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Relative Analysis of Reactive and Proactive Protocols in Manet Using NS2

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Abstract
For design of any wireless network, routing and protocol selection are important considerations. In any network like MANET, routing protocols should have best throughput and minimum delay. So the performance and relative analysis is the main consideration. In this paper we will discuss how the mobile nodes has been designed with defined parameters and the relative analysis of the proactive to proactive, reactive to reactive and the proactive to reactive protocols will be done using NS2 simulator. We have throughput of generating and receiving packet, Jitter on sending and receiving side and End to End delay are the common parameters used for the comparison. We have taken two different types of protocols one protocol from the proactive and the other is from reactive protocol and comparing the results of both the protocols by using the graphs and the information of the number of nodes, send packets, dropped packets and so on.

Keywords: NS2, MANET, proactive, reactive, Jitter.

1. Introduction
There are different types of ad-hoc networks like MANETs, VANETs, WMNS etc for which various routing protocols have been developed and the nodes are interconnected by router and protocols by TCP and UDP connections.

In mobile ad-hoc, networks each node is responsible for the performance of the network and each node is responsible for the communication of other nodes because while transferring the data from source node to destination node intermediate nodes which are present between these two nodes will help to transfer the data from source to destination. The routing protocols give information about the connections, transport of data and security which are defined at each and every layer. A GOD (General Operations Director) have been created for tracing nodes. The main motive of this paper is that to compare the best output characteristic on the basis of routing protocols. Here for calculating the output characteristics and relative analysis we are comparing the proactive and the reactive protocols by designing a topology of any number of nodes and comparing the throughput, jitter and delay parameters.

2. Wireless Network and Protocols
A wireless network is a computer network that uses wireless data connections between network nodes. A routing protocol uses software and routing algorithms to determine optimal network data transfer and communication paths between network nodes.

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There are different types of routing protocols they are proactive, reactive and hybrid routing, in this we will discuss about comparison between proactive and reactive algorithms.

2.1 Proactive Routing:

In proactive routing every node maintains one or more tables representing the entire topology of the network. These table update regularly in order to maintain a up-to-date routing information from each node to every other node. There are different types of routing protocols, we will compare any of the two protocols.
Different types of proactive routing protocols are:

1. DSDV (Destination Sequence Distance Vector)
2. CGSR (Cluster Based Routing Protocol)
3. OLSR (Optimised Link State Routing Protocol)

2.2 Reactive Routing:

It is a kind of communication protocol. The main purpose is that it reacts based only on demand. Reactive routing protocols do not maintain routes, but build them on demand. A reactive protocol finds a route on demand by flooding the network with Route Request packets. There are different types of routing protocols but we will compare any of two protocols.
Different types of Reactive Routing protocols are:

1. Ad-hoc On-demand Distance Vector (AODV)
2. Dynamic Source Routing (DSR)
3. Dynamic MANET On-Demand Routing (DYMO)

3. Simulation Experiment Details

3.1 Topology Configuration:

The topology is the arrangement of the network, including the nodes and connecting lines. This has been done in the simulator NS2 in Oracle Virtual Box with Graphical User Interface version 14.04 with Linux operating system and object tool command language has been used for programming.

3.2 Simulation Methodology:

In this paper as we are discussing about the relative analysis to get the best output on the basis of the routing protocol. Here we can create any number of nodes and ring topology is designed where nodes are mobiles which send to every other node. Where the data from the source to the sink node can be transmitted in the form of ring topology or in the form of packets formation for transmitting the data they form a routing table about the data and for every transmission the table will be updated, and the output of the data transmission can be seen in the network animator as below.

3.3 Throughput:

It determines the speed of sending the data over a network. It also tells us about how many packets are delivered without any constraints. This is a important parameter in evaluating the performance and the relative analysis of a network.

3.4 Jitter:

It is basically accumulation of pulses which is mostly found in successive pulses, periodic wave fronts etc. When different pulses of a signal reach the receiver end at different instance of time, they collectively tend to posses jitter.

3.5 End to End Delay:

It is the delay introduced in the reception of the signal. It is dependent on the processing time of nodes and channel. For optimized performance it should be minimum.

4. Result Analysis

In this section, the relative analysis of the proactive and the reactive protocols has been shown by varying the different types types of protocols the difference will be depicted.

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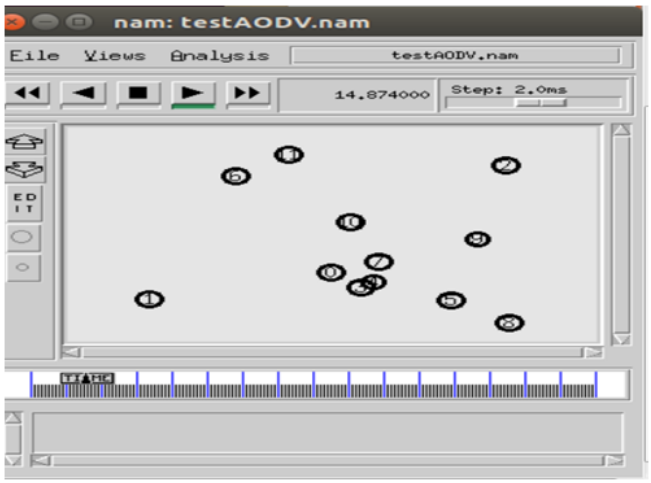

Fig1: AODV network animator

Fig2: DSDV network animator

Output Analysis:

Depicted from fig.3 & fig.4, the drop rate and number of lost packets in network working with DSDV protocol is less than that of AODV. Moreover average packet size in case of DSDV is 552 bytes and in AODV it is 540 bytes. In case of AODV, the source and sink nodes also drop packets unlike DSDV so considering drop rate, the performance of DSDV protocol is better than AODV protocol.

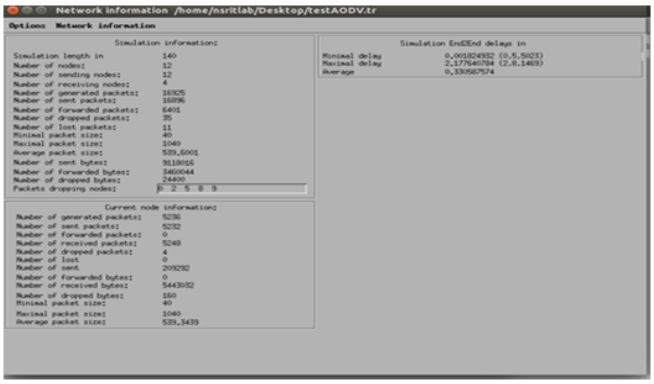

Fig 3: Network information for AODV

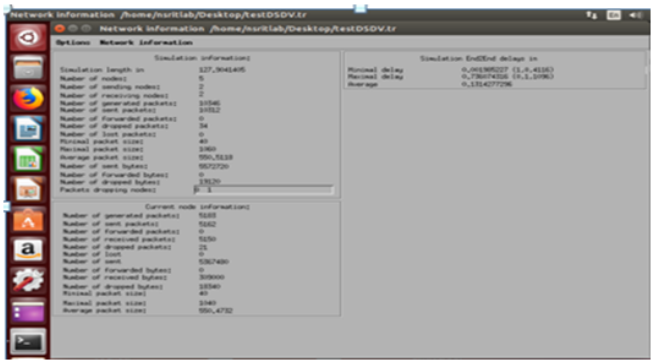

Fig 4: Network information for DSDV

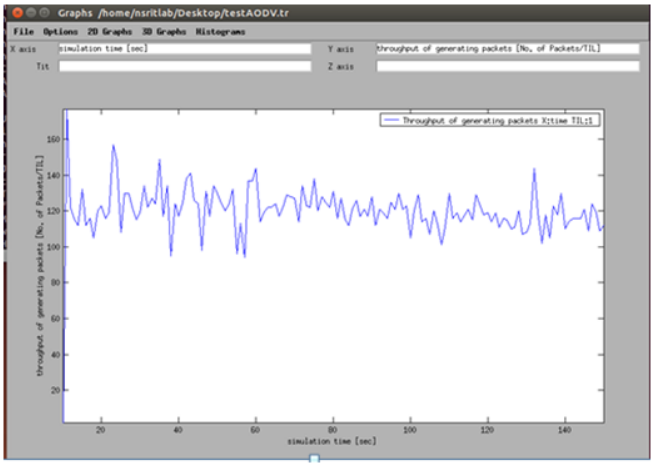

Fig 5: Throughput graph for AODV

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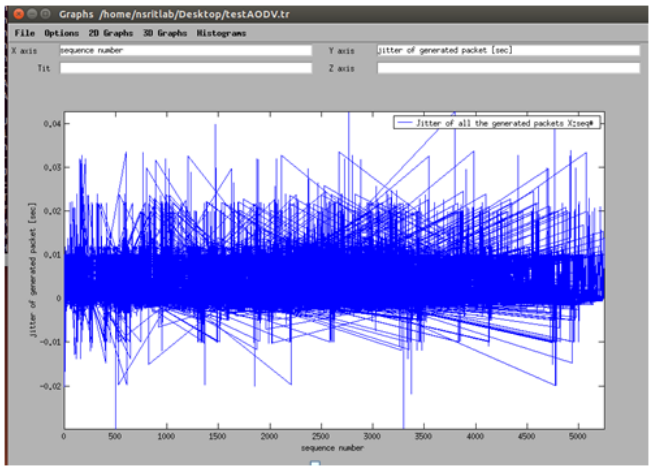

Fig6: Jitter graph for AODV

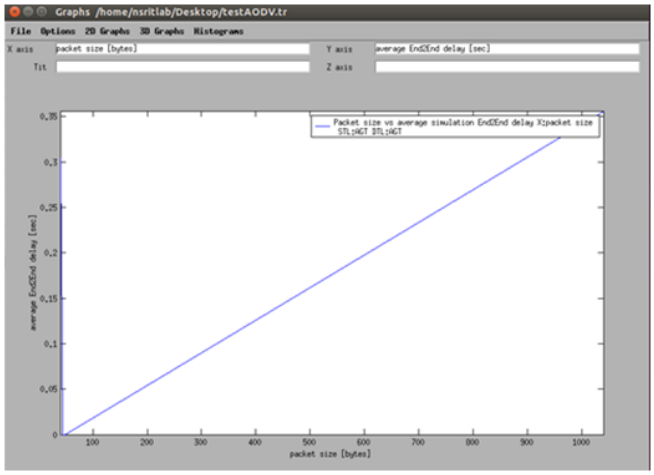

Fig 7: End to End Delay graph for AODV

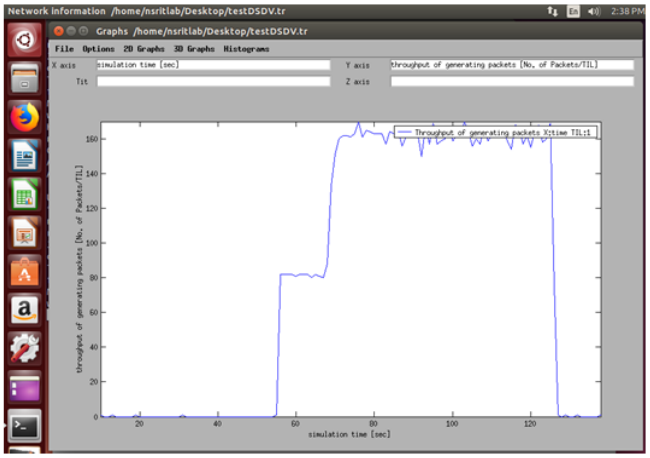

Fig 8: Throughput graph for DSDV

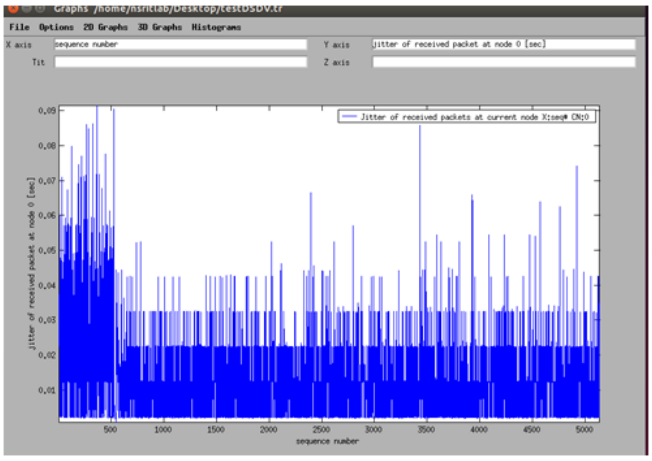

Fig 9: Jitter Graph for DSDV

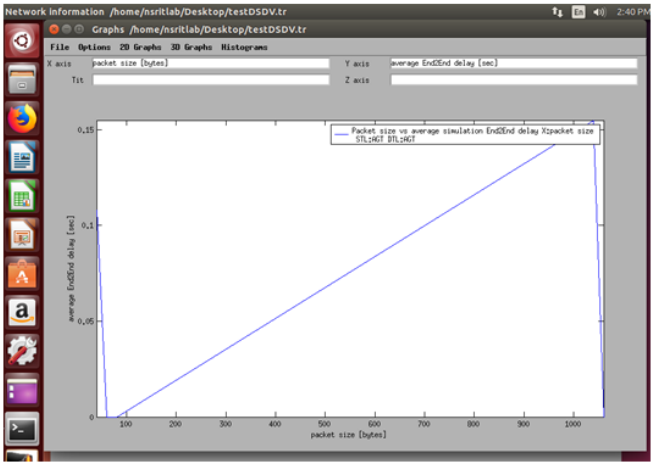

Fig 10; End to End Delay graph for DSDV

5. Conclusion:

From the above relative analysis, it has been concluded that Drop rate, Average packet size, Dropping nodes and Throughput of the generating packets, proactive routing protocol gives better performance contrary to reactive protocol but the accumulation jitter and value end to end delay is less in case of reactive making it suitable for high speed applications.

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