PERFORMANCE COMPARISION OF DSDV, AODV AND DSRFOR MOBILE AD HOC NETWORK BY VARYING NETWORK SIZE

Priyanka Jangir
Uttarakhand Technical University, Electronics department Dehradun institute of technology, Dehradun,Uttarakhand, India

Saurabh Mishra
Uttarakhand Technical University, Electronics department Dehradun institute of technology, Dehradun,Uttarakhand, India

Abstract

Mobile Ad Hoc network (MANET) is a collection of mobile nodes connected through a wireless link resulting in formation of temporary network without any assistance from existing infrastructure or any kind of centralized administration. The performance of an Ad Hoc network depends on the kind of routing protocol. Therefor high efficient routing is must for better communication. The routing protocols are classified based on different criteria. In this paper the comparison is made between Table Driven (proactive) and On Demand (reactive) protocols which can be differentiated on the basis of their routing information update mechanism. The performance of DSDV (proactive), AODV and DSR (reactive) protocol is evaluated on the basis of routing metrics. There are various simulators used for the analysis of the routing protocols. Here we have used Qualnet simulator which prove to be most accurate and time efficient. The result includes simulation of networks by varying the number of nodes.

Keywords: DSDV, AODV, DSR, Route request, Data packet, Qualnet

1. Introduction

In today's developing era when world is becoming a global village there is a need of large and efficient communication network. Mobile Ad Hoc network can be a boon for the areas where there is a little or no communication possible due to geographic or terrain constraints.Ad Hoc mobile networking is some time also referred to infrastructure less networking. The reason for this is that the nodes maintain routing among themselves and in this way they form their own network. Ad Hoc networks make it possible for the data to be quickly shared and transferred. This flow of information in the Ad Hoc network follows some set of rules called protocol. There are various protocols used depending on the type of service or availability of nodes. The performance of the protocols is generally measured by packet delivery fraction[1] [3]and routing overhead[2] which varies from one protocol to another.

2. Classification of Routing Protocols

Ad Hoc network routing protocols can be classified on the basis of routing information update mechanism. The three major categories based on the routing information update mechanism are :-

(1) Proactive or table driven routing protocols.
(2) Reactive or on demand routing protocols.
(3) Hybrid routing protocols.

2.1 *Proactive (table driven) routing protocol*

This type of protocol is mainly used when the number of nodes and the coverage area is fixed for most of the time but can be changed as per the need. There is network topology information in the form of a table at every node. This information is updated time to time by flooding the updated information in the network. This updated information exchange will take place even if there are no actual data packets in the network.
e.g. Optimized Link State Routing (OLSR), Topology Dissemination Based on Reverse Path Forwarding

(TBRPF), DSDV: Destination-Sequenced Distance-Vector.

2.2 *Reactive (on demand) routing protocol*

As per the name suggest the protocol search path only when needed. The path finding algorithm runs from source to destination only when there is some data to be transmitted. There is no existing path between the nodes. The nodes don not maintain any network topology information.
e.g. Dynamic Source Routing (DSR), Associativity-Based Routing (ABR), Ad-hoc On-demand Distance Vector (AODV), Temporarily Ordered Routing Algorithm (TORA).

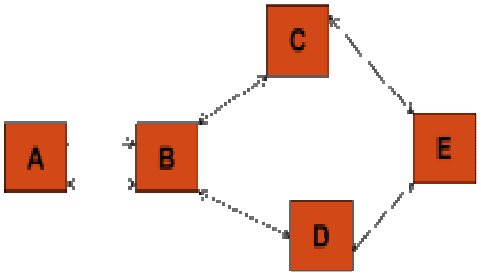
2.3 *Hybrid routing protocol*

This category of protocols modifies themselves as per the demand. They combine the useful characteristics of both proactive and reactive protocols. They may become proactive for smaller coverage area and become reactive for larger area.
e.g.Zone Routing Protocol (**ZRP**).

3. Routing Mechanism

In this paper the three protocol simulations are given for DSDV(Destination Sequenced Distance Vector Routing protocol),AODV(Ad Hoc On demand Distance Vector routing protocol) and DSR(Dynamic Source Routing protocol).

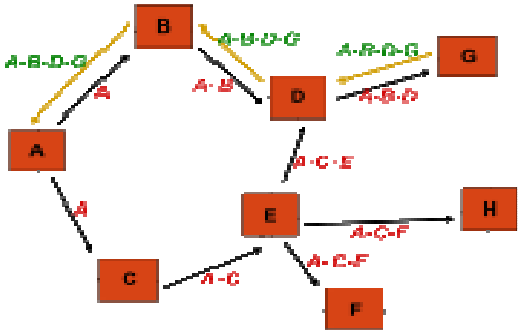
3.1 DSDV: Process of updation



Let node A joins the network. A transmits through the network B receives and propagate new route to neighbours. And the routing table is updates in this way for the continuation of information.

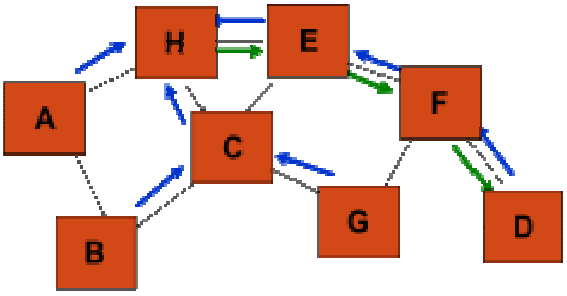
3.2*DSR*

Operate for relatively small network diameter. This is an on demand routing protocol. The process of route discovery is issued with exponential back off intervals.



For instance if A want to deliver the data packet to G it will send the route request to its nearby nodes. The route reply will come to A and the smallest path is selected, all the other paths are rejected. It support unidirectional as well as bidirectional links.

3.3 *AODV*



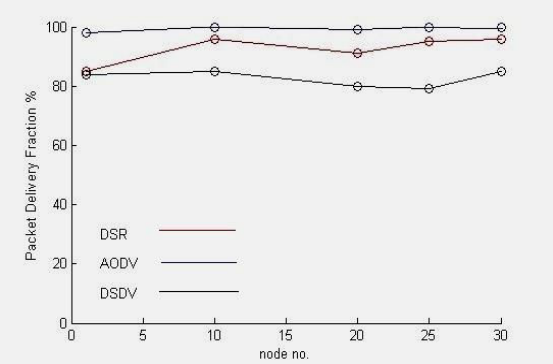
The source floods route request in the network for the needed destination. Again each node forward this

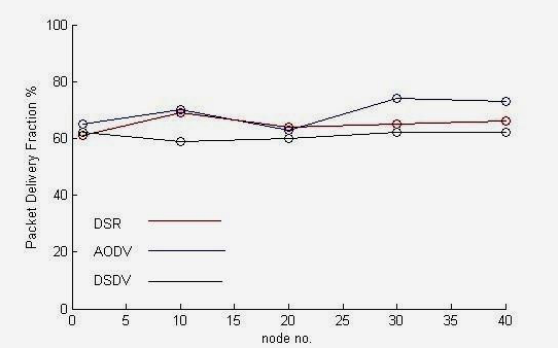
request once. After that reverse path is form from the destination to the node.

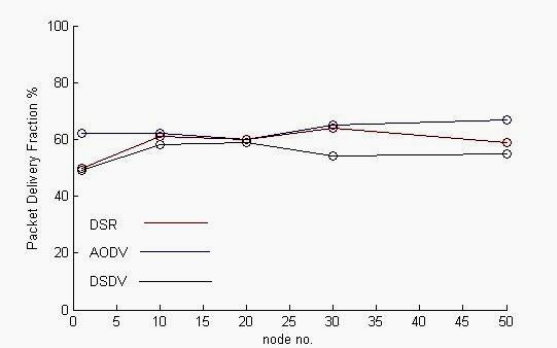
4. Simulation

The simulations for the current paper have been done on Qualnet 5.0 network simulator. The performance comparison for the above three protocols is done by varying the network size. The scenario includes node placement in a fixed area which linked with a wireless data source. There are few nodes which are interconnected. The packet fraction for the nodes is compared by placing 30, 40 and 50 nodes.

5. Results







1. AODV prove to be more efficient then the DSR and DSDV for 30 , 40 or 50 nodes.
2. As the number of nodes increases the performance decrease.
3. For 50 nodes the performance of the three protocols changes at different nodes.

6. Conclusion

The results show that the reactive routing protocolsare more efficient then the proactive routing protocols. As we increase the number of nodes in a given area then also there is a degradation of the performance.

7. Future Work

There can be complex simulation carried out for analysis of the protocols on the basis of load variation, maximum range for the nodes,variation due to terrain obstacle or due to frequent topology change in the network.

8. Refrences

1. M.Esmaelli, *Challenges in Qos Supporting via Integrating Differential services and Multipath Routing on Mobile Ad Hoc Network.*Seventh international conference on computer and information technology (CIT 2007),pages 359-368.
2. David B.Johnson, David A.Maltz, Josh Broch.*DSR: The Dynamic Source Routing Protocol for Multipath Wireless Ad Hoc Networks*(Monarch project at Carnegie Mellon

university).

3. Josh Broch, David A. Maltz, David B. Johnson, Yin-Chun Hu, JorjetaJetchena*A Performance Comparison of Multi-Hop Wireless Ad Hoc Network Routing Protocols*, in ACM/IEEE International conference on mobile computing and networking,(mobicom'98).
4. Nitiket N Mhala and N K Choudhari*An Implementation Possibility for AODV Routing Protocol in Real World*, in International Journal of Distributed and Parallel Systems(Vol.1, No.2, November 2010).
5. Samir R.Das, Charles E Perkins, *Performance Comparison of Two on Demand Routing Protocol for Ad Hoc Networks,* in IEEE INFOCOM 2000.
6. Z.J. Haas and S. Tabrizi, *On Some Challenges, and Design Choices in Ad hoc Communcations*, in proceedings of the IEEE Military Communications Conference ,(Bedford, MA, October 1998), pp.187-192.
7. S. Lee and M.Gerla, *AODV-BR: Backup routing in ad hoc networks*, in Proceedings of IEEE WCNC 2000 (Chicago, September 2000) pages 1311-1316.
8. S.J.Lee and M.Gerla, *Split Multipath Routing with Maximally Disjoint Paths in Ad Hoc Networks*, in proceedings of the IEEE ICC(June 2001), pages 3201-3205.
9. Theodore S.Rappaport, *Wireless Communications: Principles and Practice* (Prentice-Hall of India New Delhi-2007).