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Investigation of Effective Group Communication using MAODV and ODMRP Routing in MANET

Kalpana Mishra[1], Ms. Sonal Choudhary[2]

M-tech scholar ASCT Bhopal[1], Asst. Prof. ASCT Bhopal[2]
kalpna.mishra1990@yahoo.com[1], sonal804@gmail.com[2]

ABSTRACT:- Mobile ad-hoc communication is dynamic nature and all node behave like router in MANET communication node freely move in the network and many time route change so the complex task to maintain routing that type of network. MANET faces various challenges like security issue, quality of service issue and routing decision as well as group communication. Before that various work done to resolve the entire problem with the help of number of technique so here we design efficient and effective group communication with the help of MAODV and ODMRP routing and node behaviour analysis based of quality of service parameter, that work improve the quality of service as well as provide reliable communication to the network and maintain group communication. In this paper we study about number of different mechanism to improve the quality issues of communication and after that we proposed new solution to overcome the problem of quality decrement under MANET.

KEYWORDS:- MAODV, UDP, CAMP, ODMRP, PDR, group communication.

1. INTRODUCTION

Ad hoc networks are self-organizing, rapidly deployable, and dynamically reconfigurable networks, which require no fixed infrastructure and each node contain routing table. Ad hoc networks in which the nodes are connected by wireless links and can be mobile are referred to as MANETs, where all the mobile nodes function as hosts and routers at the same time. Two mobile nodes communicate directly if they are within the radio transmission range of each other. Otherwise, they reach each other via a multi-hop route [11].

Many existing and forthcoming applications in MANETs require the collaboration of groups of mobile users. Communications in battlefield and disaster relief scenarios, video conferencing and multi-party gaming in conference room or classroom settings, and emergency warnings in vehicular networks are example applications. As a consequence, multicast in MANETs becomes a hot research topic in recent years. Multicast is a communication scheme for sending the same messages from a source to a group of destinations. MANETs are inherently ready for multicast communications due to their broadcast nature. However, limited bandwidth between mobile nodes and highly dynamic topology due to unpredictable node mobility make the design of scalable and QoS-aware multicast routing protocols much more complicated than that in the traditional networks [12]. Most of the multicast protocol proposed for ad hoc networks assume a trusted, non-adversial environment and do not take security issues into account in their design.

But in real time a MANET is vulnerable to attacks than a wired or infrastructure wireless network. Here we investigates the security of Multicast Ad-hoc on demand distance vector protocol (MAODV), a well known multicast routing protocol in MANET by identifying the impact of quality of service on it. Though there exists many extensions on MADOV, the behaviour of nodes has not been explored extensively. Thus, extension to address the better quality of service of nodes their exist in path in multicast routing has been proposed in this title [13]

QoS issues of MANETs in group (multicast) communications are even more challenging because of the involvement of multiple senders and multiple receivers as well as group membership leaving and joining information storing are complex so here we design architecture to solve problem of QoS and group management under MANET [11].

2. RELATED WORK

This section provides a general overview on multicasting trends and previous frameworks introduced in research community. Several multicast routing protocols with unique features have been proposed for MANETs in the literature.

Kanwalpreet Kaur et al. (2014) shows the performance analysis of the ODMRP and the MAODV in the paper shows the comparisons of the protocol on the various parameters such consistence performance, End to end delay, Jitter etc. The performance of the protocol are identified and analysis is done by the simulation in the different scenarios. Quality of the services metrics that are identified in this work are multicast, throughput, average multicast end to end delay and jitter. The performance analysis shows that the working performance of the ODMRP and MAODV performs better on the basis of the metrics used for the analysis[1].

Core assisted multicast routing protocol (CAMP), proposed in **Garcia et al. (1999)**, is a receiver initiated shared multicast mesh routing protocol. CAMP extends the usage of core nodes to establish multicast mesh. When a node wishes to join a multicast group, it sends the join request message to multicast group. The first node that receives the join request message responds to the node by sending a join acknowledgment message and it becomes a member of the multicast group. CAMP uses as many cores as desired for a given mesh (**Garcia et al., 1999**). It improves the network reliability in the cases where the core of the group fails. In CAMP, instead of flooding the advertisement packets to the network, each core disseminates the mappings of multicast addresses to one or more core addresses to the network (Vaishampayan and Garcia-Luna-Aceves, 2004). Consequently, CAMP enhances the scalability of the protocol as compared to flood based routing protocols. However, CAMP is based on unicast routing protocols and it could be the Achilles' heel in routing functionality of CAMP [2].

MAODV (**Royer and Perkins, 2000**) is another well known multi- cast routing protocol. MAODV is the extension of AODV routing protocol where multicast groups are identified by a unique address and group sequence number. When a node wants to join a group that is not established yet, it becomes the leader of that multicast group and is responsible for maintaining the multicast group (Vasiliou and Economides, 2005).MAODV may achieve good performance results in scenarios where mobility of nodes is negligible and network does not face frequent link breakage. This is due to the fact that reconstruction of tree in MAODV needs repetitive computational process on nodes within the network [3].

ODMRP has been developed by Wireless Adaptive Mobility (WAM) Laboratory (**Yi et al., 2003**) at UCLA. ODMRP employs a mesh structure to forward multicast data packets. The mesh- based connectivity between the nodes in ODMRP results in the formation of multiple forwarding routes that result in finding the most appropriate routes. When a source node desires to send multicast data, it floods the network with Join-Query message. The Join-Query message is periodically broadcasted as long as the source node has data to send. The periodical Join-Query message refreshes multicast membership information and route updates. When an intermediate node receives a Join-Query message, it registers the source ID and the sequence number of the message in its cache to discover potential duplicates [4].

Quality of service support for ODMRP, proposed in **Xue and Ganz (2003)**, enhances the performance of ODMRP using admission control. The admission control determines whether an incoming request is accepted or rejected based on available and consumed bandwidth. When the intermediate nodes receive the Join-Query message, they compare the value of available band-width with a threshold value. If the nodes can provide the required bandwidth, they change their states to registered mode and rebroadcast the Join-Reply message. This mechanism reduces transmission traffic because the contributing nodes are on the route to the source node and also have enough bandwidth, but periodic messages to acquire bandwidth information of neighboring nodes reduce the available bandwidth of the nodes [5].

Traditional unicast routing protocols designed for flat MANETs and hierarchical extensions, cannot scale well in large-scale MANETs. Similarly, traditional multicast routing protocols, e.g., flooding-based, tree-based, and mesh based, cannot scale well in large-scale MANETs either In recent years, location-based unicast routing has attracted much attention because it scales quite well in large scale MANETs. Accordingly, researchers have proposed to use location information in multicast routing protocols.

In the Location aware, dependable multicast for mobile ad hoc networks [6], when a packet is to be multicast, the sender first locally computes a snapshot of the global network topology according to the location and transmission radius information collected from all the nodes in the network. A multicast tree for the addressed multicast group is then computed locally based on the snapshot. The resulting multicast tree is then optimally encoded and is included in the packet header. This protocol improves the scalability because it eliminates the maintenance of the multicast session state in each router, which has to be done in traditional multicast tree or multicast mesh based protocols.

K. Chen et. al. [7] proposed "Effective location-guided tree construction algorithms for small group multicast in MANET", that provide Small Group Multicast (SGM) protocol based on packet encapsulation is proposed. This protocol builds an overlay multicast packet distribution tree on top of the underlying unicast routing protocol. Different from the DSM protocol that computes the multicast tree at each sender, this protocol constructs the tree in a distributed way: each node only constructs its out-going branches to the next-level sub trees and forwards the packet to the roots of the sub trees. This process repeats until all the destinations have been reached. This protocol is more scalable than the DSM protocol because the nodes in a group need not to know the global network topology. Instead, they are only aware of each other in terms of the group membership and the location information of the group nodes. However, this protocol does not specify a method for dynamic joins and leaves in terms of location update among the group nodes. Therefore, this protocol is more suitable for the groups in which the group membership is static.

M. Mauve et. al. [8] proposed "MobiHoc Poster: Position-based multicast routing for mobile Ad-hoc networks", Position-Based Multicast (PBM) protocol is proposed using only locally available location information about the destination nodes. This protocol provides a solution in order to approximate the optima for two potentially conflicting properties of the multicast distribution tree: (1) the length of the paths to the individual destinations should be minimal, and (2) the total number of hops needed to forward the packet to all the destinations should be as small as possible. If not properly handled, a greedy multicast forwarding may lead to a problem when a packet arrives at a node that does not have any neighbor providing progress for one or more destinations.

M. Transier et. al. [9] proposed the "Scalable Position-Based Multicast (SPBM)" protocol that is to extended of PBM. SPBM uses a hierarchical aggregation of membership information: the further away a region is from an intermediate node, the higher the level of aggregation should be for this region. This hierarchical scheme improves scalability. However, because all the nodes in the network are involved in the membership update, it still cannot scale well in large-scale MANETs. In this paper, we solve this problem by summarizing the group membership information in a novel way and disseminating this information to only a portion of nodes in the network. Therefore, our scheme can potentially scale well in terms of both the number of groups and the number of group nodes in each group in large-scale MANETs.

3. PROPOSED WORK

Multicast group communication in MANET environment is very challenging issue because node move freely anywhere with independent nature, so big task to form group as well as group coordinator selection and joining and leaving information of receiver node's, for that situation handling we apply multicast ad-hoc on-demand distance vector routing for coordinate selection, and route establishment between sender to group membership communication, in our proposal basic task to provide effective and reliable group communication with the help of channel information and intermediate node capacity identification based technique. the proposed mechanism detect the collision in particular node and remove it.

Step for Secure Group Communication

In this proposal we provide reliable multicast communication and further simulate result using network simulator -2 and following step we do.

a) Create Mobile node
b) Identify coordinator node for group communication
c) Generate output file
d) Analyze QoS information of network
e) Inbuilt capacity aware and node status information
f) Increase the node reliability using proposed module.
g) Analyze quality of service of entire network

4. SIMULATION TOOL

NS2 is an open-source event-driven simulator designed specifically for research in computer communication networks. The simulator we have used to simulate the ad-hoc routing protocols in is the Network Simulator 2 (ns) [10] from Berkeley. To simulate the mobile wireless radio environment we have used a mobility extension to ns that is developed by the CMU Monarch project at Carnegie Mellon University. Since its inception in 1989, NS2 has continuously gained tremendous interest from industry, academia, and government.
To investigate network performance, we can simply use an easy-to-use scripting language to configure a network, and observe results generated by NS2. NS2 has become the most widely used open source network simulator, and one of the most widely used network simulators.

(a) Network Animator (NAM)

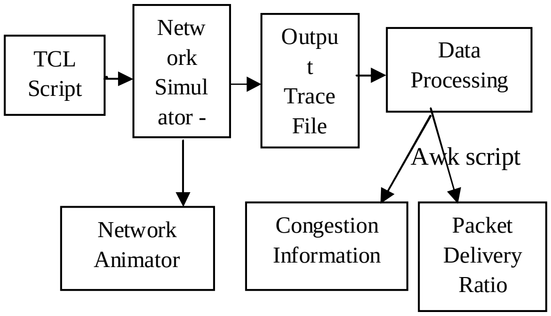

Figure 1: Network Animator

NAM is a very effective visualization tool that visualizes the packets as they propagate through the network. An overview of how a simulation is done in ns is shown in Figure 1.

(b). Performance Measure

Packet Delivery Ratio: The ratio between the number of packets originated by the application layer sources and the number of packets received by sink at the final destination.
Average End-to-end Delay: This includes all the possible delays caused by buffering during route discovery latency, queuing at the interface queue, retransmission delays at the MAC, and propagation and transfer times.
Packet Dropped: The routers might fail to deliver or drop some packets or data if they arrive when their buffer are already full.
Routing Load: The total number of routing packets transmitted during the simulation.

5. CONCLUSION AND FUTURE WORK

In this paper investigate the entire existing multicast routing in mobile ad-hoc network, and identified their work but some of researcher focus only the group management and not work the quality issue in the multicasting, so in our proposed work we design the prototype steps to resolve the problem of quality of service provision. In future we deploy the simulation structure using network simulator -2 and conclude our work through improve performance based on network parameter.

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