

QUALITY OF SERVICE IMPROVEMENT IN HYBRID NETWORK BY SELFISH NODE ISOLATION METHOD

Ms. M.Aswathy^{#1}, Mrs.T.Murugeswari^{#2}

1. PG Scholar, Hindusthan College of Engineering and Technology, Coimbatore
09526712610.
2. Assistant Professor (EEE), Hindusthan College of Engineering and Technology,
Coimbatore,09994230169.

ABSTRACT

A wireless hybrid network is the combination of a mobile wireless ad hoc network (MANET) and a wireless infrastructure network. Multi-hop cellular networks (also called hybrid networks) appear to be a promising combination of the dynamics of mobile ad hoc networks and the reliability of infrastructure wireless networks. Quality of service Oriented Distributed routing protocol enhance the Quality of Service capability of hybrid networks. But the hybrid network has many kinds of energy degradation problems. These issues adversely affect the Quality of Service (QoS) of hybrid network. Hence introduced a selfish node isolation method for solving Energy degradation problem and. Selfish node isolation method is the method in which the energy less nodes are isolated from the network and find an alternate route for packet transmission. Hence we could improve the quality of service of hybrid network in terms of Packet delivery ratio and Delay.

Key Words: Infrastructure Wireless Network, Adhoc Mode Network, Hybrid Wireless Network, Quality of Service oriented Distributed Routing Protocol, Quality of service, Enhanced Quality of service oriented Distributed Routing Protocol

Corresponding Author: Ms ASWATHY.M.

I. INTRODUCTION

The emergence and the envisioned future of real-time and multimedia applications have stimulated the need of high Quality of Service (QoS) support in wireless and mobile networking environments [1]. The *QoS support* reduces end-to-end transmission delay and enhances throughput to guarantee the seamless communication between mobile devices and wireless infrastructures. In concert hybrid wireless networks (i.e., multi-hop cellular networks) have been proven to be a better network structure for the next generation wireless networks [2–5], and can help to deal with the inflexible end-to-end QoS requirements of different applications. Hybrid networks synergistically combine infrastructure networks and MANETs to leverage each other. Specifically, infrastructure networks improve the scalability of MANETs, while MANETs automatically establish self organizing networks, extending the coverage of the infrastructure networks. Hybrid wireless network have the characteristics of

high mobility and fluctuating bandwidth. So guarantying the QoS still remains an open question. And it finally leads to the energy degradation problem. This can be solved by the selfish node isolation method.

II.EXISTING SYSTEM

As wireless communication gains popularity, significant research has been devoted to supporting real-time transmission with for wireless applications. At the same time, a wireless hybrid network that integrates a mobile wireless ad hoc network (MANET) and a wireless infrastructure network has been stringent Quality of Service (QoS) requirements proven to be a better alternative for the next generation wireless networks. But in the hybrid network there have a chance of enormous security issues and energy degradation problem. These issues adversely affect the Quality of Service (QoS) of hybrid network. Hence introduces a selfish node isolation method for solving Energy degradation problems. Selfish node isolation method is the method in which the energy less nodes are isolated from the network and will find an alternate route for packet transmission.

III.PROPOSED SYSTEM

Here we improve the QOS by reducing the security issues and energy degradation problem in the hybrid network. Selfish node isolation method is the method in which the energy less nodes are isolated from the network and find an alternate route for packet transmission. In the certificate revocation based security an authority device is used to allocate the certificate to the entire nodes in the network.

3.1 Hybrid Wireless Network

A wireless hybrid network is the combination of a mobile wireless ad hoc network (MANET) and a wireless infrastructure network. Multi-hop cellular networks (also called hybrid networks) appear to be a promising combination of the dynamics of mobile ad hoc networks and the reliability of infrastructure wireless networks. These hybrid networks offers several advantages for users as well as operators. The network topology can be dynamically adapted to the respective needs reducing installation costs for the provider, the overall coverage area can be extended and nodes can reduce their energy consumption for transmitting packets due to shorter distances. However, several weaknesses known from mobile ad hoc networks persist. In the context of hybrid networks new possibilities to deal with these weaknesses become available. Besides the security and routing issues the cooperation among nodes is of great importance.

3.2 Introduction To Manet

Hybrid network is the integration of Manet and wireless infrastructure network. This is the best alternative for next generation network. Ad-hoc networks are mobile networks that operate in the absence of any fixed infrastructure, employing peer-to-peer communication to establish network connectivity. These networks have a wide range of applications such as disaster relief and field operations, war front activities, and communication between automobiles activities and it is a self starting dynamic network comprising of mobile nodes, where each and every participation node voluntarily transmit the packets destined to some remote node using wireless (radio signal) transmission. An ad hoc network doesn't have any centralized arbitrator or server. In MANET each and every mobile node is assumed to be

moving with more or less relative speed in arbitrary direction [13]. Because of that there is no long term guaranteed path from any one node to other node [12]. MANET have very enterprising use in emergency scenarios like military operations & disaster relief operation where there is need of communication network immediately following some major event, or some temporary requirement like conference & seminar at new place where there is no earlier network infrastructure exist and need alternative solution[14].

Ad hoc network [1][2] is a network where there is no existence of wireless infrastructure for networking, Instead each node communicates with each other using their sole transmitter receiver only. In this kind of network each and every node does participate voluntarily in transit packet that flow to and from different nodes. Each node do follow same routing algorithm to route different packets. Thus this kind of network have limited homogenous feature. There are not many wireless products that follow this proposed technology.

3.3 wireless Infrastructure Network

Network with existing infrastructure is a network where exists a wireless access point or earlier wireless hardware support for each node to connect to networks. Here nodes do not participate in any kind of transit services. They communicate to access points to send & receive packets from other nodes. In this kind of network different access point can follow different wireless protocol like 802.11 b or 802.11g and still can communicate with each other. There exist several wireless products based on this kind of technology .Most wireless networks are based on the IEEE® 802.11 standards [4]. A basic wireless network consists of multiple stations communicating with radios that broadcast in either the 2.4GHz or 5GHz band, though this varies according to the locale and is also changing to enable communication in the 2.3GHz and 4.9GHz ranges.802.11 networks are organized in two ways. In infrastructure mode, one station acts as a master with all the other stations associating to it, the network is known as a BSS, and the master station is termed an access point (AP). In a BSS, all communication passes through the AP; even when one station wants to communicate with another wireless station, messages must go through the AP. In the second form of network, there is no master and stations communicate directly. This form of network is termed an IBSS and is commonly known as an ad-hoc network.

3.4 Problem with hybrid network

Hybrid network is the integration of Manet and wireless infrastructure network. This is the best alternative for next generation network. Quality of service Oriented Distributed routing protocol enhance the Quality of Service capability of hybrid networks. But the hybrid networks have many kinds of security issues and energy degradation problem. These issues adversely affect the Quality Of Service (QoS)of hybrid network. Selfish node isolation method is the method in which the energy less nodes are isolated from the network and find an alternate route for packet transmission.

A) Selfish Node Isolation Method

In an ad hoc network, the transmission range of mobile nodes is limited due to power constraint. Hence communication between two nodes beyond the transmission range relies on intermediate nodes to forward the packets. But sometimes these intermediate nodes do not

work as expected, in order to conserve their limited resources such as energy, bandwidth etc. Such nodes are called non cooperative nodes or misbehaving nodes. They are of following types:

Malicious Nodes: If malicious nodes are present in a MANET, they may attempt to reduce network connectivity by pretending to be cooperative, but in effect drop any data they are meant to pass on. Several types of attacks are performed by malicious node like DOS attack, black hole attack, worm hole attack, rushing attack[3][4]. The attacks of malicious node on other nodes could be in the form of unnecessary route request control message, frequent generation of beacon packets or forwarding of stale information to nodes. These actions may result in defragmented networks, isolated nodes, and drastically reduced network performance.

Selfish Nodes: Selfish nodes [3][4] work in an ad hoc network to optimize their own gain, with neglect for the welfare of other nodes. Selfish nodes disturb the performance of ad hoc network to a great extent. When a node becomes selfish it does not cooperate in data transmission process and causes a serious affect on network performance. It simply does not forward packets of other nodes to conserve its own energy, bandwidth.

In an ad hoc network, the transmission range of nodes is limited; hence nodes mutually cooperate with its neighbouring nodes in order to extend the overall communication. However, along with the cooperative nodes, there may be some reluctant nodes like selfish nodes and malicious nodes present in the network. In an ad hoc network, the transmission range of nodes is limited; hence nodes mutually cooperate with its neighbouring nodes in order to extend the overall communication. However, along with the cooperative nodes, there may be some reluctant nodes like selfish nodes and malicious nodes present in the network. Such nodes degrade the performance of the network. Detection of selfish nodes is accomplished which are created due to nodes conserving their energy using NS2. After their detection, performance analysis of network with selfish node and the network after isolation of selfish node is carried out. Here set threshold energy in each node in the network. The nodes below the threshold energy are isolated from the network and will find an alternate route for the packet transmission. This also uses DSR [1][2] which is a source routing protocol and this protocol can react to topological changes rapidly. Each node gathers information about the network topology by overhearing other nodes' transmissions. This is known as promiscuous mode of operation. DSR is a reactive routing protocol. There are two main operations in DSR; route discovery and route maintenance. DSR protocol tries to minimize the energy consumption by discovering routes to other nodes only when they are required. Each node maintains a route cache to remember routes that it has learnt about. All routing protocols including DSR assume that all nodes in a network are cooperative and forward others' messages. In this paper, selfish nodes are detected using promiscuous overhearing of neighbouring node .when node drop packet due to nodes conserving their energy. Also, using reputation value and energy value of each node placed at cluster head, selfish node isolation is carried out. Simulation analysis of network is carried out using NS2. Along with the detection and isolation of selfish node using global reputation, this paper also gives a review on various types of reputation based and credit based mechanisms by which selfish and malicious nodes are detected, isolated and prevented.

IV.SIMULATION RESULTS

A) Nodes are initialized and set to particular energy

Here all the nodes are adjusted to be set as a particular energy and is assumed as 10J. The nodes below to this threshold energy is isolated from the network. This is shown in Fig 3.1.

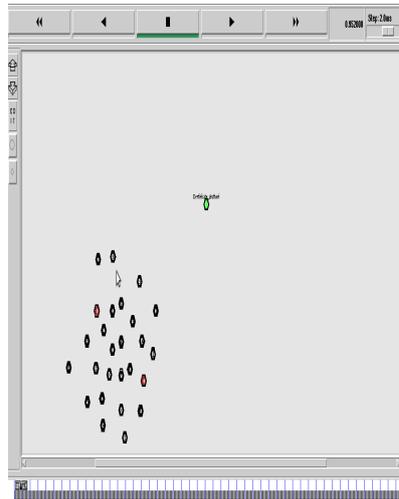


Fig 3.1Nodes are initialized and set to particular energy

B) Packet transmission occurs through nodes

This shows the packet transmission occurs through nodes. The circles in the fig 3.2 show the packet transmission from one node to another node in the network.

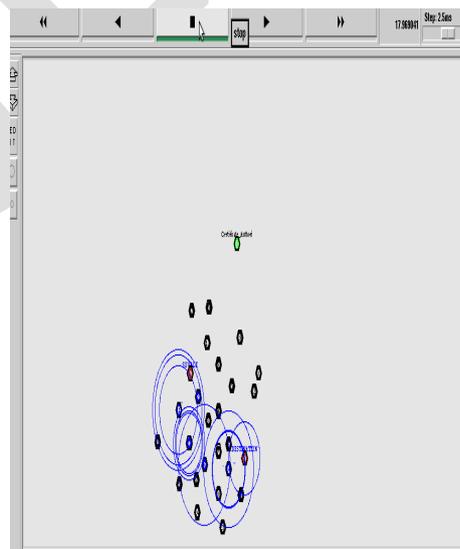


Fig3.2Assign the source node and destination node

C) Assign the source node and destination node

Here assign the source node and destination node. Here the source node is shown in red and destination node shown in brown colour. This is shown in Fig 3.3.

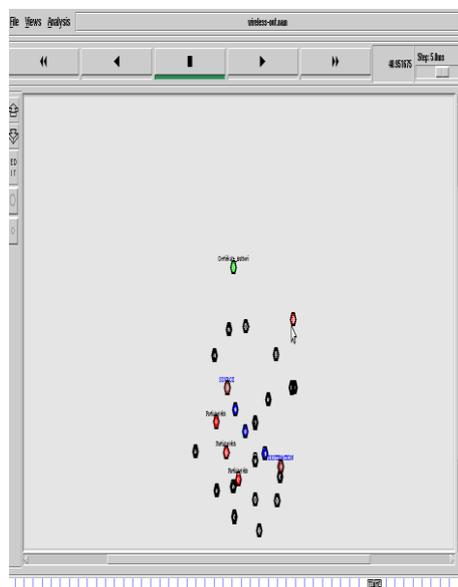


Fig3.3 Packet transmission occurs through nodes

D) Less energy nodes are shown in orange and are isolated from network and new route is found to the destination.

The nodes having energy less than 10 J is isolated from the network. This is shown in Fig 3.4.

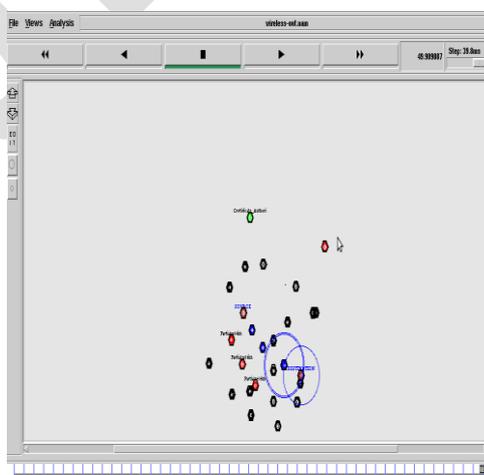
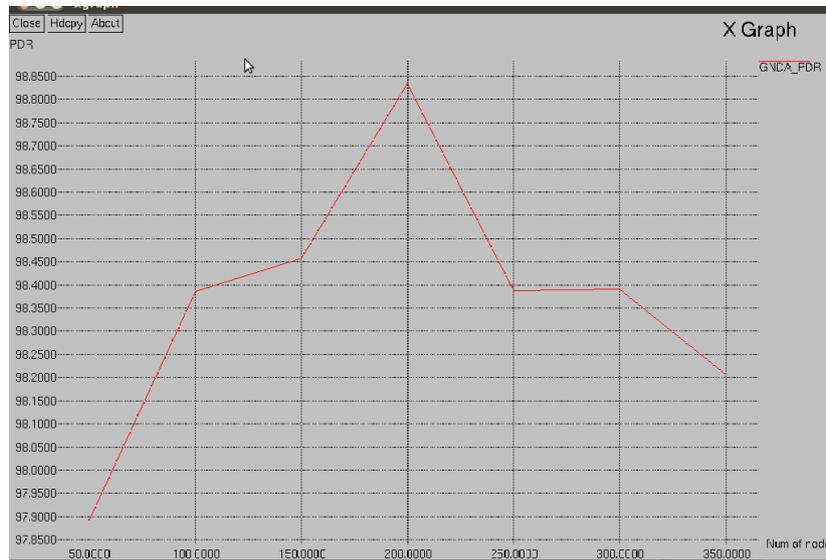


Fig3.4 Less energy nodes are shown in orange and are isolated from network

E) The packet delivery ratio increases by selfish node isolation method

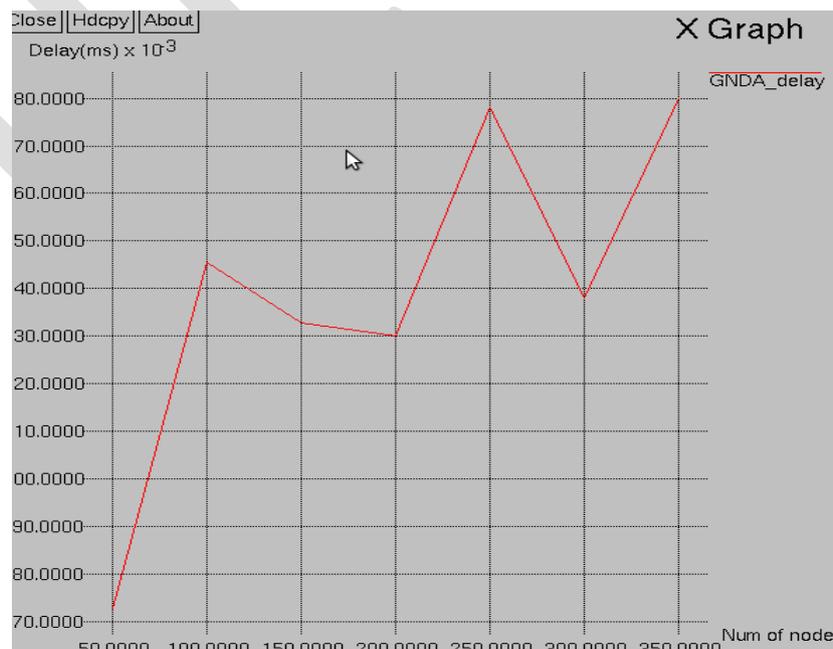
When the energy degradation problem is solved by selfish node isolation method the packet delivery ratio increases rapidly shown in Fig3.5. Here the quality of service in the hybrid network improved in terms of packet delivery ratio.



. Fig3.5 Packet delivery ratio increases rapidly by selfish node isolation method

F) The delay decreases by selfish node isolation method

When the energy degradation problem is solved by selfish node isolation method the delay decreases rapidly shown in Fig3.6. Here the quality of service in the hybrid network improved in terms reducing delay.



. Fig3.6 Delay decreases rapidly by selfish node isolation method

V. CONCLUSION

Quality of service Oriented Distributed routing protocol enhance the Quality of Service capability of hybrid networks. But the hybrid networks have many kinds of security issues and energy degradation problem. These issues adversely affect the Quality Of Service (QoS) of hybrid network. Hence introduced a selfish node isolation method for solving Energy degradation problem. Selfish node isolation method is the method in which the energy less nodes are isolated from the network and find an alternate route for packet transmission. Hence we could improve the quality of service of hybrid network in terms of Packet delivery ratio and Delay.

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