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IMPORTANCE OF RELAY NODE SET FRAMEWORK FOR MANET COMMUNICATION ENVIRONMENT

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Abstract-MANET technology is growing in every day life so many protocols and tools has been developed for the improvement of MANET protocols efficiency , when author analysis past research of MANET network they found a need to more improve and update the traditional MANET routing protocols , Routing protocols are very important activity of MANET network with efficient routing it is not possible to resolve the complexity scenario of MANET structure , it true for the point of view of network administrator that when some one gets route then network get depend on some intermediate router for routing purpose, therefore it is the demand of this new infrastructure network to resolve the issues of MANET routing by having some extra ordinary framework to proceed MANET processes efficiently is call Frame Relay Model by the author of this paper to renew the procedure followed by the traditional protocols of the MANET network.

As the author of the research paper has been going through the various proposed research module in near days they find that "MANET has been getting struggle with few common issues of network like, at central point of communication it face so many performance related issues to that degrades overall network performance down on the other hand we can also have the theoretical measurement to establish the new development " which is the main objective of this research paper to explorer the new research area regarding to overcome from the errors.

Keywords- MANET; Routing; Network Administrator; Efficiency; Frame Relay Model.

I. INTRODUCTION

After analyzing much research papers or mostly proposed improving protocols, tools and techniques before standard MANET routing protocols are established. Lots of research paper and literatures has been experiments on difference experiments too s for concluding the research proposals for such type of framework by considering different traffic pattern and traffic load as what author seen in [1, 2, 3, 4, 5], However, due to the lack of consistent quality of services of different MANET protocols, prior simulation experiments are not well developed and designed. For example, no simulation tool can predict the exact conclusion at the end of the experiment from their literature survey report because some protocols that perform well, in terms of consistency, overhead management, performance or throughput, in some scenarios may have week performance under other conditions. However, the associative relation between the experimental tools and the MANET routing protocols remains unclear. So that no one can major the predicted result by this tool. These efforts can be consider by a framework that can major and characterize MANET routing protocols. However, previously so many researches have been made but there was lack of research on this topic. In this paper, one present such a framework using the concept of a relay node set framework. The framework describes routing protocols using four associations of different modules. The framework provides a different view of MANET protocols specifications and highlights relations among different protocols. The framework provides the following capabilities.

- One can describe MANET routing protocols with on such type of experimental tools like Relay based Node Framework. This framework is application to experiment different MANET routing protocols and highlights traffic pattern, the internal relationships among different protocols [6, 7].

- In the similar fashion a Quantitative models based on the architecture proposed in FRAMEWORK can be used to identify factors that affect control overhead and maintained for different MANET routing protocols and traffic pattern Framework. The framework analysis comparison of routing protocols by analytical models for the purpose of getting identify most common and uncommon factors of MANET Routing Protocols which has been coupled with network parameters and traffic profiles. These protocols parameters and profiles could come from measurements. Therefore, this quantitative model can help researchers to get status of control overheads ,estimate how control overhead changes when the network environment changes [8].

- In this way some one found that their should be only a way to get find the details of MANET routing protocols. For example, reduction of performance factors that affect the over all overhead of a protocol can be used to consistency in the performance of that protocol in terms of control overhead. The modularized framework allows a sub protocol to be replaced by another sub-protocol to form a better MANET routing protocol as long as these two sub-protocols have the same functionality.

- The Proposed Framework and the corresponding quantitative model can aid the design, evaluation of performance, and validation of various qos with new MANET routing protocols with basis on control overhead [9]. For example, one can perform some efficient algorithms to achieve low overhead and high performance for particular application environments. Based on the factors that affect control overhead, one can also evaluate and improve MANET simulation models.

- A better understanding of control overhead based on the Framework can be useful for routing protocols for performance evaluation that incorporate adaptive controls and changes over different time session, like some protocols in MANET [09]. These reactive routing protocols are good to achieve different application specific goals, e.g., packet overhead, targeted packet loss rate, or limited delay measurement [10].

In this section, author of the paper concentrates on the explanation of the framework and provides examples of its capabilities. So many protocols and algorithm have been already proposed so that Framework will be the most effective way in order to know the performance measurement for different time and traffic pattern will be useful for many applications.

II. PROPOSED FRAMEWORK

In this section the author represent the working concept of proposed framework with two associate covering node called M and N. When figure said when a covering node like M will broadcasting a signal in MANET network it will be broadcasted to the other neighboring nodes., in this case we imagine that the protocol will be MAC for sure delivery of packets in order to explain such property, one says that the sender covers all of its neighbors. A set of nodes, says set M, is covered by another set of nodes, say set N, when any node in M is covered by at least one node in N. The set of node M say 1, 3, 4 has been covered by set of node N say 2, 5, 6.

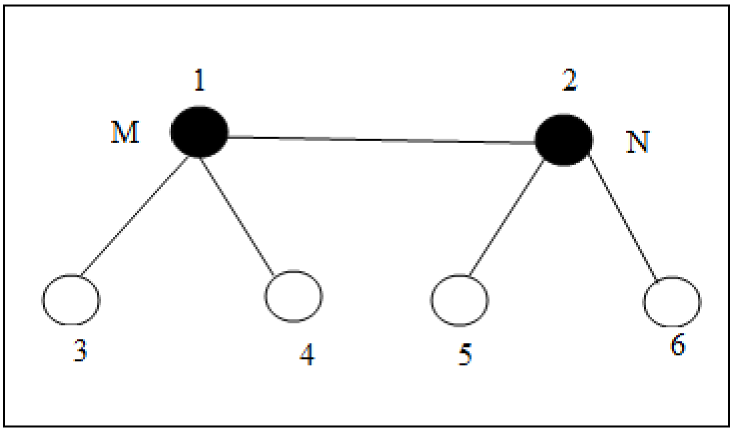

Figure1. Relay based Communication Network

In the above figure we try to say that every intermediate node in figure react as a router for performing communication form neighbor to neighbor. The relay based node set is a set of nodes that has been eligible for retransmission and control messages in the MANET network. Nodes which are not the part of this framework consider as a non framework nodes, which always stay silent after they have processed control messages received from their neighbors. Figure 1 also illustrates the role of proposed framework. For example. The neighboring like 1 and 2 using broadcast each and every packets to the broadcasting range but still if node M and N will suffer then new relay set has been introduced to over come this drawback by introducing some more intelligent set of node they again perform the retransmission policy for sending and receiving nodes so that at the receiver end broadcasting is over due the confirmation of new packets has been arrived at that side.

III. MATHEMATICAL CONSTRUCT FOR ANALYSIS OF ROUTING PROTOCOLS USING RELAY FRAMEWORK

In this section author describes the performance calculation equation and their relationship for the node to node framework communication, author assumes MAC protocol will be the reliable protocols their for the successful communication, study is this section give an analytical model for each protocol with the emphasis on performance measurement.. Due to Mac author get low overheads maintenance in retransmission policy for successful networking scenario in MANET [11, 12].

3.1 Analysis of DSR with Proposed Framework

DSR is the one of the most effective routing protocols play an important role in routing process. In this mechanism route request is broadcast when there is no known route to the expected destination. A node that is not associate specific destination rebroadcasts the route request if it does not know specific intermediate route. All nodes who come under the ranges of Framework they broadcast the request to its neighbors. A Relay framework in DSR is always worked with the pair of nodes consisting one which is initiator and the target node. This is the procedure of framework for building module in DSR, which stops when a route is found [15].

$$Overhead = \sum_{i=1}^{N_{pair}} \left[\sum_{j=1}^{N_{i,build}} \left(\overline{P_{i,j,req}} \times S_{i,j,RNS} + \overline{P_{i,j,rep}} \times S_{i,j,ret-p} + \overline{P_{i,j,err}} \times S_{i,j,RNS} \right) \right]$$

Equation 1

The definitions of variables are listed as below.

- N_{pair} is the number of pairs of source and destination nodes.
- $N_{i,\,build}$ is the total number of building or rebuilding operations for the i_{th} Framework.
- $P_{i,\,j,\,req}$ is the average size of the route request packet when the i_{th} Framework is rebuilt for the j_{th} time.
- $S_{i,j,FRAMEWORK}$ is the size of the i_{th} Framework when this Framework is rebuilt for the j_{th} time. Note that $S_{i,j,FRAMEWORK}$ can be zero when the route between the corresponding source and destination nodes is known, for example, due to the route cache recording other routes that contain the desired route.
- $P_{i,j,rep}$ is the average size of the route request reply message and corresponding route failure notification, if there is any, for the i_{th} Framework when this Framework is built for the j_{th} time.
- $S_{i,\,j,\,ret\_p}$ is the size of the subset of the i_{th} FRAMEWORK that includes all nodes on the path from the node that discovered that path back to the initiator and part of nodes adjacent to that path when the i_{th} FRAMEWORK is built for the j_{th} time. Note that S_{i,j,ret_p} less then equal to $S_{i,j,FRAMEWORK}$.
- $P_{i,\,j,\,err}$ is the average size of the error message when the i_{th} Framework is rebuilt for the j_{th} time.

In above equation some of these variables are dependent on others. When the network size in-creases, $P_{i,j,req}$, $P_{i,j,rep}$, $P_{i,j,err}$, $S_{i,j,FRAMEWORK}$ and S_{i,j,ret_p} may all increase. When nodes have higher mobility, $N_{i,build}$ could become larger. When the traffic load becomes heavier, N_{pair} becomes larger.

3.2 Analysis of TORA with the Framework

In proactive routing protocol strategy TORA and the Framework will be coordinating the associate member node [14] with each other through relationship in between to the group of set of the range node as predicted by the following instruction set.

$$Overhead = O_r + O_p + O_m$$

$$O_r = \sum_{i=1}^{N_{pair}} \sum_{j=1}^{N_{i,build..r}} (P_{QRY} \times S_{i,j,RNS} + P_{UPD} \times S_{i,j,return.path})$$

$$O_p = \sum_{i=1}^{N_{p,deat}} \sum_{j=1}^{N_{i,build..p}} (P_{OPT} \times N)$$

$$O_m = \sum_{i=1}^{N_{pair}+N_{p.deat}} \sum_{j=1}^{N_{i,maintain}} (P_{UPD} \times S_{i,j,update} + P_{CLR} \times S_{i,j,erase})$$

Equation 2

In equation 2, O_r is the overhead to generate and rebuild Relay Framework in the reactive mode, O_p is the overhead to generate and rebuild Relay Framework in the proactive mode, and O_m is the overhead to maintain Relay Framework. Some variables are the same as those in equation 1. Others are defined as follows.

- N_{pair} is the number of pairs of source and destination nodes for which paths are found in reactive mode.
- $N_{i,\ build}$ r is the total number of building or rebuilding operations for the i_{th} Relay Framework in reactive mode.
- P_{QRY} is the size of the reactive route query (QRY). It is a constant in TORA.
- P_{UPD} is the size of the request reply (UPD) message. It is also a constant in TORA.
- $N_{p\text{-}dest}$ is the average number of destination nodes that start the proactive procedure.
- $N_{i,build\_\ p}$ is total the number of building or rebuilding operations for the i-th Framework in Proactive mode.
- POPT is the size of the route building (OPT) packet in the proactive procedure. It is a constant in TORA.
- N is the total number of nodes in the network.
- $N_{i,\ m,aintain}$ is the number of times that the maintenance procedure is used for the i-the request.
- $N_{i,j,update}$ is the number of nodes that need to adjust their heights when the topology changes for the i_{th} request, including in both proactive and reactive modes, in the j_{th} maintenance operation for the i_{th} Framework
- P_{CLR} is the size of route erasing (CLR) packets. It is a constant in TORA.
- $S_{i,j,erase}$ is the number of nodes that need to propagate the CLR packet during the route erasing procedure for the i_{th} request, including both proactive and reactive modes, in the j-th maintenance operation for the i_{th} Framework

3.3 Analysis of OLSR with Proposed Framework

OLSR and relay sets are associating with wireless communication node network by having multiple overlay communication in and out of the ranges of the specified network that causes more overheads during the transmission [15] and rebroadcasting procedures so that need to be manage through the following instruction set.

$$Overhead = O_{construction} + O_{maintenance} + O_{propagation}$$

$$O_{construction} = \sum_{i=1}^{N_{hello}} \sum_{j=1}^{N} P_{i,j,hello}$$

$$O_{maintenance} = \sum_{i=1}^{N_m} \sum_{j=1}^{N_{i,adjust}} (P_{i,j,MPRS} \times S_{i,j,RNS})$$

$$O_{propagation} = \sum_{i=1}^{N_{update}} \sum_{j=1}^{N_{i,MPRS}} (P_{i,j,MPRS} \times S_{i,j,RNS})$$

Equation 3

Some parameters are defined previously. The other variables are defined below.

- N_{hello} is the total number of periods in which hello messages are sent.
- $P_{i,j,hello}$ is the size of the i_{th} hello packet sent by node j. The actual overhead in the Framework building phase can vary since the size of the hello messages varies.
- N_m is the number of Frameworks maintenance operations due to link changes. The Frameworkmaintenance operation is invoked each time the topology changes. Thus, Nm depends on random changes in the topology.
- $N_{i,adjust}$ is the number of nodes that need to adjust MPRs in the i_{th} maintenance operation. When the topology changes, the MPRSs of some nodes within a two-hop range may change. This parameter depends on the exact MPR selection algorithm that is used and on network properties.
- $P_{i,j,MPRS}$ is the size of the MPRS declaration packet (topology control message) for node j in the nodes that adjust their MPRS sets when the i_{th} link changes. The size of the MPRS declaration packet may vary, so the actual overhead due to MPRS declaration packets varies.
- $S_{i,j,FRAMEWORK}$ is the size of the FRAMEWORK for node j in the i_{th} maintenance operation.
- N_{update} is the total number of periods in which broadcast topology control messages are sent.
- $N_{i,MPRS}$ is the number of nodes with a non-empty MPRS at the i_{th} periodic broadcast.

IV. CONCLUSION

We have been presented the mathematical analytical study of three protocols comes under the category of proactive routing protocol as DSR,TORA and OLSR with specified framework mathematics instruction set in the way of proposing equation 1,2,3 form the above section and get the idea of getting lower throughput with high performance over the network dynamic traffic pattern and monitoring operations as well.

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