RESEARCH ARTICLE OPEN ACCESS

Location Based Zonal QoS Routing Protocol in Mobile Ad Hoc Networks

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ABSTRACT
In M2M communication, there is critical requirement of robust MAC protocol to enable multiple M2M devices to access the channel. For this purpose, a frame based hybrid MAC protocol consisting of CSMA-based contention period and TDMA based transmission period is presented in the literature. During contention period, the devices compete for the channel access and those devices which win a slot in transmission period will transmit the data using four-way handshaking mechanism to overcome the TDMA clock synchronization failure.

Date of Submission: 25 -07-2017 Date of acceptance: 05-08-2017

I. INTRODUCTION

A Mobile Ad Hoc Networks consist of mobile node and they are communicating with each other based on multi-hop wireless networks. No central control Mechanism works for ad-hoc network. All nodes in ad-hoc network are mobile in nature. Each node acts as source node to transmit data and acts as destination where reception of data taken place. While dealing with performance its necessary to consider scalability of network with topology change, power saving, bandwidth usage management and QoS [1] support. Providing QoS Support to multi-hop communication in MANETs [2] is a challenging because it needs cooperation between various protocol layers. In MANET, primary route discovery and selection is one of the most difficult tasks for any routing protocol. The existing routing protocol use simple minimum hop count as a metric for selecting best path from sender to receiver while it doesn't give any guarantee QoS weak connectivity, or low energy residual, few more factor also need to be consider to accomplish the QoS like node density, traffic load, link quality, link bandwidth. Since strict layering isn't work good for MANET in most of application as they do not offer QoS due to lack of cooperation in adjacent layers

II. LITERATURE SURVEY

Recently there three multipath routing protocol in the literature which are Q-AOMDV[1],LEMO [2] and QoS routing protocol[3] for delay sensitive as well as QoS aware routing for adhoc network [4]. C.Wu et al. [1] presented an ad-hoc on-demand multipath routing (Q-AOMDV [7]) which provides QoS support in terms of bandwidth, hop count and end-to-end delay. Walia et al [2] proposed a less remaining hop more opportunity (LEMO [2]) algorithm, improves packet delivery ratio by allowing more chance to deliver those packets which have already traversed more hope. P.Macharia et al [3] proposed QoS routing Protocol for delay sensitive application in which delay calculation is depends on round trip time of few probing packets. M Gawas et al [4] also proposed QoS aware routing for adhoc network in which packet delivery ratio, average end-to-end delay, routing load and throughput is considered.

III. PROBLEM STATEMENT

The objective of this project is to provide a guaranteed QoS parameters achieved at its best so routing in mobile adhoc network gives outstanding performance with respect to end-to-end delay, route discovery, best path optimization [5] and quick updates as topology changes like linked state routing protocol. For any routing protocol finding a best path for transmission of data is cumbersome and thus needs to use various routing protocol which suits best for particular topology. In our proposed topology the mobile nodes are dynamic in nature and they are bounded by a specific area, although they can travel to other area too. Assigns codes to each node in each of the area to distinguish among them [6] and very useful while routing takes place. Here we are trying to enhance QoS parameters with the help of routing protocol, by implementing the semi-adhoc network where physical routers have direct connectivity which will results into sharing of change in topology dynamically and will able to learn the best suitable path at its own so that time

constraints are minimized, will result into increase in throughput, delay, fast delivery of packets, handovers, switching location discovery etc.

IV. THE PROPOSED MECHANISM

The proposed system consists of system model and implementation test case scenarios.

4.1 System Model

The system model for the cross layer QoS routing protocol for ad-hoc network is shown in figure.1. It consists of mobile nodes spanned across a terrain, which further lies into different cluster, i.e. areas [6][10] as described below:

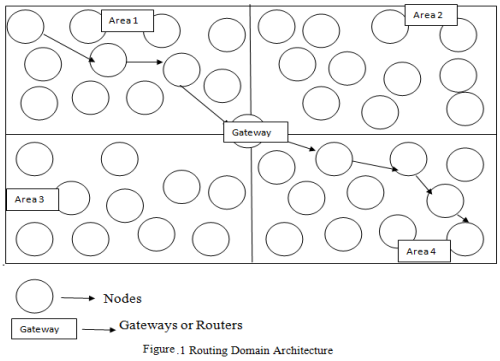

Figure .1 Routing Domain Architecture

1. M2M Domain

Domain consists of Intelligent Devices are called as mobile nodes. Each intelligent device forms the Area Network. This network is then connected to the gateway, which is the single point of integration of information collected from these devices. The gateway collects the data from the nodes and sends it to application domain through network domain

2. Network Domain

Network domain consists of wired/wireless networks. The wireless network can be based on 3GPP standards, LTE networks (which are widely used in machine or device communications) etc. Otherwise wired networks like Ethernet can also provide connectivity between gateway and application domain.

3. Application Domain

Application domain consists of end-user and backend server. End-user is the user of the data received from gateway of network domain. Backend server is the point of integration of data collected from various gateways. It performs the appropriate tasks based on the data received or collected and then forwards the data to the end-user as a result. This server itself is gateway or router and here it is called as main gateway.

4.2Model System Architecture

The Time Frame Architecture of the system is shown in the following figure.2.

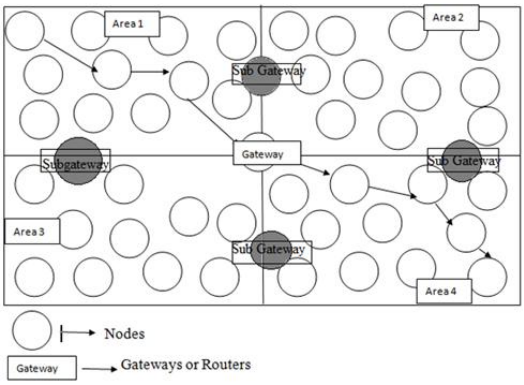

Fig 2:- Time Frame Architecture

Initially we have set of dynamic nodes and they are mobile in nature are kept separated by forming areas and also assign the number to each of the area. Once the boundary is formed between all areas, the prime concern is to find the master node which is considering a gateway for all. Through that gateway the traffic is forwarded and also received. So there is no need to run any routing protocol to find best path to reach Gateway. Every area has best path and alternative path [7] by default, through which any node can reach to master node i.e. gateway. Once traffic is coming from area 1 and destined to area 4, Gateway is responsible for forwarding to destined node. To find the destination we can have the routing protocol which finds the best path from Gateway to destination node. Once best path is learned then no need to find best path every time unless that node became dead. So all information related to each node is kept with Gateway, as soon as topology changes the information is also gets updated by sending update request generated by node itself. This way gateway keeps record of all nodes in all area.

If traffic load is increases the best alternative route is used for load balancing, this way QoS[8][4] parameter achieved without spending time for calculation for finding best path every time, choosing best path among all path, finding link quality etc. Nodes are mobile in nature so if they are moving beyond their radius, keep updating their status themselves to gateway periodically. Even though the topology gets changed, Gateway still has correct information. Even if traffic load increases on gateway then we have sub-gateway which will comes in picture for load balancing among areas. This way we can achieve better throughput compared to other methodology.

V. METHODOLOGY USED

We will compare our proposed protocol with a zonal routing protocol (ZRP[9]) in which Intrazone and Interzone used for route discovery, Fisheye Zone Routing Protocol (FZRP[11]) constructs a multi-level routing zone structure in

which different linked state updates rates are associated with different levels, it's a type of hybrid routing protocol. Also compared with Cluster Based Route Discovery is based on AODV [6][8], where intra and inter cluster route discovery takes place respectively based on CH value, which maintains the information about nodes present in the networks in its various tables.

	TO BUILD THE SYSTEM	**TO RUN THE SYSTEM**
Software Required	NS2 VERSION 2.35	NS2 VERSION 2.35
	Cisco Packet Tracer 6.3	Cisco Packet Tracer 6.3
	GNS3 Version 1.4.6	GNS3 Version 1.4.6

VI. CONCLUSION

In MANETs, route discovery [6] is challenging and become overhead to control route discovery and processing of best routs too. So zonal based routing algorithm [9] solves the problem faced by this network is Scalability [10] in Medium Access Control Layer. The performance issue is still with gateway and is resolved by improving the Structure of zone or cluster by implementing sub gateways to share load at master gateway to achieve QoS parameters. The performance fails in the multi hop scenario [7], so we propose to use location based zonal QoS routing[4] which has connectivity to different zone via sub gateways for multi hop networks, so that the throughput of the entire system escalates.

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International Journal of Engineering Research and Applications (IJERA) is **UGC approved** Journal with Sl. No. 4525, Journal no. 47088. Indexed in Cross Ref, Index Copernicus (ICV 80.82), NASA, Ads, Researcher Id Thomson Reuters, DOAJ.

Govardhan Veer " Location Based Zonal QoS Routing Protocol in Mobile Ad Hoc Networks" International Journal of Engineering Research and Applications (IJERA) 7.8 (2017): 66-68.