A Nobel Approach of Hybrid Routing Protocol In Mobile Ad-hoc Network

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Abstract— The goal of MANET is formation of a self-organized and self- configurable network of mobile nodes with wireless connectivity, where the nodes move arbitrarily. Routing is a critical issue in Mobile Adhoc Network. Therefore, Routing protocols for this network have to face the challenge of frequently changing topology. Both proactive and reactive routing protocols prove to be inefficient under these circumstances. Third category, Hybrid routing protocols combines the advantage of Proactive as well as the reactive protocols. This research work is equipped with some goals of analyzing the behaviour of existing MAC protocol over the hybrid type of routing for ad hoc networks, analyzing the impact of delay while receiving the data over the zone based communication (inside/outside of the zones), developing a solution by enhancing the existing MAC protocol and also analyzing the behaviour of the zone routing protocol with proposed algorithm. Hence in this research work calculation of the performance routing protocol using different parameters such as receiving time, bandwidth, packet loss etc obtained.

Keywords— Ad-hoc, Bandwidth, Centralized, MANET, Network, Packet-loss, Performance, Proactive, Reactive, Receiveing-Time,etc.

I. INTRODUCTION

A mobile ad-hoc network running Dynamic Source Routing reactive protocol under the conditions of limited availability and heightened response times of network nodes. Authors conclude that dynamic source routing stops being efficient in large networks and propose a hybrid routing protocol that includes the proactive phase and uses availability criterion as a metric. Authors provide experimental results for the dynamic source routing protocol simulation, as well as the message headers and functional outline of the hybrid routing scheme [1].

There are three basic approaches for providing and keeping communication in Mobile Multihop/Ad-Hoc Network (MANET). There are three approaches for solving communication in these networks. Standard approach represented by MANET routing protocols, Opportunistic approach used in Delay Tolerant Networks (DTN) represented by opportunistic routing protocols, and Hybrid approach represented by hybrid (standard and opportunistic) routing protocols. MANET consists from mobile devices, which have different features and can create diverse type of mobile environment. Not all of basic approach can work efficient to provide and keep communication in such environments. From this reason, in this paper are compared three representatives of this approaches (Dynamic Source

Routing - DSR, Social Based Opportunistic Routing - SBOR and Hybrid Social Based Routing - HSBR) and verified their usability and affectivity for given MANET environment for simulations. All methods are simulated with different level of mobile nodes velocity. Theoretical assumptions of increasing success of delivery by combination of advantages from MANET and DTN solutions are verified and confirmed based on simulations [12].

Mobile ad hoc network-a revolutionary concept in itself, is a collection of wireless mobile nodes that are dynamically and arbitrarily located in a fashion that the interconnection between nodes are capable of changing in a continual basis. MANET has increasingly gained popularity, especially with the military and it is the aim and zeal of technology to upgrade its components and make them better and better [11, 13-16]. Mainly 4 or 5 types of conventional routing protocols of reactive, proactive or hybrid natures are used based on the requirements of the network. However power consumption in all these are rather high causing the transmission cost to increase. Thus, the quest for an energy efficient routing protocol in MANET to make its usage even better [17-18]. In this paper we have tried to talk about newer energy efficient routing protocols. These take into consideration that in MANET, channel and energy capacity are scarce resources.

Thus it is extremely important to enhance the lifetime of MANETs [3 & 20].

To make a hybrid protocol that work in different kind of environment as in our common environment we have continuous link. But on the other hand we also have that type of environment in which we don't have continuous communication link. But we don't have a method that work's efficiently in both environments. From that observation we find the environments that have both characteristics that may be continuous for some time and may be discontinuous for some time so we find a way that work in both environments efficiently and have continuous communication. For that we develop hybrid algorithm that work efficiently in that type of environments that algorithm basically combine two different protocols and provide feature of both protocol [20-22]. That will be a switching algorithm who decides which protocol will be used on the basis of network characteristics because we gather switching data from network so this algorithm is faithful and work efficiently in all type of environments [4 & 21].

Mobile ad hoc network is a collection of wireless mobile nodes that creates a dynamically wireless network among them without using any fixed infrastructure. Nodes are mobile and free to move, independent of each other which makes routing much difficult [7-9 & 22]. The routing protocols in MANET should be more dynamic so that they quickly respond to topological changes. In this paper simulation based experiments are performed to analyze the performance of Hybrid Routing Protocols ZRP, CBRP on the basis of Packet Delivery Ratio, End to End delay and Average Throughput. These results are compared with AODV, DSR and FSR routing protocols by varying number of nodes [9 & 10]. The comparison shows that Hybrid routing Protocol for Adhoc networks performs better as compared to AODV and DSR routing protocols [19].

II. RELATED WORK

In this research paper study of various previous research works and their results are analysed with concentric approach to proposed work. Most of the work done related to the performance comparison of MANETs routing protocols includes either purely reactive protocols or purely proactive protocols. Some research references are given here.

[1] In this Article author collected concept of routing methods and a Simulation of routing in an ad-hoc network in conditions of limited availability for mobile Adhoc networks.
[2] In this Article author proposed An Enhanced Hybrid Social Based Routing Algorithm for MANET-DTN.
[3] In this Article author tried to focus on some energy efficient routing algorithms which are suitable with MANET systems.
 [4] In this Article author given a hybrid routing protocol for any rural environment.

[5] In this Article author provided many ways to reduce routing overheads. This research work was associated with concepts of ZRP.
[6] In this Article author produced A QoS-Oriented Distributed Routing Protocol for Hybrid Wireless Networks with MANET concepts.
[7] In this Article author told how to maintain A Channel-Aggregation Diversity Based MAC Protocol for Spectrum and Energy Efficient Cognitive Ad Hoc Networks.
[8] In this Article, Interference-dependent contention control in multi-hop wireless ad-hoc networks: An optimal cognitive MAC protocol proposed by author.
[9] In this Article, author provided an analytical research aspect with practical implementation about many performance parameters of routing in MANET.
[10] In this Article, researcher perform investigation of MAC for a Hierarchical and Heterogeneous Multichannel Ad Hoc Network in Mobile Ad hoc Network.

III. METHODOLOGY

Here in this research work a solution proposed for zone routing protocol by considering the role of MAC layer routing protocol and how we can enhance its performance [1,8,12 &14]. In this work following tool and strategy for the implementation used:

Ns-2 Network simulator: It is open source network simulator which works with two different programming languages (C++/TCL). It also provides a animation tool for visualization of the simulation.

Here I have used Linux platform for implementation

It is being analyzed the performance of ZRP by considering the role of MAC protocols by developing different simulation scenario.

By using this simulator, it will count packet loss rate and retransmission attempts and also count network threshold due to retransmission.

Existing binary exponential set the values according to backoff when needed, no any threshold limit is there. In new modified algorithm, a threshold value is set to the backoff, if the value of backoff node is greater than the defined threshold then it directly moves to the starting position of transmission. If the value lies under the defined threshold then it will set that node in backoff for a particular amount of time.

Proposed Algorithm

Here on the basis of study of MAC protocol for existing binary exponential modification is done by following new Algorithm for this proposed work.
Step of algorithm are given below:
If (backoff value > threshold value)
{
backoff value = start backoff;
}
else
{

backoff value = binary exponential value;
}
Proposed Flow Chart
By this proposed flow chart it is tried to simplify how efficiently proposed hybrid routing algorithm will perform for any Mobile Ad-hoc network system. The flow chart is as given in Figure 3.
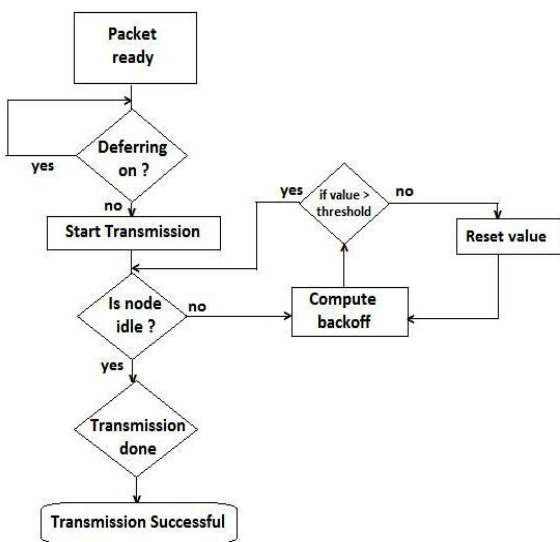

Figure 1: Flow Chart of Proposed Work

IV.   RESULTS AND DISCUSSION

The first step is to make TCL code according to the proposal in which threshold values are defined according to them back off time is applied to nodes. With this threshold value the main purpose is to reduce the waiting time and also decreases the packet loss. These results are shown in form of xgraphs.
1. After start simulation it shows total number of nodes used for simulation scenario.
2. In this scenario, total number of nodes are 8, all the nodes present in different zones, the source and destination are in single zone only, these were able to communicate with each other directly if nodes were static in nature but here the simulation is done in ad hoc networks that is why all nodes are movable in nature, destination node may change the zones after moving.
3. A border node is used here which act as helper node to find the destination node. Node 2 act as helper node of source which helps to find the destination which is moving outside the zone and lies in another zone at this particular time.
4. Accordingly helper nodes are changed after the movement of nodes, the nodes near to destination act as helper node always.
5. Accordingly, now the node number 4 act as helper node to send data from source to destination, only one node is

here which lies near to the destination node and it act as helper node.

Receiving Time-
Actual time required for simple binary exponential is more as compared to modified algorithm. Less receiving time is required to manage and receive the data.
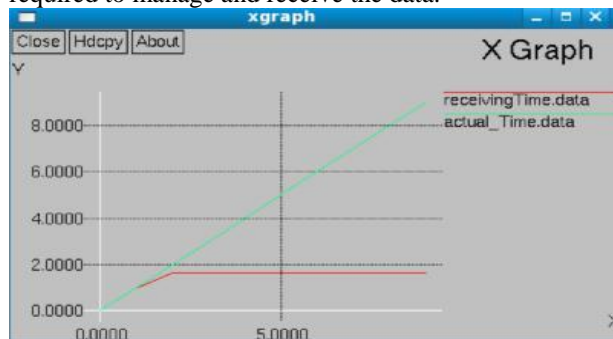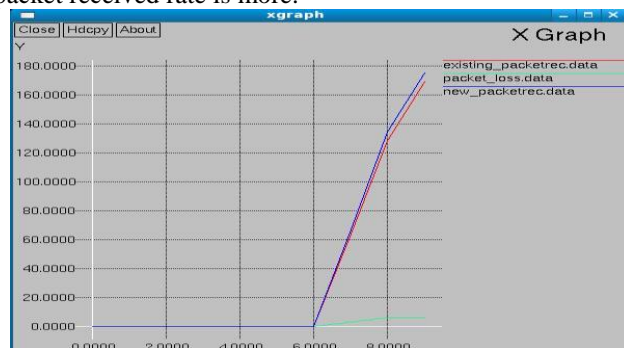

Graph 1: Receiving Time

Bandwidth-
Bandwidth varies according to the number of nodes used in the scenario.
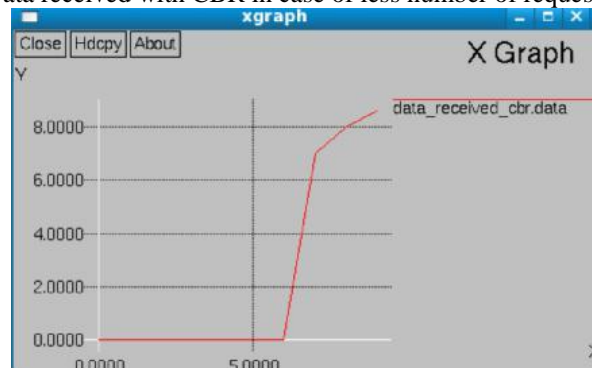**Packet Loss Rate-**
 Packet loss is decreased in this scenario, packet received rate is less in existing backoff but in new implemented algorithm packet received rate is more.

Graph 2: Packet Loss Rate

Constant bit rate-
 Data received with CBR in case of less number of requests.

Graph 3: Constant Bit Rate

V.   CONCLUSION AND FUTURE SCOPE

In this research work tried proposed algorithm implemented a solution to handle the request in zone routing protocol by set the threshold value which can handle a limited number of requests while interference occur in the network. Proposed solution can estimate a flow's contention, intra-flow contention, and MAC layer's overhead. Statistics about the availability of bandwidth can be used to build routing metric in order to select forwarding path(s) to utilize the bandwidth in better way.

The future scope is to implement the work for another different parameters such as in case of contention, collision etc.

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