Recent Routing Protocols in Mobile AdHoc Network (MANET)

[1]Mr.C.Rangarajan, [2]Mrs.S.Sridevikarumari, [3]Ms.V.Sujitha

[1]Associate Professor & Head, Dept. Computer Applications, Pioneer College of Arts and Science, Coimbatore

[2]Asst.Professor, Dept. Computer Applications, Pioneer College of Arts and Science, Coimbatore

[3]Student, Dept. Computer Applications, Pioneer College of Arts and Science, Coimbatore

Abstract: Mobile Ad Hoc Networks (MANETs) are kind of wireless network with self-administrating characteristics, where the nodes get associated in a spontaneous or ad hoc basis. MANET is not an infrastructure based network and there exist no centralized resources. Framing a route between source and destination is a challenging task in MANET. Several protocols have been proposed to overcome this problem. This paper surveys the recent protocols which are proposed to overcome the routing issue.

Keywords: Routing, Protocol, MANET, Proactive, Reactive, Hybrid.

I. INTRODUCTION

The introduction of smart devices with short range remote infrastructure systems has persuaded the advancement of Mobile Ad hoc NETworks (MANETs) amid the most recent couple of years. MANET is a sort of wireless ad hoc network, is an independent framework comprising of portable devices which are associated with remote connections. In MANET the nodes are permitted to move unreservedly and arbitrarily; likewise, the nodes sort out themselves subjectively. The topology of the MANET gets changed in a dynamic way and it is erratic. The operation of the MANET remains in a solitary way and it can be associated with World Wide Web (WWW) or open systems. The framework/infrastructure is not required by MANET and other web necessities or whatever other sorts of established base stations. The cellular network model ensembles the necessity of wireless communication by having fixed base stations. When more than one node makes a communication then it is totally dependent on the wired backbone and the established base stations in cellular networks. The imperative use of MANET is in military and appalling environment where difficulty arises as a major issue in setting up of infrastructure.

II. CHARACTERISTICS OF MANET

✓ Dynamic Topology - The nodes in the network are allowed to move in a free manner with various directions at the rate of any speed; and randomly the topology of the network gets changed at unpredictable circumstances.

✓ Energy Saving - The nodes in the MANET are dependent on batteries. Therefore preservation models necessary for energy optimization have become one of the mandatory design principles.

✓ Restricted Bandwidth - Wireless Communications throughput has the impact of multiple access, fading, noise, and interference conditions. It is regularly considerably less than a maximum transmission rate of radio signal.

✓ Security Risk - Basic security issues like eavesdropping, spoofing and denial-of-service attacks are becoming a common issue in MANET, thus it should be deliberately considered.

✓ Tiny terminals: In most extreme cases, nodes in the MANET have the mobility option but with very low CPU ability and memory capacity.

✓ Common Medium: The physical medium used for communication is open to any element with the appropriate equipment and adequate resources. Accessibility of the channels or medium is not restricted.

✓ QoS: Providing a quality based service
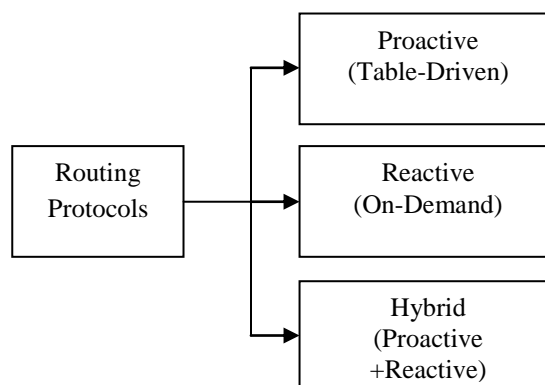
III. ROUTING PROTOCOLS

Fig.1 Routing Protocols

Routing is the procedure of moving data packet from source node to destination node. Routing is mostly considered as one of the most important and challenging task in MANET. Many works have been proposed to address this issue, but not yet solved. Even in the recent research proposals, most of the articles target the design of effective routing mechanism. Routing protocols are divided into 3 types namely (1) Proactive, (2) Reactive and (3) Hybrid.

TABLE I. WORKING MECHANISM OF PROTOCOLS

Proactive Routing Protocol	This kind of protocols determines the route between each node before it starts its communication. Furthermore, the information about the routing is updated in the routing table in a periodic manner, this helps to preserve the founded path. At the point when there arise a requirement for communication, the nodes in can quickly begin to impart immediately as the routing path found already.
Reactive Routing Protocol	This kind of protocols determines the routing path when there arise a need for communication. Nodes don't determine the path unless a need arrives. At the point when there is a need, nodes ought to discover the path and after that, it only can start the communication. The information about the dynamic routing is just kept up.
Hybrid Routing Protocol	The components of proactive and reactive protocols are incorporated to fulfill requirement based on the scenario. Hybrid protocols can perform as proactive or reactive in various circumstances like larger size network.

IV. PROACTIVE ROUTING PROTOCOL

G. Oddi et al.,2012 proposed a protocol using of Reinforcement Learning (RL) strategies, to progressively pick the most stable path, it uses GPS data among the attainable ones to expand versatility to connection loss.S. Nejatian et al.,2014 have proposed Proactive Unified Spectrum Handoff (PUSH) mechanism in cognitive radio mobile ad hoc networks (CR-MANETs) by using an authorized path is considered in which the channel accessibility relies on upon the mobility of Primary User's (PU's) movement, Secondary User's (SU's) and the different channels which have different settings and configuration. The PUSH calculation utilizes and expects the intellectual connection accessibility while considering the PU obstruction limit to estimate the most extreme connection openness period.Z. Wang et al.,2014 have proposed a lightweight proactive source routing (PSR) protocol, which can control the

system topology data than the distance vector (DV) protocol to encourage source routing, in spite of the fact that it has much lesser overhead than conventional distance vector based routing protocols, reactive source routing protocols, and link-state-based routing protocols.Segmented Processor (SP) scheme proposed by K. Taneja et al.,2015 was to amend the power consumption in MANET, which was especially for the proactive routing based applications.T. T. Child et al.,2015 proposed Self-Adaptive Proactive (SAP) routing scheme, which can identify mobility states of MANET and self-adjust the metrics of routing as needs. Nodes depend on the mobility signal to identify whether the system is moderately static or dynamic and subsequently switch the metric to either expected transmission count (ETX) or mobility factor (MF), individually.

V. REACTIVE ROUTING PROTOCOL

S. K. Shah and D. D. Vishwakarma.,2012 proposed a protocol Ad-hoc On-demand Distance Vector based on Artificial Neural Network (ANN-AODV) for MANET. Restricted transfer speed and transmission force the regulatory and control the data to update the dynamic change in the MANET topology. Reverse Reactive Routing (RRR) protocol proposed by B.S.Gouda and C.K. Behera.,2012 was a discovery of route approach which is utilized to detect a ideal route to reach the destination with minimum overhead than the flood based route discovery. M.Anandhi et al.,2016 proposed a Dynamic Triangular Vision Optimized Slant Selection Protocol (DTVOSSP) where it concentrates on considering least number of nodes for finding the ideal route. Lamri Sayad et al.,2016 proposed on-demand routing protocol with tabu search based local route repair (OTLR), it utilizes a wise method to locally repair the routes which got failed. Nihad I. Abbas et al.,2015 proposed an ad hoc on-demand distance vector (AODV) protocol based on fuzzy logic which was termed as FAODV, its main idea was to prefer the maximum trusted nodes to build the path between the source- node and destination-node.

VI. HYBRID ROUTING PROTOCOL

Gargi Parashar et al.,2013 proposed a method namely Congestion Control Protocol (CCP) which was hybrid that endeavors to stay away from packet misfortune because of clog and in addition decrease end to end delay in delivering the packets by combining two protocols DSDV and IAODV. A. Al-Rokabi and C. Politis.,2014 proposed a SOAP protocol which utilizes the methodology of both OLSR and AODV protocol. Dhanalakshmi Natarajan and Alli P Rajendran et al.,2014 proposed an advanced OLSR (AOLSR) protocol which was based on updated Dijkstra's algorithm, that is AOLSR is fully based on energy consumption of nodes, routing path and the mobility of the nodes. J. M. Chacko and K. B. Senthilkumar.,2016 proposed Signal-to-Interference plus Noise Ratio (SINR) based Hybrid Multi-path Routing Protocol (SHMRP). It chooses more than one route when there arises a demand,

but it was based on SINR. I. Allam et al.,2012 proposed AntTrust protocol which was based on enforcement of cooperation. The primary aim of AntTrust was to give a best component to quantify the reputation of different nodes of the system and to reject all nodes which don't work together into the system.

VII. SUMMARY OF PROTOCOL SURVEYED

Protocol Name	Protocol Type	Year
ANN-AODV	Reactive	2012
ANTTRUST	Hybrid	2012
AOLSR	Hybrid	2014
CCP	Hybrid	2013
DTVOSSP	Reactive	2016
FAODV	Reactive	2015
OTLR	Reactive	2016
PSR	Proactive	2014
PUSH	Proactive	2014
RL	Proactive	2012
RRR	Reactive	2016
SAP	Proactive	2012
SHMRP	Hybrid	2016
SOAP	Hybrid	2014
SP	Proactive	2015

VIII. CONCLUSION

Multiple protocols get proposed daily for MANET to solve the existing and new issues. We don't know the type of protocol and whether it solved the issues in MANET. This research paper has surveyed the some of the recent proactive protocols, reactive protocols and hybrid protocols, which help the researchers to select the suitable protocol type for their research proposal to solve the issues in MANET.

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