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SURVEY OF ROUTING PROTOCOLS IN MANET

UDAYSINGH A. BAGADE[1], SURESH S. ASOLE[2]

1. M.E. Student, BabasahebNaik College of Engineering Pusad, SantGadge Baba Amravati University, Amravati, Maharashtra, India
2. Associate Professor, Computer Science& Engineering Dept., BabasahebNaik College of Engineering Pusad, SantGadge Baba Amravati University, Amravati, Maharashtra, India

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Abstract: In Mobile Ad-hoc Networks mobility of the nodes is the main aspect. Due to mobility of nodes the network topology changes frequently. The routing protocols must dynamically update the routes which has the high overhead. Different types of mobility patterns have different impact on network routing protocols or applications. In this paper we present the survey of performance analysis of different routing protocols in MANET based on parameters like overhead, PDF. The purpose of paper is to contribute the study and comparison of routing protocols performance in MANET.

Keywords: Mobile Ad-hoc Networks, Performance parameters, Routing Protocols

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Corresponding Author: MR. UDAYSINGH A. BAGADE

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INTRODUCTION

A mobile ad-hoc network is self-configuring network of mobile nodes which do not need any pre-existing infrastructure. In manet the mobility of the nodes affects the performance of network. The network topology changes frequently due to mobility of nodes. Routing is the process of transferring packets between networks or within networks. There exist many routing protocols in manet. During last few years research in various aspects of manet like routing protocols & others is being carried out. This paper tries to analyse the performance of routing protocols on some parameters like routing overhead, PDF by studying the papers. Impact of various mobility models on performance of routing protocols in MANET is presented in [1].A performance comparison of DSR and AODV protocols based on Manhattan Grid (MG) model has been published [4]. A performance study of DSR and AODV considering probabilistic random walk and boundless simulation area has been presented in [5]. A performance evaluation of AODV and DSDV using scenario based mobility models has been presented in [6]. A comparative analysis of DSR and DSDV protocols, considering RW, Group Mobility, Freeway and MG models is found in [7]. This paper tries to provide brief study of routing protocols in MANET.

I. ROUTING PROTOCOLS

Routing protocols for wireless ad hoc networks can be classified into the three categories: On-demand (or Reactive), Table-driven (or Proactive), and Zone based (or Hybrid).

A. On-demand (reactive) protocols

On demand protocol compute the route to a specific destination only when needed, so a routing table containing all the nodes as entries need not have to be maintained in each node. When a source wants to send packet to a destination, it invokes a route discovery mechanism to find the path to the destination. The route remains valid till the destination is reachable or until the route is no longer needed.

B. Table driven(proactive)protocols

Proactive (table driven)protocols maintain the routing information consistently up-to-date from each node to every other node in the network. The proactive routing protocol maintains its table in order to store routing information. Change in the network topology caused by anything need to be reflected to this table and propagate the updating information throughout the network.

C. Hybrid protocols

These types of protocols combine the advantages of proactive and of reactive routing. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding. The choice for one or the other method requires predetermination for typical cases.

II. AODV

AODV is an on-demand, single path and loop-free distance vector protocol. It uses the hop-by-hop routing approach. In AODV, whenever a source needs a path to the destination, it starts the route discovery by flooding the route request (RREQ) to the destination in the network and then waits for the route reply (RREP). If the intermediate node, which receives the first copy of RREQ, knows the destination node, it may unicast a route reply (RREP) back to the source node via the reverse path; otherwise, it re-broadcasts the RREQ packet. If the source receives the RREP, the forward path to the destination would be established. When a node discovers a link break, the node proceeds the local repair if the destination is nearby. If the destination is far away it broadcasts the RERR packet. The source, received the RERR message, tries to search the route to the destination again if the path is still needed.

AODV [8] allows nodes to obtain routes for destination quickly &does not require to maintain routes to destination that are not in active communication. AODV[8] does not discover a route until a flow is initiated. This route discovery latency result can be high in large-scale networks. AODV[9] protocol reduces control message overhead and it responds quickly to the changes in network topology. But routing overhead is more than DSR[12]. Performance of AODV is better in delivering more than 90% packets ie. Higher PDF and end-to-end delay is also higher[14]. The main drawback is that it the optimal performance is achieved only in low traffic and denser networks.

III. AOMDV

AOMDV is the multiple-path routing protocol. It searches loop-free multiple paths from the source to the destination. All the discovered paths are listed and stored in the table because the number of the paths is multiple. At this time, they are stored with the last-hop to distinguish each path. In the route discovery process, a node may receive several copies of the same RREQ since the RREQ is flooded network-wide. In AODV, only the first copy of the RREQ is used to form reverse paths. So, the duplicate copies that arrive later are simply discarded. On the other hand, in AOMDV[13], all duplicate copies that arrive later are examined for potential

alternate reverse paths. But reverse paths are formed by only those copies that preserve the loop-free and the disjoint among paths. When the destination receives RREQ copies, it also forms reverse paths in the same way as intermediate nodes do. The destination node generates the RREP in response to every RREQ copy.

In AOMDV Routing overhead is lowered nearly 30% than AODV[13]by establishing multiple loop-free paths in one time route discovery. Packets loss is reduced nearly 40% than AODV & has better throughput.

IV. DSDV

Destination Sequenced Distance Vector (DSDV)is a proactive routing protocol. Each mobile node maintains a routing table in which all the possible destinations and the number of hops to them in the network are stored. The entries in the table are updated periodically. It assigns sequence number to routing entries. During communication route with highest sequence number is selected, in case of same sequence number higher metric value route is selected.

DSDV[9] has higher overhead even when no changes in topology. It also stores the routes that are no longer used. It has lower delay than AODV&DSR[12]and lower PDF [14] than AODV, DSR. The main advantage of DSDV is loop freeness &it's fast reaction to topology change.

V. DSR

DSR is a reactive protocol, in which each mobile node keeps track of the routes of which it is aware in a route cache. When search request for path is received, it refers to its route cache to check if it contains the required information. DSR uses more memory while reducing the route discovery delay in the system.

DSR [12] has the lowest routing protocol overhead for some mobility models i.e. RW, MG, GM, RPGM. As it uses caching; hence it is more likely to find a route in cache and perform the route discovery less frequently than with AODV. DSR experiences higher average delays, particularly with MG and GM models, at higher node speeds. This protocol performs best with the RW model[12]. DSR suffers from high End to end delay, when increasing the mobile node speed. It has higher PDF than AODV [14].

VI. ZRP

The Zone Routing Protocol (ZRP) [6] in contrast to other MANET routing protocols, integrates both proactive and reactive routing components into a single protocol to maintain valid routing

tables without too much overhead. Around each node, ZRP defines a zone whose radius is measured in terms of hops. Each node utilizes proactive routing within its zone and reactive routing outside of its zone. Hence, a given node knows the identity of and a route to all nodes within its zone. When the node has data packets for a particular destination, then it checks its routing table for a route. If the destination lies within the zone, a route will exist in the route table. Otherwise, if the destination is not within the zone, a search to find a route to that destination is needed.

ZRP [8] defines Intrazone Routing Protocol (IARP) for intrazone routing. It utilizes Interzone Routing Protocol (IERP) for discovering routes to destinations outside the zone. Limitation of this protocol is for large value of routing zone protocol behaves like pure proactive whereas for small values it behaves like reactive & creates overlapping zone.

VII. COMPARISON OF ROUTING PROTOCOLS

Based on literature survey the comparison of routing protocols is as shown in the table below. The table below shows the basic category of protocol as well as the nature of routing. The table also specifies the advantages & disadvantages of them.

TABLE I
COMPARISON OF ROUTING PROTOCOLS

Characteristics / Methods	Proactive / Reactive	Location Based / Identity Based	Advantages	Disadvantages
AODV	Reactive	Identity Based	Loop free. Obtains routes quickly. Decreases routing overhead.	Route discovery latency can be high for large network. Performs better only in low traffic
DSDV	Proactive	Identity based	Loop Free. Fast reaction to topology change	higher overhead as maintains routing information even when not used.
AOMDV	Reactive	Identity based	Multiple loop free disjoint paths. Routing overhead is	May suffer Path failure due increased node mobility on longer path.

			lower. Improvement in route discovery latency.	
DSR	Reactive	Identity based	Lowest overhead as it uses caching. Loop free routing. Lesser Packet loss.	Higher delay in increased node speed.
ZRP	Hybrid	Identity based	Performs better for small size network.	For large routing zone behaves like pure proactive & for small zone like reactive. If network is large avg throughput decreases.

CONCLUSION

The protocols studied here are concentrating only on identity based routing which do not depend on location for routing. After performing survey and analyzing the protocols AODV, AOMDV, DSDV, DSR & ZRP on the basis of parameters overhead & packet delivery fraction, it is found that AOMDV protocol gives the better performance than the others. The performance depends on some factors like node speed, mobility and other scenarios.

REFERENCES

1. Sandeep Kaur, Harpreet Singh, Taranjit Singh and Yadvinder Singh , "Mobility Models In Ad-hoc Networks", JGRCS, Vol 3(11), 2012, 58-64

2. S. Shah et al, "Performance Evaluation of Ad Hoc Routing Protocols Using NS2 Simulation", Conf. of Mobile and Pervasive Computing, 2008

3. S. Sesay et al., "Simulation Comparison of Four Wireless Ad Hoc Routing Protocols", Information Technology Journal 3(3), 2004, pp: 219.

4. G. Jayakumar, G. Gopinath," Performance Comparison of MANET Protocol Based on Manhattan Grid Model ",Journal of Mobile Communications, vol 2, no. 1, pp. 18-26, 2008.

5. M. K. Jeya Kumar, R.S. Rajesh, "A Survey of MANET Routing Protocols in Mobility Models", Int. Journal of Soft Computing 4(3),2009, pp. 136-141.

6. Sham-ul-Arfeen et al, "Performance Evaluation of MANET Routing Protocols Using ScenarioBased Mobility Models", IATAIET, Springer,2007. pp. 419-424.

7. B. Divecha et al, "Impact of Node Mobility on MANET Routing Protocols Models", Journal of Digital Information Management, February2007.

8. Savita Gandhi, Nirbhay Chaubey, Naren Tada, Srushti Trivedi, "Scenario Based Performance Comparison of Reactive, Proactive & Hybrid Protocols in MANET", ICCCI 2012

9. Geethu Mohandas, Dr Salaja Silas, Shini Sam, "Survey On Routing Protocols on Mobile Adhoc Networks"

10. Nicholas Cooper and Natarajan Meghanathan, "Impact of Mobility Models on Multipath Routing In Mobile Adhoc Networks", IJCNC 2010

11. Ran Park ,Wuwoan Kim, Sangdong Jang ,"Improved AOMDV to increase path stability by utilizing the node mobility information in MANET ": ICOIN 2013

12. Valentina Timcenko, Mirjana Stojanovic and Slavica Rakas , "MANET Routing Protocols Vs. Mobility Models : Performance Analysis and Comparison", AIC 09

13. Mahesh K. Marina and Samir R. Das, "Ad hoc On Demand Multipath Distance Vector Routing", WCMC 2006

14. Youssef Saadi, Said El Kafhali, Abdelkrim Haqiq, Bauchaib Nassereddine, "Simulation Analysis of Routing Protocols Using Manhattan Grid Mobility Model", IJCA May 2012