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Review on Node-Disjoint Multipath Routing Based on AOMDV Protocol for MANETS

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Abstract- **Constant link failures are occurred in mobile ad-hoc networks because of node's mobility and use of fickle wireless channels for data transmission. Because of this, multipath routing protocols arrive with a critical research issue. In this, we propose to implement node-disjoint multipath routing based on AOMDV protocol. The main objective of proposed approach is to obtain all available node-disjoint routes from source-destination with minimum routing control overhead. With the given approach, as first route for destination is dogged the source starts data transmission. All other backup routes, if available, via the first route are scheduled concurrently with data transmission. In the current work we are proposing the concept of Node Disjoint –Multipath based on the congestion threshold and results will be obtained through various simulations shown through the effectiveness of our proposed methods in terms of End to end delay, Throughput, hop count, Packet delivery Ratio.**

Keywords: **Manets, Mobile ad-hoc routing, Multipath, Node-Disjoint, Route availability, AODV protocol AOMDV protocol, Video transmission, Congestion.**

I. INTRODUCTION

Mobile ad hoc networks (MANET) self-configuration, self-sustainable and self-organizable which are collections of mobile hosts. The mobile host has no centralized control to communicate with each other through wireless channels. They are intrinsically infrastructure-less, inexpensive and quick-to deploy attributes of MANETs is providing an assurance for its use in divergent departments. Over the years, Internet streaming multimedia audio / video streaming, on-demand TV, with several applications including Voice over IP surveillance system is well established. Routing protocols which find and save more than one route in the routing table for each destination node are cited to as multipath routing protocols. In wireless outlines, routes are broken due to node mobility. Likewise, the wireless links which are used for data transmission are intrinsically untrustworthy and error prone. So, multipath routing protocols are used to overdrawn the shortcomings of shortest path routing protocols. Multipath routing protocols are used to raise the reliability by sending the same packet on each path and fault tolerance by ensuring the availability of backup routes at all times. It can likewise be used to afford load balancing, which lessen the congestion on a single path caused because of the burst traffic. Node-disjoint multipath routing permits the establishment of multiple paths; each consists of a unique set of nodes in between a source and destination. As we all know that MANETs consist of mobile nodes which cause consistent link failures. This link failure purposes two main problems. First, whenever a route break occurs then all the packets which have already been transmitted on those routes are dropped and it decreases the average packet delivery ratio (PDR). Second, the transmission of data traffic is paused for the time till new route is discovered and in turn it increases the average end-to-end delay.

We will develop a node-disjoint multipath routing method (NDMP-AOMDV) based on ad-hoc on-demand multipath distance vector (AOMDV) routing protocol in this research. Our proposed approach will minimize effect of link failure and improve the throughput. Therefore the above mentioned two problems are addressed which are caused by frequent link failures.

II. RELATED WORK

Multipath routing establishes number of routes between source and destination nodes. For fault tolerance, even if one route failure occurs, source nodes can maintain connections by using other routes. Route disconnection cause data transmission failures.Therefore, multiple routing protocols can reduce data transmission failures and delay times that are caused by route disconnection. During the route discovery process, multipath routing protocols search node-disjoint, link-disjoint or non-disjoint routes. Node-disjoint routes have completely disjoint routes in which there are no nodes or links in common. Link-disjoint routes have no common links but it may have nodes in common. Non-disjoint routes can use nodes or links in common. If a node or link failure occur (and if it is used in the main and backup route) in non-disjoint and link-disjoint routes, then the main and backup route get be disconnected at the same time. However in node-disjoint routes the main routes and backup routes use completely different nodes or links. If main route will be disconnected, data transmission may be available through the backup route. In single-path routing protocols the route maintenance may be performed after route failure. So, data transmission will be stopped till the new route is established which in turn cause data transmission delay. Whereas, multipath routing protocols perform the route maintenance process even when only one route fails among the multiple routes. To perform the route maintenance process before all routes fail, the network always maintain multiple routes. This can reduce data

transmission delays which are caused by link failure. The AOMDV protocol establishes loop-free link-disjoint paths in the network. The time when intermediate nodes receive the RREQ packet from the source node, AOMDV stores all RREQ packets, unlike conventional AODV, which discards duplicates. So, each node maintains a first-hop-list where information from additional field called first-hop in RREQ packet to indicate the neighbor node of the source nodes. If first-hop of received RREQ packet is duplicated from its own first-hop-list then the RREQ packet is discarded, whereas, the RREQ packet is not duplicated from previous RREQ packets. The node updates the next-hop, hop-count and advertised-hop-count in routing table. At the destination, RREP packets are sent from each received RREQ packet. In AODVM protocol, in-between nodes are not allowed to send a RREP packet directly to the source node and intermediate nodes do not even discard the duplicate RREQ packets. But intermediate nodes record all received RREQ packets in routing table. The destination node sends a RREP for all the received RREQ packets. An intermediate node forwards a received RREP packet to the neighbor in the routing table. AOMDV has overhead of storing multiple next-hops and hop-counts and first-hop list for each destination. AODVM may not establish alternate routes depending on the path along which the RREP packets are sent.

III. CONCEPT OF THEORY FOR RESEARCH

A node-disjoint multipath routing method based on AODV protocol determine all available node-disjoint routes from source to destination with minimum routing control overhead. The route discovery method identifies all available node-disjoint routes by using a single flooding of a RREQ message and It greatly lessen the routing overhead caused by route discovery and maintenance processes and thus increasing the network capacity. Simulation results shows that NDMP-AODV is able to provide low end-to-end delay and high packet delivery ratio, while keeping low routing overhead. But method is suitable for low and moderate mobility networks as shown by the results in simulation section.

So all above concept give us motivation for improvement in the protocol. The node-disjoint multipath routing method based on AOMDV protocol will be developed. It will be identified that all the available node-disjoint routes will be using a single flooding of a RREQ message. This will greatly reduce the routing overhead caused by route discovery and maintenance processes thus increasing the network capacity.

IV. OBJECTIVE OF RESEARCH

The ad hoc routing protocols are promising routing protocols. They can be used in mobile ad hoc networks to route packets between mobile nodes. The main objectives are as under :

1. Implementation of NDMP-AOMDV and AOMDV routing protocol in NS2.
2. The performance study and comparison for a number of performance metrics of routing protocols namely NDMP-AOMDV and AOMDV will be done using following matrices:
   a. Hop count
   b. Packet Delivery Ratio
   c. Throughput
   d. END to end delay

V. METHODOLOGY BEHIND NODE-DISJOINT MULTIPATH ROUTING METHOD BASED ON AOMDV PROTOCOL FOR MANETS

In this section, we proposed NDMP-AOMDV protocol methodology. The main goal of NDMP-AOMDV is to find all available node-disjoint routes between a source to destination pair with minimum routing overhead. To achieve this goal, NDMP-AOMDV protocol will work in three phases: (i) Route Discovery Phase (ii) Route Selection Phase and (iii) Route Maintenance Phase.

All the proposed route maintenance methods will be used with the proposed route discovery process for performance evaluation. In the current work we are proposing the concept of Node Disjoint –Multipath based on the congestion threshold and results will be obtained through various simulations shown through the effectiveness of our suggested methods in terms of End to end delay, Throughput, hop count, Packet delivery Ratio.

VI. CONCLUSION AND FUTURE WORK

Earlier in AODV route discovery method identifies all the available node-disjoint routes using a single flooding of a RREQ message. That greatly reduces the routing overhead caused by route discovery and maintenance processes thus increasing the network capacity. That method is suitable for low and moderate mobility networks as shown by the results in simulation section. Also, three different route maintenance methods are proposed and will be implemented to show the performance of that route discovery method. To reduce the initial delay, source node can send data as soon as it gets the primary route. Due to multiple routes stored in routing table backup routes are always available for continuous data transmission when the primary route is broken. Simulation results shows that NDMP-AODV is able to provide low end-to-end delay and high packet delivery ratio, while keeping low routing overhead.

Now, we will improve the route selection process and the concept of Node Disjoint –Multipath based on the congestion threshold using NDMP-AOMDV so that it can satisfy user application requirements. Also, we will compare existing AOMDV with NDMP-AOMDV.

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