is also known as wearable and tearable networks, which are created when the requirement is generated.

Index terms— manet, routing protocols, metrics.

1 Introduction

obile Adhoc Networks are created for temporary time where nodes can join and leave the created network without any restriction [1]- [3]. Nodes can communicate and route the data in any direction. Nodes which configured themself with MANET environment may be part of small network or may be part of large network. In MANET type of communication is peer to peer.

Peer to Peer networks are "peers" of computers which are connected with each other with the help of Internet and P2P software. Systems in P2P environment act as a client and server by itself.

Main Challenging part of Mobile Adhoc Network is maintaining the routing information without losing it. Because nodes are arbitrary moving in Manet so required routing protocols which manage the route information in there table if particular node switch off from the Mobile Adhoc Network. Generation of error message should be there if communication link is broken between the nodes when they leave and join the selected network.

2 II. The Classification Of Routing Protocols

For this purpose routing protocols can be classified as described below: a) Proactive Routing / Table **??**riven These types of routing protocols maintains the list all the routes from source to destination in advance [2]. These types of protocols maintain fresh lists of routes by periodically distributing routing information throughout the network. b) Reactive (On -Demand) Routing These types of protocols find a route on demand by flooding the network with "Route Request" packets [2]. c) Hybrid (both pro-active and reactive) Routing Reactive

These types of routing protocols combine the advantages of proactive and reactive routing [3]. The routing is initially established with some proactively prospected routes and then serves the demand of additionally activated nodes through reactive flooding. The choice for one or the other methods requires predetermination for typical cases. To transfer data from one node to another node we need some routing protocols that will transfer data without any loss. Protocols are set of rules and regulations which are used in network communication.

different paths are for each hop stored in routing tables in advance .When ever source want to send data to destination. In will search the path from the routing tables [1]- [3]. In DSDV each routing table contains the Hop count and Sequence Number. Hop count tells the number of hops occurs in the path for source to destination. Sequence Number is used to update path. The path with the old sequence number is replaced with the new sequence number. The New Sequence number defines the new path from source to destination. FSR is proactive and flat routing protocol. It is also known as Link State Routing Protocol because it uses topology information

44 from source to destination for sending the data [15]. Link state defines the activeness of nodes while creations
45 of path from source to destination. Inactive nodes are not part of the path .FSR also maintain the information
46 about the nodes which are near to the focal point. To maintain the topology information WRP uses Link State
47 Table. TORA is reactive protocol and on demand routing protocol [3]. It is also known as Link reversal routing
48 protocol. Path searching is based on the source initiation. In the TORA, the path search is performed from
49 higher level to low level. Each node maintains multiple paths from source to destination. While transferring the
50 data from source to destination ,any path can be used, which is currently available for transfer the data. Shortest
51 path method is not applicable in TORA. **??**t The AODV routing protocol is an on demand routing protocol
52 [8]. Therefore, routes are created only when the requirement is generated [2]. "Hello Messages" may be used to
53 detect and monitor neighbors. Periodically nodes broadcast the "Hello Message" to determine the activeness of
54 neighbor nodes [6]- [9]. This technique is used to know the status of active nodes for data transfer. It broadcasts
55 a "Route Request" (RREQ) to each intermediate node. if the receiving node does not receive RREQ and there
56 is no route to the destination rebroadcasts the RREQ. If the receiving node is the destination or has a current
57 route to the destination, it generates a Route Reply (RREP).
58 i. Advantages 1. The searching of paths are done when the requirement is generated.
59 ii. Disadvantages 1. Multiple route replies are generated for the same route request. 2. Time to time "hello"
60 message is generated; which is wastage of resources like battery consumption.
61 c) Distance Source Routing Protocols (DSR)
62 DSR is an on demand based routing protocol that is based on source routing [2]. It is designed for use in
63 multi-hop wireless adhoc networks of mobile nodes. DSR is based on the concept of "Route Discovery" and
64 "Route Maintenance". In DSR the Route Discovery process is started by a packet that discovers the path from
65 source to destination and accumulates the whole information about path into its header [2]. Route Reply is
66 generated by the destination if the route is discovered from source to destination and If no path is found from
67 source to destination then the error message is generated [2], [10].
68 i. Advantages 1. When the whole path is searched from source to destination, then reply is sent back to
69 source. One source reply is generated for route request. 2. It is source generated type of routing protocol. 3. No
70 beaconing technique is used.
71 ii. Disadvantages 1. Protocol is unable to find the broken links. 2. Full path searching is time consuming
72 process.

3   d) Zone Routing Protocols (ZRP)

73
74 ZRP is hybrid protocol as it is combination of reactive and proactive [12]. Reactive Protocol is on demand
75 protocol which finds the path from source to destination when requirement is generated. Proactive protocol
76 means that information about each path is already stored in the tables. Based on zones, ZRP can also be divided
77 into Intra Zone Routing Protocol (IARP) and Inter Zone Routing Protocol (IERP).
78 i. Advantages 1. It is combination of reactive and proactive.

4   If the nodes are within the zone table driven

79
80 technique is used, if nodes are far from zone reactive path searching technique is used.
81 ii. Disadvantages 1. If the zones are overlapping, difficulty is in the path search.
82 V.

5   Metrics in Manet

83
84 Metrics are measurements in the manet used to analysis the performance of routing protocols. Metrics are
85 required to evaluate the performance of network; metrics defines how well the network is doing under different
86 parameters [16]. The metrics can be classified in two parts.

6   Conclusion

87
88 In this paper, we have surveyed the various routing protocols with their advantage and disadvantages. We
89 analyzed the metrics which are used to analysis the performance of the network. As mobile adhoc network
90 growing day by day. there are many area to review like routing protocols, types of attack, application, IDS etc.
91 [1] [2]

---

[2]The Literature Survey on Manet, Routing Protocols and Metrics
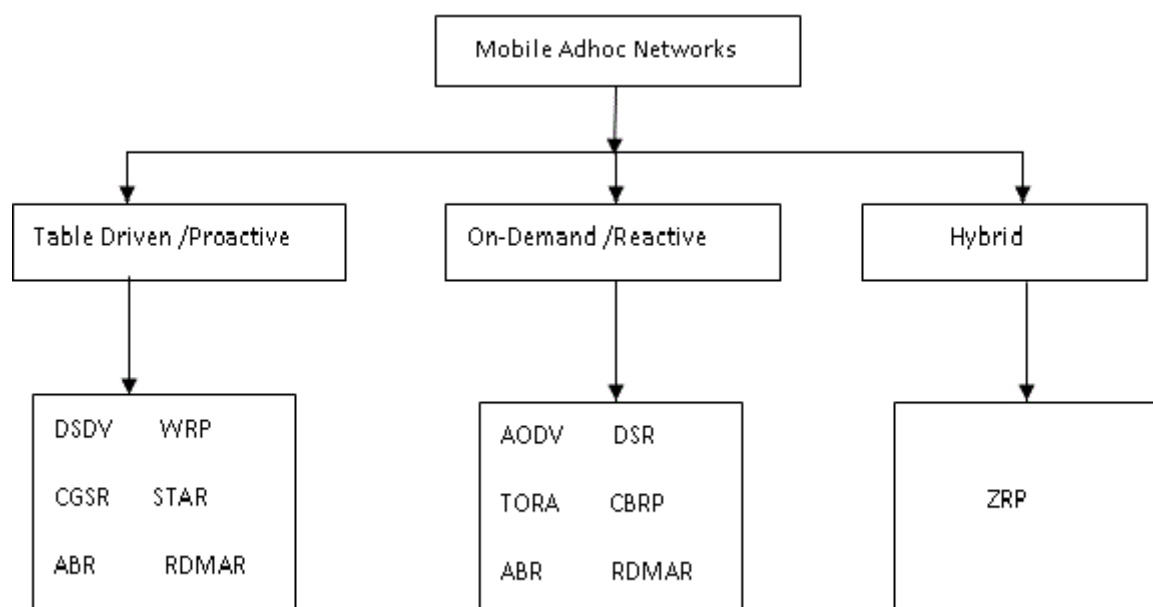
11

Figure 1: Figure 1 : 1 Global

1

Figure 2: i. Advantages 1 .

i. Advantages

1. The Updation in routing tables regarding paths is done time to time by broadcasting of messages between the hops.

2. Paths are predetermined.

ii. Disadvantages

1. Not applicable for Large Networks.

2. Wastage of battery resources unnecessarily due to updation of paths.

i. Advantages

1. It stores the information about previous node and next node in the Routing Table.

2. Path searching and path updation cost is less.

ii. Disadvantages

1. Required more space due to multiple tables.

2. Complexity is increases due to creation of shortest path in advance and storing the previous node and next node information in the Routing Table

3. Multiple Updation in multiple tables requires more power consumption.

c) Fisheye State Routing Protocols (FSR)

[Note: b) Wireless Routing Protocols (WRP)WRP is table driven or proactive routing protocol[2].]

Figure 3:

i. Advantages

1. Multiple paths available from source to destination.

2. Efficient and loop free routing.

3. Overhead reduce because of on demand creations of routes.

ii. Disadvantages

1. Non availability of paths when required.

2. Delay in the path searching.

3. Flooding of messages in the network while discovering of routes on demand.

b) Adhoc on Demand Distance Vector Routing Protocols (AODV)

Figure 4:

92 [Rfc for Adhoc on Demanding Routing Protocol] , `http://www.ietf.org/rfc/rfc4728.txt.aodvr` *Rfc*
93   *for Adhoc on Demanding Routing Protocol*

94 [Cavalli et al. ()] 'A Validation Model for the DSR Protocol'. Ana Cavalli , Cyril Grepet , Stephane Maag ,
95   Vincent Tortajada . *Proc. of 24th International Conference on Distributed Computing*, (of 24th International
96   Conference on Distributed Computing) 2004. IEEE Computer Society.

97 [Perkins and Royer ()] 'Ad-hoc On-Demand Distance Vector Routing'. C E Perkins , E M Royer . *Proc. of 2nd*
98   *International Conference on Mobile Computing System and Applications*, (of 2nd International Conference
99   on Mobile Computing System and ApplicationsNew Orleans, LA) 1999. IEEE Computer Society. p. .

100 [Royer and Perkins ()] 'An Implementation Study of the AODV Routing Protocol'. Elizabeth M Royer , Charles
101   E Perkins . *Proc. of International Conference on Wireless Communication and Networking*, (of International
102   Conference on Wireless Communication and Networking) 2000.

103 [Royer ()] *International Journal Personal Metrics Formula Throughput No. of packet received/No. of per Unit*
104   *of time PDR No. of packet received/No. of packet sent End to End Delay Time the pkt sent-Time the pkt*
105   *received Jitter*, Elizabeth M Royer . PA+1)-(PS+1))-((PA)-(PS)))/N-1. 1999. (A Review of Current Routing
106   Protocols for Adhoc Mobile Wireless Networks)

107 [Yaaco and Rosli ()] 'Investigate the Performance metrics of Mobile Adhoc Networks (MANET)'. Norsuzila Yaaco
108   , Nurhazwani Rosli . *International Symposium Wireless Technology and Application (ISWTA)*, Mohd Tarmizi
109   Azita Laily Yusof, Ali (ed.) 2013. IEEE Computer Society. p. .

110 [Nagham et al. ()] 'Manet Routing Protocols Taxonomy'. H Nagham , Saeed , F Maysam , Abbod , Ai-Raweshid
111   Hameed . *Proc. of International Conference Future Communication Networks (ICFCN)*, (of International
112   Conference Future Communication Networks (ICFCN)) 2012. IEEE Computer Society. p. .

113 [Kumar Chaurasi et al. ()] 'MAODV: Modified Wormhole Detection AODV Protocols'. Umesh Kumar Chaurasi
114   , Mrs Varsha , Singh . *Proc. of 6th International Conference on Contemporary Computing (IC3)*, (of 6th
115   International Conference on Contemporary Computing (IC3)) 2013. IEEE Computer Society. p. .

116 [Packet Loss No. of pkt sent-No..of pkt received PA=Packet Arrival, PS=Packet Start Communication IEEE Computer Society]
117   'Packet Loss No. of pkt sent-No..of pkt received PA=Packet Arrival, PS=Packet Start Communication'.
118   *IEEE Computer Society* (6) .

119 [Jiao Wen-Cheng et al. ()] 'Research and Improvement of AODV Protocol in Adhoc Network'. Jiao Wen-Cheng
120   , Jing , Zheng . *Proc. of 6th International Conference on Wireless Communications Networking and Mobile*
121   *Computing (WiCOM)*, (of 6th International Conference on Wireless Communications Networking and Mobile
122   Computing (WiCOM)) 2010. IEEE Computer Society. p. .

123 [Rfc for Dynamic Source Routing] *Rfc for Dynamic Source Routing*, `http://www.ietf.org/rfc/rfc4728.`
124   `txt.dsr`

125 [Rfc for Fisheye State Routing Protocols] *Rfc for Fisheye State Routing Protocols*, `https://tools.ietf.`
126   `org/html/draft-ietf-manet-fsr-03`

127 [Rfc for Mobile Ad hoc Networks (MANET) ()] `http://www.ietf.org/html.charters/manetcharter.`
128   `html` *Rfc for Mobile Ad hoc Networks (MANET)*, 1997.

129 [Rfc for Routing Protocol Performance Issues andEvaluationConsiderations] *Rfc for Routing Protocol Perfor-*
130   *mance Issues andEvaluationConsiderations*, `https://www.ietf.org/rfc/rfc2501.txt`

131 [Rfc for Zone Routing Protocols] *Rfc for Zone Routing Protocols*, `http://-tools.ietf.org/html/`
132   `draft-ietf-manet-zone`

133 [Sinha et al. ()] 'Scalable Unidirectional Routing with Zone Routing Protocol (ZRP) Extensions for Mobile Ad-
134   Hoc Networks'. Prasun Sinha , V Srikanth , Son Krishnamurthy , Dao . *Proc. of International Conference*
135   *on Wireless Communications and Networking*, (of International Conference on Wireless Communications and
136   Networking) 2000. p. 3.

137 [Sinha et al. ()] 'Scalable Unidirectional Routing with Zone Routing Protocol (ZRP) Extensions for Mobile Ad-
138   Hoc Networks'. Prasun Sinha , V Srikanth , Son Krishnamurthy , Dao . *Proc. of International Conference*
139   *on Wireless Communications and Networking*, (of International Conference on Wireless Communications and
140   Networking) 2000. p. 3.