



An Optimized Solution to Improve Performance of Hybrid Routing Protocol

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Abstract: Mobile Adhoc Networks (MANET) are self organizing in nature. In MANET'S communication is done through multi hops with dynamic topology, where nodes itself behave as routers. The nodes communicate with each other. Many routing algorithms are used for the process of route discovery. Due to different nature of the network MANETs and its routing issues have become a challenge. Many routing algorithms are being proposed by researchers. These protocols are mainly categorized as Proactive, Reactive and Hybrid routing protocols. This paper presents routing protocols for mobile adhoc networks and evaluates the work done in literature with respect to services and tradeoffs such as throughput, average delay, security and control overhead etc.

Keywords: Connectivity, Coverage, Nodes, Wireless sensor network

I. INTRODUCTION

Wireless networks area rising new technology that allowed users to access data and services electronically, in spite of their position. Wireless networks are also classified into two types: infrastructure network and also the different one is infrastructure-less networks.

In particular, a very large number of recent studies focused on Mobile Ad-hoc Networks. The performance of a mobile ad hoc network depends on the routing scheme employed, and the traditional routing protocols do not work efficiently in a MANET. This kind of network, in fact, has a dynamic topology (every node can move randomly and the radio propagation conditions change rapidly over the time) and a limited bandwidth. Ad hoc wireless network must be capable to self-organize and self-configure due to the fact that the mobile structure is changing all the time. Mobile hosts have a limited range and sending the message to another host, which is not in the sender's host transmission range, must be forwarded through the network using other hosts which will be operated as routers for delivering the message throughout the network [10]. Routing could be a key issue in MANETs attributable to their extremely dynamic and distributed nature. A routing protocol is required whenever a packet must be send to a destination via range of nodes and lots of routing protocols are planned for such quite impromptu networks. Routing is the process of selecting paths in a network along which to send network traffic. In packet switching networks, routing directs packet forwarding, the transit of logically addressed packets from their source toward their ultimate destination through intermediate nodes. An ad hoc routing protocol is a convention, or standard, that controls how nodes decide which way to route packets between computing devices in a mobile ad-hoc network [11].

II. CHARACTERISTICS OF MANET

A number of the main characteristics of mobile routing protocols are:

Dynamic Network topology: Because the nodes move, the topology could modification quickly and also the property inside the network varies with time.

Limited Bandwidth: The information measure on manet is limited than that of wired networks.

Distributed Operation: Nodes collaborate implement functions and not one node is only answerable for the operation.

Security: The wireless links lack defense against threats. Many attacks like denial of services, eavesdropping, replay attacks area unit attainable.

III. CLASSIFICATION OF ROUTING PROTOCOLS IN MANET

Routing Protocol is employed to seek out valid routes between human activities nodes. It should be ready to handle high quality of the nodes. Routing protocols classified into 3 major categories: Proactive, Reactive and Hybrid routing protocols.

A. Proactive (Table – Driven) Routing Protocols

Proactive protocols endlessly learn the topology of the network by exchanging topological info among the network nodes. During this family of protocols, nodes maintain one or a lot of routing tables concerning nodes within the network. These routing protocols update the routing table info either sporadically or in response to alter within the configuration [7]. The advantage of those protocols is that a supply node does not want route-discovery procedures to

seek out a route to a destination node. On the opposite hand the disadvantage of those protocols is that maintaining a homogenous and up-to-date routing table needs substantial electronic communication overhead that consumes information measure and power, and reduces outturn, particularly within the case of an outsized range of high node quality. There square measure varied sorts of Table Driven Protocols: Cluster-Head entry Switch Routing protocol (CGSR), Wireless Routing Protocol (WRP), wide-angle State Routing Protocol (FSR), class-conscious State Routing (HSR) [1].

The main disadvantages of Proactive Routing protocols are:

Wastage of information measure as a result of unneeded advertising of routing information

Maintaining a routing table for every node and advertising of this table results in overhead that consumes a lot of information measure.

Regular update of its routing tables uses up battery power.

Slow reaction on restructuring and failures.

B. Reactive (On – Demand) Routing Protocols

For protocols during this class associate in nursing data formatting of a route discovery mechanism by the supply node to seek out the route to the destination node once the supply node has knowledge packets to send. Once a route is found, the route maintenance is initiated to keep up this route till it's now not needed or the destination isn't approachable. The advantage of those protocols is that overhead electronic communication is reduced [1]. Various sorts of reactive routing protocols are: Dynamic supply Routing (DSR), Ad-hoc On-Demand Distance Vector Routing (AODV), Associatively - primarily based Routing (ABR), Signal Stability primarily based accommodative Routing rule (SSA), Flow orientated Routing Protocol (FORP) [2].

The main disadvantages of Reactive Routing protocols are:

High latency time is needed to find the route to the destination

Flooding to will result in network preventative.

RREP, RREQ RERR messages results in management overhead.

C. Hybrid Routing Protocols

Hybrid protocols combine features from both reactive and proactive routing protocols, typically attempting to exploit the reduced control traffic overhead from proactive systems whilst reducing the route discovery delays of reactive systems by maintaining some form of routing table [8]. Hence, within the recent days, many hybrid protocols also are planned. The various sorts of hybrid routing protocols are: Core Extraction Distributed Ad - Hoc Routing Protocol (CEDAR), Zone Routing Protocol (ZRP), and Zone - primarily based class-conscious Link State Routing Protocol (ZHLS). Figure.1 shows the classification of routing protocols.

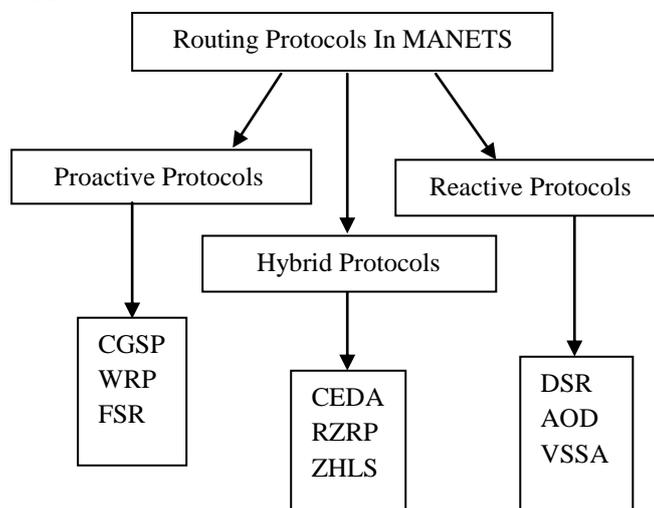


Fig 1: Classification of Routing Protocols

IV. CHALLENGES OF MANET

The following list of challenges shows the inefficiencies and limitations very in MANET environment:

Limited wireless transmission range: In wireless networks the radio band are restricted and therefore information rates it offers area unit abundant lesser than what a wired network offers. this needs the routing protocols in wireless networks to use the information measure perpetually inane best manner by keeping the overhead as low as potential[11].

Routing Overhead: In wireless Adhoc networks, nodes of 10 modifications their location at intervals network. So, some stale routes area unit generated within the routing table those results in redundant routing overhead [11].

Battery constraints: this can be one in all the restricted resources that kind a significant constraint for the nodes in an advertisement hoc network. Devices utilized in these networks have restrictions on the ability supply so as to keep up immovability, size and weight of the device. By increasing the ability and process ability makes the nodes large and fewer transportable. Thus solely MANET nodes should optimally use this resource [12].

Time-varying wireless link characteristics: The wireless channel is liable to a spread of transmission impediments like path loss, fading, interference and blockage. These factors resist the vary, data rate, and therefore the dependability of the wireless transmission. The extent to that these factors have an effect on the transmission depends upon the environmental conditions and therefore the quality of the transmitter [11].

Energy constrained operation: Because batteries carried by each mobile node have limited power supply, processing power is limited, which in turn limits services and applications that can be supported by each node. This becomes a bigger issue in mobile ad hoc networks because, as each node is acting as both an end system and a router at the same time, additional energy is required to forward packets from other no dense receiver[12].

Packet losses because of transmission errors: In wireless networks experiences higher packet loss because of factors like high bit error rate (BER) within the wireless channel, enlarged collisions because of the uni-directional links, path breaks quality of nodes, and therefore the inherent weakening properties of the wireless channel[11].

Quality of Service (QoS): Providing different quality of service levels in a constantly changing environment will be a challenge. The inherent stochastic feature of communications quality in a MANET makes it difficult to offer fixed guarantees on the services offered to a device. An adaptive QoS must be implemented over the traditional resource reservation to support the multimedia services [13].

Potentially frequent network partitions: The haphazardly moving nodes in an advertisement hoc network will result in network partitions. In major cases, the intermediate nodes area unit the one that area unit extremely laid low with this partitioning [11].

Ease of snooping on wireless transmissions (security issues): The radio channel used for unplanned networks is broadcast in nature and is shared by all the nodes within the network. Information transmitted by a node is received by all the nodes at intervals its transmission mechanism varies. Thus associate degree assailant will simply snoop the info being transmitted within the network. Here the need of confidentiality is profaned if associate degree opponent is additionally ready to interpret the info gathered through snooping [11].

V. PROPOSED WORK

There are many drawbacks discussed in classifications of the MANET routing protocols like latency, battery life and routing overheads. In proposed work the outlined drawbacks are to be improved using optimization scheme like BSO-TS. It is nature inspired optimization technique. Bee Colony Optimization is a specialization to Swarm Intelligence. BSO-TS algorithm has been used for improving the latency, battery life and routing overheads in hybrid routing protocols.

VI. CONCLUSION

This paper presents different routing protocols for MANET, that area unit categorized as proactive, reactive and hybrid routing protocols. Proactive routing protocols tend to supply lower latency than that of the on-demand protocols as a result of the fight to keep up routes to all or any nodes within the network all the time. On the opposite hand, reactive protocols discover routes only if they are required, they will still generate large quantity of traffic once the network changes often. Typically reactive or proactive feature of a selected routing protocol may not be enough instead a combination may higher resolution referred to as the hybrid protocols. The network is comparatively static, proactive routing protocols is used, as storing the topology info in such case is additional economical. On the opposite hand, because the quality of nodes within the network will increase, reactive protocols perform higher conjointly it is clear that mentioned protocols have some type of limitations looking on matters of the network within which these protocol works. Then proposed hybrid routing protocols are used to prevent improved battery life, latency and routing overheads.

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