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Dynamic Route Allocation for Guaranteed Data Delivery in Mobile Ad Hoc Networks using DPRP & VDVH

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Abstract: -Mobile Ad hoc networks (MANET) carried out multi-hop communication in an environment with no fixed infrastructure, by means of mobile nodes and changing network topology. In mobile ad hoc networks (MANETs), nodes move freely and so the topology of the nodes is highly dynamic. The process of routing the data packets to the destination is a challenging task.Provoked by this issue, this paper presents the new approach a Dynamic Position Based Routing (DPRP) protocol which implemented in the distributed architecture and takes advantage of the stateless property of geographic routing and the broadcast nature of wireless medium dynamically.In the case of communication hole, a Virtual Destination-based Void Handling (VDVH) scheme is further proposed to work together with DPRP. Both theoretical analysis and simulation results show that DPRP achieves excellent performance even under high node mobility with acceptable overhead and the new void handling scheme also works well.

Keywords: MANET, Ad hoc Networks, Routing, Geographic routing, DPRP, VDVH, Node Mobility.

1.INTRODUCTION

MOBILE ad hoc networks (MANETs) have gained a great deal of attention because of its significant advantages carried about by multihop, infrastructure-less transmission. On the other hand, due to the error prone wireless channel and the dynamic network topology, reliable data delivery in MANETs, especially in challenged environments with high mobility residue an issue. MANET is used to communicate between hosts in the absence of dedicated routing infrastructure, when messages are forwarded by intermediate hosts if the sender and receiver are out of communication range. The quality of such a routing algorithm can be measured by its delivery ratio that be supposed to maximum; that is, the ratio of the number of data packets received at the destination to the number of data packets sent by the source. Traditional topology-based MANET routing protocols (e.g., DSDV, AODV, DSR) are relatively liable to node mobility. The main cause is due to the end-to-end route discovery is before data transmission. Owing to the constantly and even fast changing network topology, it is very difficult to maintain a deterministic route. The discovery and recovery procedures are also time and energy consuming. Once the path shatters, data packets will get lost or be delayed for a long time in anticipation of the renewal of the route, causing transmission disruption.

Geographic ad-hoc networks, using position-based routing, are targeted to handle large networks containing many nodes. Such networks are inappropriate to use topology based algorithm as the amount of resources required would be vast. The advantage in geographic networks is the ability to deliver a packet from its source to the destination based as much as possible on local information without keeping network-wide information. While topology based algorithms may be more efficient in delivering packets in terms of delivery success probability and route optimality, position based routing has the advantage of modest memory requirement at the node and low control message overhead, which also translate to more efficient use of power resources. While this is not a full comparison between the two groups, it emphasizes the will to center position-based routing algorithms as much as possible on local information. Actually, due to the broadcast nature of the wireless medium, a single packet transmission will lead to multiple receptions. If such transmission is used as backup, the strength of the routing protocol can be significantly enhanced. The concept of such multicast-like routingstrategy has already been demonstrated in opportunistic routing. Conversely, most of them use link-state style topology database to select and prioritize the forwarding candidates.

However, the constraints that is to be addressed in MANETs such as error prone wireless channel, the dynamic network topology, reliable data delivery especially in challenged environments with high mobility remains an issue. The route owing to the constantly and even fast changing network topology. The discovery and recovery procedures are also time and energy consuming. Once the path breaks, data packets will get lost or be delayed for a long time until the reconstruction of the route, causing interruption in transmission.

So, to provide an efficient and reliable data delivery in MANETs, a Dynamic Position-based routing protocol (DPRP) is used and implemented in distributed architecture, in which several forwarding candidates cache the packet that has been received using MAC interception. If the best forwarder does not forward the packet in certain time slots, suboptimal candidates will take turn to forward the packet according to a locally formed order. In this way, providing one of the candidates succeeds in receiving and forwarding the packet, the data transmission will not be interrupted. Potential multipath are broken on the soar on a per packet DPRP's excellent strength can be projected.In the case of communication hole, a VirtualDestination-based Void Handling (VDVH) scheme is further proposed to work together with DPRP.

2.SYSTEM ANLYSIS

2.1 Conventional MANET routing protocol

BrochJ et al (1998) compared the performances of the various available MANET protocols. And they addressed the issues of various topology-based MANET protocols

DSDV, DSR, AODV and provide comparison between them. However, the link breakages are not detected quickly and so most of the data packets are dropped. Further, irrespective of the availability of current data for exchange, DSDV maintain routes between all nodes.

This causes unnecessary traffic and prevents nodes from saving battery power. Even though only some user data has to be transmitted, it keeps the track of topology through the nodes by exchanging routing information.

Similarly the drawbacks of DSR such as the route maintenance mechanism that does not locally repair a broken link, so rerouting must be carried out. Stale route cache information could also result in inconsistencies during the route reconstruction phase. Also, the connection setup delay is higher than in table-driven protocols. The performance degrades rapidly with increasing mobility even though the protocol performs well in static and low-mobility environments,

With regard to the constraints of AODV, the intermediate nodes can lead to inconsistent routes if the source sequence number is very old and the intermediate nodes have a higher but not the latest destination sequence number, thereby having stale entries. Similarly, the Multiple Route Reply packets in response to a single Route Request packet can lead to heavy control overhead. Hence, there is unnecessary bandwidth consumption due to periodic beaconing.

2.2 Dynamic Position-based Routing Protocol

The design of DPBR is based on the opportunistic forwarding and executed in the service model that composed by core and access routers. The Access routers are to be aware of their own location and the positions of neighboring nodes. Neighborhood location information can be exchanged using one-hop beacon or piggyback in the data packet's header. Core routers send messages with access routers to report the congestion situation. When a source node wants to transmit a packet, it gets the location of the destination first and then attaches it to the packet header. Due to the destination node's movement, the multihop path may diverge from the true location of the final destination and a packet would be dropped even if it has already beendelivered into the neighborhood of the destination. To deal with such issue, additional check for the destination node is introduced. At each access router, it will check its neighbor list to see whether the destination is within its transmission range. If yes, the packet will be directly forwarded to the destination, similar to the destination location prediction scheme described in. The forwarding table is constructed dynamically during data packet transmissions and its preservation is much easier than a routing table. As the establishment of the forwarding table only depends on local information, it takes much less time to be constructed. The table records only the current active flows, while in conventional protocols, a decrease in the route expire time would require far more resources to rebuild. Algorithm 1 depicts the procedure to select and prioritize the forwarder list.

Algorithm 1:-
Input:
ListN : Neighbor List
ND : Destination Node
Base : Distance between current node and ND
Step 1: If ND is available in Neighbor list then assign next hop as ND and Return.
Reconstruct the forwarding table by repeating the following steps
Step 2: For all nodes in the List N
Update distance of each node in List N by using the function dist(List[Ni], ND)
Step 3: prioritize the forwarder list
Step4: If the dist(List[Ni]) <= Base then ensure that Ni should not exceed half of the transmission range of a current node. Else goto step 6.
Step 5: Attach the node Ni into the candidate list
Step 6: Continue step 4 and step 5 for all nodes in List[N]

The lower the index of the node in the candidate list, the higher priority it has.As the data packets are transmitted in a multicast-like form, each of them is identified with a unique tuple (src_ip,seq_no) where src_ip is the IP address of the source node and seq_no is the corresponding sequence number. Each access router maintains a monotonically increasing sequence number, and an ID_Cache to record the ID (src_ip, seq_no) of the packets that have been recently received. If a packet with the same ID is received again, it will be discarded. Otherwise, it will be forwarded at once if the receiver is the next hop, or cached in a Packet List if it is received by a forwarding candidate, or dropped if the receiver is not specified.

2.3 Virtual Destination-based Void Handling

To handle communication voids, almost all existing mechanisms try to find a route around. During the void handling process, the advantage of greedy forwarding cannot be achieved as the path that is used to go around the hole is usually not optimal (e.g., with more hops compared to the possible optimal path). More importantly, the robustness of multicast-style routing cannot be exploited. In order to enable opportunistic forwarding in void handling, which means even in dealing with voids, we can still transmit the packet in an opportunistic routing like fashion; virtual destination is introduced, as the temporary target that the packets are forwarded to destination.

3.RESULTS & SCREENSHOTS

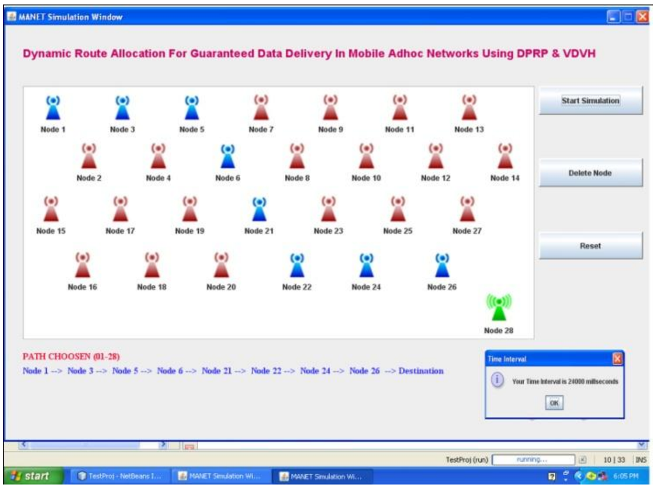

Fig1.MANET Simulation in normal state

Fig2.MANET Simulation after node deletion

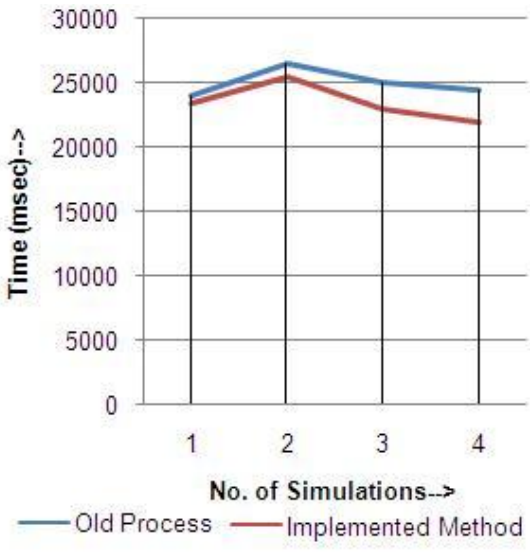

Fig3.Tranmission time comparison

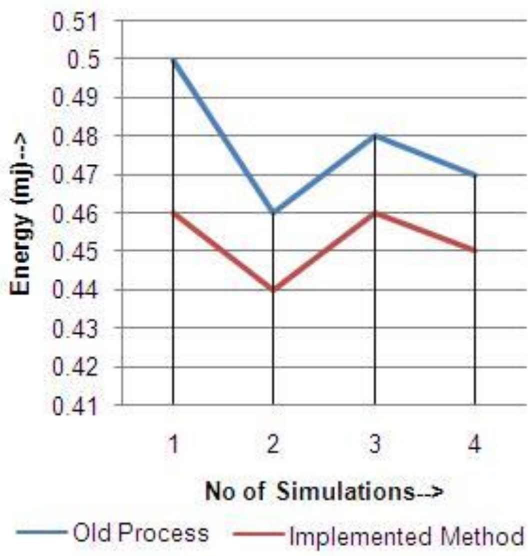

Fig4.Tranmission energy comparison

4.CONCLUSION & FUTURE WORK

In this paper, we address the problem of reliable data delivery in highly dynamic mobile ad hoc networks. Continually changing network topology makes conservative ad hoc routing protocols incapable of providing satisfactory performance. In spite of frequent link break due to node mobility, substantial data packets would either go astray.

Stimulated by opportunistic routing, we propose a MANET routing protocol DPRP which takes advantage of the stateless property of geographic routing and broadcast nature of wireless medium. In addition selecting the next hop, several forwarding candidates are also explicitly specified in case of link break. Leveraging on such natural backup in the air, broken route can be recovered in a timely manner.

The efficacy of the involvement of forwarding candidates against node mobility is analyzed. Through simulation, the effectiveness and efficiency of proposed routing method has confirmed. In addition, the metric high packet delivery ratio is achieved while the delay and duplication are the lowest.

As future work, we plan to investigate and study on how to improve and reduce further the routing overhead using history and setting up structures like clusters for instance. Webelieve that making the nodes more aware of itsSurroundingtopology is the right way to further enhance those protocols.As GPS system becomes more and more common in wirelessdevices, it will give a whole new source of information.Knowing its current location and the locations of other nodes,a node can quite efficiently reduce the area for searching itsdestination node. By combining the GPS system with the current protocols, we expect large enhancement on routingoverhead, which makes those protocols eventually practicalfor use in the real world. Finally, we plan to investigate further the preemptivemechanismfor AODV, on how to improveand reduce PAODV overhead when compared to AODV.

REFERENCES

[1] Quanjun Chen, Member, IEEE, Salil S. Kanhere, Senior Member, IEEE, andMahbub Hassan, Senior Member, IEEE,"Adaptive Position Update for GeographicRouting in Mobile Ad Hoc Networks",IEEE Transactions On Mobile Computing, Vol. 12, No. 3, March 2013.

[2] Kemal Akkaya, Mohamed Younis, "A survey on routing protocols for wireless sensor networks", online publications on Elsevier, www.sciencedirect.com, 26 November 2003

[3] LajosHanzo Ii And Rahim Tafazolli, "A Survey Of Qos Routing Solutions ForMobile Ad Hoc Networks", 2nd Quarter 2007, Volume 9, No. 2, IEEE Communications surveys.

[4] Jamal N. Al-Karaki,Ahmed E. Kamal, "Routing Techniques inWireless Sensor Networks: A Survey",IEEE Wireless Communications • December 2004.

[5] G.ShirishaK.L.Haritha, "Reliable Data Delivery For Highly DynamicMobile Ad Hoc Networks",Shirisha.G.Et, Al.,
International Journal Of Technology And Engineering Science [IJTES],Vol 1 (6), Pp 628 – 632, September 2013.

[6] LuoJunhai, Ye Danxia, Xue Liu, and Fan Mingyu, "A Survey of Multicast Routing Protocols forMobile Ad-Hoc Networks",IEEE Communications Surveys & Tutorials, Vol. 11, No. 1, First Quarter 2009.

[7] Elizabeth M. Royer, University of California, Santa Barbara,Chai-KeongToh,"A Review of Current Routing Protocols forAd Hoc Mobile Wireless Networks", IEEE Personal Communications • April 1999.

[8] Chunhung Richard Lin and Jain-Shing Liu, "QoS Routing in Ad Hoc Wireless Networks",IEEE Journal On Selected Areas In Communications, Vol. 17, No. 8, August 1999.

[9] Saranya, Chandrasekaran,"A Dynamic Position Based Routing Protocol To Optimize PacketDelivery In Mobile AdhocNetwork",Volume 4, No. 3, March 2013,Journal of Global Research in Computer Science.

[10] ParthasarathyVelusamy, MurugaboopathiGurusamy, M.J.Carmel Mary Belinda,"POR: Position based Opportunistic Routing for Reliable and Efficient Data Transmission in MANETs",Life Science Journal 2013;10(2),
http://www.lifesciencesite.com .