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BEHAVIOUR ANALYSIS OF DSR MANET PROTOCOL WITH HTTP TRAFFIC USING OPNET SIMULATOR

Diya Naresh Vadhwani[1], Deepak Kulhare[2], Megha Singh[3]

M.Tech Student, Dept. of CSE, CIIT, Indore, India[1]

Associate Prof., Dept. of CSE, CIIT, Indore, India[2]

Assistant Prof., Dept. of CSE, CIIT, Indore, India[3]

ABSTRACT: MANET is mobile adhoc network in which the infrastructure is formed using the mobile nodes without any centralized administration.DSR means dynamic source routing. DSR is reactive Manet routing protocol. In this paper the performance analysis of DSR reactive Manet routing protocols is made for throughput and delay using the opnet simulator. The DSR protocol is analysed on the basis of HTTP traffic because today the internet application are more important for secure communication. Some studies have been reported in the literature to evaluate the performance of Manet routing algorithm like DSR using HTTP with OPNET Simulator .

Keywords: MANET; DSR; HTTP; OPNET

I. INTRODUCTION

MANET means mobile Ad-hoc network in which there is no centralized administrator for the control of nodes in the network. For the mobility the nodes are free to move in the network environment without any infrastructure defined.
A MANET node communicates via the wireless link or channel and thus nodes are free to move randomly and hence the topology used is dynamic in nature. Thus MANET nodes act as router for other mobile node in the adhoc network, for this purpose routing in Manet is an important task. If the performance is analyzed on MANET then it can be determined that which type of application can be used in the MANET. Here the DSR routing protocol is analyzed with HTTP.
A Mobile Ad-hoc network (MANET) is a multi hop wireless network formed by a group of mobile node that has wireless capabilities [1]. Ad-hoc is a communication mode that allows computers to directly communication with each other without a router. In Latin, ad-hoc means "for this" meaning "for this special purpose" [1]. In ad hoc networks, nodes do not start out familiar with the topology of their networks; instead, they have to discover it [1]. The basic idea is that a new node may announce its presence and should listen for announcements broadcast by its neighbours [1]. Each node learns about nodes nearby and Static ad-hoc network the positions of a node may not change once it has become a part of the network. Ex- Rooftop networks [1]. Each device in a MANET is free to move independently in any direction. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route the traffic [1]. In this paper the performance analysis of DSR routing protocol for different node like 50, 70 and 100 is done using http with the help of OPNET modeller 14.5.

II. DSR

Dynamic source routing protocol abbreviated as DSR is also a reactive protocol. The Dynamic Source Routing (DSR) [1], [7] is one of the purest examples of an on-demand routing protocol that is based on the concept of source routing. DSR used to updates its route caches by finding new routes. It updates its cache with new route discovered or when there exist a direct route between source and destination node [4]. When a node wants to transmit data, it defines a route for the transmission and then starts transmitting data through the defined route [4].
In the DSR protocol, source node sends the routing request (RREQ) packets by means of flooding technology [4]. Each RREQ packet includes source node address (Sid), destination node address (Did) and the unique request sequence-number (Request ID) [4]. An advantage of DSR is that nodes can store multiple routes in their route cache, which means that the source node can check its route cache for a valid route before initiating route discovery, and if a valid route is found there is no need for route discovery [4]. This is very beneficial in network with low mobility [4]. Since they routes stored in the route cache will be valid longer. Another advantage of DSR is that it does not require any periodic beaconing (or hello message exchanges), therefore nodes can enter sleep node to conserve their power [4]. This also saves a considerable amount of bandwidth in the network [4].

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The Dynamic Source Routing protocol (DSR) [3] is a simple and efficient routing protocol designed specifically for use in multi-hop wireless Ad- hoc networks of mobile nodes. DSR allows the network to be completely self-organizing and self-configuring, without the need for any existing network infrastructure or administration. The protocol is composed of the two main mechanisms of "Route Discovery" and "Route Maintenance", which work together to allow nodes to discover and maintain routes to arbitrary destinations in the ad hoc network.

A. Route Discovery process in DSR

When a source node wants to start data transmission with a node in the network, it checks its routing cache [4] when there is no route available to the destination in its cache or route is expired, it broad cast RREQ. When destination is located or any intermediate node that has fresh enough route to the destination node, RREP is generated [4],[11]. When the source node receives the RREP it updates its caches and the traffic is routed through the route [4],[11].

B. Route Maintenance in DSR

When the transmission of data started, it is the responsibility of the node that is transmitting data to confirm the next hop received the data along with source route [4]. The node generates a route error message, if it does not receive any confirmation to the originator node [4]. The originator node again performs new route discovery Process [4].
From [4] the DSR protocol is analysed on the basis of traffic parameters like FTP, HTTP, EMAIL and VIDEO CONFERENCING on 35 nodes.
From [18] the DSR protocol is analysed for 50 and 100 nodes where the performance analysis for different parameter like load, delays throughput is done. Also DSR for 50 nodes perform well than DSR for 90 nodes size [18].

III. PERFORMANCE METRICS

A. HTTP

The HTTP traffic is considered here for the simulations since it is applicable in internet applications.
In HTTP Following are considered:

- **HTTP traffic received packets per sec**: Average number of packets per second forwarded to the HTTP applications by the transport layers in the network.
- **HTTP traffic sent packets per sec**: Average number of packets per second submitted to the transport layer by all HTTP applications in the network

B. Delay

Represents the end to end delay of all the packets received by the wireless LAN MACs of all WLAN nodes in the network and forwarded to the higher layer.
These delays include medium access delay at the source MAC, reception of all the fragments individually, and transfer of the frames via AP, if access point functionality is enabled.

C. Throughput

Represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLAN nodes of the network.
The average rate at which the data packet is delivered successfully from one node to another over a communication network is known as throughput [4]. The throughput is usually measured in bits per second (bits/sec) [4]. A throughput with a higher value is more often an absolute choice in every network [4].
Mathematically, throughput can be defined by the following formula [4]:

Throughput= (number of delivered packet * packet size)/total duration of simulation

D. DSR Routing parameters

- **DSR Routing traffic received *:***

  Amount of routing traffic received in packets/sec in the entire network

- **DSR Routing traffic sent:**

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Amount of routing traffic sent in packets/sec in the entire network

IV. SIMULATION

In this paper the DSR is analysed using http with the help of OPNET MODELER 14.5.The OPNET SIMULATOR is used to analyse the parameters like throughput ,delay for various node size like 50, 70, 100 mobile nodes.

V. SIMULATION FOR DIFFERENT NODE SIZE

A. *For 50 Nodes*

Fig 1 shows the Amount of routing traffic Received and Sent in packets/sec in the entire network for 50 nodes.

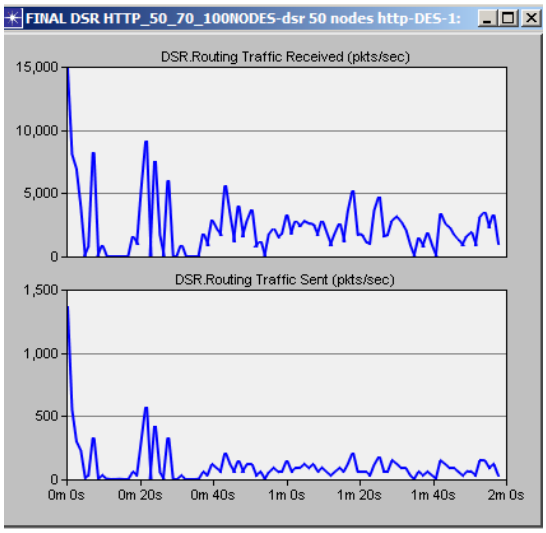

Fig.1 DSR routing traffic received and sent in packets/sec for 50 nodes

Fig 2 show s the Average number of packets per second forwarded to the HTTP applications by the transport layers in the network and Average number of packets per second submitted to the transport layer by all HTTP applications in the network for 50 nodes.

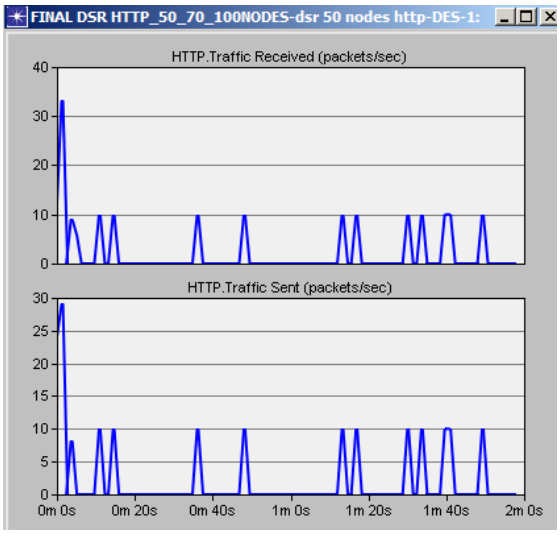

Fig.2. HTTP traffic received and Sent in packets/sec

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Fig 3 represents the end to end delay of all the packets received by the wireless LAN MACs of all WLAN nodes in the network and forwarded to the higher layer. This delay includes medium access delay at the source MAC, reception of all the fragments individually, and transfers of the frames via AP, if access point functionality is enabled for 50 nodes. And throughput which represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLAN nodes of the network for 50 nodes

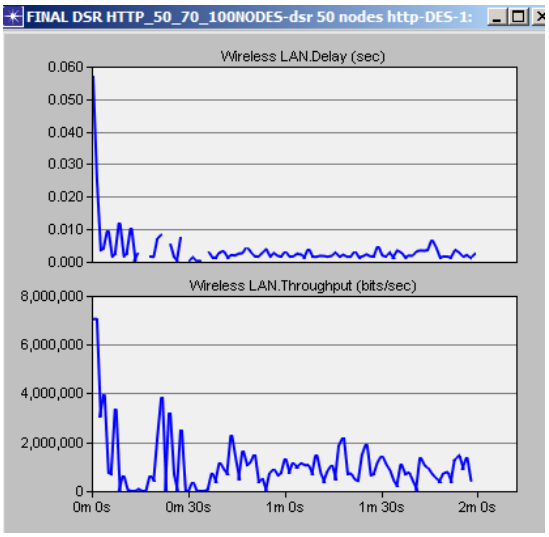

Fig.3 Wireless LAN Delay and throughput for 50 DSR Node

B. For 70 Nodes

Fig 4 shows the Amount of routing traffic Received and Sent in packets/sec in the entire network for 70 nodes.

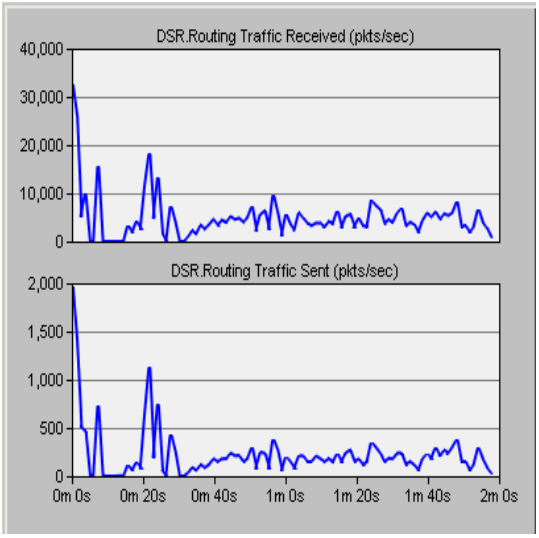

Fig.4 DSR routing traffic received and sent in packets/sec for 70

Fig 5 show s the Average number of packets per second forwarded to the HTTP applications by the transport layers in the network and Average number of packets per second submitted to the transport layer by all HTTP applications in the network for 70 nodes.

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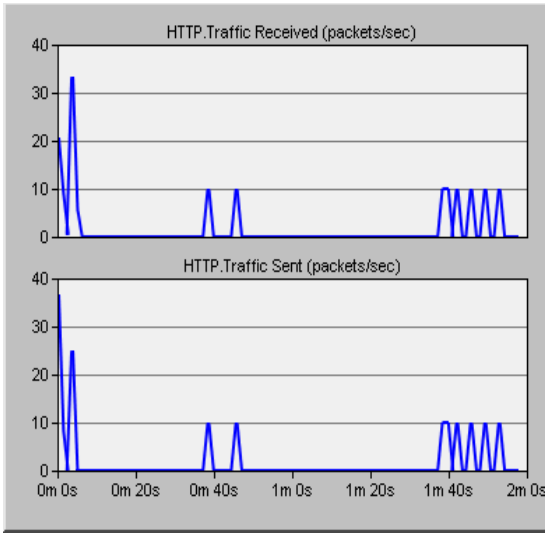

Fig.5 HTTP traffic received and Sent in packets/sec for 70 nodes

Fig 6 represents the end to end delay of all the packets received by the wireless LAN MACs of all WLAN nodes in the network and forwarded to the higher layer. This delay includes medium access delay at the source MAC, reception of all the fragments individually, and transfers of the frames via AP, if access point functionality is enabled for 70 nodes. And throughput which represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLAN nodes of the network for 70 nodes

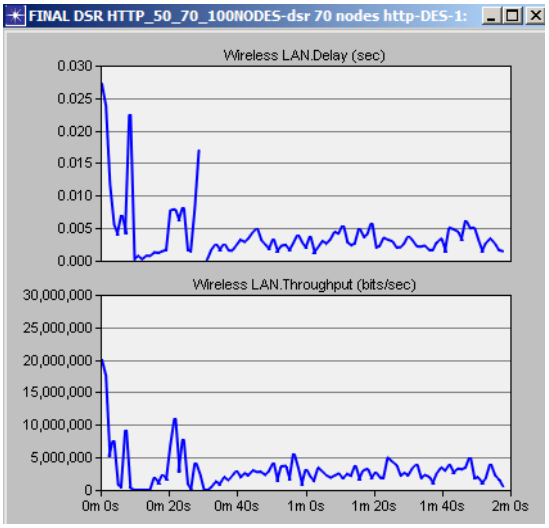

Fig 6 Wireless LAN Delay and throughput for 70 DSR Node

E. For 100 Nodes

Fig 7 shows the Amount of routing traffic Received and Sent in packets/sec in the entire network for 100 nodes.

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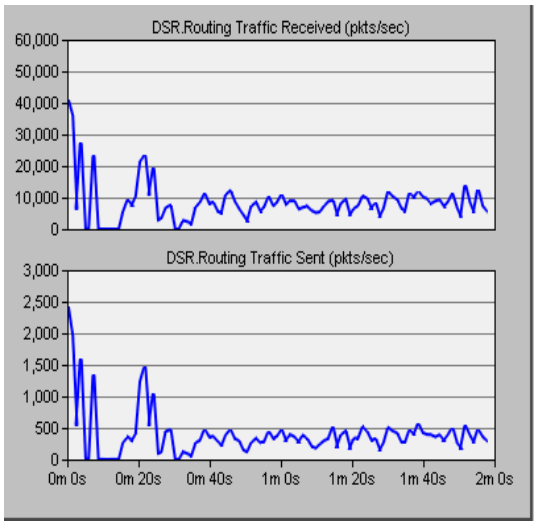

Fig.7 DSR routing traffic received and sent in packets/sec for 100 nodes

Fig 8 show s the Average number of packets per second forwarded to the HTTP applications by the transport layers in the network and Average number of packets per second submitted to the transport layer by all HTTP applications in the network for 100 nodes

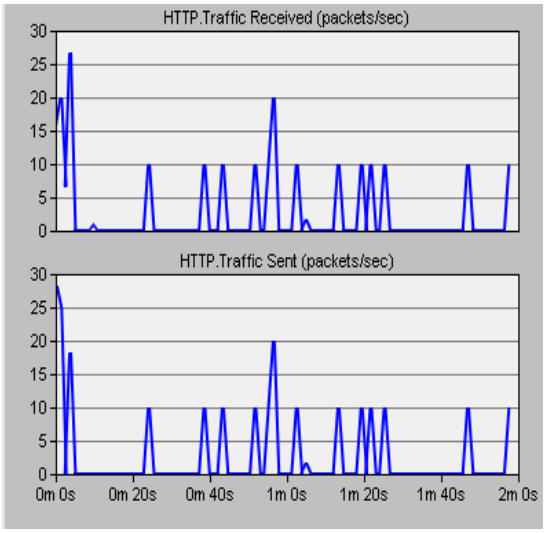

Fig.8 HTTP traffic received and Sent in packets/sec for 100 nodes

Fig 9. Represents the end to end delay of all the packets received by the wireless LAN MACs of all WLAN nodes in the network and forwarded to the higher layer. This delay includes medium access delay at the source MAC, reception of all the fragments individually, and transfers of the frames via AP, if access point functionality is enabled for 100 nodes.

And throughput which represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLAN nodes of the network for 100 nodes

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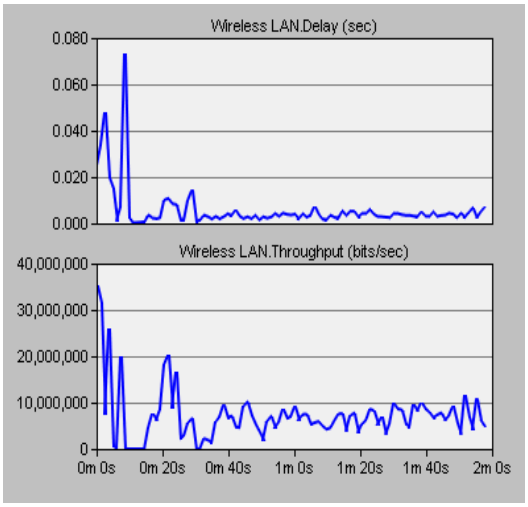

Fig 9 Wireless LAN Delay and throughput for 100 DSR Node

F. Comparison of Delay and throughput for 50,70 and 100 mobile nodes

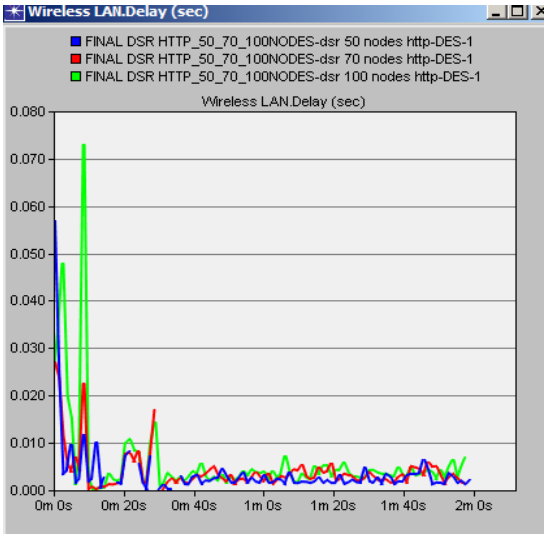

Fig 10 Delay for 50, 70 and 100 Nodes

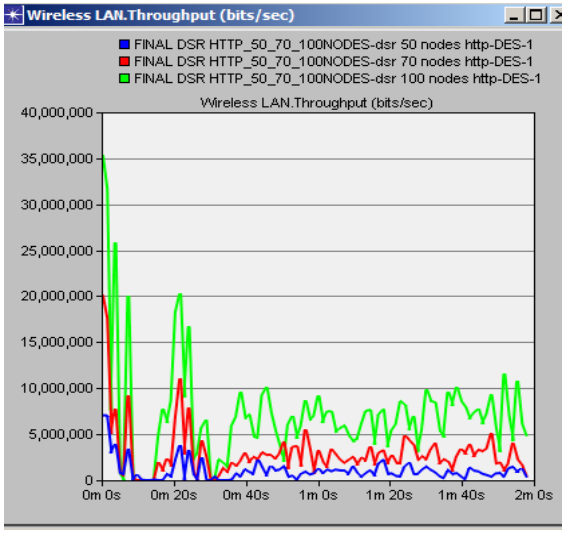

Fig 11 Throughput for 50, 70 and 100 Nodes

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VI. CONCLUSION

From the above simulation the performance matrices like throughput and delay are analysed for 50, 70 and 100 mobile nodes for dsr Manet routing protocol. From above it is observed analysis that throughput is more in 100 nodes than 50 and 70.Also the delay is less for 70 nodes than 50.
Also the traffic parameters like DSR routing traffic received and Sent are analysed for 50, 70 and 100 nodes. The HTTP traffic Received and Sent is also analysed for 50, 70 and 100 nodes. For future the more traffic loads can be considered for evaluation.

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BIOGRAPHY

Diya Naresh Vadhwani is a MTECH Student in CSE, CIIT, RKDF group of institution Indore, RGPV University, M.P Bhopal, India

Mr. Deepak Kulhare is working as Associate Professor at Department of CSE, CIIT, RKDF group of institution Indore, RGPV University M.P, India

Megha Singh is working as Assistant Professor at Department of CSE, CIIT, RKDF group of institution Indore, RGPV University M.P, India