# A Review: an Analysis of KMPR Selection in OLSR and AODV Protocols in a VANET Network using NS-2

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***Abstract***— **Recent advances in wireless technologies have given rise to the emergence of vehicular ad hoc networks (VANETs). In such networks, the limited coverage of Wi -Fi and the high mobility of the nodes generate frequent topology changes and network fragmentations. Vehicular Ad-hoc Networks (VANETs) are a special type of Ad-hoc networks. They can be utilized to guarantee road safety, to avoid potential accidents and make new forms of inter-vehicle communications so they will be an important part of the future Intelligent Transportation Systems (ITS).To enhance the safety of drivers and provide the comfortable driving environment, messages for different Kinetic Multipoint Relay) selection in OLSR (optimized link state routing) and AODV (ad-hoc on demand distance vector) Protocols in a VANET network using NS-2. As MPR (Multipoint Relay) selection in OLSR and AODV protocol in VANET suffer from message decoding issues that purpose we used KMPR selection. We have proposed KMPR selection in OLSR and AODV protocol in VANET .The Performance of KMPR selection in OLSR and AODV protocol in VANET will be evaluated in terms of throughput, routing overhead and broadcast delay using simulation platform NS-2.**

***Keywords— VANETs, Routing Protocols, OLSR, AODV, KMPR.***

## I. INTRODUCTION

Vehicular Ad-hoc Networks (VANETs) are a special type of Ad-hoc networks. They can be utilized to guarantee road safety, to avoid potential accidents and make new forms of inter-vehicle communications so they will be an important part of the future Intelligent Transportation Systems (ITS). The growth of the increased number of vehicles are equipped with wireless transceivers to communicate with other vehicles to form a special class of wireless networks, known as vehicular ad hoc networks or VANETs. To enhance the safety of drivers and provide the comfortable driving environment, messages for different purposes need to be sent to vehicles through the inter-vehicle communications.

The VANETs is the commonly used ad-hoc routing protocols initially implemented for MANETs have been tested and evaluated for VANET environments. VANETs share some common characteristics with MANETs. They are both characterized by the movement and self organization of the nodes. We consider the possibility of using ad-hoc and MANET protocols for VANET scenarios.

The OLSR protocol is a pro-active routing protocol, which builds up a route for data transmission by maintaining a routing table inside every node of the network. The routing table is computed upon the knowledge of topology information, which is exchanged by means of Topology Control (TC) packets. OLSR makes use of HELLO messages to find its one hop neighbors and its two hop neighbors through their responses. The sender can then select its Multi Point Relays (MPR) based on the one hop node which offers the best routes to the two hop nodes. By this way, the amount of control traffic can be reduced. Each node has also an MPR selector set which enumerates nodes that have selected it as an MPR node. OLSR uses TC messages along with MPR forwarding to disseminate neighbor information throughout the network. Host Network Address (HNA) messages are used by OLSR to disseminate network route advertisements in the same way TC messages advertise host routes.

The AODV (Ad hoc on-Demand Distance Vector) is an improvement of DSDV to on demand scheme. It minimizes the broadcast packet by creating route only when needed. Every node in network maintains the route information table and participates in routing table exchange. When source node wants to send data to the destination node, it first initiates route discovery process. In this process, source node broadcasts Route Request (RREQ) packet to its neighbors. Neighbor nodes which receive RREQ forward the packets to its neighbor nodes. This process continues until RREQ reach to the destination or the node who know the path to destination. When the intermediate nodes receive RREQ, they record in their tables the address of neighbors, thereby establishing a reverse path. When the node which knows the path to destination or destination node itself receives RREQ, it sends back Route Reply (RREP) packet to source node. This RREP packet is transmitted by using reverse path. When the source node receives RREP packet, it can know the path to destination node and it stores the discovered path information in its route table. This is the end of route discovery process. Then, AODV performs route maintenance process. In route maintenance process, each node periodically transmits a Hello message to detect link breakage.

The KMPR (Kinetic Multipoint Relay) is used to control the retransmission massage in OLSR. It has a delivery time faster than MPR (Multipoint Relay) This might comes from two

properties of KMPR. Firstly, as described in MPR suffers from message decoding issues, which we corrected in KMPR. KMPR is backbone maintenance is significantly less than MPR. Therefore, the channel access is faster and the probability of collisions is decreased. The benefit of KMPR: its low routing overhead. Indeed, by using mobility predictions, the routing overhead may be reduced. The KMPR protocol was able to meet the flooding properties of MPR and this by reducing the MPR channel access and MPR broadcast delay.
In this paper, we use NS-2 for the purpose of executing of KMPR two routing protocols OLSR and AODV in a VANET. The OLSR and AODV Routing Protocol for a delivery time and MPR suffers from message decoding issues.

## II. Literature Review

Jerome Harri Et Al. [6], Have Introduced A Olsr Uses The Mpr Provide A Localized Way Of Flooding Reduction In A Manet And Performance Evaluation Of Determining The Throughput, Pdr And Overhead.

Amiour Med Tahar et al.[12], have introduced AODV protocol uses the MPR in Order to reduce the number of massages broadcasted during the flooding phase under NS-2 have be done using parameters such as, a freeway topology, a dynamic mobility, with high speed and high traffic density.

Evjola Spaho et al.[9], have introduced design of different Routing Protocol for VANET network and evaluated the performance of OLSR and AODV routing protocols in a VANET by considering average PDR, throughput and delay as performance metrics.

Sheen Wan et al.[1] have proposed the Reliable Routing for Roadside to Vehicle (R2V) communications a rural areas where rough terrain poses additional challenge By implementing the performance of the proposed routing protocol based on the rural roadways and terrains in the Yellowstone National Park .The simulation results show the DSR by 18.4% in terms of packet delivery ratio, by 16.9% in terms of control overhead, and by 47.2% in terms of average packet delay.UDP data packets with size of 1024 bits. transmission range is, 200− 300 m, Antenna height 2m , Average speed ($\bar{v}$) 43mph Simulation time 6 min ,Link data rate 1Mbps Tool:- OPNET .

T. Taleb et al. [2] have discussed the use of information on vehicles movement information (e.g., position, direction, speed, and digital mapping of roads). By implementing the protocol's effectiveness in terms of high stability, reduced control overhead, and high throughput compared to DSR. The proposed protocol should be able to provide good stability and maintain high throughput in IVC and RVC scenarios. Simulation time:- 60min, Simulation area:- 1200*1200m² ,Vehicle speed:- 10-90km/h, No. of vehicle:- 600, transmission range:-100−400 m .

Evjola Spaho et al. [3] have discussed the performance of OLSR and AODV protocols in a VANET crossroad scenario. The mobility patterns of vehicles are generated by means of CAVENET (Cellular Automaton based Vehicular Network) and as communication protocol simulator, is used NS3 (Network Simulator-3). They used IEEE 802.11p standard, Two Ray Ground Propagation Loss Model and sent multiple CBR flows over UDP between ten pairs source destination. They used Packet Delivery Ratio (PDR), throughput and delay as evaluation metrics.

Jamal Toutouh et al. [4] have proposed the optimization strategy used to obtain automatically efficient OLSR parameter configurations is carried out by coupling two different stages: 1) an optimization procedure and 2) a simulation stage. The optimization block is carried out by a meta-heuristic method i.e., PSO, DE, GA, and SA. These four methods to find optimal solutions in continuous search. They used a simulation procedure for assigning a quantitative quality value to the OLSR performance of computed configurations in terms of communication cost. This procedure is carried out by means of the ns−2 widely used to simulate VANETs accurately. They implementing the automatically tuned OLSRs by using meta-heuristics are more scalable than the standard version because they are less likely to be affected by medium access and congestion problems. Specifically, the PSO obtained configuration the best tradeoff between the QoS and the routing workload. Simulation time:- 60min, Simulation area:- 1200*1200m² ,Vehicle speed:- 10-90km/h, No. of vehicle :-600, transmission range :-100− 400 m .

Osama Abumansoor et al. [5] have proposed the present a location verification protocol among cooperative neighboring vehicles to overcome an NLOS condition and secure the integrity of localization services for VANETs. They implementing with the help to maintain localization service integrity and reliability Simulation Time:-15-30min, No .of Vehicles:- 100-1000,Data Rate: 6Mbps,MAC Layer :802.11p .

## III. Problem Overview

As MPR selection in OLSR and AODV protocol in VANET suffer from message decoding issues. We have proposed KMPR selection in OLSR and AODV protocol in VANET .The Performance of KMPR (Kinetic Multipoint Relay) selection in OLSR and AODV protocol in VANET will be evaluated in terms of throughput, routing overhead and broadcast delay using simulation platform NS-2.

This protocol has been chosen since it presents a series of features that make it suitable for highly dynamic ad hoc networks and concretely for VANETs. These features are the following.

1) OLSR is a routing protocol that follows a proactive strategy, which increases the suitability for ad hoc networks

With nodes of high mobility generating frequent and rapid topological changes, like in VANETs.

2) Using OLSR, the status of the links is immediately known. Additionally, it is possible to extend the protocol information that is exchanged with some data of quality of the links to allow the hosts to know in advance the quality of the network routes.

3) The simple operation of OLSR allows easy integration into existing operating systems and devices (including smart phones, embedded systems, etc.) without changing the format of the header of the IP messages.

4) The OLSR protocol is well suited for high density networks, where most of the communication is concentrated between a large numbers of nodes (as in VANETs).

5) OLSR is particularly appropriate for networks with applications that require short transmission delays (as most of warning information VANET applications) .

6) Thanks to its capability of managing multiple interface Addresses of the same host, VANET nodes can use different network interfaces (Wi-Fi, Bluetooth, etc.) and act as gateways to other possible network infrastructures and devices (as drivers and pedestrian smart phones, VANET

Base stations, etc.).

The main drawback of OLSR is the necessity of maintaining the routing table for all the possible routes. Such a drawback is negligible for scenarios with few nodes, but for large dense networks, the overhead of control messages could use additional bandwidth and provoke network congestion. This constrains the scalability of the studied protocol.

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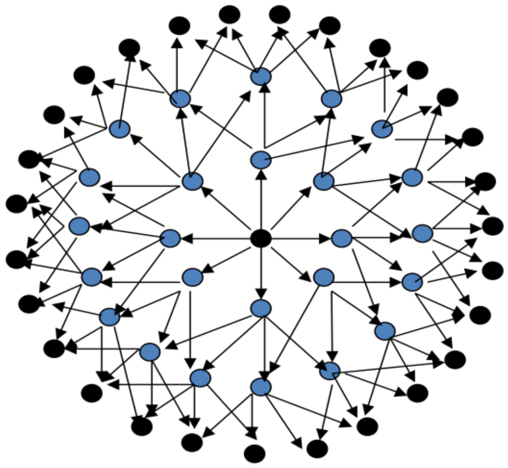
## IV. ROUTING PROTOCOLS IN VANET

### *A. OLSR Protocol*

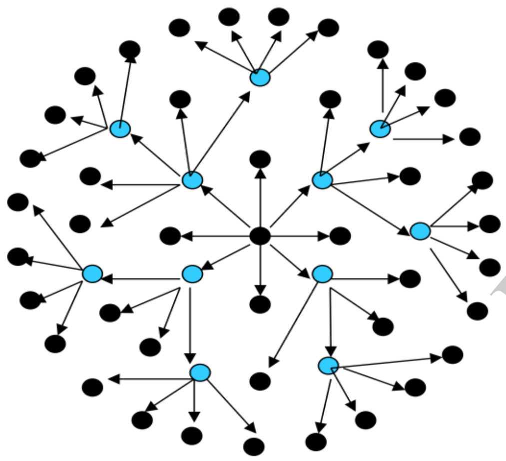
The OLSR is a link-state routing protocol designed for VANETs, which show low bandwidth and high mobility.

In OLSR only MPR retransmit control messages by Reduce size of control message and Minimize flooding. The use of MPRs reduces the number of required transmissions. The OLSR protocol is a pro-active routing protocol, which builds up a route for data transmission by maintaining a routing table inside every node of the network. The routing table is computed upon the knowledge of topology information, which is exchanged by means of Topology Control (TC) packets. OLSR makes use of HELLO messages to find its one hop neighbors and its two hop neighbors through their responses. The sender can then select its Multi Point Relays (MPR) based on the one hop node which shows fig. A offer the best routes to the three hop nodes as show the fig B. By this way, the amount of control traffic can be reduced. Each node has also an MPR selector set which enumerates nodes that have selected it as an MPR node. OLSR uses TC messages along with MPR forwarding to disseminate neighbor information throughout the network. Host Network Address (HNA) messages are used by OLSR to disseminate network route advertisements in the same way TC messages advertise host routes.



24 retransmissions to diffuse a message up to 3 hops

Retransmission node



11 retransmission to diffuse a message up to 3 hops

Fig.B Retransmission node

*B. AODV Protocol*

The AODV (Ad hoc on-Demand Distance Vector) is an improvement of DSDV to on demand scheme. It minimizes the broadcast packet by creating route only when needed. Every node in network maintains the route information table and participate in routing table exchange. When source node wants to send data to the destination node, it first initiates route discovery process. In this process, source node broadcasts Route Request (RREQ) packet to its neighbors. Neighbor nodes which receive RREQ forward the packets to its neighbor nodes. This process continues until RREQ reach to the destination or the node who know the path to destination. When the intermediate nodes receive RREQ, they record in their tables the address of neighbors, thereby establishing a reverse path. When the node which knows the path to destination or destination node itself receives RREQ, it sends back Route Reply (RREP) packet to source node. This RREP packet is transmitted by using reverse path. When the source node receives RREP packet, it can know the path to destination node and it stores the discovered path information in its route table. This is the end of route discovery process. Then, AODV performs route maintenance process. In route maintenance process, each node periodically transmits a Hello message to detect link breakage.

## V. PROPOSED WORK

We have proposed KMPR (Kinetic Multipoint Relay) selection in OLSR and AODV protocol in VANET to resolve message decoding issues and to improve delivery time which are the key performance metrics in VANET.

Since $ns-2$ is a network simulator of general purpose, it does not offer a way for directly defining realistic VANET simulations, where the nodes follow the behavior of vehicles in a road, traffic lights, traffic signs, etc. To solve this problem, we have used the Simulation of Urban Mobility (SUMO) road traffic simulator to generate realistic mobility models. This tool returns traces with the mobility definitions that can be used by $ns-2$. In ns-2 why two languages is used because the two requirements of the simulator i.e C++ is fast to run but slower to change code and OTcl is easy to code but runs slowly. so the Performance of KMPR (Kinetic Multipoint Relay) selection in OLSR and AODV protocol in VANET will be evaluated in terms of throughput, routing overhead and broadcast delay using simulation platform NS-2.



## *6. CONCLUSION*

We have proposed KMPR (Kinetic Multipoint Relay) selection in OLSR and AODV protocol in VANET to resolve message decoding issues and to improve delivery time which are the key performance metrics in VANET.

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