

# An Analysis of Manet and Vanet Routing Protocols

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**Abstract-** MANET and VANET square measure the active analysis areas and plenty of routing protocols have been planned to be used in these areas. In MANET, nodes square measure connected through wireless channels in an exceedingly network and every node acts as a router and as a number. One among the situation of Manet is transport ad-hoc networks. For communication in VANET, efficient Routing Protocols square measure required. attributable to extremely dynamical configuration and frequent disconnection it's strenuous to style Associate in Nursing economical routing protocol for vehicles, there will be 2 sorts of VANET that square measure V2V(Vehicle to Vehicle) and V2RSU(Vehicle to Road aspect Unit). As a result of daily happening of accidents VANET is one of the affecting areas for the refinement of Intelligent Transportation System (ITS) that will insure passengers and road safety. The Intelligent Transport Systems provides info if there exists any emergency and tells regarding traffic density. The traffic and traffic density. The prevailing routing protocols for VANET aren't economical enough to satisfy all traffic situations. Worthy routing protocols square measure needed to initiate communication between vehicles in future for passengers and road safety. This paper shows literature survey associated with Reactive and Proactive Routing Protocols of MANET as AODV, DSDV, OLSR, and DSR. Analysis and characterization of those protocols is shown within the paper which helps in any improvement of existing routing protocols

**Keywords-** MANET, VANET, AODV, DSDV, DSR, OLSR.

## I. INTRODUCTION

One sort of the wireless Networks is that the Mobile ad- hoc Networks and another sort of wireless Network is transport Ad-hoc Network. In MANET, nodes communicate with associate degree while not an existing infrastructure. A mobile ad-hoc network may be a set of wireless mobile nodes that forms temporary network while not any stable infrastructure. In MANET, every node works as a router and as host. These nodes area unit peer to see, self configuring and liberated to move in any direction due to this links to alternative nodes changes speedily.

In MANET, Network is self configuring and performs important functioning for safeguarding & looking

out routes. In MANET, every node acts as a router and as a bunch and also the nodes area unit liberated to move in any direction due to this the topology changes speedily. Maintaining routes during a speedily dynamical topology is hard. The mobile ad-hoc Networks have characteristics as –

1. Multihop
2. Dynamically dynamical atmosphere
3. Information measure forced links

Because of these characteristics we will not use the protocols of wired networks for wireless networks. One of the challenges in Manet is Dynamic communication with one another during a speedily dynamical atmosphere. Alternative challenges embrace Routing, Speed, Quality of Service, and lack of authorization facilities, attacks associated with trust vulnerability, Unicasting, Multicasting, and Frequency of updates or Network overhead. The Advantage of Manet technology is that mobile instruments are used at any purpose of your time.

## II. USES OF MANET

Mobile ad-hoc networks have a large application space thanks to its characteristics. A number of the applying space of Manet is as follows-

1. It's employed in the operation of rescue and military connected operations.
2. Manet is helpful in public transportation as Internet and computer network hot spots.
3. Helpful in conferences and seminars for distribution of information.
4. Employed in localized looking and Advertising.

VANET could be a set of Mobile Ad-hoc Networks. It's a freshly introduced technology. VANET permits vehicles to speak with one another and share data in an exceedingly wireless network if the vehicles area unit among the vary. VANET has some completely different characteristics than the Manet that creates it distinctive. There are often 2 forms of VANET-

1. **V2V** - When there is no infrastructure needed, nodes do vehicle to vehicle communication with each other.

2. **V2RSU**-When Road Side Units are used for routing information exchange with the other vehicles.

An important issue in VANET is that the high rate at that vehicles move that makes issues for data exchange. Wide varied quality characteristics transport or mobile nodes area unit expected to own outstanding impact on the performance of routing protocols.

Though researchers have developed protocols for routing as Ad-hoc On Demand Distance Vector, Destination Sequenced Distance Vector, Optimized Link State Routing, and Dynamic supply Routing. These protocols can't be directly employed in VANET. As a result of in VANET, high speed, varied density nodes communicate with one another and there exists fast variation in link property.

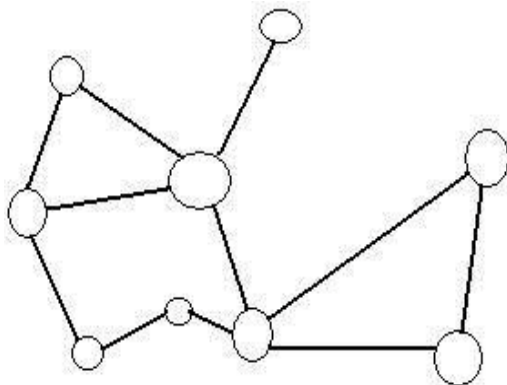


Figure-2.1 Simple MANET architecture

### III. USES OF VANET

Vehicular ad-hoc network helpful is in issues of safety of vehicles and conjointly useful for providing comfort level to the passengers these areas embrace –

**Comfort Applications:** Samples of comfort applications embrace Traffic system (TIS), Weather info system and gas station. These applications offer comfort level to the passengers and conjointly offer traffic potency.

**Safety Applications:** Samples of Safety Applications include Emergency warning system, Co-operative Message Transfer, Post Crash Notification, Cooperative Collision Warning, period traffic.

These safety applications shares emergency and safety knowledge between vehicles that insures the security of passengers. Convenience Applications: samples of convenience applications square measure Route Diversions,

Electronic Toll assortment, and Parking availableness etc. Convenience applications offer convenience to the general public and passengers in varied ways.

Some Factors that have an effect on quality in VANET. In VANET the quality patterns of nodes affects the upkeep, route discovery, consistency.

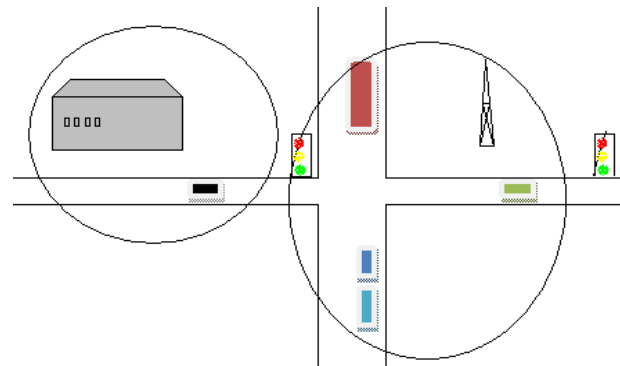


Figure-3.1 WLAN/Cellular

Here square measure some factors that have an effect on quality in VANET-

**1. Traffic control mechanisms:** Traffic lights and stop signs square measure the usually used traffic control tools. Result of those tools square measure long queue of vehicles that reduces the speed of the vehicles. Reduced quality means that there square measure additional static nodes and therefore the rate of route amendment becomes slow within the network.

**2. Interdependent vehicular motion:** Movement of surrounding vehicles has an effect on the movement of the other vehicle on the road. We will perceive this with the instance that a vehicle tries to take care of least distance with a vehicle before it. Once someone driving vehicle changes its lane or increases/decreases speed it depends on the encircling of the vehicle.

**3. Average speed:** Rate of amendment of topology is determined by however apace a vehicle changes its position. The typical speed of vehicles is also affected by the speed limit of the road. Acceleration and fastness of topology and vehicles, broken and new routes conjointly have an effect on the speed of vehicles.

### 3.1 COMPARISON BETWEEN MANET AND VANET

Similarity between Manet and VANET is that in each ad-hoc networks the nodes square measure self-organizing and they manage the info by themselves while not a server. Vehicular ad-hoc networks have few distinctive

characteristics and thus gift as a category of Mobile ad-hoc networks.

**3.1.1. Rapidly Changing Dynamic Topology** - In transport ad-hoc network, vehicles move at a high rate, on highways vehicles will move at the speed of 60-70 mph i.e. 25m/sec. And it will vary for totally different vehicles.

**3.1.2. Frequent Network Disconnections** - speedily dynamic topology ends up in frequent network disconnections as a result of the link between 2 vehicles will disconnect in no time. the matter becomes worst if the node density varies as a result of totally different density of nodes is there on roads and highways. so here exists a desire of strong routing protocol that may acknowledge frequent disconnections and might offer associate degree alternate link quickly for communication with none interrupt.

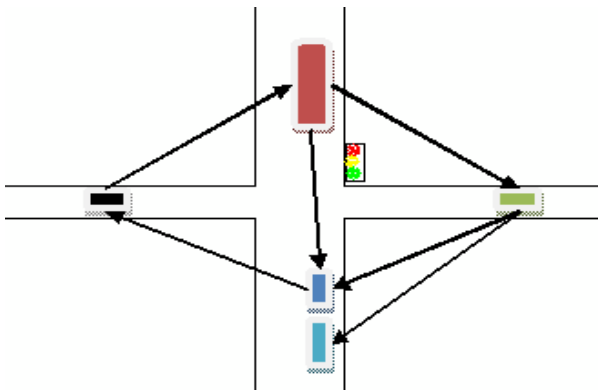


Figure-3.2 Pure ADHOC

**3.1.3. Unlimited battery Power** – the nodes in VANET mustn't suffer for power limitations as in detector networks. In another situation of ad-hoc networks static nodes have ample energy.

**3.1.4. Quality of Services** – Any ancient Manet routing protocols don't follow QoS routing strategy. There square measure several researches done to integrate QoS routing ways in Manet routing protocols. For Urban VANET (MURU) the Multi-hop Routing Protocols [30], estimate normal factors of a route, basis of that's position of car, speed and trajectories. MURU establishes new metric referred to as "Expected Disconnection Degree" (EDD) that's supported the factors mentioned higher than. So nodes in MURU got to grasp position of them and will have external street map with existence of systematic location facilities.

#### IV. LITERATURE SURVEY

### 1. "Comprehensive Study of Proactive and Reactive Protocols in MANET"

We have recognized many important segments of literature For routing protocols in MANET and VANET. They did the comparison on three parameters e2edelay, packet delivery ratio, throughput between protocols OLSR, AODV, DSDV and TORA and showed that AODV and OLSR performs better than DSDV and TORA. TORA lacks in all three factors.

### 2. "Performance Comparison of AODV, DSDV, OLSR and DSR Routing Protocols in Mobile Ad Hoc Networks"

The realistic differentiation of routing protocols DSDV, AODV and DSR is shown. AODV performs best with its ability to maintain connection by exchanging information periodically. Reference [4] did comparative study on MANET routing protocols on parameters throughput, packet delivery ratio, end to end delay and normalized routing load. They did comparative study for 50 and 100 nodes.

### 3. "Step by Step Procedural Comparison of DSR, AODV and DSDV routing protocol",

Compared 3 popular routing protocols AODV, DSDV, DSR and showed that AODV has a stable end to end delay. DSDV has more packet delivery ratio than the AODV and DSR protocols. DSR has highest end to end delay and routing load. This reference showed that AODV is efficient than DSR & DSDV but in case of normalized routing load DSDV is better.

**4. "Provided a simulation and analysis of routing protocols of VANET for end to end delay in vehicle to vehicle communication"** They took urban scenario for V2V communication using Bellman ford routing protocol and found that Bellman ford routing protocol implemented using QualNet performs better than AODV and DSR for end to end delay for all sets of velocity. They showed that Bellman ford suits more for DSRC technology as compared to DSR and AODV protocols.

### 4.1 CLASSIFICATION OF ROUTING PROTOCOLS IN MANET

Routing protocols in MANET can be broadly partitioned into two categories that are Reactive & Proactive protocols, where proactive protocols are table driven and reactive protocols are on-demand.

#### A. Reactive Routing Protocols

In Reactive Protocols routes are discovered only when the routes are needed.

### A.1 Ad-hoc On-demand Distance Vector Routing (AODV)

It is an on-demand routing protocol i.e. it creates route only when the route is demanded by the source nodes [1, 10]. AODV can use unicast and multicast routing as needed by the network. AODV uses sequence numbers to ensure that the current route is a fresh route. AODV uses broadcast IP therefore routing provided by it, does not contain loops. Whenever we need to send packets from source to a destination for which route is not discovered. It sends a RREQ (route request packet) throughout the network. A node that receives RREQ can reply back with RREP (route reply) message, if it is the destination or it has a route to destination with a sequence number greater/equal to the RREQ. Route Error (RERR) message is used whenever link break occurs. RERR is sent to the source node to inform that the destination is not reachable now. Issues in AODV are that- here for connection setup and for initiation of communication time required is more than the other approaches of route establishment. It may lead to inconsistency in route if intermediate nodes contain old entries. It may lead to heavy control overhead if for a single RREP packet there has many route reply packets. It consumes extra bandwidth because of periodic beaconing.

### A.2 Dynamic Source Routing (DSR)

DSR protocol uses source routing method. It is like the AODV protocol as it forms route whenever demanded by the source. DSR is different from AODV in a way that In DSR each intermediate node that broadcasts a RREQ packet adds its own address to a list attached in the packet. Destination node generates RREP message that includes list of addresses received in route request and transmits it back by using same path to the source. DSR protocol does two main mechanisms that are- allowing the discovery of routes & maintenance of source routes in the mobile ad-hoc network.

**Route Discovery** - is used whenever source tries to send data to a destination for which it does not know route.

**Route Maintenance**- using this mechanism source that wants to send packets to destination can be detected. While source is sending packets to destination, If topology changes route maintenance is done. DSR protocol can be used with ad hoc networks as it uses source routing method, unidirectional links and provides loops free routes. Issues in DSR found as - the route information within the header will lead to byte

overhead, if there exists too many nodes in the network. Unnecessary flooding burden is there on the network. DSR is not able to repair broken links in a local manner.

### B. Proactive Routing Protocols

In proactive routing protocols information about nodes is stored in the form of tables. Whenever any change occurs in the Network topology then the tables are updated accordingly. Nodes swap topology information so they have route information at any point of time. No route discovery delay is associated while finding new route. DSDV (Destination Sequenced Distance Vector) and OLSR (Optimized Link State Routing) protocols are proactive routing protocols.

#### B.1 Optimized Link State Routing (OLSR)

It is a table driven proactive link state routing protocol. It reduces flooding process and control message overhead by marking subsets of neighbors as multi point relays (MRLs). OLSR uses two types of messages - HELLO message and Topology Control (TC) message. There are two lists which are maintained by HELLO message.

1. First list maintains neighbors address to which link exists.
2. Second list maintains neighbor's address from which control traffic heard but bidirectional links are not confirmed. In OLSR, each node maintains a routing table. This routing table contains destination address, next node address, number of nodes to destination. Main issue in the OLSR protocol is related to the large message overhead which is difficult to maintain.

#### B.2 Destination Sequenced Distance Vector (DSDV)

DSDV is a table driven scheme for ad hoc mobile Networks. DSDV protocol is based on Bellman – Ford Algorithm along with some improvements on it. In DSDV, routing table maintains entry about number of nodes to destination in the network and entry for every mobile node. Sequence Numbers are used to differentiate between stale routes & fresh routes. Use of sequence numbers avoids formation of loops. In all available routes, route with highest sequence number is used.

Whenever network is stable, incremental updates are sent to avoid extra traffic. If the Network is idle than also Routing updates are exchanged, for this network uses battery and network bandwidth. If any link failure occurs while route is active, the node upstream propagates a RERR message to the source node for informing about the link failure.

Issues in DSDV protocol includes heavy overhead because there exists requirement of periodic update messages. Another issue is related with the wastage of bandwidth because of unnecessary routing information even if no change in the network topology.

## V. CONCLUSION

In this paper surveyed about Reactive and Proactive Routing protocols of MANET. The comparative analysis between the mobile ad-hoc network and the vehicular ad-hoc network. Our literature survey focuses on protocols like AODV, DSR, DSDV and OLSR.

The Reactive protocols will be the best if we want to use any existing protocol with the same set of rules in both the VANET and MANET based on previous research work and study AODV results better than any other reactive protocols for both MANET and VANET.

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