Survey on NCPR: A Neighbor Coverage-Based Probabilistic Rebroadcast for Reducing Routing Overhead in MANET

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Abstract— Mobile ad hoc networks consist of Scatter a collection of mobile nodes (or host) with having flat network. Main technique of NCPR Rebroadcasting is very expensive and completely occupies too much network resource. In MANET different mechanisms are intend for improving the routing performance.. In the Dynamic Probabilistic Route Discovery scheme, each node decides the forwarding probability according to the number of its neighbor nodes and those neighbor nodes which are enclosed by the previous broadcast. So, coverage-based probabilistic rebroadcast protocol for reducing routing overhead in MANET intend a rebroadcast delay to determine the rebroadcast order, and then it obtain the more precisely fixed additional coverage ratio and connectivity factor.

Keywords— Wireless Mobile Ad hoc Networks, AODV, Neighbor Coverage, Network Connectivity, Routing Overhead

I. INTRODUCTION

An ad Hoc network is the network connection that is build up for single period devoted to a particular action of communication between two nodes. The Ad Hoc network that is used for mobile communication is called MANET. A MANET is a type of ad hoc network that can change locations and configure itself. Because MANETS are mobile, they use wireless connections to connect to various networks. Example of MANET is a standard Wi-Fi connection, or another medium, such as satellite or cellular transmission.
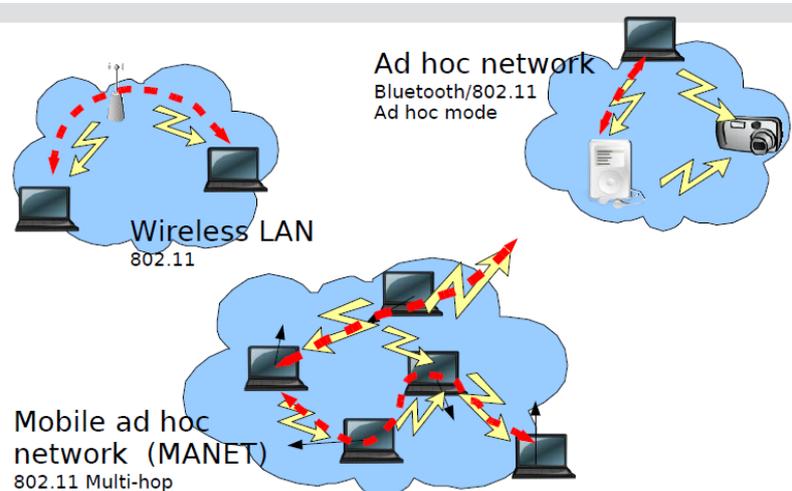

Fig. Different types of wireless networks

The MANET use wireless networks to connect with different networks. Some of the MANETS are connected to LANs and some are connected to the internet based on the application of the network. These networks configure themselves even though they are not connected to any wireless routers.

MANET is useful in many real-time application like military (unknown terrain, limit the range of communication Destroyed infrastructure), Disaster relief(wiped out infrastructure, search and rescue),Economic and commercial(Access extension, personal area network, adhoc gaming).Main goals of the MANET is finding end-to-end path, Scaling i.e. minimizing the overhead ,routing must be loop free and routing maintenance.

Routing Protocols in adhoc network is classified into the three important types:

1. Proactive Routing:

It has the global network view that is the node disseminates the routing information continuously and route is always available when needed. Proactive routing incurs the more overhead in Adhoc network. In proactive routing process of approaching of node is slow. Example of Proactive Routing is OLSR(optimized link state routing) and DSDV*(Destination-Sequenced Distance-Vector Routing).*

2. Reactive Routing

It has a partial network view that is only active or cached routes are known and routes are discovered when needed. Reactive routing reacts quickly when topology of network changes. Reactive Routing incurs less overhead in Adhoc network. Example of reactive routing is AODV (Adhoc on demand distance vector routing).

3. Hybrid Routing

Hybrid routing achieves scaling. Hybrid routing is combination of AODV routing and link state routing. In hybrid routing process of approaching node is more and requires less processing power.

II.   RELATED WORK

X Zang, Wang and Sung[1], the author has explain NCPR protocol routing. This technique is used to reduce overhead which are related to broadcasting. NCPR is uniquely designed for MANET and it takes the comparison across popular way scheme by stimulation using MAC collision rate, normalized routing overhead, packet delivery ration, number of CBR connections and Random Packet loss rate. Author concluded that end-to-end delay is reduced by 53.9% in NCPR protocol and the delay is increased by 0.6%.

J Abdulai, ould-khoua and L. M. Mackenzie[6], tells about the improving probabilistic route discovery in MANET. It includes the Two-P scheme which defines the forwarding probability at node. For this author defines two topology first one is two logical grouping 25nodes located in sparse and dense region of network and second one is four logical grouping of 25 nodes located in various region of networks. The performance of enhancing adjusted probabilistic route discovery using AODV as the base routing protocol, which traditionally uses blind flooding.

Jae-soo kim, Qi Zang, Agrawal[8], In this paper author has study of coverage area and neighbor confirmation in mobile adhoc network. Explains the how to minimize the number of rebroadcast packet while good retransmission latency and packet reachability are maintained. Even though the large no. of rebroadcast guarantees high reachability, it causes high network bandwidth wastage and so many packet collisions. On the other hand the small numbers of rebroadcast result in low reachability, because it cause rebroadcast chain broken so that some hosts may not receive the broadcast packet.

Aminu Mohammed, Mohamed ould-khaoua[9],author has described the dynamic probabilistic couter based broadcasting in MANET. It exploits the use of packet couter and probability at mobile nodes which is computed by the probability function ti dissemination of broadcast packet.

Jiwei chen,yeng lee[13] has proposed robust adhoc routing for loss wireless enviorment. A hybrid routing scheme that gracefully integrates the characteristics of on-demand and proactive routing.

Kshavarz-haddad, Ribeorio and Riedi[14],In this paper author done the comparison of DRB and DCCB of efficient and robust dynamic broadcast for adhoc and sensor network. The Feature of DRB and DCCB from other existing timer-based scheme is their hybrid backbone consisting of fixed and various part.

III.   REVIEW OF ROUTING PROTOCOL

AODV and DSR are proposed for improve the scalability and reduce the routing overhead when new route is requested by host.

1. AODV Protocol

AODV stands Adhoc on demand distance vector routing. It is reactive protocol. Protocol flooding is to discover the route when needed. Only active routes in the routing table are present to discovers the route(route request and route reply). For route discovery send the HELLO message from sourse though the monitor links its discovers the destination by giving the sequence numbers in control messages for avoiding the routing loop then finally we get the destination but if any error in route discovery then gives explicit route error notification(RERR).

Fig. Route discovery in AODV

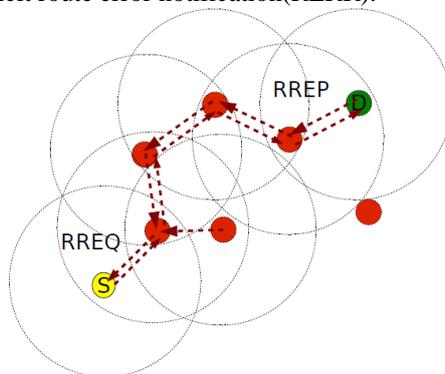## 2. DSR

DSR stands Dynamic Source Routing. its is a reactive link state protocol. it can accumulates source route during discovery of route. DSR routing append the full route to all data packets. The hop-by-hop forwarding state in nodes is not applicable for DSR. It is disorderly composition of cache routing information and automatic route shorting. Some packet salvaging can be happen in DSR.

Fig. Route discovery in DSR

3. NCPR

Neighbor coverage based probabilistic rebroadcast protocol is combination of both neighbor coverage and probabilistic method. In the neighbor coverage knowledge, we need a rebroadcast delay to determine the rebroadcast order, and then we can obtain a more accurate additional coverage ratio [1].

This is calculated the rebroadcast delay and rebroadcast probability with the help of coverage ratio and connectivity factor:

Fig. System Architecture of NCPR

Rebroadcast Delay

The rebroadcast delay is to determine the forwarding order. The node which has more common neighbors with the previous node has the lower delay. If this node rebroadcasts a packet, then more common neighbors.

Rebroadcast Probability

The information about the uncovered neighbors of connectivity metric and local node density is to calculate the rebroadcast probability.

The rebroadcast probability is composed of two parts:

a) Additional coverage ratio, which is the ratio of the number of nodes that should be covered by a single broadcast to the total number of neighbors

b) Connectivity factor, which reflects the relationship of network connectivity and the number of neighbors of a given node.

IV.   ADVANTAGE AND DISADVANTAGE OF NCPR

Advantages:

Increase the packet delivery ratio

Decrease the average end-to-end delay

Decrease the number of retransmissions

Improve the routing performance

Disadvantages:

MANET leads to periodic link breakage, which in turn leads to periodic path failure and route discoveries, hence overhead is created.

In MANET there is high mobility, it causes frequent link breakage which leads to frequent path failure and route discovery.

Broadcasting has storm problem.

In router broadcasting increasing the number of retransmission is main reason of routing overhead.

V.   CONCLUSION

In this survey paper. NCPR protocol dynamically calculate the rebroadcast delay and rebroadcast probability for reduce the overhead of route discovery. It also includes the connectivity factor of nodes to determine the rebroadcast order and coverage ratio. Varies routing schemes are optimized in literatures. Routing protocols are used to have the knowledge about the neighbor covered nodes and to generate the less traffic in the routing. For improvement and performance in routing of any network with less overhead is as future work.

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