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REVIEW ARTICLE

PERFORMANCE ANALYSIS OF AODV, OLSR, DSR AND GRP ROUTING PROTOCOL OF MOBILE ADHOC NETWORK – A REVIEW

Suchita Baxla[1], Prof. Rajesh Nema[2]
[1]Department of Electronics & Communication, NRI College, Bhopal, M.P, India
[2]Department of Electronics & Communication, NRI College, Bhopal, M.P, India

[1] Suchi_baxla@rediffmail.com; [2] Rajeshnema2010@rediffmail.com

Abstract— Manet is formed by a collection of mobile nodes, with no preset infrastructure where each node plays a role of router. It is getting fame day by day due to wide use of mobile and handheld devices. Dynamic nature of this network makes routing protocols to play a prominent role in setting up efficient route among pair of nodes. This paper just presents the impact of comparison of different routing protocol in terms of different parameters.

Key Terms: - MANET; AODV; OLSR; DSR; GRP

I. INTRODUCTION

All Wireless mobile adhoc networks are characterized as networks without any physical connections. A Mobile Adhoc Network (MANET) is an adhoc or temporary wireless network composed of wireless mobile nodes, in which no fixed infrastructure. There are no dedicated routers, servers, access points, base stations and cables. If two mobile nodes are within each other's transmission range, they can communicate with each other directly. Otherwise, the nodes in between have to forward the packets for them from source node to destination node. In such cases, every mobile node has to function as a router to forward the packets for others. In mobile adhoc networks, there are various techniques for tracking changes in the network topology and rediscovering new routes when older ones break and routing operations should be performed with collective cooperation of all nodes. Classification of routing protocols in manet`s can be done in many ways, but most of these are done depending on routing strategy and network structure. According to the routing strategy the routing protocols can be categorized as table-driven and on demand (source initiated), while depending on the network structure these are classified as flat routing, hierarchical routing and geographic position assisted routing. Both the table-driven and on demand protocols come under flat routing. One of the most popular methods to distinguish mobile adhoc network routing protocols is based on how routing information is acquired and maintained by mobile nodes. Using this method, mobile adhoc network routing protocol can be divided into proactive routing, also called or table-driven routing protocol, reactive routing also called on demand routing protocols and hybrid routing. Hybrid routing protocols are proposed to combine the merits of both proactive and reactive routing protocols [8].

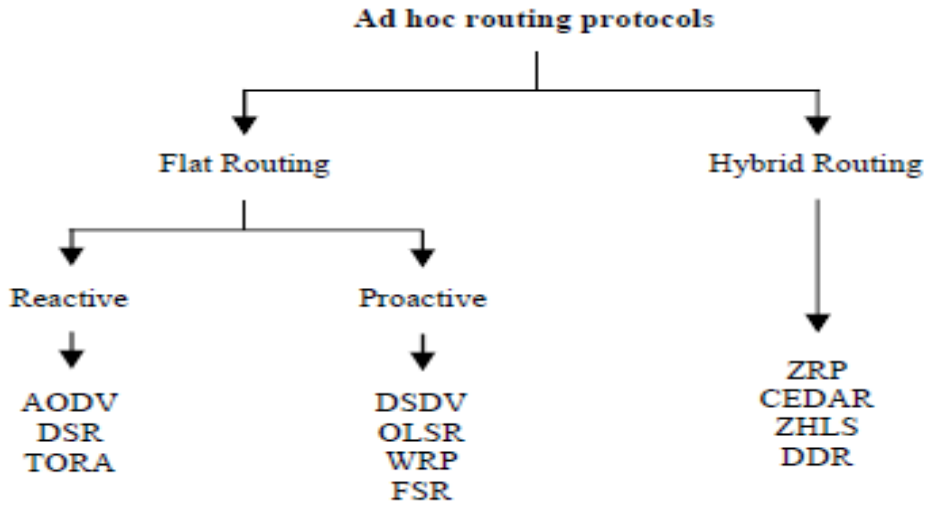

Fig.1 shows the classification of Manet routing protocols

II. REACTIVE ROUTING PROTOCOL

Ad Hoc on-Demand Distance Vector Routing (AODV)

The Ad AODV-node informs its neighbours about its own existence by constantly sending "hello messages" at a defined interval. This enables all nodes to know the status about their neighbours, i.e. if they gone down or moved out of reach. To resolve a route to another node in the network AODV floods its neighbours with a route request (RREQ). A RREQ contain the senders' address, the address of the sought node and the last sequence number received from that node if there exist one. The receiving node checks if it has a route to the specified node. If a route exists and the sequence-number for this is higher than the supplied a new route is found. The node replies to the requesting by sending a route reply (RREP). If on the other hand a route does not exist the receiving node sends a RREQ itself to try to find a route for the requesting node [9].

Dynamic Source Routing (DSR)

The Dynamic Source The key feature of this protocol is that it is a pure on demand protocol, i.e. it does not employ any periodic exchange of packets. DSR does even employ beacon packets like some other on demand protocols. Consequently, DSR applies on demand schemes for both route discovery and route maintenance. This makes the routing overhead traffic scales to the actual needed size automatically, which is considered as the main advantage of DSR [8].

III. PROACTIVE ROUTING PROTOCOL

Optimized Link State Routing (OLSR)

Protocol is a proactive routing protocol where the routes are always immediately available when needed. OLSR is an optimization version of a pure link state protocol in which the topological changes cause the flooding of the topological information to all available hosts in the network. OLSR may optimize the reactivity to topological changes by reducing the maximum time interval for periodic control message transmission. Furthermore, as OLSR continuously maintains routes to all destinations in the network, the protocol is beneficial for traffic patterns where a large subset of nodes are communicating with another large subset of nodes, and where the [source, destination] pairs are changing over time. OLSR protocol is well suited for the application which does not allow the long delays in the transmission of the data packets. The best working environment for OLSR protocol is a dense network, where the most communication is concentrated between a large numbers of nodes. OLSR reduce the control overhead forcing the MPR to propagate the updates of the link state, also the efficiency is gained compared to classical link state protocol when the selected MPR set is as small as possible. But the drawback of this is that it must maintain the routing table for all the possible routes, so there is no difference in small networks, but when the number of the mobile hosts increase, then the overhead from the control messages is also increasing. This constrains the scalability of the OLSR protocol. The OLSR protocol work most efficiently in the dense networks [12].

IV. HYBRID PROTOCOL

GRP (Gathering-based Routing Protocol)

Gathering-based Routing Protocol (GRP) protocol is source initialized protocol in MANET routing protocol in which all the routing path is created by source node in Mobile Ad-hoc network. In this protocol, source node collects all the information about the route to the designation. In this procedure, source node sends a destination Query toward the destination through network. It works like AODV and DSR using RREQS (Reverse Request Query By Source). In it, when destination Query reached to the destination, destinations send a packet called Network Information Gathering (NIG) which approach through network. When NIG packet reached at a router, it all the information about the network and its resources. There are many nodes called Effective Outgoing Links router gives (EIL) where NIG packet does not riches, routers send this information to these EILs. At last NIG reaches at source node and source node get all the information .GRP does not require maintains of routing tables or route construction prior to or during the forwarding process. Moreover GRP offers a number of advantages over convention ad hoc routing strategies. The forwarding process also allowed a packet to adopt to change in the topology by selecting the next best choice if an intermediate node used by previous packets becomes unavailable. These approaches do not require table maintains other hand immediate neighbor or dissemination of topology information even without the need for route construction. Routes can be altered node by node and packet by packet simply by considering additional Quality -of- Services (QoS) parameters relating to the next-hop neighbors, such as delay or available bandwidth. One of the major disadvantages of GRP is complexity and overhead required for a distributed location database service. However, the over- head of the location service cannot be entirely apportioned as the routing overhead if location-aware nodes and location-centric data become an integral part of pervasive computing and mobile sensor networks used for control and monitoring of applications. For example, location-aware capabilities provide facilities for uncast and multicast messaging into specific user-defined geographic areas [13].

TABLE 1: COMPARISON BETWEEN THE THREE CATEGORIES OF ROUTING PROTOCOLS

PARAMETER	PROACTIVE	REACTIVE	HYBRID
Network organization	Flat / Hierarchical	Flat	Flat Hierarchical
Topology dissemination	Periodical	On-demand	Both
Route Latency	Always available	Available when needed	Both
Communication overhead	High	Low	Medium
Storage Requirements	Higher	Dependent on no. of routes Maintained or needed	Depends on size of each zone or cluster
Route Availability	Always available	Computed as per need	Depends on location of destination
Periodic Route Updates	Required always	Not required	Used inside each zone
Delay	Low	High	Low for local destinations and high for Interzone
Scalability	100 nodes > 100	> 100	> 1000
Control Traffic	High	Low	Lower that other two types
Routing Information	Keep stored in table	Doesn't store	Depends on Requirement

V. CONCLUSION

In this paper, we have presented and discussed the routing protocols in mobile ad hoc networks and provided comparisons between them. Each routing protocol has unique features. As there are still many challenges facing wireless ad hoc networks, it is not clear that any particular algorithm or class of algorithm is the best for all scenarios, each protocol has their own merits and demerits and is well suited for certain situations.

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