A survey on performance analysis of various routing protocols in MANETs

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ABSTRACT

In wireless communication technology, a wireless ad hoc network is a collection of specific mobile nodes without having particular infrastructure. It is formed with decentralized authority. A user can move anywhere with anytime in this ad hoc network. So such type of this network must take care of the routing protocols and these protocols must fit with dynamic network topology. To attain this scenario various routing protocols are implemented and used. In this paper, survey has been made about the performance of these protocols based on the features like number of hops per route, traffic received and sent, route discovery time, total route requests sent, total route replies sent, control traffic received and sent, etc

Keywords: Routing protocols, topology.

INTRODUCTION

The Mobile AdHoc Networks (MANETs) originated from DARPA packet radio network project in the year of 1972. First they were used for military scenarios. In the mid of years 1980 to 1990 it was known as survivable adaptive radio networks which was an improved version of previous one.In the next generation notebook computers which uses radio waves concepts has been introduced. Here there is no centralized authority, so that topology discovery, message delivery are done by the nodes itself. MANETs work in high changing environment, so that their topology cannot be a static one. Because of this reason there is a need for optimized and secured protocols. There are lot of protocols available which are apt for MANETs which includes Dynamic source routing (DSR), AdHoc on-demand Distance Vector (AODV) routing and Temporally Ordered Routing Algorithm (TORA). To measure the performance of these algorithms, simulation works have been done.

2. ROUTING ALGORITHMS

There are various routing algorithms available. They are categorized as follows.

I. Table driven (proactive) routing: Proactive routing protocols maintain lists of destinations and their paths by periodically distributing routing tables in the network. Examples of proactive algorithms are:

o   Optimized Link State Routing Protocol (OLSR)RFC 3626, RFC 7181.
o   BabelRFC 6126
o   Destination Sequence Distance Vector (DSDV)
o   DREAM

II. On-demand (reactive) routing

This protocol finds a path on demand by flooding the network with Route Request packets.Examples of on-demand algorithms are:

•   ABR - Associativity-Based Routing
•   Ad hoc On-demand Distance Vector(AODV) (RFC 3561)
•   Dynamic Source Routing (RFC 4728)
•   Flow State in the Dynamic Source Routing
•   Power-Aware DSR-based

III. Hybrid (both proactive and reactive) routing

It is a combination of both proactive and reactive routing. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding. Examples of hybrid algorithms are:

•   ZRP (Zone Routing Protocol) ZRP uses IARP as pro-active and IERP as reactive component.
•   ZHLS (Zone-based Hierarchical Link State Routing Protocol)

IV. Hierarchical routing protocols

The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding on the lower levels. The choice for

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one or the other method requires proper attribution for respective hierarchical levels. Examples of hierarchical routing algorithms are:

- CBRP (Cluster Based Routing Protocol)
- FSR (Fisheye State Routing protocol)
- Order One Network Protocol; Fast logarithm-of-2 maximum times to contact nodes. Supports large groups.
- ZHLS (Zone-based Hierarchical Link State Routing Protocol)

3. PERFORMANCE ANALYSIS

S. Ahmed and et all [2] used dynamic source routing (DSR), ad hoc on-demand distance vector (AODV) routing, and temporally ordered routing algorithm (TORA) algorithms for their discussion. They have given the features of each of these routing protocols. For evaluating the performances over varying loads for each of these protocols using OPNET Modeler 10.5. They used various simulation parameters as control traffic sent and received, Data traffic sent. From their findings we know that AODV shows better performance for data traffic received and throughput. DSR and AODV show poor performance as compared to TORA for the control traffic sent and throughput. However, TORA and AODV show an average level of performance for the data traffic received and data traffic sent, respectively.

Saima Zafar and et all [3] analysed and calculated performances of important routing protocols, Ad hoc On-demand Distance Vector (AODV), Dynamic Source Routing (DSR) and Destination Sequence Distance Vector (DSDV) routing protocols and analysed their performance. They used NS2.35 for calculating performance. Next to that they described about the features of each routing algorithms. They used various simulation parameters like Simulation Duration, Number of Nodes, Simulation Area,Antenna, traffic, packet size, Propagation Model. They compared packet delivery with number of nodes and speed of each protocol. Finally they concluded that DSR protocol has constant throughput and smaller end to end delay as compared with other protocols.

Mr.R.KondaReddy and et all[4] provided an overview of different routing protocols proposed in literature and also provides a comparison between them. First they characterized Table driven routing protocols like DSDV, CGSR, WRP based on the parameters like time complexity, communication complexity, routing philosophy, number of required tables, etc. Then the compared the characteristics of on demand Ad Hoc routing protocols like AODV, DSR, TORA, ABR, SSR based on the performance parameters. TORA

protocol chooses its own convenient path rather than shortest path so that it tries to reduce routing overhead.

Jeevitha.R and et all [5] analysed the performance of AODV and DSDV Routing protocols in VANET. This VANET is one of the subset of MANET.This VANET gives the alternative for an existing system when it damaged due to natural disaster. In that situation vehicles must move faster so that mobile network has to manage routing. So the protocols must have to meet this kind of challenges. For these situations they compared behaviour of AODV and DSDV protocols which uses Random waypoint mobility model. They used throughput and jitter as performance metrics and number of nodes (vehicles) as 25.By simulation result, AODV works well than DSDV.

4. CONCLUSION

In this paper, various routing protocols for MANET have been discussed. Performance of these routing protocols under various simulation parameters was analysed. By this we can conclude that TORA protocol can work better than other protocols. While choosing the protocol for MANET we must consider about performance metrics and mobility models and based on that we must choose the protocol so that we can obtain better performance.

REFERENCES

1. Chai KeongToh Ad Hoc Mobile Wireless Networks, Prentice Hall Publishers, 2002. ISBN 978-0-13-007817-9

2. S. Ahmed and M. S. Alam, "Performance Evaluation of Important Ad Hoc Network Protocols", EURASIP Journal onWireless Communications and Networking Volume 2006, Article ID 78645, Pages 1–11DOI 10.1155/WCN /2006/78645.

3. SaimaZafar, Hina Tariq, KanzaManzoor," Through put and Delay Analysis of AODV, DSDV and DSR Routing Protocols in Mobile Ad Hoc Networks", International Journal of Computer Networks and Applications (IJCNA) Volume 3, Issue 2, March – April (2016) ISSN: 2395-0455.

4. *Mr.R.KondaReddy, Ms SK Shaheena Begum, "Performance Analysis of Routing Protocols in MobileAd-Hoc Networks", International Journal of Engineering Research and Developmente-ISSN: 2278-067X, p-ISSN: 2278-800X, Volume 10, Issue 7 (July 2014), PP.36-44*

5. Jeevitha.R, M. Chandra Kumar," Simulation and Analysis of AODV and DSDV Routing protocols in Vehicular Adhoc networks using Random waypoint Mobility Model", http://www. internationaljournalssrg.orgInternational Conference on Explorations and Innovations in Engineering & Technology (ICEIET - 2016)