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Efficient Multicast Routing Algorithms for Scalable Wireless Network

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Abstract: - Maintaining the day to day scaling network nodes is challenge. The existing hierarchical and non-hierarchical is handling the growing network nodes randomly with overhead of recursive logic with repeaters and power consumption which comes at cost. The span of individual network which is a cluster of nodes is limited, if there are multiple individual networks which are grouped together, then forms the non- hierarchical structure. The existing algorithms to link the source with the destination is purely random propagation, which uses more number of repeater nodes and looping leading to the consumption more power, which is redundant. To overcome the overhead of purely random propagation algorithm ,there came another algorithm called non-repetitive random propagation ,which uses the concept of distant repeaters ,which also creates redundancy .In order to overcome the above said overheads ,we have devised an optimized algorithm which deals with the problem without using any repeaters and looping. The algorithm uses the concept of minimum eccentricity. Calculating the minimum eccentricity would identify the dominant node which can connect or communicate with rest of the nodes independently reducing the redundancy. The node identified as dominant node should possess maximum battery power and without any selfish behavior such as distributing the available resource impartially with every other node under the coverage area.

Keywords: - Mobile ad hoc networks, multicast, wireless networks, protocol.

I. INTRODUCTION

Wireless technologies have revolutionized the world of communications. It started with the use of radio receivers or transmitters for use in wireless telegraphy .The term wireless are used to describe technologies such as the cellular networks and wireless broadband Internet. Although the wireless medium has limited spectrum along with a few other constraints as compared to the guided media, it provides the only means of mobile communication. Wireless networking is used for random and rapid deployment of a large number of nodes, which is a technology with a wide range of applications such as tactical communications, disaster relief operations, health care and temporary networking in areas that are not densely populated [1]. A mobile ad-hoc network (MANET) consists of mobile hosts equipped with wireless communication devices. The transmission of a mobile host is received by all hosts within its transmission range due to the broadcast nature of wireless communication and Omni-directional antennae. If two wireless hosts are not within the transmission range in ad hoc networks [2], other mobile hosts located between them can forward their messages, which effectively build connected networks among the mobile hosts in the deployed area. The use of wireless ad hoc networks also introduces additional security challenges that have to be dealt with. Compromised node and denial of service are two key attacks in wireless sensor networks .In this proposal, data delivery mechanisms that can with high probability circumvent black holes formed by these attacks. The routing algorithms namely Non-Repetitive Random Propagation (NRRP), Directed Random Propagation (DRP) and a new Optimized algorithm is proposed which would reduce the route discovery time and no of hops from source to destination. A Zone Leader multicasting Algorithm is also implemented for multiple zones. The challenge faced nowadays is to design a robust multicast routing protocol for a scalable wireless network. The increased quantity of data transmission and reception in wireless networks has adversely increased the need for bandwidth on demand and quality of service. The further increase in data traffic, leads to loss of information, accuracy and reliability [3] [4]. To overcome this drawback, we have proposed a scalable and efficient multicast optimized algorithm.

II. OBJECTIVES OF THE PAPER

The aim of the project is to develop a optimized algorithms for non –hierarchical networks to develop a data transmitted for source to destination with minimum loops and non-repetitive nodes and in hierarchical network to develop a multicasting algorithm for leader election in the existence of self-centered nodes for intrusion detection in mobile ad hoc networks (MANETs). To balance the resource utilization among all nodes

and prolong the life span of a MANET, nodes with the most remaining resources should be elected as the leaders.

III. EXISTING SYSTEM

The existing Hierarchical network system, which is an ad hoc network in which the nodes are not static and will be varying the zones between the different clusters. The nodes which are varying the zones are monitored by the zone leader i.e. cluster head, possessing the maximum battery power and non-selfish. This system has a limitation i.e. when there is scalability in the network nodes, identifying the zone leader would (cluster head) be a challenge [6].

The existing non-Hierarchical network system, the proposed algorithms such as *Purely Random* Propagation, *Non Repetitive Random Propagation* and *Direct Random Propagation* whose job is transmit from data from source to destination with minimum repeaters and loops. The limitations of this system are, it consumes more battery power and there would be a more time to leave period which induces delay into network by considering a single node as a source repeatedly [7] [9] [12].

3.1 Hierarchical network model

Involves iterative algorithms for creating networks which are able to reproduce the unique properties of the scale-free topology and the high clustering of the nodes at the same time as shown in fig.1.

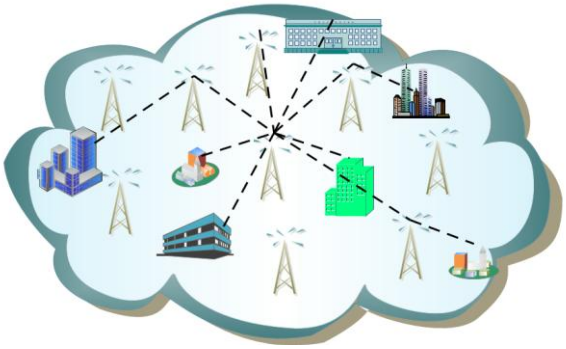

Fig.1.Hierarchical network model.

3.2 Non-Hierarchical network model

Node are arranged like a galaxy without any limit and coverage area.The common aspect of Wireless Network Model as shown fig.2.

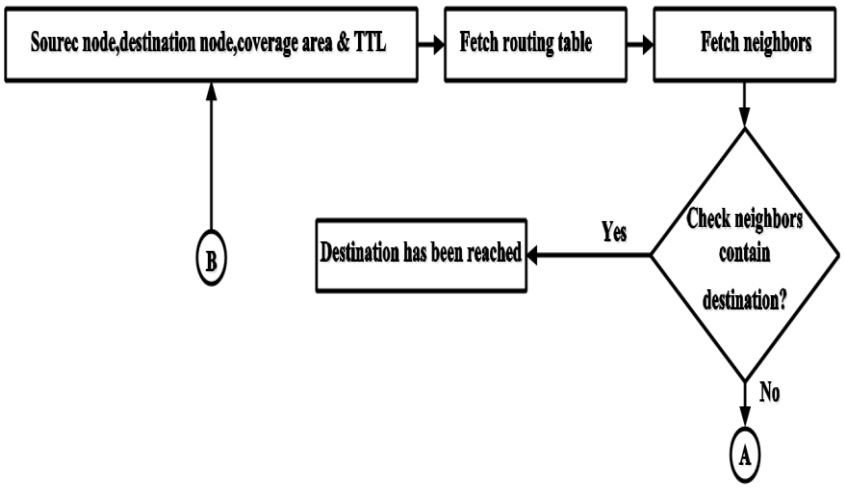

Fig.2.The common aspect of Wireless Network Model

This model mainly deals with the Concept of Transmission of data packet from source to destinationthat is represented by following data flow diagram such as:

a) Data flow diagram for purely random propagation as shown in Fig.3.
b) Data flow diagram for Non-Repetitive Random Propagation as shown in Fig.4.
c) Data flow diagram for Directed Random Propagation as shown in Fig.5.

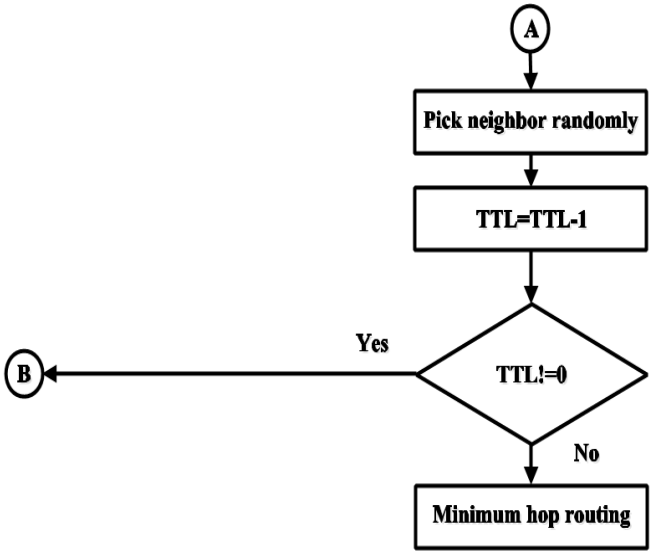

Fig.3.Data flow diagram for purely random propagation

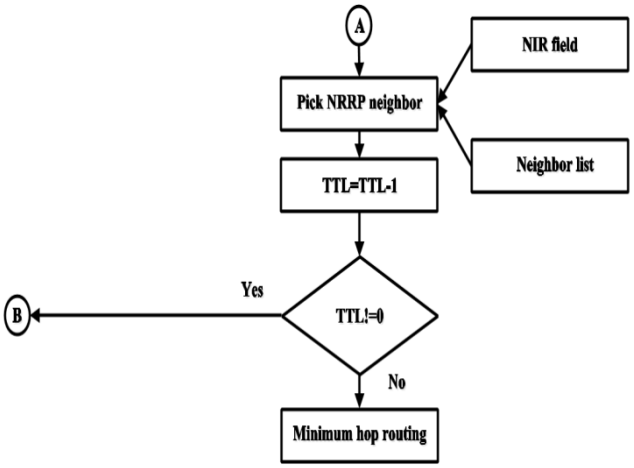

Fig.4.Data flow diagram for Non-Repetitive Random Propagation.

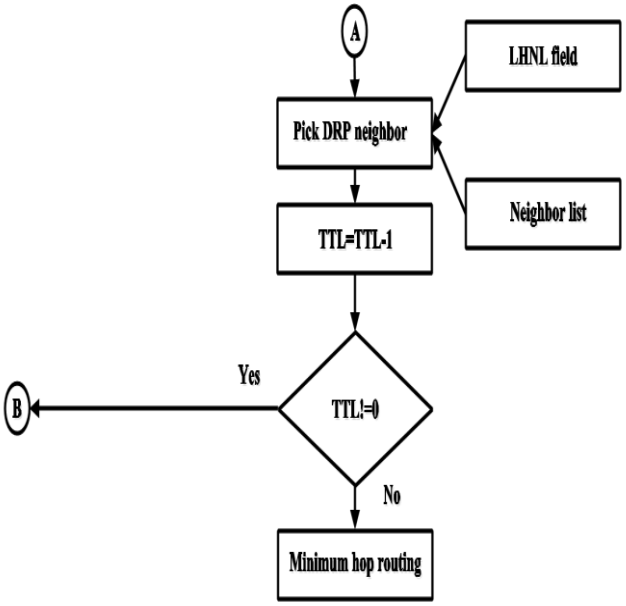

Fig.5. Data flow diagram for Directed Random Propagation

IV. LITERATURE SURVEY

Tao Shu, Marwan Krunz, and Sisi Liu, Purely Random Propagation (PRP), Non-Repetitive Random Propagation (NRRP) , Directed Random Propagation (DRP).In this the number of repeaters are more and power consumption is maximum [5]. Dr.A.VinayaBabu, K.Madhukar, S.Nagaprasad, This paper proposes Multicast Zone Routing Protocol (MZRP) for Mobile Ad-hoc Networks (MANETs) and the Reliable Adaptive Congestion Controlled multicast (ReAct) transport layer protocol for reliable and timely multicast delivery on top of the MZRP. This paper mainly concentrates on congestion control but it does not deal with eccentricity .In this paper they dealt only for non-scalable networks not for scalable networks [8]. Y. Huang and W. Lee. In this paper they have dealt with Intrusion detection as a preventive measure, such as authentication and encryption, but they have not concentrated on selfish behavior nodes. They have elected the dominant node based on eccentricity and battery [10]. O. Kachirski and R. Guha. A modular IDS system based on mobile agents is proposed and the authors point out the impact of limited computational and battery power on the network monitoring tasks. The idea is to logically divide a mobile network into clusters with a single cluster head for each cluster based on highest connectivity index [11].

V. PROPOSED SYSTEM

The system we propose includes both Hierarchical and non-Hierarchical network system. In this system the nodes are grouped together to form zone clusters and zone clusters are grouped together form another higher level of cluster ,which consists of zone clusters as nodes and this continues to grows due to scalability in network nodes. The problem of transmitting data/signals from source to destination happens as follows. Firstly we try to identify the dominant nodes in zone cluster, and then with these dominant clusters in the network we try to identify the dominant cluster node for the entire network system , the reason is at the higher level we consider the entire network as one cluster consisting of group of clusters. The question is how we identify the dominant cluster node, the answer is the minimum eccentricity from a node to all other nodes in the network, that node would become the dominant node. The source node would hand over the data or signal to dominant node and this dominant node would transmit or deliver the data or signal to destination node. The dominant node would be non-selfish with more battery power. The algorithm we propose would mathematically identify the dominant node

VI. MODULE DESCRIPTION

The major challenge is in managing the scalable network system without any overheads of using large number of repeaters and loops, which the existing systems i.e. Hierarchical and non-Hierarchical systems are doing. The question is how to achieve the goal to manage scalable networks without any overheads mentioned above.To overcome this problem we developed a proposed model as shown Fig.6. and Fig.7.

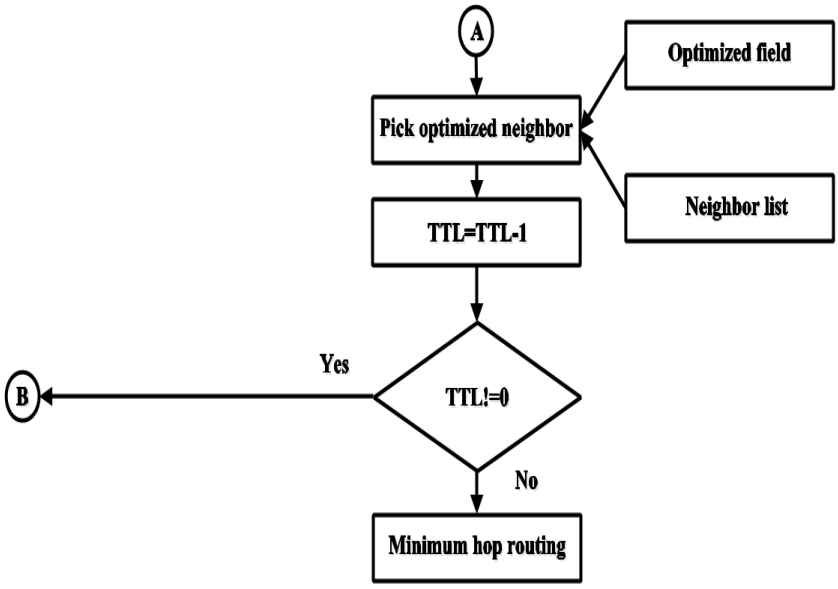

Fig.6.the proposed data flow diagram for Efficient Multicast Routing Algorithms for Scalable Wireless Network.

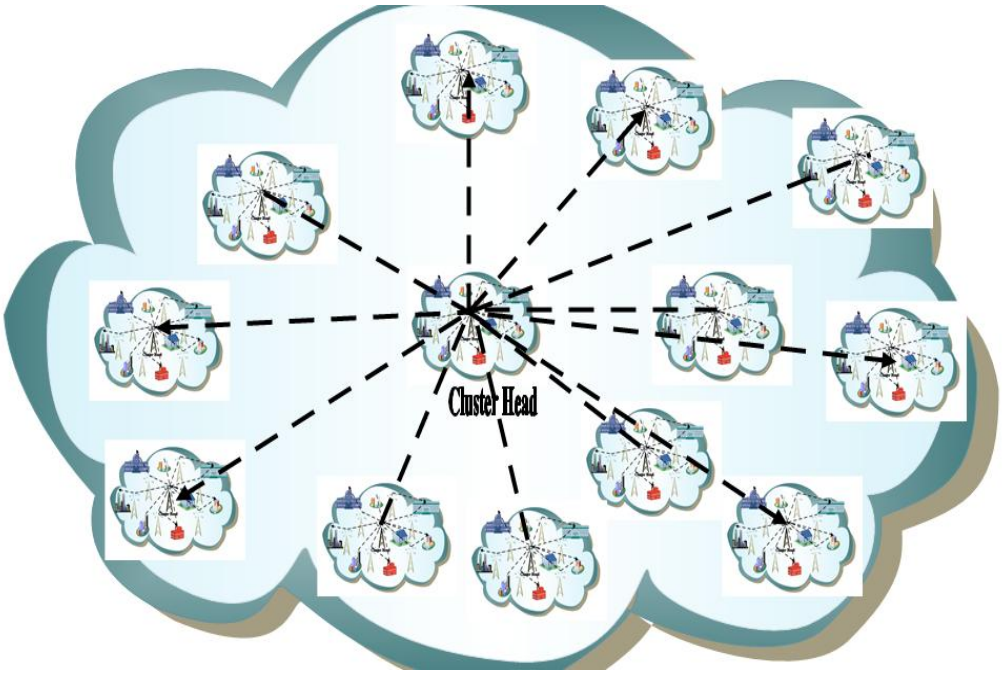

Fig.7.Efficient Multicast Routing Algorithms for Scalable Wireless Network.

VII. IMPLEMENTATION RESULTS AND COMPARISONS

Comparison b/w Hierarchical& Non-Hierarchical Networks

TTL=3, Source node=2, Destination node=8, Coverage Area =20,Hierarchical network in Fig.8. and Non-Hierarchical Networks Fig.9.

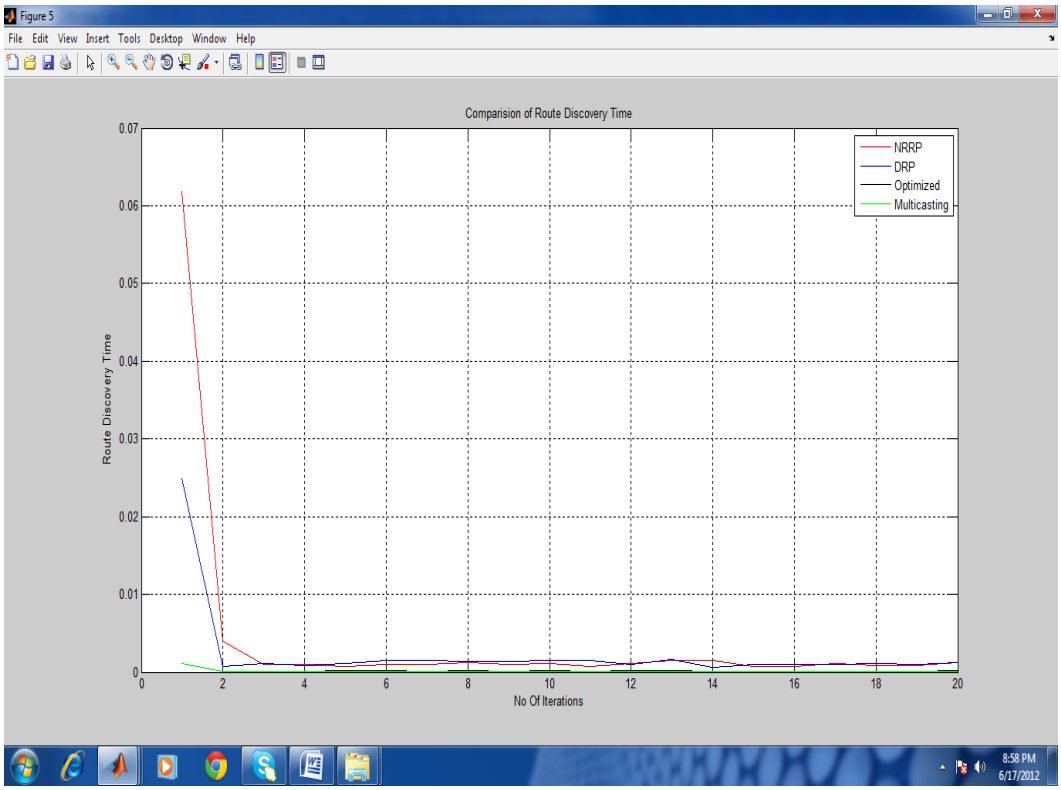

Fig.8.The Hierarchical network

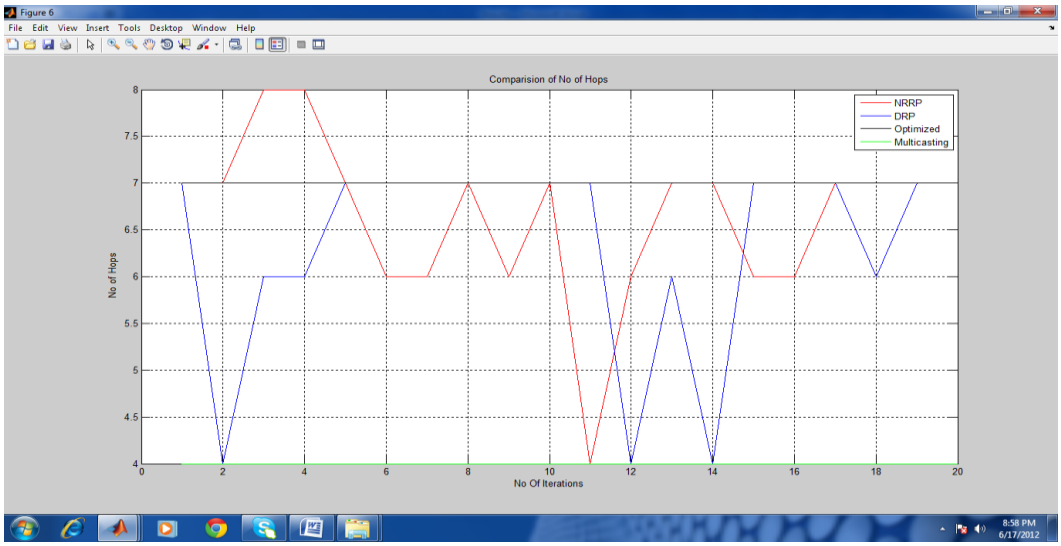

Fig.9. Non-Hierarchical Networks

VIII. CONCLUSION

The solutions for the overheads would be devised using the concepts of power optimization, dominant node identification, and selfish behavior identification. The time lines would be decided, once the extent of visibility of the scalable network under all ideal and non-ideal condition is achieved best.

REFERENCES

[1]. L. Ji and M. S. Corson., "Differential destination multicast: a MANET multicast routing protosmall groups," April 2001pp 22-23..

[2]. E. M. Royer and C. E. Perkins., "Multicast operation of the ad hoc on-demand distance vector routing protocol" August 2011 pp 11-12.

[3]. C. Wu, Y. Tay, and C.-K. Toh.. Nath, "Ad hoc multicast routing protocol utilizing increasing id-numbers (AMRIS) functional specification," 2007 pp 102-103.

[4]. X. Zhang and L. Jacob., "Multicast zone routing protocol in mobile ad hoc wireless networks," October 2003.

[5]. Tao Shu, Marwan Krunz, and Sisi Liu,"Secure Data Collection in Wireless Sensor Networks Using Randomized Dispersive Routes" Dec 2012 pp 21-22

[6]. C. Chiang, M. Gerla, and L. Zhang., "Forwarding group multicast protocol (FGMP) for multihopmobile wireless networks In AJ," June 2008 pp 34-35.

[7]. J. J. Garcia-Luna-Aceves and E. Madruga., "The core- assisted mesh protocol" August 2009 pp 1024-1025.

[8]. Dr.A.VinayaBabu, K.Madhukar, S.Nagaprasad,"Multicast Zone Routing Protocol In Wireless Mobile Ad-hoc Networks"jan 2000 pp 11-12.

[9]. M. Gerla, S. J. Lee, and W. Su., "On-demand multicast routing protocol (ODMRP) for ad hoc networks" July 2000 pp 90-91,

[10]. Yian Huang, Wenke Lee,"A Cooperative Intrusion Detection System for Ad Hoc Networks"Nov 1999 pp 54-55.

[11]. O. Kachirski and R. Guha," Case-Based Agents for Packet-Level Intrusion Detection in Ad Hoc Networks" july 2012 pp 22-23.

[12]. P. Bose, P. Morin, I. Stojmenovic and J. Urrutia. "Routing with guaranteed delivery in ad hoc wireless networks" August 1999 pp 78-79..

[13]. S. Lee, W. Su, J. Hsu, M. Gerla, and R. Bagrodia., "A performance comparison study of ad hoc wireless multicast protocols" Oct 2010 pp 23-24.

[14]. X. Xiang, Z. Zhou and X. Wang , and D.-p. Qian," Self- Adaptive On Demand Geographic Routing Protocols for Mobile Ad Hoc Networks" May 2007 pp 65-66.

[15]. P. Bose, P. Morin, I. Stojmenovic and J. Urrutia. "Routing with guaranteed delivery in ad hoc wireless networks" August 1999 pp 27-28.

[16]. B. Karp and H. T.Kung.Greedyperimeterstatelessroutingforwirelessnetworks"August2000pp6566.