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ANALYSIS ON VARIOUS PROACTIVE MULTIPATHS ROUTING PROTOCOL FOR MOBILE AD HOC NETWORKS

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Analysis on Various Proactive Multipaths Routing Protocol for Mobile Ad Hoc Networks

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Abstract – An ad hoc mobile network is a collection of mobile nodes that are vigorously and randomly located in such a way that the interconnections flanked by nodes are capable of changing on a continual basis. The main goal of such an ad hoc network routing protocol is truthful and well-organized route establishment between a pair of nodes so that communication may be delivered in a timely manner. In this study we examine routing protocols for ad hoc networks and evaluate these protocols based on a given set of parameters. Multi-path routing achieves load balancing and is more resilient to route failures. Recently, numerous multi-path routing protocols have been proposed for wireless mobile ad hoc networks. Performance evaluations of these protocols showed that they achieve lower routing overhead, lower end-to-end delay and alleviate congestion in comparison with single path routing protocols.

Keywords: Multipath, Networks, Routing Protocol

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1. INTRODUCTION

Wireless networks are an emerging new technology that will allow users to access information and services electronically, regardless of their geographic position. Wireless networks can be classified in two types:- infrastructure network and infrastructure less (ad hoc) networks. Infrastructure network consists of a network with fixed and wired gateways. A mobile host communicates with a bridge in the network (called base station) within its communication radius. The mobile unit can move geographically while it is communicating. When it goes out of range of one base station, it connects with new base station and starts communicating through it. This is called handoff. In this approach the base stations are fixed.

1.1 Proactive routing protocols

A proactive approach to MANET routing seeks to maintain a constantly updated topology understanding. The whole network should, in theory, be known to all nodes. This results in a constant overhead of routing traffic, but no initial delay in communication.

2. REVIEW OF LITERATURE:

OLSR is a proactive routing protocol for mobile ad hoc networks. The protocol inherits the stability of a link state algorithm and has the advantage of having routes immediately available when needed due to its proactive nature. OLSR is an optimization over the classical link state protocol, tailored for mobile ad hoc networks. OLSR minimizes the overhead from flooding of control traffic by using only selected nodes, called MPRs, to retransmit control messages. This technique significantly reduces the number of retransmissions required to flood a message to all nodes in the network. Secondly, OLSR requires only partial link state to be flooded in order to provide shortest path routes. The minimal set of link state information required is that all nodes, selected as MPRs, MUST declare the links to their MPR selectors. Additional topological information, if present, MAY be utilized e.g., for redundancy purposes. OLSR MAY optimize the reactivity to topological changes by reducing the maximum time interval for periodic control message transmission.

3. ROUTING PROTOCOLS FOR MANET:

OLSR

The *Optimized Link State routing* (OLSR) is described in RFC3626 [3]. It is a table-driven pro-active protocol. As the name suggests, it uses the link-state scheme in an optimized manner to diffuse topology information. In a classic link-state algorithm, link-state information is flooded throughout the network. OLSR uses this approach as well, but since the protocol runs in wireless multi-hop scenarios the message flooding in OLSR is optimized to preserve bandwidth. The optimization is based on a technique called *Multi Point Relaying*. Being a table-driven protocol, OLSR operation mainly consists of updating and maintaining information in a variety of tables. The data in these tables is based on received control traffic, and control traffic is generated based on information retrieved from these tables. The route calculation itself is also driven by the tables.

Table Driven Routing Protocols

In Table-driven routing protocols each node maintains one or more tables containing routing information to every other node in the network. All nodes update these tables so as to maintain a consistent and up-to-date view of the network.

Because of multiple and diverse ad hoc protocols there is an obvious need for a general taxonomy to classify protocols considered. Traditional classification is to divide protocols to table-driven and to source-initiated on-demand driven protocols [1].

Table-driven routing protocols try to maintain consistent, up-to-date routing information from each node to every other node. Network nodes maintain one or many tables for routing information. Nodes respond to network topology changes by propagating route updates throughout the network to maintain a consistent network view.

Source-initiated on-demand protocols create routes only when these routes are needed. The need is initiated by the source, as the name suggests. When a node requires a route to a destination, it initiates a route discovery process within the network. This process is completed once a route is found or all possible route permutations have been examined. After that there is a route maintenance procedure to keep up the valid routes and to remove the invalid routes.

When the network topology changes the nodes propagate update messages throughout the network in order to maintain consistent and up-to-date routing information about the whole network. These routing protocols differ in the method by which the topology change information is distributed across the network and the number of necessary routing-related tables.

Dynamic Destination-Sequenced Distance-Vector Routing Protocol:

The Destination-Sequenced Distance-Vector (DSDV) Routing Algorithm [Perkins94] is based on the idea of the classical Bellman-Ford Routing Algorithm with certain improvements.

Every mobile station maintains a routing table that lists all available destinations, the number of hops to reach the destination and the sequence number assigned by the destination node. The sequence number is used to distinguish stale routes from new ones and thus avoid the formation of loops. The stations periodically transmit their routing tables to their immediate neighbors. A station also transmits its routing table if a significant change has occurred in its table from the last update sent. So, the update is both time-driven and event-driven. The routing table updates can be sent in two ways:- a "full dump" or an incremental update. A full dump sends the full routing table to the neighbors and could span many packets whereas in an incremental update only those entries from the routing table are sent that has a metric change since the last update and it must fit in a packet. If there is space in the incremental update packet then those entries may be included whose sequence number has changed. When the network is relatively stable, incremental updates are sent to avoid extra traffic and full dump are relatively infrequent. In a fast-changing network, incremental packets can grow big so full dumps will be more frequent. Each route update packet, in addition to the routing table information, also contains a unique sequence number assigned by the transmitter.

The Wireless Routing Protocol (WRP)

The Wireless Routing Protocol (WRP) [Murthy96]is a table-based distance-vector routing protocol. Each node in the network maintains a Distance table, a Routing table, a Link-Cost table and a Message Retransmission list.

The Wireless Routing Protocol (WRP) [7] is a proactive, destination-based protocol. WRP belong to the class of path finding algorithms. The Distance table of a node x contains the distance of each destination node y via each neighbor z of x. It also contains the downstream neighbor of z through which this path is realized. The Routing table of node x contains the distance of each destination node y from node x, the predecessor and the successor of node x on this path. It also contains a tag to identify if the entry is a simple path, a loop or invalid. Storing predecessor and successor in the table is beneficial in detecting loops and avoiding counting-to-infinity problems. The Link-Cost table contains cost of link to each neighbor of the node and the number of timeouts since an error-free message was received from that neighbor. The Message Retransmission list (MRL) contains information to let a node know which of its neighbor has not acknowledged its update message and to retransmit update message to that neighbor.

ABR -

The Associatively Based Routing (ABR) protocol is a new approach for routing proposed in [Toh97, Toh99]. ABR defines a new metric for routing known as the degree of association stability. It is free from loops, deadlock, and packet duplicates. In ABR, a route is selected based on associatively states of nodes. The routes thus selected are liked to be long-lived. All nodes generate periodic beacons to signify its existence. When a neighbor node receives a beacon, it updates it’s associatively tables. For every beacon received, node increments its associatively tick with respect to the node from which it received the beacon. Association stability means connection stability of one node with respect to another node over time and space.

CONCLUSION:

In this paper we found that there are numerous applicable protocols for ad hoc networks, but one confusing problem is the vast number of separate protocols. Each of these protocols is designed to perform its task as well as it is possible according to its design criteria. The protocol to be chosen must cover all states of a specified network and never is allowed to consume too much network resources by protocol overhead traffic.

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