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AN ORGANIZED APPROACH TO AVOID PACKET DELAY IN WIRELESS AD-HOC NETWORKS (WANET)

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I. ABSTRACT

Wireless ad-hoc network is define as a collection of node that communicate over a wireless link by using radio signals over a common channel. These several nodes are transmitters and receivers and different stations or routers. The wireless nodes communicates without any existence of fixed infrastructure or central control. Thus it is considered as a robust network because of its non-hierarchical distributed control, mobility of nodes usually makes the network topology unstructured. Which makes the processing of the system difficult and it results to complex interaction within the wireless nodes. Because of this the performance of the system gets degraded. To improve the performance for best quality communication we give an organized approach to avoid packet delay and the complex interaction between the wireless nodes. The analysis and the simulated results shows that the proposed model gives much better performance in comparison with existing model.

II. INTRODUCTION

A wireless ad-hoc network is a simple network where different wireless node are connected to each other. The advantage to wireless ad-hoc network is the easy communication between the wireless nodes which gives an efficient approach across the network in which there is a transfer of packet from source to destination. While in the current system model, many programs need to be resolved. In wireless ad-hoc network where there are several wireless nodes communicating with each other which results out to be a complex interaction which leads to packet delay and affect the wireless Ad-hoc network .Thus it result out to be a bad network. In this paper we concentrate on overall delay in the system, because of that there is a high traffic in the network between the wireless nodes in order to increase the performance. Delay in network means the difference between the time at which the packet is send and the time at which the packet is received. As the points discussed above it gives the efficient approach for the communication of wireless nodes in wireless ad-hoc network. A wireless ad-hoc network

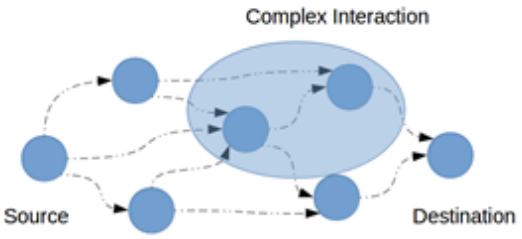

Figure 1- Network Diagram

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(WANET) is a network which doesn't have a structure and in those network number of wireless nodes are connected without any physical links i.e. wireless connections and the device in the WANET are independent to move of their own choice. This network consist of peer to peer communication. The establishment and maintenance within the network is done by TCP (Transmission control protocol) it can exchange data amongst the node with help of FTP (File transfer protocol) application it is a connection oriented protocol and it covers the transport layer and session layer of the OSI model. Routing is done with the help of AODV (Ad-hoc on-demand distance vector routing) protocol and the entire network is simulated in network simulator NS2 and according to the results the above method is useful to implement on real wireless ad-hoc network (WANET). Figure 2 illustrates the network diagram in which there are wireless nodes showing complex interaction between them.

III. LITERATURE SURVEY

In a wireless ad-hoc network where many nodes can be similar to each other in a system, it is very important to get a maximum throughput and a better performance in order to reduce the end to end delay. By introducing a new algorithm which is called as Backoff algorithm helps to adapt a maximal number of nodes in [1]. They discuss about the different protocol and the different types of network where changes could be possible to optimize the system. They try to work on the mobility of the nodes. The advantage of this approach is that it improves the performance of the transport protocol. Similarly in [2] the packets of wireless network are depends on the multiple hops to get delivered to the destination. Using the transmission power control technique, it is easy to control end to end delay in the network as well as it reduces power consumption and increases capacity of carrying traffic of network. Here they try to improve the transmission power control which is important because of its fundamental nature of wireless network it has a potential to increase networks traffic carrying capacity, reduce energy consumption and reduce end to end delay. The advantage of this approach is that it enhances the Transmission power control in wireless ad-hoc network. In [5] we analyze the delay and to increase the performance of the multi hop wireless network, the new optimal scheduling policies are beneficial. Though the fixed pairs of source and destination are set, a new grouping technique handles the complex correlations. Analysis of the known delay optimal policy and expected delay in the system can indicates that the average delay is almost nearer to the lower bound technique. Our paper consist of seven sections out of which Section III consist of System Model in which the description and the comparison of both the existing and proposed model is discussed. In Section V working of the system architecture is explained. Section VI consist of Experimental Results followed by Conclusion and References in Section VII and Section VIII.

3.1 System Model

Here we have describe our system model and the simulation of the system. For simulation our system we have considered a wireless ad-hoc network (WNET) in there are several nodes which communicate with each other over a wireless link. Each node has the potential to receive and transmit the packets travelling in the entire network. Mobility of nodes in the network topology is usually unstructured thus making communication difficult. There are different perimeters on which our System is designed. Our network is a

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wireless channel with radio propagation model and MAC type Mac/802_11 the communication of the network is done in the Link Layer of the OSI model. Protocol used for routing is AODV (Ad-hoc no-demand distance vector routing). We have used to agents TCP (Transmission control protocol) and UDP (user datagram protocol). These are the two agents which are responsible for the management of the network. And the applications used are FTP (File transfer protocol) and CBR (Constant bit rate) because of this two application establishment of the connection within the network is done. TCP manages congestion, both for the connections own benefit and for the benefit of connections as well which is known as TCP Reno.

3.1.1 To Find Average Delay

In the proposed network there are different methods to be followed. According to this packets flow in a groups as discussed in [9] lower bounds pertaining to system wide average delay are computed. Then the flow comes in the network which are dynamically distributed in many groups that passes through every node and because for of high complex interaction between them the flow gets congested and packets starts dropping which results for delay of packet in the network. Average delay is calculated on the basis of hop count that is the flow of packet on every node. Difference the time at which the packet is send from the source and the time at which the packet gets received at the receiver is the delay in the network. Similarly in [10] they have discussed that in the wireless sensor network transport is responsible for the maintenance of the congestion and the reliability. Here they have designed an application which controls the large amount of packet loss and ensure for end to end delay reliability. We have an algorithm which has a solution for complex interaction that is congestion and the packet delay in the network with the help of this algorithm we will be able to minimize the congestion and packet delay in the network it is a simple approach to the wireless ad-hoc network where we give well organized route for the flow of the packets to every node and try to avoid dropping of packet in the best possible manner.

3.2 Resizing of Congestion Window

In our existing system we give an efficient approach to the flow of packets in the network TCP and UDP are the application which are responsible for inter connection between the nodes in the network TCP is an application which is connection oriented and compare to UDP it has better control over the network. Though TCP is not as fast as UDP application thus it gives a slow start. TCP is suitable for those applications which requires high reliability it also rearranges data pickets in order specified. UDP (User Datagram Protocol) is a protocol which is used for message transport. It is not a connection based protocol so a single program can send a load of packets at a time. It is suitable for applications which need fast, efficient transmission. In our system we use these both application which controls the congestion and the packet drop which will reduce the packet loss at the end. Here TCP gives protection for packet drop and congestion and UDP gives the reliability for the transfer of packets. To increase the load of data packet transfer within the network is done with the help of congestion window here we

Algorithm: To increase the size of congestion window

```
1: plotting(TCPS)
2: conges ← set CW at TCPS
3: current ← current_time
4: When current_time ← current_time + 0.1:
5: call plotting(TCPS)
```

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increase the size of congestion window where the data packet is reliable and more amount of data is travelled through nodes. Thus it reduces the congestion and packet drop in the wireless ad-hoc network. To simulate this we have an algorithm which demonstrates the resizing of congestion window as shown below. The above given algorithm is an algorithm for increasing the size of the congestion window in this a procedure id created named as plotting with a variable and then congestion window is set. Further initialization of the current time is done where we increment it by 0.1 every time we call the function this is how the size of the congestion window is increased which allows both the agents to connect within the network to increase the performance and throughput. Revising it once again we have considered a wireless ad-hoc network with several wireless nodes including source and destination. Where we have used TCP and UDP agents to maintain the connectivity and the stability of the system which avoid congestion and packet drop in the network. For the flow of data packet size of the congestion window is increased which allows load data packet to transfer from one end to other. The flow char given below demonstrate the working of the entire system.

3.2.1 Working of System Architecture

Here we have our system architecture for our proposed system. This architecture describes the complete work flow of the system. In beginning we need to setup all the nodes for the wireless simulation. Among those nodes there is transmitter and receiver that is source and destination and the remaining are different stations and routers where the packets are transmitted from source and travels through different stations and reaches at the destination by receiver. When the communication start within the network. It is also known as packet radio network. The wireless host communicate in the network without any existence of fixed infrastructure. Due to mobility of nodes the network topology gets unstructured. Thus because of this there is lot complex interaction which leads to packet loss. Thus there is monitoring of packet which monitor whether there is loss of packet or not and if yes it Optimize the route where we use TCPreno and UDP agent for the transmission of packets and the application use was FTP and CBR. The above agents optimize the routes and thus to load number of packets for the flow we increase the size of the congestion window. Thus it results in flow of large set of packets at a time and then the routing of the packet is done protocol used for routing is AODV. It works by using Route Request messages RR EQ and Route Reply messages RREP. The Route Request contains the Source IP address and Sequence number, Destination IP address

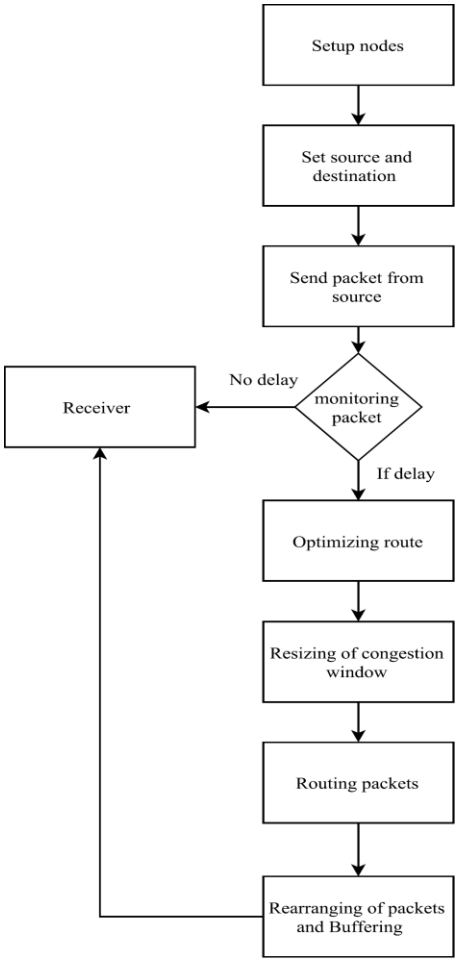

Figure 2- Architecture Diagram

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and Sequence number as well as the life span of Route Request. If the neighbor node doesn't know the route to the destination it rebroadcast the RREQ. And if the neighbor knows the route to the destination it sends the RREP back to the source. Thus it is a packet routing protocol for network that containing of wireless nodes in this each node contains routing table which consist of routing information, packet details and the neighboring nodes. There are two phases in AODV Routing Route Discovery and Route Maintenance each node maintains the routing table maintaining the information of the route in the network. It also deals with the route table management.

IV. EXPERIMENTAL RESULTS

We perform the entire simulation in network simulator NS2 it is software which is use for the simulation related to networks which is compatible with both windows and Linux machines. To implement and experiment this proposed system we need a Computer with a configuration of 2GB RAM minimum 10GB of disk space and Core i3 processor with dual boot of Windows and Linux, Trace-graph to plot the analyzed results. Below given charts describes the experimental results. Results for both the existing model as well as proposed model.

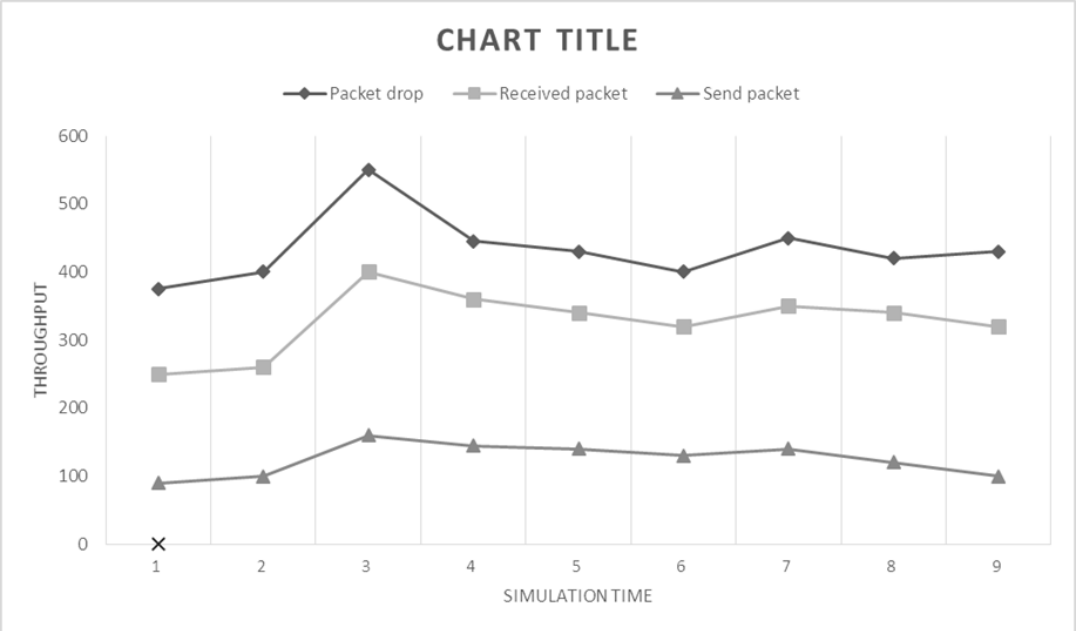

Figure 3- Shows the Simulation Results for Existing system

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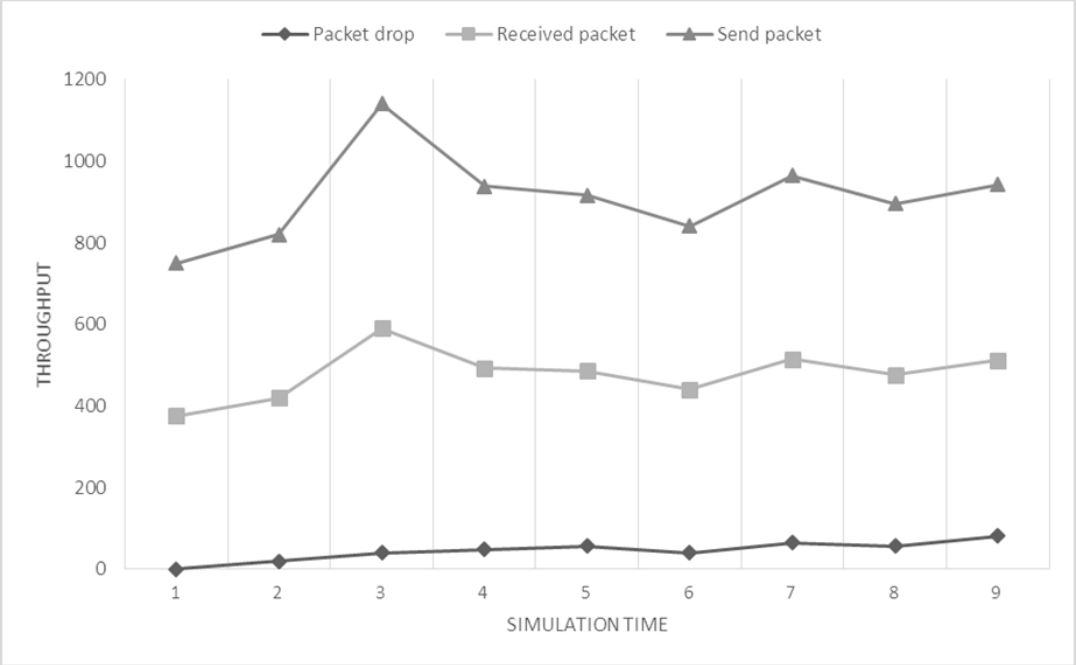

Figure 4- Shows the Simulation Results for Proposed system

V. CONCLUSION

In wireless ad-hoc network the mobility of wireless nodes make the network topology unstructured and because of non-hierarchical distribution packet delay due to heavy congestion is a problem face in wireless ad-hoc network. In order to improve the performance and reduce the problems faced in the network we give an organized approach to avoid packet delay and complex interaction between them. The entire experiment was simulated in network simulator NS2 the analysis and the simulated results shows that the performance after the changes being done is much better as compare to earlier model.

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