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Performance Comparison of Routing Protocol in MANET Varying Transmission Range

Neha Sachdeva
M.Tech Student
ECE Deptt. KITM, Kurukshetra
India

Ruby Gupta
Assistant Professor
ECE Deptt. KITM, Kurukshetra
India

Abstract- A Mobile Ad Hoc Network (MANET) consists of a set of mobile hosts that carry out basic networking functions like packet forwarding, routing, and service discovery without the help of an established infrastructure. Nodes of an ad hoc network rely on one another in forwarding a packet to its destination, due to the limited range of each mobile host's wireless transmissions nodes should be able to enter and leave the network as they wish. Because of the limited transmitter range of the nodes, multiple hops are generally needed to reach other nodes. Every node in an ad hoc network must be willing to forward packets for other nodes. These nodes generally have a limited transmission range and, so, each node seeks the assistance of its neighboring nodes in forwarding packets.

*Key Words- **MANET, DSDV, AODV.***

I. Introduction

A mobile ad hoc network (MANET) consists of mobile wireless nodes in which the communication between nodes is carried out without any centralized control. MANET is a self organized and self configurable network where the mobile nodes move arbitrarily. The mobile nodes can receive and forward packets as a router. Routing is a critical issue in MANET. Mobile ad-hoc wireless networks hold the promise of the future, with the capability to establish networks at anytime, anywhere. These networks don't rely on extraneous hardware, which makes them an ideal candidate for rescue and emergency operations. These networks are built, operated, and maintained by their constituent wireless nodes. These nodes generally have a limited transmission range and, so, each node seeks the assistance of its neighboring nodes in forwarding packets. The nodes in an ad hoc network generally have limited battery power and, so, reactive routing protocols endeavor to save power by discovering routes only when they are essentially required. Since, MANETs are currently not deployed on a large scale and due to the inherent randomness of mobility models, research in evaluating the performance of routing protocols on various mobility models are simulation based. Performance of MANETs depends on the routing protocolscheme employed. Traditional routing protocols do not work efficiently in MANETs due to its dynamic nature. Hence,designing an efficient and reliable routing protocol is very challenging to the changing network conditions such as network size, traffic density, and other network conditions. This paper aims to achieve three objectives, firstly some of the existing routing protocols in MANETs based on generally two main classes of protocol namely, proactive and reactive are presented. Then, an overview of advantages and disadvantages of various discussed reactive and proactive routing strategies is provided. Finally, these two groups of routing protocols are compared in terms of performance metrics.

II. Routing Protocols in Mobile Adhoc Network

The routing protocols in mobile ad-hoc network can be divided into two categories:

- Proactive or table-driven routing protocol
- Reactive or on-demand routing protocols-hoc network

Pro-active or table-driven routing protocols require each node to maintain up-to-date routing information to every other node (or nodes located within aspecific(region) in the network. On-demand routing protocols are designed to reduce the overheads in table-driven protocols by maintaining information for active routes only as and when required.

A.Table-Driven Routing Protocols:

In table driven routing protocols every mobile node maintains the network topology information in the form of routing table by periodically exchanging routing information. Routing information is generally flooded in the network. Whenever a node requires a path to destination it runs an appropriate path-finding algorithm on the topology information it maintains

B. Reactive or on-demand routing protocols:. In this routing Protocols that fall under this category do not maintain the network topology information. They obtain the necessary path when it is required by using a connection establishment process. Hence these protocols do not exchange information periodically. On Demand Routing Protocols, also known as Reactive Protocols, establish routes between nodes only when they are required to route data packets. There is no updating of every possible route in the network instead it focuses on routes that are being used or being set up.

When a route is required by a source node to a destination for which it does not have route information, it starts a route discovery process which goes from one node to the other until it arrives at the destination or a node in-between has a route to the destination. On Demand protocols are generally considered efficient when the route discovery is less frequent than the data transfer because the network traffic caused by the route discovery step is low compared to the total communication bandwidth. This makes On Demand Protocols more suited to large networks with light traffic and low mobility. An example of an On Demand Protocol is Dynamic Source Routing.

C. Hybrid routing protocols:

In hybrid Protocols belonging to this category combine the best features of the above two categories. Hybrid Routing Protocols combine Table Based Routing Protocols with On Demand Routing Protocols. They use distance-vectors for more precise metrics to establish the best paths to destination networks, and report routing information only when there is a change in the topology of the network Nodes within a certain distance from the node concerned or within a particular geographical region, are said to be within the routing zone of the given node Each node in the network has its own routing zone, the size of which is defined by a zone radius, which is defined by a metric such as the number of hops. Each node keeps a record of routing information for its own zone. Zone Routing Protocol (ZRP) is an example of a Hybrid routing protocol. For routing within zone a table driven approach is used. For nodes that are located beyond this zone on.

III. Performance Metric:

The main objective of this paper is comparing the Performance of DSDV and AODV protocols using following metrics:

A. Packet Delivery Fraction

The ratio of the data packets delivered to the destinations to those generated by the CBR sources is known as packet delivery fraction.

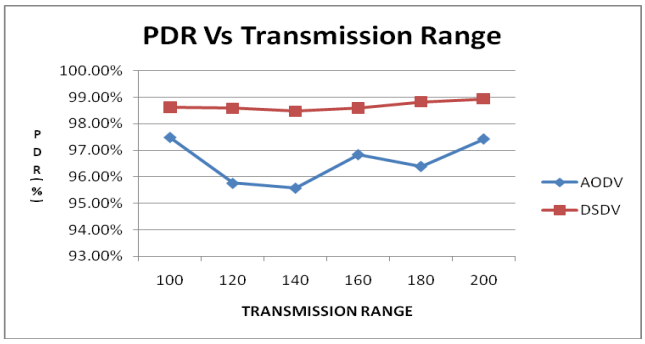
IV. Simulation

The simulations were performed using Network Simulator 2 (Ns-2.33). Constant bit rate (CBR) traffic was used in simulation. Simulation was done by varying no. of nodes from 100,120,140,160,180 and 200.The pause time was kept constant at 100sec in a simulation area of 800mX800m. During the simulation, each node started its journey from a random spot to a random chosen destination. Once the destination was reached, the node took a rest period of time in second and another random destination is chosen after that pause time. This process was repeated throughout the simulation, causing continuous changes in the topology of the underlying network.The following table gives the simulation parameters used during the simulation.

Parameter	Value
Simulator	NS-2.33
Simulator area	800mX800m
No.of mobile Nodes	100,120,140,160,180,200
Pause time	50 sec
Max. Speed	Mobility model
Packet Size	512
Routing Protocol	AODV,DSDV
Traffic Sources	FTP
Simulation time	100 sec

A. Packet Delivery Ratio

Graph shows that the packet Delivery ratio for DSDV is better than AODV.AODV having higher packet deliveryratio for transmission ranges 200m. The simulation graph show the range for DSDV routing protocol would lie between 160 to 200m.for better performance where as for AODV higher transmission range i.e.200m is required for better performance.



V. Conclusion

In this paper we performed the simulation to compare the performance of AODV and DSDV routing protocols on different performance parameters i.e. packet delivery ratio. we provide an overview of several routing schemes proposed for ad hoc mobile networks. Also,a classification of these schemes is provided according to the routing strategy (i.e., table-driven and on-demand).A comparison of these two categories of routing protocols is provided, highlighting their features, differences, and characteristics. The results indicate that the performance of AODV is superior to DSDV. It is also observed that the performance is better especially when the number of nodes in the network is higher. The range

would lie between160m to 200m for better performance.The higher transmission range 200m is required for better performance.

.The result shown in table:

Performance Parameter	Best Performance	Worst Performance
Packet Delivery Ratio	DSDV	AODV

VI. Future

The other performance metric like goodput, packet drop routing and normalized routing overhead can beconsider to analysye the performance under varying transmission range.

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