Comparison of Packet Delivery Fraction of On-demand Routing Protocol based on different Terrain-Area in MANET

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ABSTRACT
Now a days telecommunication technology leads to a rapid growth of number of users, these number of users nothing but number of nodes in MANET. A wireless ad hoc network is a decentralized type of wireless network. The mobility of nodes effect on the performance of the network. Due to mobility of nodes the link breaks number of times which effect on the packet delivery. Therefore to analyze the performance, packet delivery fraction (PDF) can be used. This paper describe the packet delivery fraction of on demand routing protocol AODV and DSR on different terrain areas using GLOMOSIM.

Keywords
MANET, Packet Delivery Fraction, AODV, DSR and GLOMOSIM-2.03.

1. INTRODUCTION
Mobile Ad-hoc networks (MANET) is collection of communication devices or nodes that wish to communicate without any fixed infrastructure and pre-determined organization of available links. In MANET, each node is equipped with wireless transmitter and receiver which are called antennas and by using these antennas they can communicate and connect each other without any wired connection that infrastructure network require[1]. Mobile Ad-hoc works without any fixed infrastructure environment. Movable nodes of MANETs are communicating each other via their transmission radio range. Each nodes of mobile Ad-hoc networks perform as a host (source, destination) as well as a router.

The topology in Mobile ad-hoc network is dynamic so various data packets follow different routes between two nodes. The MANET can be deployed easily and rapidly in emergency conditions such as search and rescue operation after a natural disaster due to its flexibility and suitability. Routing is the main challenge in the MANET [2].

Mobile Ad-hoc networks are very popular in various fields such as disaster rescue operation, military emergency situations, conference room as well as personal area network.

2. TYPES OF ROUTING PROTOCOL IN AD-HOC NETWORKS
2.1 Reactive Protocol
It is also known as On-Demand routing protocol. Routes are establish when there is the demand at destination only. They don’t store all paths. Here the source initiates the route discovery process.

Routing protocol of wireless Ad-hoc networks

Reactive routing protocol  Proactive routing protocol

Fig 1. Classification of Routing Protocol

2.1.1 DSR (Dynamic Source Routing)
The Dynamic Source Routing (DSR) is examples of an on-demand routing protocol which is based on source routing. It allows the network to be completely self-organizing and self-configuring and does not require any existing network infrastructure or administration. It consist of two process route discovery and route maintenance. when a source node needs a route to the destination it first search the route in its cache if no route is there then it initiates route discovery process.

Route discovery is performed by flooding the network with route request (RREQ) packet. Each node receives an RREQ and rebroadcast it to the neighbor nodes.

Whenever an intermediate node gets this RREQ packet it just sends the packet to neighboring nodes. When destination node receives the RREQ packet it generates a Route Reply (RREP) packet. Similarly in Route Maintenance DSR uses when there is a link break or the path became unusable. In this case it delete the route from cache, then see the availability of other route in its cache if no route is there then again initiate route discovery process.
2.1.2 AODV (Ad-hoc On-demand Distance Vector)

Ad-hoc On-demand Distance Vector protocol is on-demand routing protocol. That means it discovers the route when there is a demand. AODV builds routes using a route request / route reply query cycle Fig. 2(a) and Fig.2(b). When a source node required a route to a destination it broadcasts a route request (RREQ) packet across the network if it does not have the route it rebroadcast. If it had the route to the destination then it sends the route reply (RREP) back to the source.

![Fig.2(a). Route Request (RREQ) flooding](image)

Flooding

![Fig.2(b). Route Reply (RREP) propagation](image)

2.2 Proactive routing protocol

Also known as Table-Driven routing protocols. In this protocol every node maintain table which contain entire topology. The table update regularly in order to maintain up to date node information.

3. INTRODUCTION OF GLOMOSIM

GloMoSim stands for Global Mobile Information System Simulator and is a scalable network simulation environment for mobile ad-hoc networks, developed at UCLA Parallel Computing Laboratory. GloMoSim uses a parallel discrete event simulation capability provided by Parsec (Parallel Simulation Environment for Complex Systems) which is C based simulation language. GloMoSim simulates networks with up to thousand nodes linked by a heterogeneous communications capability that includes multicast, asymmetric communications using direct satellite broadcasts, multi-hop wireless communications using Ad-hoc networking, and traditional Internet protocols [7].

4. SIMULATION

4.1 Simulation tools and parameter

The simulation is done using GLOMOSIM simulator 2.03. In this paper the basic configuration of this testing is that the terrain Dimension has been taken 1500*300 and 2500*500 square with total 30 nodes. Manually set traffic pattern with CBR connection between mobile nodes. For this observation we have been taken various pause times. Other parameters are following in table 1.

<table>
<thead>
<tr>
<th>Table 1 Simulation Parameters</th>
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<tbody>
<tr>
<td>Parameter</td>
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<tr>
<td>Channel Type</td>
</tr>
<tr>
<td>Radio Propagation Model</td>
</tr>
<tr>
<td>MAC protocol</td>
</tr>
<tr>
<td>No of nodes</td>
</tr>
<tr>
<td>No of source</td>
</tr>
<tr>
<td>Pause time</td>
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<tr>
<td>Traffic pattern</td>
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<tr>
<td>Simulation time</td>
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<tr>
<td>Terrain Dimension</td>
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<td>Mobility model</td>
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<td>Routing protocol</td>
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<td>Simulation tools</td>
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</table>

4.2 Variation in pause Time

Pause time in mobile Ad-hoc networks corresponds to the period of time which a mobile node halts at an intermediate node before transferring to destination point. A low pause time indicates high mobility and high pause time is low mobility [8].

4.3 Performance evaluation result

In this paper we have taken two routing protocol DSR and AODV for analyzing the performance of the entire network.

Packet delivery fraction: The packet delivery fraction is also known as PDF whose defined the ratio between the total no. of packet received to the total no. of packet sent at the CBR source.

\[
PDF = \frac{\sum_{total\ number\ of\ packet\ received}}{\sum_{total\ number\ of\ packet\ sent}}
\]
5. RESULT AND ANALYSIS

In this paper we have compare and analysis the different terrain area for the DSR and AODV routing protocol with various pause time

5.1 Terrain area (1500*300)

The above fig3 (a) and fig3 (b) is shown the packet delivery fraction vs pause time in sec. In the 1500*300 Terrain Dimension and 2500*500 with 30 nodes when pause time is 0 that time AODV transfer 98% packets whereas DSR 54%. As the Pause time increases that means mobility decreases the packet delivers increases.

When the no. of source increases (5 source to 10 source) with in the same terrain area the AODV and DSR transfer 95%, 65% respectively when mobility is high.

5.2 Terrain area (2500*500)

The above fig4(a) and fig4(b) is shown the packet delivery fraction vs pause time in sec. In the 2500*500 terrain dimension with 30 nodes when pause time is 0 that time AODV, DSR transfer 93% and 37% respectively. As the pause time increases means mobility decreases, the no of links break reduces so that packet delivery increases. When the no. of source increases from (5 to 10 source) with in the same terrain area AODV and DSR transfer 93% and 79% respectively.

6. CONCLUSION

The packet delivery fraction of AODV and DSR are calculated and analyses. It is observed that in the terrain area 1500*300 and pause time from 0 to 900 AODV has better PDF than DSR for 5 sources. If the terrain area and number of nodes increased to 2500*500 and 10 respectively, then it is observed that the performance of AODV is better than DSR. In both the cases AODV transfer more than 90% packet.

We can go for security issues. The security can be improve using cryptography algorithm. we can also compare the performance with hybrid model.
7. REFERENCES


