

# Review Based on Proactive and Reactive Routing Protocol for VANET

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**Abstract:** *In last few years, VANET (Vehicular Ad-hoc Network) has become a miraculous field for research analysis and development. VANET is a subclass of MANET (Mobile Ad-hoc Network). MANET and VANET both are wireless networks which are featured as self-managed and ad-hoc networks. VANETs distinguish from MANETs in terms of high mobility and dynamic configuration. Because of erratic connectivity, network segregation and high mobility, information routing in VANETs becomes complicated and challenging, hence generating a requirement for effective VANET routing protocols. This article offers a summary on VANET and provides its routing protocols which intensify on vehicle to vehicle such as V2V communication. This article objectives at categorizes protocols based on routing information and comparing them resort to following parameters namely methodology utilized, advantages/strengths and restrictions. The paper compares proactive and reactive routing protocols depending on their benefits and drawbacks also portray the challenges and research related issues for the routing techniques that available in VANETs.*

**Keywords:** VANET, MANET, Proactive, Reactive AODV, DSDV, DSR, OLSR.

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## 1. INTRODUCTION

Vehicular ad hoc network (VANET) is an unambiguous form of MANET. This field includes vehicle to vehicle communication and vehicle to Road Side wireless communication. Vehicular Ad Hoc Network Communication is a wide-ranging region of research in Wireless technologies. (VANET's) technically based upon the smart Transportation Systems that uses moving cars (Vehicles) as requisite nodes in a network to perform such an autonomous mobile network. [1]. Routing in VANET can be categorized upon transmission strategies or routing information unicast, broadcast, multicast are various transmission approach. Topology Based and Position Based Routing protocols use a mixture of routing information, such as Position Based Routing Protocol required preinstalled map or route information [2].

## 2. EVOLUTION OF VANETS

In Vehicular ad-hoc networks, the term "Ad-hoc" is a Latin word with the essence "for this purpose" [6]. Here, the network consists of multiple nodes that are connected through wireless links. In ad-hoc networks the links may connect or disconnect very intermittently. So, in order to manage the robust, reliable, efficient, timely and scalable ventures in ad-hoc network, dynamic restructuring needs to be handled by the elemental network [7]. For this, the network should send the information through other nodes of the system to perform the communication among any pair of nodes. A wireless ad-hoc network is an ad-hoc network in which all communication links are wireless. The main features of a Wireless Ad-hoc network (WANET) are absence of pre-existing infrastructure and immovable base stations; transmission within link coverage and mobile nodes with dynamic connections.

### 3. REVIEW OF ROUTING PROTOCOLS IN VANET

Routing protocols in VANET have two categories position information for routing and Topology Based. Topology-Based Routing depends on link's information stored in routing tables for forwarding packets to destination and Position. Based Routing use node position to forward packet. GPS provides position information.

**Topology-Based Routing:-** Topology-based routing protocols rely on the topology of the network. exceedingly of the topology-based routing algorithms try to balance between being aware of the potential routes and keeping overhead at the minimum level. The aerial here refers to the bandwidth and computing time used to route a packet. Protocols that keep a table of information about neighboring nodes are called proactive protocols; while reactive protocols route a packet on the fly.[3],[4].

**Proactive topology based protocols:-** This type of protocols frame routing tables based on the current connectivity information of the nodes. The nodes continuously try to keep up to date routing information. Proactive- topology based Routing protocols are developed to work in low mobility surroundings (like MANET), such as Optimized Link State Routing (OLSR) (Clausen et al., 2001) and Destination-Sequenced Distance-Vector Routing (DSDV) (Perkins & Bhagwat, 1994) [3], [4].

**Reactive Topology Based Protocols:-** This type of protocols relies on flooding the network with skepticism packets to find the path to the destination nodes. The Dynamic Source Routing (DSR) (Johnson & Maltz, 1996) is one of the reactive topology-based routing protocols. In the DSR, a node sends out a flood of skepticism packets that are forwarded until they reach their destination. Each node along the path to the destination adds its actual location to the list of relay nodes carried in the packet. When the destination is reached, it responds to the source listing the path taken. After waiting a set chunk of time, the source node then sends the packet from node to node along the shortest path. [3], [4].

**Position-Based Routing Protocols:-** Perform the routing decisions based on the geographic information of the nodes. This class offers an alternative approach known to be more robust to face the mobility issues (Giordano & Stojmenovic, 2003) [5].

**Map-Based Routing:-** The Map-based routing protocols combine the position information with topological knowledge about the road and the surroundings (GSR,SAR) Geographic Source Routing (Lochert et al., 2003) and Spatial Aware Routing (SAR) (Tian et al., 2003) [6]

**Movement-Based routing:-** Numerous protocols enhance the basic position based scheme to optimize the routing decisions. To address this shortcoming, some approaches like Directional Greedy Forwarding (DGR) (Gong et al., 2007)& Geographic source routing(GSR)(Lochert 2007) [7]

**Sequenced Distance-Vector Routing:-** It is considered being Table driven routing protocol. As an advantage of routing protocols, Routing table simplifies the route setup process. The route information is updated periodically so, the updates are propagated throughout network is its disadvantage. It leads to heavy control overhead during high mobility to obtain information about a destination node [6]

**Optimized Link State Routing OLSR:-** OLSR Floods the network by the topology control messages in order to disseminate the link states information throughout the entire network showing which nodes are connected to which other nodes. The drawbacks effect consumes the networks resources and wastes a part of the bandwidth which increases with rapid changes. Moreover, the use of flooding increases the network congestion and leads to loss of messages because of collision.

**Ad hoc On Demand Distance Vector routing (AODV):-** AODV is a distance vector routing protocol, when a node wants to establish new communication with another node, it searches for an available path to the destination node in its routing table .AODV is an ad hoc on demand routing protocol. That means the routes are only established when need to reduce traffic overhead. AODV supports unicast broadcast and also multicast [11].

**Dynamic Source Routing Protocol (DSR):-** DSR On demand protocol designed to restrict the bandwidth consumed by control packets in hoc wireless network. It is beacon-less and hence doesn't require periodic hello packet transmissions which are used by a node to inform its neighbors of its presence. During the route construction phase, it establishes a route by flooding Route Request packets in the network. The destination node, on receiving a Route Request packet, responds by sending a Route Request packet back to the source. [10].

**Traffic-aware routing:-** The traffic-aware routing protocols suggest the use of available data about vehicular traffic density and flows in addition to spatial information. Thus, only streets where vehicles are moving will be used for packet forwarding. The following sub-section examines examples of such routing solution which are designed using traffic information [12].

#### 4. METHOD OF ROUTING PROTOCOL IN VANET

**Unicast routing** one to one communication takes place using multihop scheme; where intermediate nodes are used to forward data. This is the widely used class in ad hoc network. most of the topology based routings are Unicast such as AODV , DSR , GPSR ,DIR[14] **Multicast routing** one to many communication take place. This can be further partitions into geocast and cluster based. In cluster based routing, nodes automatically divided into clusters and one cluster head is selected and all outgoing and incoming communication take place through it. **Geocast routing**, message delivery to other nodes lie within a specific geographic area, like area where accident takes place. Mobicast, ZOR (Zone of Relevance) are geocast protocols [13]. **Broadcast routing** [11] one to all communication take place. Flooding is most frequently used routing protocol in VANET especially to communicate safety related message. Simplest of broadcast method is carried by flooding in which each node rebroadcast the message to other nodes. But larger density of nodes, this causes exponential increase in bandwidth.

#### 5. CONCLUSION

A comprehensive survey on the development of communication standards, routing protocols and major challenges for Vehicular Ad hoc networks (VANETs) is presented in this paper. VANET is a subclass of Wireless Ad hoc networks (WANETs) that provides a promising access for future intelligent transportation system (ITS). These networks have no fixed infrastructure and instantly on the vehicles themselves to contribute network functionality. However, due to mobility constraints, driver behavior, and high mobility, VANETs exhibit characteristics that are significantly different from the MANETs. This paper presents a systematic difference between the two networks.

In the past decade, many VANET research around the world have been undertaken and several VANET standards have been developed to improve vehicle-to-vehicle or vehicle-to-infrastructure communications. In this paper, we reviewed some of the main areas that researchers have focused on in the last few years and these including VANET, VANET routing protocol and emphasized the most salient results achieved till date by them.

#### REFERENCES

- [1] Mohamed Watfa, "Advances in Vehicular Ad-Hoc Networks: Developments and Challenges", IGI Global, 2010.
- [2] Ganesh S. Khekare and Apeksha V. Sakhare, "Intelligent Traffic System for VANET: A Survey", International Journal of Advanced Computer Research, vol. 2, Number-4, no. 6, pp. 99-102, December 2012.
- [3] Rakesh Kumar and Mayank Dave, "A Review of Various VANET Data Dissemination Protocols", International Journal of u- and e-Service, Science and Technology, vol. 5, no. 3, pp. 27-44, 2012.
- [4] Sherali Zeadally, Ray Hunt, Yuh Shyan Chen, Angela Irwin, and Aamir Hassan, "Vehicular ad hoc networks (VANETS): status, results and challenges", Springer Science, Business Media, LLC, p. 25, 2010.
- [5] Manjot Kaur, Sukhman Kaur, and Gurpreet Singh, "Vehicular Ad Hoc Networks", Journal of Global Research in Computer Science, 2012.
- [6] Prasant Mohapatra and Srikanth V. Krishnamurthy, "Ad Hoc Networks: Technologies and Protocols", Boston, USA: Springer, 2005.
- [7] Mohammad Jalil Piran, G. Rama Murthy, and G. Praveen Babu, "Vehicular Ad Hoc and Sensor Networks; Principles and Challenges", International Journal of Ad hoc, Sensor &

- Ubiquitous Computing (IJASUC), vol. 2, no. 2, pp. 38-49, 2011.
- [8] Lochert, C., Mauve, M., F'ussler, H., and Hartenstein, H., "Geographic routing in city scenarios", SIGMOBILE Mob. Comput. Commun. Rev., vol. 9, no. 1, pp. 69-72, 2005.
- [9] R. A. Santos, "Performance evaluation of routing protocols in vehicular ad hoc networks", 2005.
- [10] Pei, G., Gerla, M., and Chen, T.-W. (2000), "Fisheye State Routing: A Routing Scheme for Ad Hoc Wireless Networks", Proc. ICC 2000, New Orleans, LA, June 2000.
- [11] Johnson, D. B. and Maltz, D. A. (1996), "Dynamic Source Routing in Ad Hoc Wireless Networks", Mobile Computing, T. Imielinski and H. Korth, Eds., Ch. 5, Kluwer, 1996, pp. 153-81.
- [12] Perkins, C.; Belding-Royer, E.; Das, S. (July 2003) "Adhoc On-Demand Distance Vector (AODV) Routing".
- [13] O. K. Tonguz et al, "DV-CAST: A distributed Vehicular broadcast protocol for vehicular ad-hoc networks", IEEE wireless communication, vol. 17 April 2010, pp. 47-57
- [14] Marwa Altayeb, Imad Mahgoub, "A Survey of Vehicular Ad hoc Networks Routing Protocols", ISSR Journals, 2013, Vol. 3, No. 3, pp. 829-846.
- [15] Karp B, Kung HT. "GPSR: greedy perimeter stateless routing for wireless networks", ACM/IEEE MobiCom 2000.
- [16] Kartik Pandit, Dipak Ghosal, H. Michael Zhang, and Chen-Nee Chuah, "Adaptive Traffic Signal Control With Vehicular Ad hoc Networks", IEEE Transactions on Vehicular Technology, vol. 62, no. 4, pp. 1459-1471, May 2013.
- [17] Dedicated Short Range Communication (DSRC) Home. (2014,February) [Online]. <http://www.leearmstrong.com/DSRC/DSRCHomeset.html>
- [18] Sajjad Akbar Mohammad, Asim Rasheed, and Amir Qayyum, "VANET architectures and protocol stacks: a survey", Communication technologies for vehicles, pp. 95-105, 2011.
- [19] Piyush Chouhan, Girish Kaushal and Urmila Prajapati "Comparative Study MANET and VANET", International Journal Of Engineering And Computer Science ISSN:2319-7242 Volume - 5 Issue -04 April, 2016 Page No. 16079-16083.