Performance Tuning of OLSR and GRP Routing Protocols in MANET's using OPNET

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Abstract: Wireless Technology is at its pinnacle after we observe analysis and innovation. This field has become a hub of invention of latest theories and structures. Mobile Ad-hoc Network is subject that focus by the researchers nowadays. As Wireless networks became progressively well-liked within the past few decades, significantly since the 1990's they are being introduced and from then continuously modifying the quality and wireless devices has been doing wonders by updating the technology and because the quality of mobile devices (MDs) and wireless networks considerably increased over the past years, wireless ad hoc networks has currently become one in all the foremost trends and active fields of communication and networking analysis.. Mobile Ad hoc Network may be a agglomeration of mobile nodes within which the wireless links area unit often broken because of mobility and dynamic infrastructure. Routing may be a broader issue and challenge in ad hoc networks. The main bifurcation of MANET routing protocols are Proactive, Reactive and Hybrid. In this paper the performance parameters are compared and main aims is to tune the performance of Hybrid routing protocol by concentrated on geographical-based Routing Protocol (GRP) and a Optimized Link State Protocol (OLSR) which is a proactive routing protocol, whereby routes mostly discovered and updated frequently and accessible when needed .The simulation results show the improvement of the network performance of these routing protocols on the idea of throughput , delay , load , etc .

Keywords— Manet, GRP, OLSR, OPNET, Routing Protocols .

1. INTRODUCTION

Network structure is dynamic quickly in recent years. the sole network accessible from decades was wired network. The emergence of wireless networks has gone associate extended manner in breakdown the growing service demands[1][2]. The most target of research and development has nearly shifted from wired networks to wireless networks. the constraints of wireless network techniques like elevated error rate, high power restrictions, constraints of reliability in terms of throughput and load, other parameters such as delay ,etc has not deterred the development and performance in mobile adhoc networks [3]. MANETS be a wireless network that transmits from computer to computer and all computers ought to communicate, this peer-to-peer mode of operation can greatly extend the gap of the wireless network. to realize access to the online, one among the computers are connected via wire or wireless. MANETs essentially classified into three categories on the premise of route discovery reactive in addition familiar as on-demand routing protocol ,proactive in addition. In protocol where all the nodes being equal i.e. they play constant role within the network. In stratified protocol totally different nodes play different roles i.e. during this totally different cluster heads being chosen among cluster members. In location primarily based protocol nodes rely on the placement fact and use this fact for communication.

2. ROUTING PROTOCOLS-

2.1 Optimized Link State Routing
Optimized Link State Protocol (OLSR) characterized as proactive routing protocol. OLSR is superficial version of link state protocol. The method is different from traditional ,as flooding is performed by MPR nodes and each MPR node acts as sender which ultimately reduces number of packets in the network[4]. To decrease the promising overhead within the network protocol makes use of Multipoint Relays. The function of MPR is to decrease the broadcasts by reducing the flooding in which few regions within the network will act as a transmitter. In end it scale back to produce the shortest path[5].

2.2 Geographic Routing Protocol
 GRP may be a position based protocol identified as hybrid routing protocol. In GRP is employed to mark the placement of node and also the quadrants optimize flooding. Once a node moves and crosses neighborhood then the flooding position is updated[6]. The neighbors and their positions area unit known by the exchange of "Hello" protocol. The idea of route protection ensures that a node will come its packet to consequent node [4].The protocol that referred to as proactive protocol [4] is primarily based on the concept of flat based routing

3. Proposed Methodology

The methodologies used for modelling and performance analysis of routing protocols which are based on experimentation and thus we obtained analysis based on simulation using OPNET .In addition, simulation offers flexibility in model development, validation, and performance analysis. To analysis of these matters the impact on these parameters and the performance of routing protocol, a simulation methodology approach has been adopted to look at the impact and performance of routing protocols

In OLSR we used the concept of logical grouping i.e based on clustering and compared the results of Default OLSR and Proposed technique i,e based on logical grouping named as enhanced OLSR. In GRP we introduce the concept of quadrant based routing and compared the results using default nature of GRP with proposed named as enhanced GRP . This study intends to enhance the performance of OLSR and GRP routing protocols by performance standardization of those protocols [3]. As at that time it take a fraction of time to start and send Data packets [6]. GRP provides a high-quality structure which might work on constant time that gathers network data at a transmitting node employing a very little overheads[7][8].

3. Experimental-Procedures

OPNET Simulation Tool has been used to evaluate the performance of the OLSR and GRP Protocols. The GUI based results shown using graphs based on some parameters are evaluated. The OPNET works in a hierarchy as depicted using flow chart
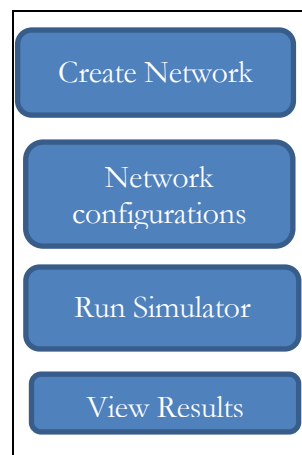
4. PERFORMANCE EVALUATION   PARAMETERS

We have contrasted the performance of our tuned protocol and compared the results with Default protocol.

4.1 Simulation setting

To upgrade and enhance the performance of our tuned protocol, we have optimized our protocol using OPNET simulator. We have considered a network with 100 nodes distributed randomly in 100m X 100m area.

4.2 Performance Parameters

In this subsection, we display evaluation and the performance by using various parameters metrics. In this work, we evaluated four performance parameters given below:

1) Network Load: Load defines the reliability of routing protocol.
2) Throughput: To evaluate the throughput, the numbers of packets routed per second and successfully received at the receiver end.
3) Delay: It is sum of the times taken by the successful data packets to travel from their initial node to destination divided by the total number of successful[9].
4) MPR count : MPR nodes performs control flooding i.e forward packets from one cluster to another. They create TC interval to find best positioning of the network in OLSR protocol.

4.3 Simulation Results and Analysis

Maximum Simulation Time	600 seconds
Environment size	100*100 m
Number of nodes	50 , 100
Routing protocol	OLSR, GRP
Packet size	1024
Speed	10 m/s
Traffic type	FTP (low load)

5. Analysis-

The graphs depicts the actual results achieved. The results shows the performance has increased in terms of elevated throughput.
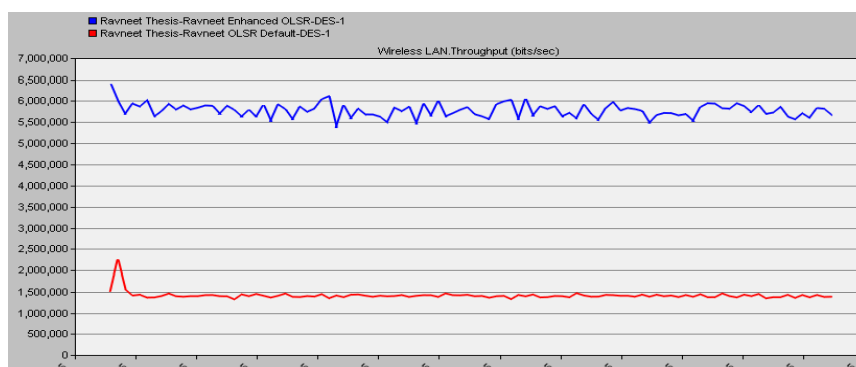
1) **Throughput**:

Fig – 1 Interval plot- Analysis of Throughput

It is number packets sent per second are assessed through extensive simulations. Simulation results of Enhanced protocol depicts an elevated throughput. Here by using logical clustering Enhanced OLSR outperformed the default OLSR protocol. It nearly increased the throughput to 4 times.
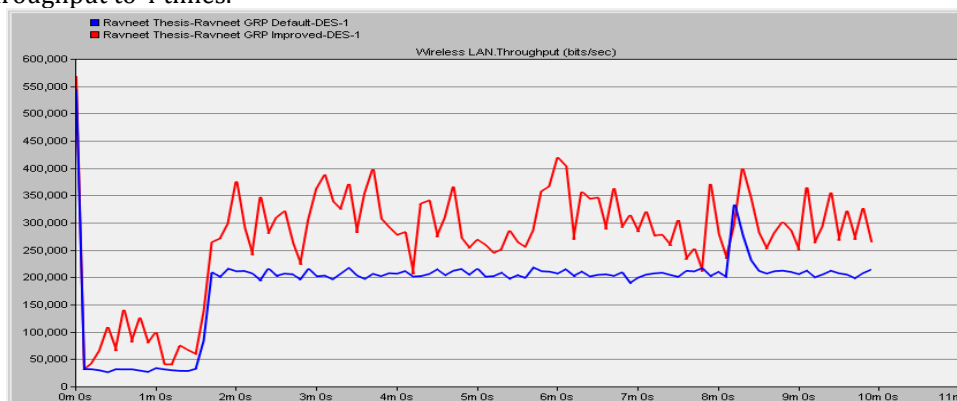

Fig. 2: Interval plot- Analysis of Throughput

Here by using quadrant based technique Enhanced GRP performed better than the default GRP protocol. It nearly increased the throughput to 2.5 times.

2) Load

Load factor rely on reliability . Load factor is more in case of enhanced OLSR as compared to default OLSR routing protocol.Thus if reliability factor is reduced there is congestion in the network. But in our case there is no congestion as reliability is same in both the cases.

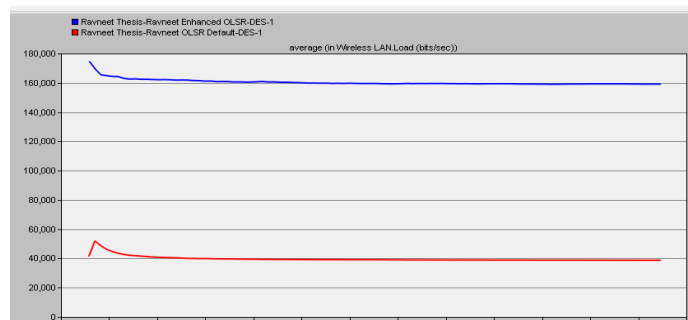| Protocol	Throughput	Load	Reliability= Throughput/load
Default	6,000,000	1,60,000	37.5
Enhanced	1500000	40000	37.5

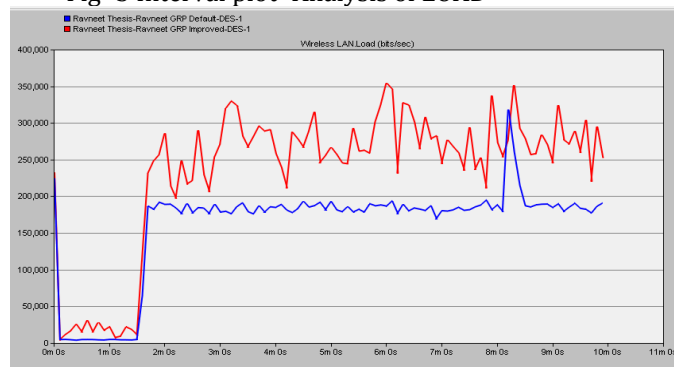Fig- 3 Interval plot- Analysis of LOAD

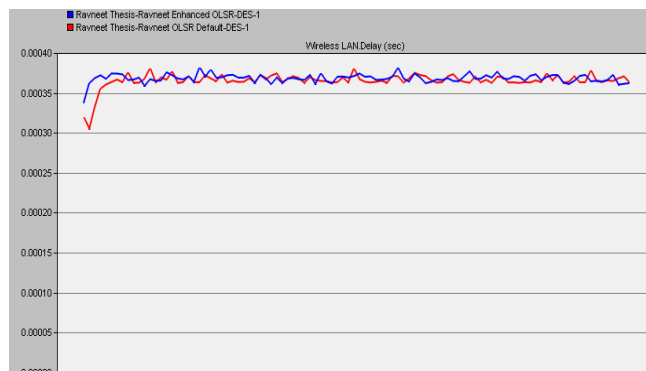Fig 4 Interval plot- Analysis of LOAD

3) **Delay** –

Fig 5 Interval plot- Analysis of DELAY

Delay depicts almost same reading in both the cases in OLSR routing protocol. Although being constant delay we have achieved high throughput.
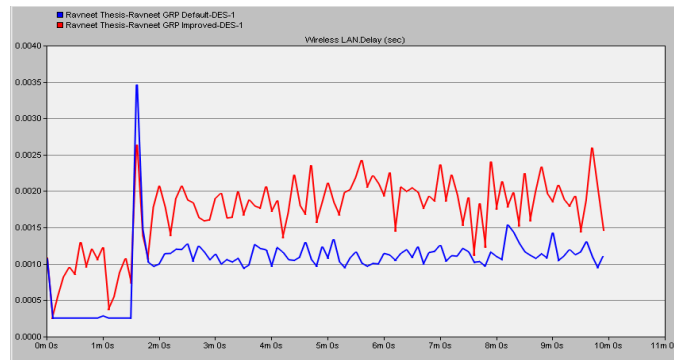
Fig 5 Interval plot- Analysis of DELAY

In GRP routing protocol delay is more as in quadrant shifting by node delay is more, but delay can ignored as we are getting good throughput.

4. CONCLUSION

Thus to conclude , In this paper both (i.e GRP & OLSR) the enhanced versions of proposed work shown better results than the both default routing protocols.Based on logical grouping OLSR performed better and by using quadrant based technique Enhanced GRP performed better, we kept all the parameters same for both the default and enhanced routing protocols thus, we have achieved the better results. In this paper while comparing the OLSR and GRP , OLSR perform better because of its maximum throughput.

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