ENHANCEMENT OF OLSR ROUTING PROTOCOL IN MANET

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Abstract
MANET stands for "Mobile Ad Hoc Network." A MANET is a type of ad hoc network that can change locations and configure itself by the controller. Because MANETs are mobile, they use wireless connections to connect to various networks. Optimized link state routing (OLSR) protocol is a one means of the proactive routing protocols for MANETs. It is based on the multi-point relays (MPRS) procedure to achieve all nodes in the network with a restricted number of broadcasts. In this paper, our scenario design of OLSR using grouping technique for nodes involves the factor distance and sink. We apply various techniques to enhance the performance of OLSR, which are discussed.
Keywords: Hello, MANET, OLSR, OPNET, Routing

I. INTRODUCTION

A mobile Ad-Hoc Network (MANET) is a collection of mobile nodes which communicate with each other via wireless link either in a straight line or relying on other nodes as routers. The operators of MANETs don't depend on pre-existing communications or base station. Network nodes in MANETs are free to move arbitrarily. By the cause of mobility of nodes, network topology of MANET may vary dynamically without rotating to any present central management. All network actions such as discover the topology and deliver data packets have to be execute by the nodes themselves, either independently or in a group. In MANETs every node is a likely router for other nodes. The task of specify a routing protocol for a mobile wireless network is not a small one. The main difficulty in mobile networking is the restricted bandwidth and the high speed of topological change and link breakdown caused by node movement. As a result routing in Ad-Hoc wireless system play an important task for data forwarding where each mobile phone node can act as a communicate in addition to being a source or destination node. For the reason that, a large number of routing protocols have been developed to give services with Ad-Hoc network. Movable Ad-Hoc routing protocols are conventionally divided into two classes (Proactive and Reactive) depending on when nodes obtain a route to a target .proactive protocols are characterized by all nodes keep up routes to all target in the network at all period. Thus using a proactive protocol, a node is instantly able to route (or drop) a packet. OLSR i.e. "optimized link state routing" is suitable specimen of proactive protocols, Which are marked out by nodes obtained and keep up routes on demand i.e., a route to a target is not acquired through a node until packet is not received by a target node. Specimen of reactive protocols is "Ad-Hoc on Demand Distance Vector Routing Protocol" (AODV).

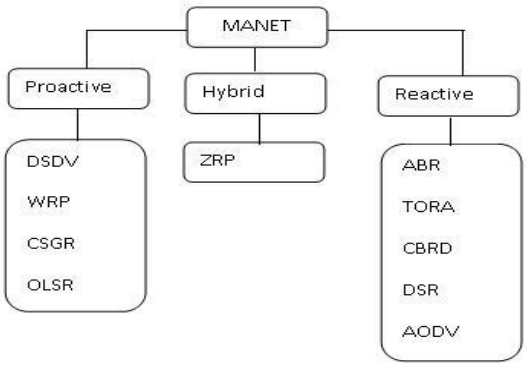

Fig. 1 MANET protocol structure

The rest of this paper is planned as follows. Section II, gives an overview of the Investigative study of routing protocols in MANET with help of various research papers. Section III, presents our simulation parameters and proposed work for performance enhancement. Section IV, presents results and discussion of our proposed work. In Section V, concludes and presents some future works.

II. LITERATURE REVIEW

Navaid Akhter et al. had proposed "Performance Improvement of Optimized Link State Routing (OLSR) Protocol" [1]. An author concludes that the optimization of OLSR control messages intervals has shown to consistently outperform the default implementation of OLSR under specific mobility conditions considered during this study. Author visualize undertaking research to analyze the scalability of OLSR protocol in respect of control messages intervals with number of nodes and to set the boundary limits through detailed simulation studies. N. ENNEYA et al. had proposed "Enhancing Delay in MANET Using OLSR Protocol**" [4].** The author of the above paper concludes the two versions of the real OLSR protocol, in the goal to meet and improve its presentation to the dynamic nature of MANETs mark out by the link location and topology changes. These statements are based on a mobility grade that is quantified and evaluated in point by each mobile node in the network. Yang Cheng Huang et al. had proposed "Tuning OLSR" [6]. An author concludes the performance of the OLSR protocol by tuning soft state refresh intervals. Through simulations see OLSR routing performance is more sensitive to the value of HELLO intervals than the value of TC intervals. Although a smaller HELLO interval could speed up neighbor and link failure detection, the improvement is not linear with the decrease of the interval. So it may be possible to tune the operation of OLSR dynamically, during operation, by measuring metrics presented in this paper, but the mechanism for performing such a dynamic tuning requires further investigations. Kuldeep Vats et al .had proposed "Simulation and Performance Analysis of OLSR Routing Protocol Using OPNET" [13]. An Author concludes MANET routing protocol in the OLSR were performance analyzed. The presentation of OLSR protocol in the course of a network different size carried out a proportional analysis of the performance and found it had improved performance in all aspects in a network. The performance of OLSR which can be achieved by Hello Traffic Sent (bit/sec), Total TC message sent (TTMS) and Total TC message forward (TTMF), Total hello message and TC traffic sent (bit/sec), Routing traffic received (pkt/s), Routing traffic sent (pkt/s), MPR Count.

III. SIMULATION PARAMETERS AND PORPOSED WORK

The aim of proposed work is to enhance the performance of OLSR routing protocol. In this paper the values of various control interval are altered which are beneficial for OLSR for enhance its performance. The values of control interval are optimally used considering the factors like distance and energy. The network in divided in some groups based on initial energy. The forwarder node from each group is selected each round which is responsible for sending and receiving data packets. The CHs are elected on bases on left energy which result in optimal use of network energy. The scenarios are designed using OPNET-14.5. The simulation results had shown that proposed OLSR perform better in compare with their original version. We have to take the various parameters for fulfill our importance that are explain as given below in Table I.

TABLE I Simulation parameters

Maximum Simulation Time	600 Sec
Environment Size	100 *100 meter
No. of Nodes	70
Routing Protocol	OLSR
Data Rate	1Mbps
Packet Size	1Mbps
Speed	11 Mps
Traffic Type	HTTP
Trajectory	OLSR Move
TTL (Time to Live)	System Defined

IV. RESULTS AND DISCUSSION

In OLSR routing protocol simulation research result using special parameters of OPNET Modular with the help of DES graphs which

use the global statistics for analysis result of OLSR routing protocol.

A. Hello Packets

The Hello messages are initially broadcasting in network. The hello messages are used to check the link states of various nodes in network. Also the Hello interval gathers the information like energy, node id and distance from various nodes. In our work we have to decrease the interval of Hello messages and its performance better than existing by default value. In fig.2 shows the enhanced OLSR and existing OLSR performance.

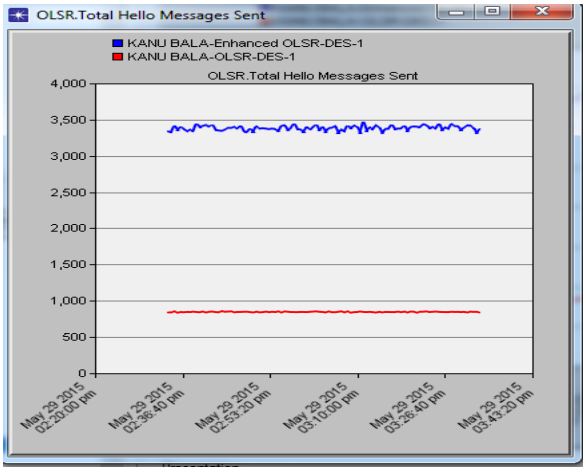

Fig. 2 Total Hello message sent

B. Topology control messages (TC)

This attributes specify the time interval to control topology. The TC messages are forwarded in network by MPR (Multipoint Relay) nodes. Basically TC messages are responsible for changing (Top to Bottom Activity). Higher the TC packets sent rate in network, it results in changing the network topology frequently. As the result more fresh roots are available in network for better routing. Figure 3, represents the values of total TC messages sent in network. Enhanced OLSR had shown much higher value for TC messages sent in evaluation with OLSR. The better roots results in enhancing the overall OLSR performance.

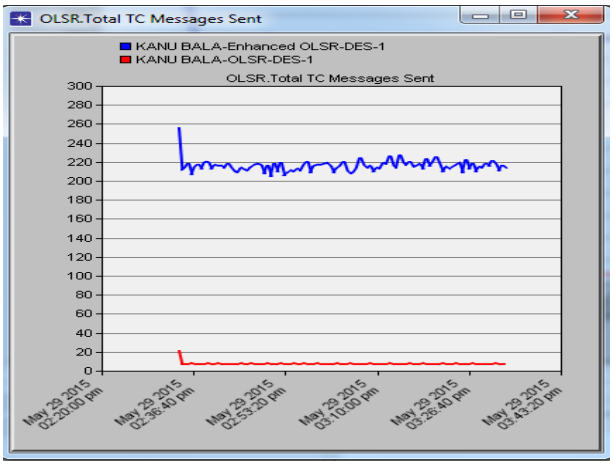

Fig. 3 Total TC messages sent

C. Throughput

The term throughput is defined as number of requests fulfilled for second. The enhanced OLSR has much higher throughput than OLSR. The change in interval and optimal use of energy results in improving the throughput. Figure 4 shows the higher throughput as compared to existing routing protocol performance.

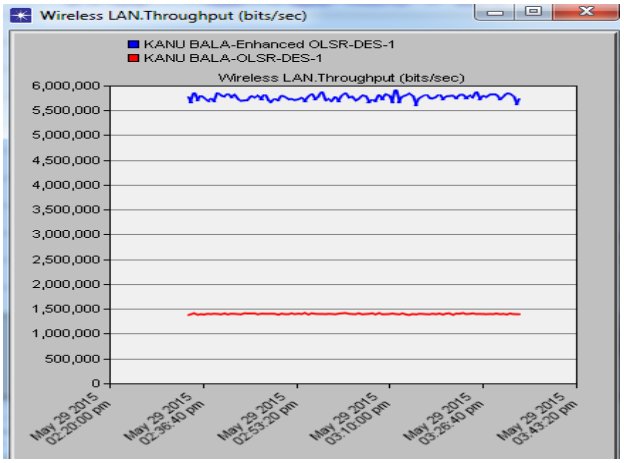

Fig. 4 Throughput of Existing and Enhanced OLSR

D. End to End Delay

The end to end delay is total time taken to send data packet from source to destination until last data bit received. The delay is shown by fig. 5, for enhanced and default OLSR. The delay is almost same for both enhanced and default OLSR. The delay reflects the efficiency of proposed routing for OLSR.

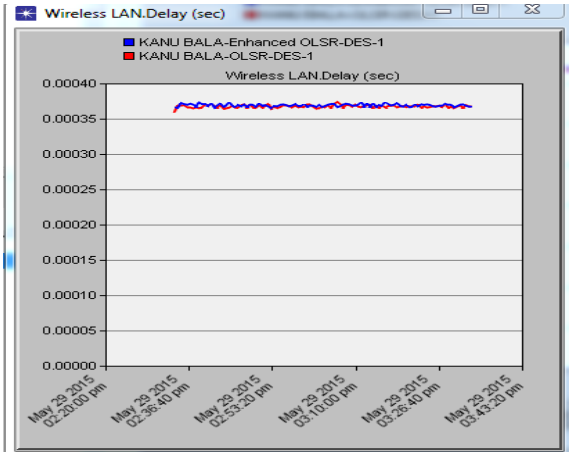

Fig. 5 Delay of Existing and Enhanced OLSR

E. Load

Load represents the total load (in bits/sec) submitted to MANET by all higher layers in all MANET nodes of the network. In fig.6 shows the Load is higher for enhanced OLSR protocol but at the same time throughput is too high, which shows that there is no case of congestion. The proposed routing for OLSR is reliable too.

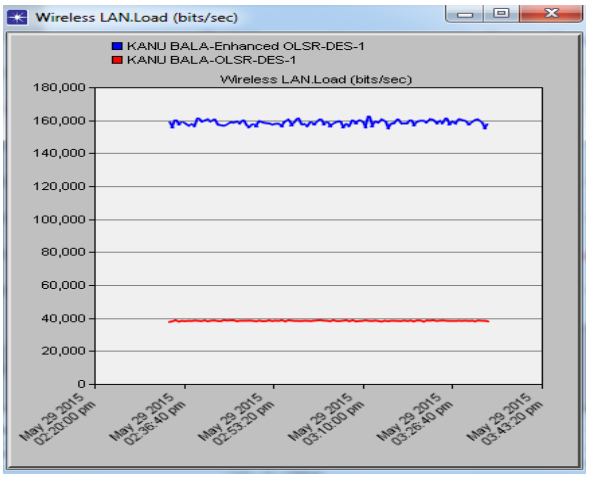

Fig. 6 Load of Existing and Enhanced OLSR

V. Conclusion

In this paper the work had been done for the enhancement of OLSR routing protocol. The technique employed for enhancement purpose as discussed above, the simulation study for OLSR had been done by using OPNET 14.5. As the simulation study the proposed OLSR perform quite efficiently in contrast with normal OLSR over in terms of throughput, delay and load of enhanced OLSR is highly acceptable in terms of overall performance. There will be forever scope to progress the work that has done in this learning. The results could be enhanced by choosing other configuration parameters and by using more group heads.

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