International Journal of Advanced Technology in Engineering and Science
Vol. No. 09, Issue No. 04, April 2021
www.ijates.com
ijates
ISSN 2348 - 7550

Performance Analysis for DSR, AODV and LAR Protocols within Mobile Adhoc Network

[1]Gaurav Kumar, [2]Prashant Singh, [3]Amit Kumar Pandey, [4]Dhyanender Jain

[1,2,3,4] Department of Information Technology

[1,2,3,4] Dr. Akhilesh Das Gupta Institute of Technology & Management, New Delhi, India.

gaurav.2000kumar@gmail.com[1],prashant.ert@gmail.com[2],amitpandey33@gmail.com[3], dhyanendra.jain@gmail.com[4]

ABSTRACT

Mobile adhoc network (MANET), a system of autonomous mobile nodes linked via wireless links, is an autonomous system. Each node can move freely into a network. These nodes often change their position. Ad hoc is Latin for "for this" and further means "for these Purposes only"[1]. MANETs can be operated without fixed infrastructure. This paper compares three routing protocols that MANETs use: Adhoc On Demand Vector(AODV), Dynamic Supply Routing (DSR), Location Aided Routing (1 LAR). DSR and AODV both refer to reactive routing protocols. LAR is a hybrid routing protocol. Simulation is the main method for evaluating performance of MANETs. This paper analyzes the Routing protocols with their environment conditions. It then evaluates their relative performance against three performance metrics: throughput (packet delivery ratio), and end to end delay. Glomosim Network simulator was used for the simulations.

Keywords: Index terms-MANET. AODV. DS. LAR

INTRODUCTION

A mobile adhoc wireless network is a group that consists of mobile nodes. These nodes work together to forward packets out of range of direct wireless transmission. Ad hoc networks can be quickly established and are not dependent on fixed network infrastructures such as access point. MANETs offer a dynamic network topology that is far more flexible than traditional wired networks. This causes many problems in research, including limited battery life and low bandwidth. MANETs share several distinctive characteristics. The mobile ad-hoc network (MANET), offers greater flexibility.

The communication model used is more flexible than traditional wire-line networks as the user doesn't have to be located in one place [3]. MANETs gain popularity as they have no pre-existing fixed infrastructure. They can also support other applications like military communications, rescue operation, data acquisition in hostile areas conferences and meetings on

battlefield among soldiers to coordinate an attack. The routing strategy allows for proactive and reactive routing. These protocols can be classified according to network structure as hierarchical or active, depending on how they are organized.

Proactive Routing Methods

In proactive routing protocol, every node constantly maintains the most up-to date routes to each other node within the network. Proactive routing protocol is also known as "Table Driven routing Protocol". Routing information is sent periodically across the network. The network transmits information whenever a route is in use before traffic arrives. Proactive routing is necessary to maintain a dynamic network topology. It requires significant resources. Wireless Routing protocol is WRP, Destination Sequenced Displace Vector (DSDV), Global State Routing and Cluster-head Gateway Switch Routing.

Reactive routing protocol

The reactive routing protocol is also known "on-demand routing Protocols". In reactive routing protocols, a node initiates an route discovery process throughout the network. This Once a route was established, it is maintained via a routing maintenance process. Reactive strategy is where nodes keep track of routes to their active destination. Some of the reactive protocols are: Ad hoc-On-Demand Distance Vector (AODV), Dynamic Source Routing (DSR),Temporally-Ordered Routing Algorithms TOA (TORA), Associative Basedrouting (ABR), Signal Stability Routing) and location Aided Routing. OVERVIEW AODV, DSR, AND LAR

The Ad Hoc Distance Vector (AODV).

Ad Hoc Ondemand Distance Vector Routing Protocol (AODV), is a reactive protocol for mobile ad hoc networking[4/5]. AODV's routing information is kept in routing tables at mobile devices. Every mobile device has a next-hop route table. This routing table includes the destinations it currently has. An entry in a routing tables expires after a predetermined expiration date. To maintain freshness of routing information AODV uses sequence codes at each destination. AODV uses sequence numbers to determine the freshness of routing information. AODV defines three types if control messages for route maintenance.

REQ: A mobile node transmits a request message for routing to another node. AODV uses expanding ring techniques to flood messages. Every RREQ carries a Time to Live (TTL) value. This value indicates how many hops this message should have been forwarded.
_A route reply message to RREQ is unicast from the sender to the receiver if that node uses the requested addresses. Unicasting the message is possible due to the fact that each route forwarding a RREQ can cache back to the sender.

RERRroute error messages are used to notify others of lost links.

Dynamic Source Routing

Dynamic Source Routing(DSR)[6]is a pure example of an efficient on-demand routing protocol. It is specially designed for use with multihopadhoc networks. DSR doesn't send periodic routing messages like AODV. This allows for large routing updates to be avoided. DSR consists only of Route Discovery, Route Maintenance and Route Discovery. Route Discovery determines the best route for communication between a source/target node. Route Maintenance ensures the communication path remains optimal and free from loops. DSR allows for the network to be fully self-organized and self-configured without the need of any network infrastructure. Route Reply could only be generated once the message has reached the destination node. Route Reply is only possible if the message has reached the destination. In the case where there is fatal transmission, Route Maintenance Phase can be initiated. DSR is unique because it uses source routing. The route is an integral part of the packet so routing loops, short-lived and long-lived can't be formed.

Location-Aided Roping (LAR).

The Location Aided Routing (LAR), which uses location data, aims to reduce the routing overheads inherent in the traditional flooding algorithm. Two different LAR schemes are proposed in[7]. The first scheme calculates an request Zone which determines the limit of where the route request can travel. The second method stores destination coordinates in the route request packets. Both methods limit overheads transmitted through the network. They will also determine shortest path to destination.

EXPERIMENTAL SURVEYS AND ANALYSIS

The performance of protocols depends on different metrics..the important parameters throughput/packet delivery ratio, end-to–end delay and end-to–end delay have been deen considered to make an analytical observation.

Throughput An indicator of a network's overall success in transmitting data, end-to-end throughput can be described as the number or data packets successfully delivered.

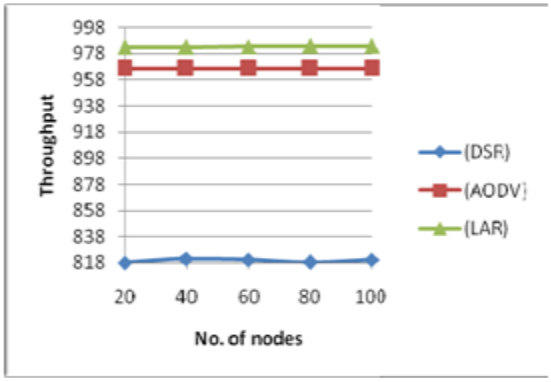
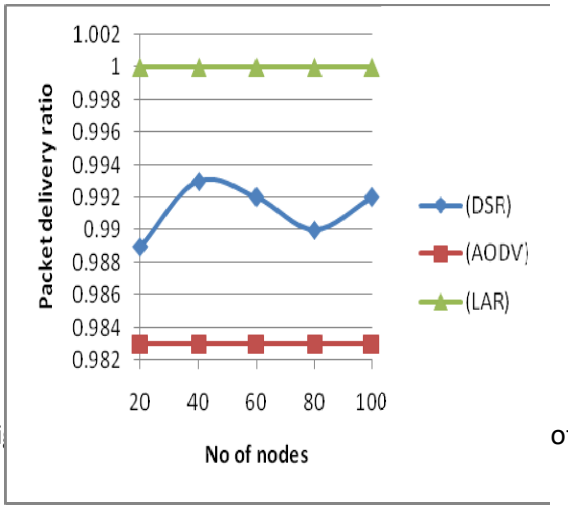


Fig.1 Throughputforprotocolsovemodes

Data packet delivery ratio: The percentage of successfully delivered data packs to the destination.

C. End/to-end delay and No of nodes
The LAR is slower than the end-to–end delay.



Fi of Nodes

End-to-end delay: A network's end-to-end delay

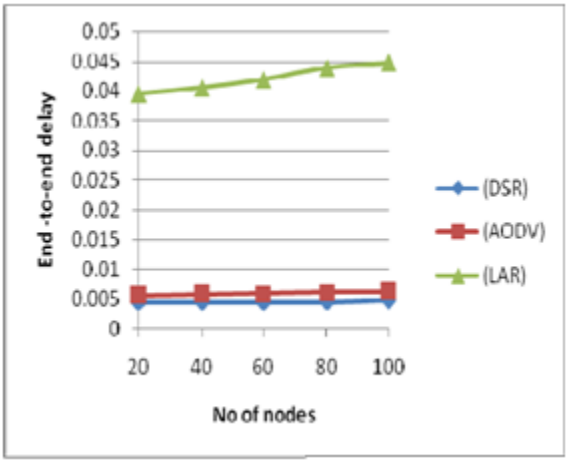


Fig3.End-to-end delay for protocol svs.No of Nodes

DSR/AODV In LAR
protocol as the no is the average time between the generation of and successful delivery (or delivery) of data packets.A comparison of Throughput and. Nodes LAR exhibit higher throughput than the AODV, DSR. Fig. 1 displays the comparison of throughputs for the same

parameter.End-to-end delay decreases when nodes are added to the network. DSR/AODV As the nodes increase, end-to–end delay of the network is also increased.

CONCLUSION

This paper discusses the performance of AODV, DSR, and LAR protocols when subject to increased loads. We tested the protocols in five different scenarios.B. Packet delivery vs. nodes Scenarios (20,40,60,80and 100) on rectangular Area(500*500m2). The received packets for LAR have been received at a much higher rate than the DSR and AODV packets. These protocols were developed using the GloMoSim Simulator.

REFERENCES

[1] Mobile ad hoc networks (MANET). http: //www.ietf.org/ html.charters/manet-charter.html, 1997. IETF Working Group Charter.

[2] Antipapal Suresh. Performance Analysis of Ad hoc On-demand Distance Vector routing (AODV) using OPNET Simulator[J].Communication Networks University of Bremen,2005,10(5):63-69.

[3] K. Leung and Vivtor O.K. Li, "Transmission Control Protocol (TCP) in wireless Networks: issues, approaches and challenges," IEEE Communications Survey, Vol. 8 No. 4, pp. 64-79, 4th October 2006

[4] A. A. Hanbali, E. Altman, and P. Nain, "A Survey of TCP over Ad Hoc Networks," IEEE Communication. Surveys and Tutorials, Vol. 7, No. 3, 3rd Quarter 2005.

[5] D. B. Johnson and D. A. Maltz, "Dynamic Source Routing in Ad-Hoc Ad hoc Networks," Mobile Computing, ed. T. Imielinski and H. Korth, Kluwer Academic Publishers, 1996, pp. 153-181.

[6] K.Fall, S.Floyd "Simulation Based Comparison of Tahoe, Reno and SACK TCP".

[7] M. Allman, V. Paxson, and W. Stevens, "TCP Congestion Control," Request for Comments, RFC 2581, Network Working Group, Internet Engineering Task Force, Apr.1999.

[8] A. Khurshid. An improved tcp congestion control algorithm for wireless networks. M. Sc. Engg. Thesis, Department of Computer Science and Engineering, BUET, Dhaka, Bangladesh, 2008.

[9]Suhas Waghmare,"Comaprative analysis of TCP variants in wireless environment" in proceedings of 978-1-4244-8679-3/11/$26.00 ©2011 IEEE.

[10] G. Holland, N. Vaidya, "Analysis of TCP Performance over Mobile Ad Hoc Networks," in Proceedings of ACM/IEEE MOBICOM "99, (Seattle, Washington, Aug. 1999).