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Delay Optimization and Analysis of Various Performance Metrics for DSR Protocol Using OPNET 14.5

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Abstract— In this paper the DSR and OP-DSR manet routing protocol are compared with various performance matrices like wireless lan delay, retransmission attempts, ip traffic dropped and route discovery time. The network is design with 100 mobile nodes with random way point topology for DSR and OP-DSR. The OP-DSR is the optimized DSR protocol which is implemented using OPNET 14.5 simulator in order to simulate the various performance matrices. Here wireless LAN delay is compared for DSR and OP-DSR and it is shown that OP-DSR protocol has decreased delay value. Here the DSR Manet routing protocol (OP-DSR) can be made efficient in terms of delay metric.

Keywords— Wireless LAN delay, wireless retransmission attempts, IP traffic dropped, MANET, DSR

I. INTRODUCTION

MANET is known as mobile ad-hoc network which is the wireless technology without base station. Manet contains many routing protocols like reactive, proactive, hybrid etc. For route discovery by source routing process the dynamic source routing protocol (DSR) is used. The DSR Manet routing protocol is the reactive source based routing process which has two main processes i.e first is Route Discovery process and second is Route Maintenance process. Here in this paper the DSR and OP-DSR protocols are simulated with OPNET simulator. The network is made up of 100 mobile nodes with random way point topology. DSR and OP-DSR protocols are also compared on the basis of various performance metrics like wireless LAN delay, wireless retransmission attempts, IP traffic dropped etc. From the simulations and results in following figures it shown that OP-DSR which is the enhanced version of original DSR and has optimized delay.

II. DYNAMIC SOURCE ROUTING REVIEW

DSR, this protocol before it sends the data to the destination [1]. Source can recognize each and every intermediate system details towards to the target node [1]. All the nodes has cache which has all the information about the routing information to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it[1]. From [1] it is reviewed that DSR has one disadvantage that there is delay occurs when there is establishment of new connection. Thus to optimized the delay new OP-DSR has implemented in OPNET simulator in order to decrease the delay. From [2] it is concluded that the DSR protocol is made efficient in terms of traffic in the network but in terms of delay the default DSR is better. Thus the delay metric is considered here to make the DSR routing protocol more efficient.

III. SIMULATIONS AND SETUP FOR PROPOSED DSR (OP-DSR)

Here the OPNET simulator is used to implement and simulate the DSR and OP-DSR protocols. OPNET SIMULTOR is optimizing network engineering tool which is used to analyse, simulate the routing protocols. Table I shows the simulation setup for proposed setup. The network is design in opnet modeller 14.5. Fig-1 shows the network diagram for 100 mobile nodes.

TABLE I SIMULATION SETUP FOR PROPOSEDSYSTEM

Parameter	Value
Network Area	1000 m * 1000m
Number of Nodes	100
Routing Protocol	DSR & OP-DSR
Physical characteristics	DSSS
Transmit Power	0.005 W
Mobility Profile Name	Random Way Point
Data Rate	11Mbps
Simulation Time	120 seconds
Buffer Size	25600

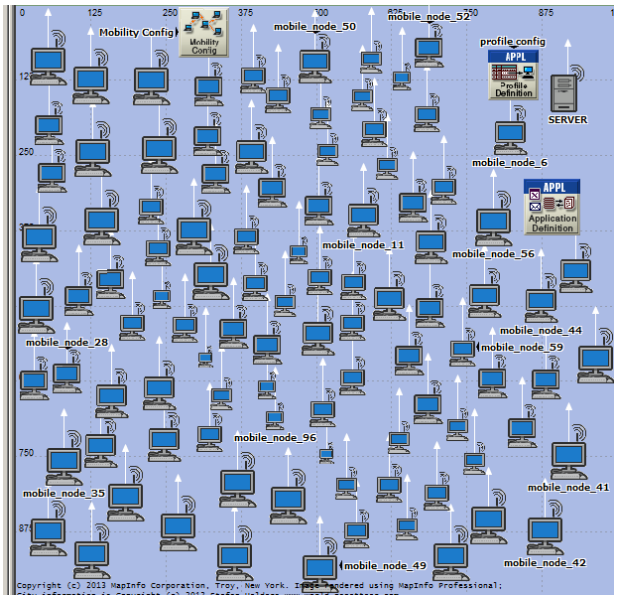

Fig. 1 Network layout for 100 mobile nodes

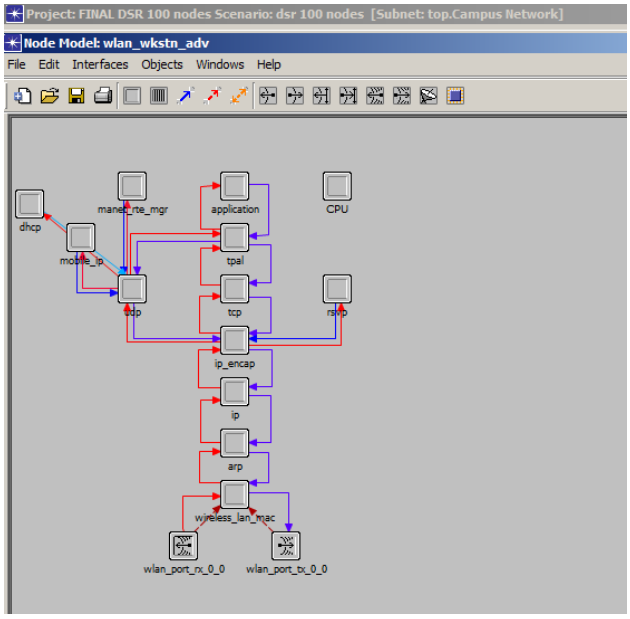

Fig. 2 Node Model for mobile nodes

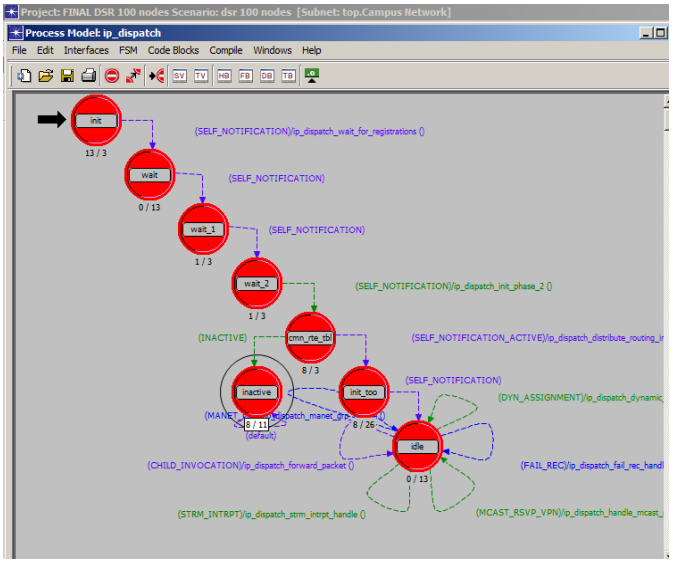

Fig. 3 Process Model for mobile nodes

Following performance metrics are evaluated for DSR and OP-DSR

A. 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. 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.

B. IP traffic dropped

The number of IP datagram's dropped by ALL nodes in the network across all IP interfaces. The reasons for dropping an IP datagram can be any one of the following:

-Insufficient space in the central processor's queue.
-Insufficient space in a slot processor's buffer (only when slot based processing is enabled).
-Maximum number of hops exceeded by an IP datagram.
-On non-routing nodes, for destinations that are more than one hop away, a local router interface was not found to be used as the next hop.
-On routing nodes, the route table lookup failed to yield a route to the destination.

C. Retransmission Attempts

Total number of retransmission attempts by all WLAN MACs in the network until either packet is successfully transmitted or it is discarded as a result of reaching short or long retry limit.

For 802.11e-capable MACs, the retransmission attempt counts recorded under this statistic also include retry count increments due to internal collisions. Additionally, if any 11e-capable MACs use Block-ACK mechanism, this statistic will furthermore record retransmitted Block-ACK Requests, delayed Block-ACKs and block MPDUs, which are not acknowledged in received Block-ACKs.

D. Route Discovery Time

The time to discover a route to a specific destination is the time when a route request was sent out to discover a route to that destination until the time a route reply is received with a route to that destination.

This statistic represents the time to discover a route to a specific destination by all nodes in the network

IV. RESULTS WITH COMPARISON OF TWO PROTCOCOLS

Now the results are shown to compare the DSR and OP-DSR protocols which are simulated in OPNET simulator. Also the graphs are shown for both protocols. In OPNET 14.5 the two scenarios are named as **dsr 100 nodes** for original DSR and **dsr 100 nodes udated** for OP-DSR protocol respectively, in which OP-DSR is modified DSR routing protocol with updated DSR route cache and DSR route discovery parameters. Both the protocols are compared on the basis of performance metrics like wireless LAN delay, IP-traffic dropped ,route discovery time, wireless retransmission attempts.

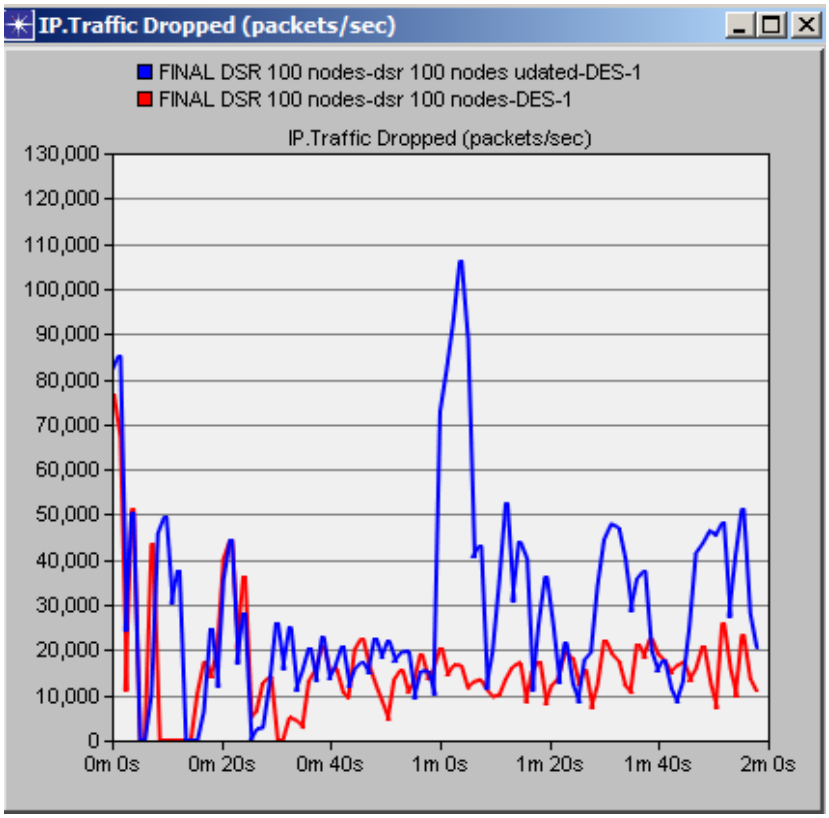

Fig. 4 IP-traffic dropped for DSR and OP-DSR

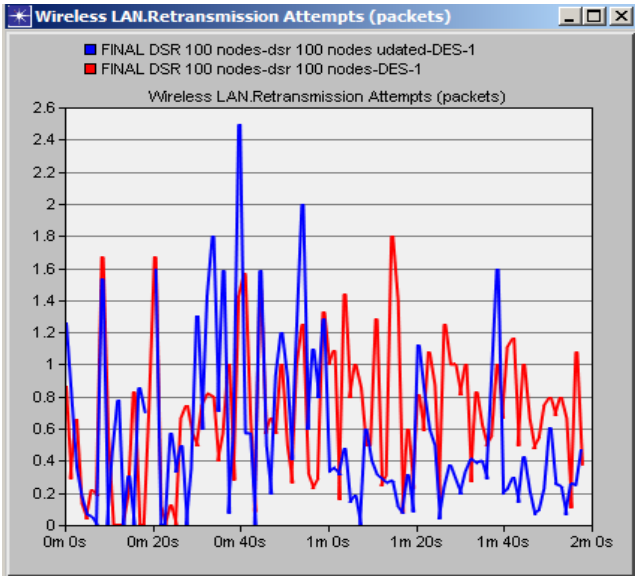

Fig. 5 Wireless retransmission attemptsfor DSR and OP-DSR

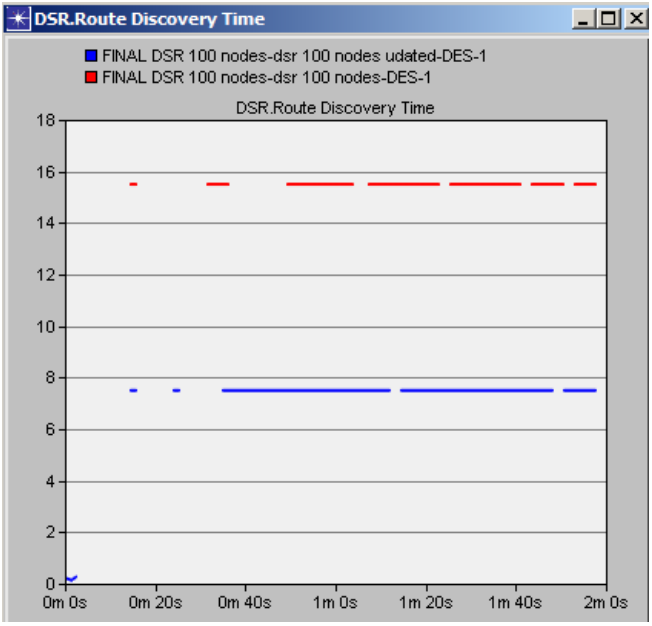

Fig. 6 Route Discovery Time for DSR and OP-DSR

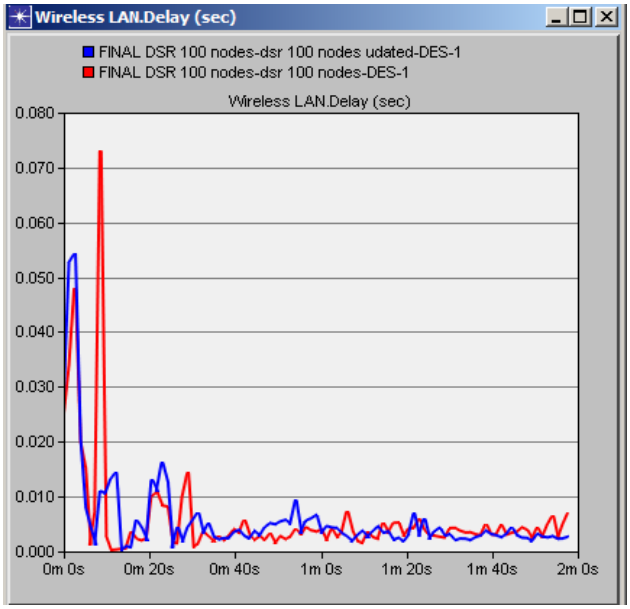

Fig. 7 Delay for DSR and OP-DSR

TABLE III
STATISTICS SUMMARY FOR DELAY METRIC

Protocol	**Initial Delay Value (sec)**	**Final Delay Value (sec)**
OP-DSR	0.0289207340681	0.00271046126175
DSR	0.0252369851998	0.00712716011447

TABLE IIIII
STATISTICS SUMMARY ROUTE DISCOVERY TIME

Protocol	**Initial Value (sec)**	**Final Value (sec)**
OP-DSR	0.215200169391	0.0594506114682
DSR	7.5	15.5

V. CONCLUSIONS

Fig 4 shows the comparison for metric IP traffic dropped for DSR and OP-DSR Fig 5 shows the comparison for metric wireless retransmission attempts for DSR and OP-DSR. Fig 6 shows the comparison for metric route discovery time for DSR and OP-DSR. Fig 7 shows the comparison for metric wireless LAN Delay for DSR and OP-DSR. From the Table III the route discovery time for DSR is more than OP-DSR, hence less time is required by OP-DSR protocol to discover a route to a specific destination by all nodes in the network. Thus OP-DSR is optimised. From the simulations and graph in Fig 7 it is seen that delay for DSR has initial value 0.0252369851998 sec and final value 0.00712716011447 sec , while the delay for OP-DSR protocol consists of initial value 0.0289207340681 sec and final value 0.00271046126175 sec. Thus from the results in Table II for Delay performance metric it is concluded that there is decrease in delay with approximately 4.4%, i.e. delay for route discovery is more in DSR and is less in proposed OP-DSR.Thus the OP-DSR protocol is efficient in terms of delay metric. Hence the proposed system i.e. OP-DSR performs well in terms of Delay against the original DSR.

REFERENCES

[1] V. Saravanan, D.Vijayakumar, "Performance Of Reactive And Proactive MANET Routing Protocols With Trajectories," International Journal of Engineering Research & Technology (IJERT) Vol. 1 Issue 8, October - 2012 ISSN: 2278-0181
[2] Zhaohua Long, Zheng He, "Optimization and Implementation of DSR Route Protocol based on Ad hoc network," 1-4244-1312-5/07/$25.00 © 2007 IEEE,1508-1511
[3] D.Maltz, D.Johnson, "Dynamic Source Routing Protocol for Mobile Ad Hoc Networks," IETF Draft, 1996
[4] Mobile Ad hoc Networking (MANET): Routing Protocol Performance Issues and Evaluation Considerations (RFC 2501)
[5] Min Chen, "The Network Simulation of OPNET", Beijing: TsingHua University Press, 2004.
[6] C. Siva Ram Murthy, B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols," Prentice Hall, 2004.
[7] Zuraida Binti Abdullah Hani, Mohd. Dani Bin Baba, "Designing Routing protocols for Mobile Ad hoc networks", IEEE 2003.
[8] Diya Naresh Vadhwani, Deepak Kulhare, "TRAFFIC ANALYSIS OF DSR, AODV AND OLSR USING TCP AND UDP", International Journal on Computer Science and Engineering (IJCSE) ISSN : 0975-3397 Vol. 5 No. 04 Apr 2013 221- 225,2013
[9] Kuldeep Vats Manoj, Deepak Rohilla, Amit Rathee ,"802.11(a) based Simulation and Performance analysis of DSR Routing Protocol using OPNET," INTERNATIONAL JOURNAL OF COMPUTER APPLICATION, issue 2 Vol 4 (august 2012) ISSN-2250-1797-202-210, 2012
[10] OPNET TECHNOLOGIES, INC., „OPNET: Making networks and applications perform. Bethesda (USA)", OPNET Technologies, Inc. http://www.opnet.com,2005
[11] A. K.Gupta, H.Sadawarti and A.K.Verma,"Performance Analysis of AODV, DSR & TORA Routing Protocols", IACSIT International Journal of Engineering and Technology, Vol.2, No.2, April 2010.
[12] F. Bertocchi, P. Bergamo, G. Mazzini, M. Zorzi ,"Performance Comparison of Routing Protocols for Ad Hoc Networks", DI, University of Ferrara, Italy,2003
[13] David B. Johnson and David A. Maltz, "Dynamic source routing in ad hoc wireless networks. In Mobile Computing," edited by Tomasz Imielinski and Hank Korth, chapter 5, pages 153–181. Kluwer Academic Publishers, 1996.
[14] OPNET Modeler, http://www.opnet.com
[15] OPNET Modeler Wireless Suite http://www.opnet.com/products/modeler

[16] Diya Naresh Vadhwani, Deepak Kulhare, Megha Singh, "BEHAVIOUR ANALYSIS OF DSR MANETP ROTOCOL WITH HTTP TRAFFIC USING OPNET SIMULATOR" , International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 3, May 2013

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