ISSN No. 0976-5697

Volume 4, No. 4, March-April 2013

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

Simulation based study of common issues in Flooding over Mobile ad hoc networks

Ramandeep kaur* and Parminder singh
Research Scholar*, Assistant professor
Department of IT CEC Landran
Ramanrai2888@gmail.com*, Sing.parminder01@gmail.com

Abstract: Wireless network is a network set up by using radio signal frequency to communicate among computers and other network devices. Sometimes it's also referred to as Wi-Fi network or WLAN [1]. With the advances of wireless communication technology, a mobile ad hoc network (MANET) is comprised of mobile hosts that can communicate with each other using wireless links. It is also possible to have access to some hosts in a fixed infrastructure, depending on the kind of mobile ad hoc network available. The wireless communication medium does not have a foreseeable behavior as in a wired channel [2]. On the contrary, the wireless communication medium has variable and unpredictable characteristics. This paper focuses on flooding; the source node broadcasts its packet to all its neighboring nodes. The goal of this paper for working on homogenous to heterogeneous networks and improve the network connectivity among the neighboring nodes. We analyze the performance and discuss the flooding techniques by using AODV and DSDV protocols. We demonstrate through simulations that our protocols used in this proposed work provide good performance and incur a significantly smaller congestion. This paper shows that the proposed mechanisms improve the Throughput and significantly enhance the network performances in terms of delay.

Keywords- MANET, flooding, AODV, DSR

I. INTRODUCTION

A mobile ad hoc network (MANET) is comprised of mobile hosts that can communicate with each other using wireless links. It is also possible to have access to some hosts in a fixed infrastructure, depending on the kind of mobile ad hoc network available. Data communication in a MANET differs from that of wired networks in different aspects. The wireless communication medium does not have a foreseeable behavior as in a wired channel [3]. On the contrary, the wireless communication medium has variable and unpredictable characteristics. The signal strength and propagation delay may vary with respect to time and environment where the mobile nodes are. Unlike a wired network, the wireless medium is a broadcast medium; that is, all nodes in the transmission range of a transmitting device can receive a message.

Mobile ad hoc networks (MANETs), mesh networks, and multihop sensor networks are instances of multihop wireless networks where nodes cooperate to forward traffic among each other. Such networks are important whenever infrastructure is unavailable (or expensive) and quick deployment is desired [4].

The main contributions of this work are:

a. Demonstrating the impact of flooding data on various nodes with modification on the MANET Model with of AODV Protocol
b. Quantification of the inaccuracy of broadcasting in Mobile ad-hoc networks under different nodes on the simulation Scenario, underlying routing protocol i.e. AODV and DSDV.
c. Suggesting and developing techniques to reduce unwanted Broadcasting.
d. Evaluating the performance of the MANET using Flooding technique and then use of AODV protocol.

The remainder of the paper is organized as follows[5]: a review of related work in the area of MANET and flooding techniques is presented in Section 2. Section 3 motivates our work, showing that the nodes communicates with each other not on the range of the same networks but also communicates in the different networks. Section 4 analyzes, using extensive simulations, the levels and causes of flooding and this section also overcome the effect of flooding by appropriate technique used by Adhoc protocols. Section 5 discusses the results obtained from the scenario used in the section 3 and compare with previous results. The final section 6 concludes our work and suggests possible future work[6].

II. RELATED WORK

On wireless Ad-hoc networks, due to the node' mobility and the frequent change of the network topology, the use of broadcast schemes is the fastest method to reach all the network nodes. The related work described in given below.

The new technique called priority forwarding [7] that improved the latency time retransmission. The principle behind forwarding techniques to forward the packets to all communication nodes and the destination node send the notification to the source node but in this technique a lot of bandwidth used and also chances to duplicate packet has generated due to retransmission. These flooding techniques that used on the early papers impact on the overall performance of Ad Hoc Wireless Networks and to remove the disadvantages of early flooding techniques the new proposed technique used in this paper was Priority Flooding Technique. The priority checking feature allows a flooding packet to be propagated as quickly as possible, keeping flooding latency low.

The flooding method [8] that had uses the characteristics of the existing DSR protocol. The DSR (Dynamic Source Routing) protocol is the most typical of the protocols used in ad-hoc networks and mentioned in RFC 4728. The problem of DSR when flood to packets on the network then no routing information maintained on the route cache.

Therefore a proposed method of sequence of flooding introduced that overcome the problem of DSR and resulting low collision and congestion.

The Mobile ad hoc networks [11] are infrastructure-less networks, dynamically formed by an independent system of mobile nodes that are connected via wireless links. The Authors provided novel routing metrics that take into account nodes degree of centrality, for both proactive and reactive routing protocols. To define central node, we used two characterizations, depending on whether the routing protocol is proactive or reactive[14]. For nodes using reactive approaches, we characterized their centrality by the size of their routing tables. As for proactive approaches, a node's centrality was defined by size of its MPR Selector List. Subsequently, routing metrics minimizing the average route centrality were accordingly proposed and implemented on two representatives of reactive and proactive approaches, respectively AODV and OLSR. Simulation results demonstrated that our load-balancing mechanisms significantly improved these routing protocols in terms of load distribution, end to end delay and packet delivery fraction.

III. PROBLEM FORMULATION

Flooding is the most commonly used scheme in ad hoc routing protocols. In flooding, the source node broadcasts its packet to all its neighboring nodes. Each neighbor node, upon receiving the packet, checks if it received the same packet previously, if so it discards the packet, otherwise, it rebroadcasts the packet to its own neighbors . First, in homogeneous MANETs a node A is in node B's neighborhood if and only if node B is in node A's neighborhood, this is because the two nodes have the same transmission range [13]. The majority of the previous work on routing techniques in MANETs has focused on homogenous MANETs. A homogenous MANET is the one in which each node in the network has the same transmission range. But we implemented this work on heterogeneous also and obtained the various results shown in section5.

IV. SIMULATION SCENARIO

To evaluate the performance of the proposed work, we implemented them on AODV [16] as respective representatives of reactive routing protocol. Simulations were run on ns-2 [16] for AODV. We defined the scenario shown in figure for the simulations, each having different transmission ranges. The mobility model used was random waypoint [18], and the node speed was uniformly distributed. As for the simulated network, we considered 30 nodes, 20 of which were traffic sources. Traffic was created with constant-bit-rate (CBR) date sources and packet size was 1024 bytes. Eventually, mobile nodes were placed within a rectangle of 500 m x 200 m and this is presented in figure1.

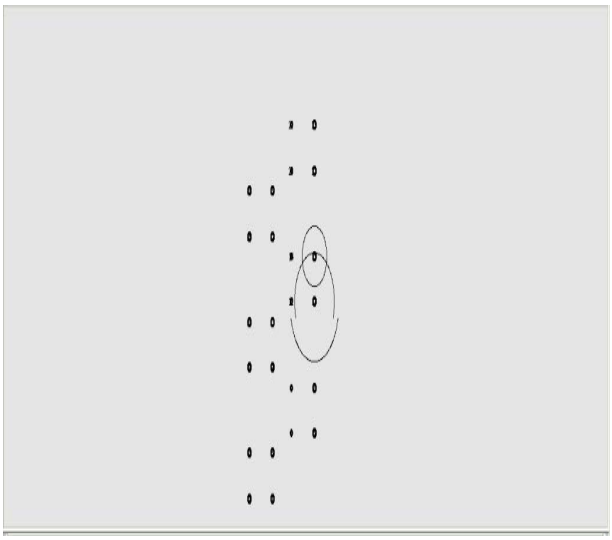

Figure 1: Simulated Scenario

V. SIMULATION RESULTS

The Throughput metric measures the data packets delivered to a group member per second averaged over all multicast group members. We now consider another performance metric, the number of times a broadcast packet is received within a node in the network. The corresponding simulation result is presented in Figure 2. With flooding techniques we observe that this number is almost equal to 1 whereas with Omni directional antennas.

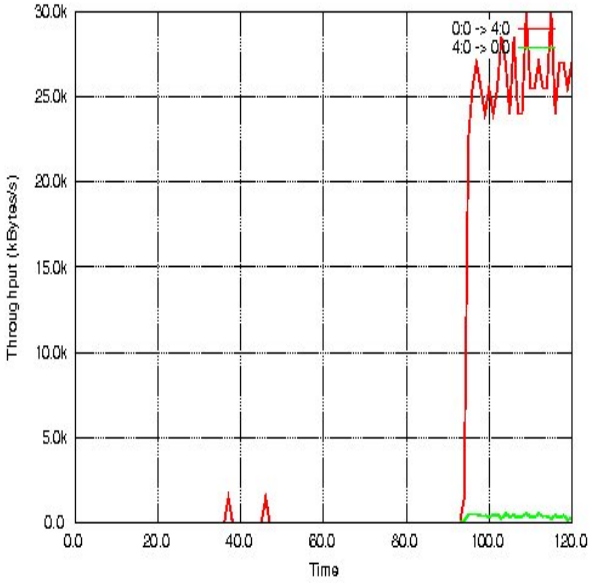

Figure 2: Throughput vs Time

This metric measures the delay (shown in figure 3) of a data packet delivery (over all received packets at all receivers) which includes delays caused by queuing at the interfaces, propagation, and transfer times.

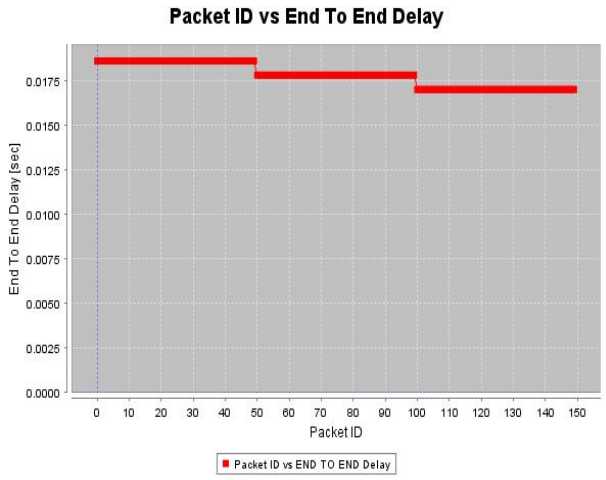

Figure 3: Delay of Packet Delivery

VI. CONCLUSION

In this paper, we proposed an improvement for the MAC layer modeling in flooding techniques scenarios for ns-2.Based on our study of the performance of ad hoc networks with AODV protocol, we arrive in this paper at the conclusion that the nodes used in the scenario improves performance using priority forwarding[20]. Our study of priority forwarding is based on the observation that the source of redundant broadcast packet reception observed in broadcasting protocols.

The concluded work and overall simulation statistics calculated from the above results shown in Table 1.1

Table 1.1: Summary of Simulation Statistics

SNo	Parameter	Value
1	Actual movement of the Nodes	35
2	No. of generated packets	150
3	No. of sent packets	150
4	No. of Received packets	150
5	No. of dropped Packets	0
6	Minimal generated Packet Size	500
7	Minimal generated Packet Size	900

VII. FUTURE WORK

The experimental setup is also envisaged using heterogeneous networks and to comparing with the latest trends and simulation models. If we think about security in MANET then it is adding at application-level data confidentiality/Integrity to communication nodes on the simulation modelling MANETs.

VIII. REFERENCES

[1]. Kihwan Kim Ying Cai, “A Priority Forwarding Technique for Efficient and Fast Flooding in Wireless Ad Hoc Networks”,IEEE 2005;pp: 224-228.

[2]. Masato Noto, “An Efficient Flooding Method in Ad-hoc Networks for Reducing Power Consumption “, IEEE 2008; pp. 974-979

[3]. Victor Cabrera Murcia,Spain" Simulation-Based Study of Common Issues in VANET Routing Protocols", VTC09Spring,pp-1919-27

[4]. Pagani E., Rossi G. P. "An Admission Control Policy for QoS Multicast Traffic in Mobile Ad Hoc Networks". Technical Report, Dept. of Computer Science, Università degli Studi di Milano,pp.2-11, 2001.

[5]. Lin CR, Gerla M. Adaptive clustering for mobile wireless networks. IEEE Journal on Selected Areas in Communications 1997; 15(7): 1265-1275.

[6]. P. Krishna , N. H. Vaidya , M. Chatterjee , D. K. Pradhan, A cluster-based approach for routing in dynamic networks, ACM SIGCOMM Computer Communication Review, v.27 n.2, p.49-64, Apr. 1997 [doi>10.1145/263876.263885

[7]. Lin CR, Gerla M. Adaptive clustering for mobile wireless networks. IEEE Journal on Selected Areas in Communications 1997; 15(7): 1265-1275.

[8]. Shobha.K.R, Dr.K.Rajanikanth,” Efficient Flooding Using Relay Routing in On-Demand Routing Protocol for Mobile Adhoc Networks”,IEEE 2009,pp.316-21.

[9]. Yoav Sasson David Cavin Andr´e Schiper,” Probabilistic Broadcast for Flooding in Wireless Mobile Ad hoc Networks”,IEEE 2003,pp. 1124-30.

[10]. Dow CR, Lin JH, Hwang SF, Wang YW. An efficient distributed clustering scheme for wireless ad-hoc networks. Transactions of IECEI, Wireless Communication Switching 2002; E85-B(8) 1561-1571.

[11]. Yannick Lacharite, Maoyu Wang et.al. ,” A Simplified Approach to Multicast Forwarding Gateways in MANET”,IEEE 2007,pp.426-430

[12]. Larry Hughes and Ying Zhang,” Self-limiting, adaptive protocols for controlled flooding in ad hoc networks”, Conference on Communication Networks and Services Research (CNSR’04), IEEE 2004.

[13]. Abdulla Al-Qawasmeh and Saïd Bettayeb, “A Proactive Distance-Based Flooding Technique for MANETs with Heterogeneous Radio Ranges”,IEEE 2008,pp.648-654.

[14]. Seok-Kyu Kweon and Kang G. Shin. Distributed of QoS Routing Using Bounded Flooding. Technical Report CSE-TR-388-99, University of Michigan, 1999.

[15]. B. M. Waxman. Routing of Multipoint Connections. IEEE Journal on Selected Areas in Communications, December 1988.

[16]. S. Skin and J. J. Jones. “Modern Communication Principles-- with Application to Digital Signaling.“ McGraw-Hill, New York.

[17]. www.isi.edu/nsnam/ns/

[18]. R. Ogier, F. Templin, and M. Lewis. Topology Dissemination Based on Reverse Path Forwarding (TBRPF). Request for Comments 3684, February 2004. Available at http://www.ietf.org/rfc/rfc3684.txt.

[19]. J. Xie, R. R. Talpade, A. McAuley, and M. Liu. AMRoute: Ad Hoc Multicast Routing Protocol. Mobile Networks and Applications, 7(6):429–439, 2002.

[20]. S. Kumar, V. S. Raghavan, and J. Deng. Medium access control protocols for ad hoc wireless networks: A survey. Ad Hoc Networks, 4(3):326–358, 2006.