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EFFICIENT BROADCAST IN ADHOC MOBILE NETWORK WITH TDMA BASED MAC FOR VEHICLES

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EFFICIENT BROADCAST IN ADHOC MOBILE NETWORK WITH TDMA BASED MAC FOR VEHICLES

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Abstract

In Vehicular Ad hoc NETwork (VANET) safety applications, the source vehicle that detects an accident can generate a warning message and propagate it to the following vehicles to notify other drivers before they reach the potential danger zone on the road. Recent studies have shown that sparse vehicle traffic leads to network fragmentation, which poses a crucial research challenge for safety applications. Thus analyze and quantify the improvement in VANET connectivity when a limited number of roadside units (RSUs) are deployed and to investigate the routing performance for broadcast-based safety applications in this enhanced VANET environment. Our results show that, even with a small number of RSUs, the performance in terms of the probability of network connectivity, the rehealing delay, the number of rehealing hops, and the message penetration time can be significantly improved in highways.

Keywords: VANET, RSU, Broadcast, Traffic, Rehealing.

I.INTRODUCTION

An ad hoc network, or MANET (Mobile Ad hoc NETwork), is a network composed only of nodes, with no Access Point. Messages are exchanged and relayed between nodes. In fact, an ad hoc network the capability of making communications possible even between two nodes that are not in direct range with each other: packets to be exchanged between these two nodes are forwarded by intermediate nodes, using a routing algorithm. Hence, a MANET may spread over a larger distance, provided that its ends are interconnected by a chain of links between nodes (also called routers in this architecture). Vehicular Ad-Hoc Network, or VANET, is a form of mobile ad-hoc network, to provide communications among nearby vehicles and between vehicles and nearest fixed equipment, usually described as roadside equipment. The VANET used to providing safety and comfort for passenger. Having VANET inside vehicle need only small

electronic device, which will provide Ad-Hoc Network connectivity for the passengers inside the vehicle. By this device operating this network does not need complicated connection and server communication. Each vehicle equipped with VANET device will be a node in the Ad-Hoc network and can receive and relay others messages through the wireless network. In vehicular Ad-Hoc network using different ad-hoc networking technologies such as WiFi IEEE 802.11 b/g, WiMAX IEEE 802.16 Bluetooth, IRA, ZigBee for easy, accurate, effective and simple communication between vehicles on dynamic mobility.

II.PROPOSED SYSTEM

In the proposed system VeMAC, a novel multichannel TDMA protocol has been used for the channel allocation and the reliable broadcast. Minimum spanning tree algorithm is used to find the alternate shortest path. From the fig.1decribes how a VeMAC, a novel multichannel TDMA protocol developed based on ADHOC MAC and designed specifically for VANETs. On the control channel, the protocol provides a reliable one-hop broadcast service without the hidden terminal problem as well as an efficient multihop broadcast service to disseminate information all over the network. The VeMAC assigns disjoint sets of time slots to vehicles moving in opposite directions and to RSUs, and hence can decrease the rate of transmission collision on the control channel caused by node mobility. As well, the VeMAC employs new techniques for the nodes to access the available time slots and to detect transmission collisions.

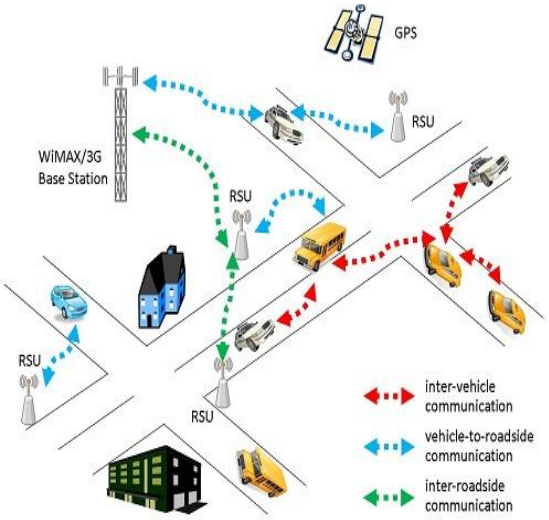

Figure.1 VANET

These techniques are different from the ones used by ADHOC MAC, which have some limitations as to be discussed in details. It is shown that the proposed VeMAC protocol provides significantly higher throughput on the control channel than that of ADHOC MAC and ADHOC enhanced.

Generally, the multi-hop communication means the nodes within the network can able to communicate with the help of two or more nodes, which are acting as the relay nodes, between the source and destination node. The advantages of system are hidden terminal problem are recovered, signals received from multiple channels, Reliable broadcast without collision.

III.PROTOCOL DESCRIPTION

In the seven-layer OSI model of computer networking, media access control (MAC) data communication protocol is a sub layer of the data link layer (layer 2). The MAC sublayer provides addressing and channel access control mechanisms that make it possible for several terminals or network nodes to communicate within a multiple access network that incorporates a shared medium, e.g. Ethernet. The hardware that implements the MAC is referred to as a medium access controller.

The MAC sub layer acts as an interface between the logical link control (LLC) sublayer and the network's physical layer. The MAC layer emulates a full-duplex logical communication channel in a multi-point network. This channel may provide unicast, multicast or broadcast communication service.

A maximum spanning tree is a spanning tree with weight greater than or equal to the weight of every other spanning tree. Such a tree can be found with algorithms such as Prim's or Kruskal's after multiplying the edge weights by -1 and solving the MST problem on the new graph. A path in the maximum spanning tree is the widest path in the graph between its two endpoints: among all possible paths, it maximizes the weight of the minimum-weight edge.Maximum spanning trees find applications in parsing algorithms for natural and in training algorithms for conditional random fields.

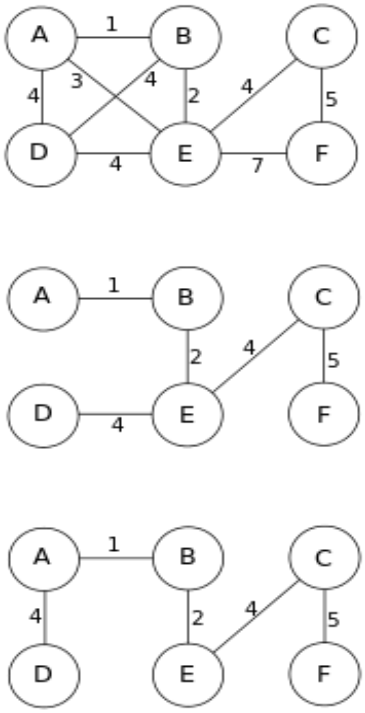

Figure.2.Graph

IV.RESULT AND DISCUSSION

A network setup consists of fifty nodes and only fifteen nodes are allowed to communicate within the particular range of area. Among the nodes created few node acts as base station and channel or medium.

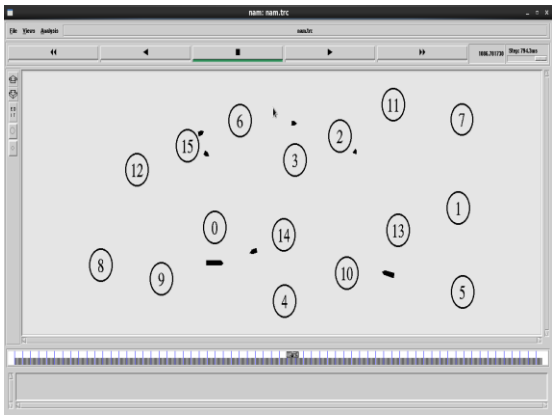

Figure.3. Node establishment

The data will be broadcasted to all the nodes within the range if any collision occurs. The nodes collect data from all directions to avoid the hidden terminal problem. Due to this the collision rate can be reduced.

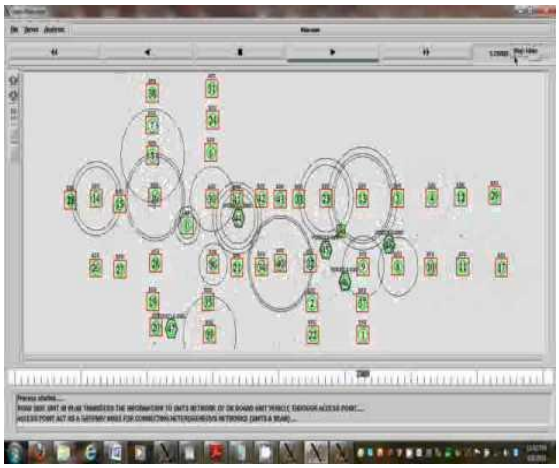

Figure.4. Broadcast data to the nodes within the ranges

V.CONCLUSION

A novel multichannel TDMA MAC protocol, called VeMAC, is proposed for VANETs based on the ADHOC MAC protocol. The nodes access the time slots on the control channel and service channels in distributed ways, which are designed to avoid any hidden terminal problem.

Simulation results in highway and city scenarios show that, compared with the ADHOC MAC and ADHOC-enhanced protocols, the VeMAC provides a smaller rate of transmission collisions (access collisions and merging collisions), which results in a significantly higher through-put on the control channel.

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