Routing Protocols Performance Analysis for Vanet

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Abstract— The performance of VANET remains optimum and after that due to high packet loss rate communication among vehicles is not feasible. Finding optimal path is a typical task for dynamic protocols. The research objective is to study some of the important QOS metrics in VANET & vehicular traffic management solutions to improve overall safety of traffic.

Keywords— Vehicular Ad hoc Networks, Quality of services,Mobile Ad-hoc Network

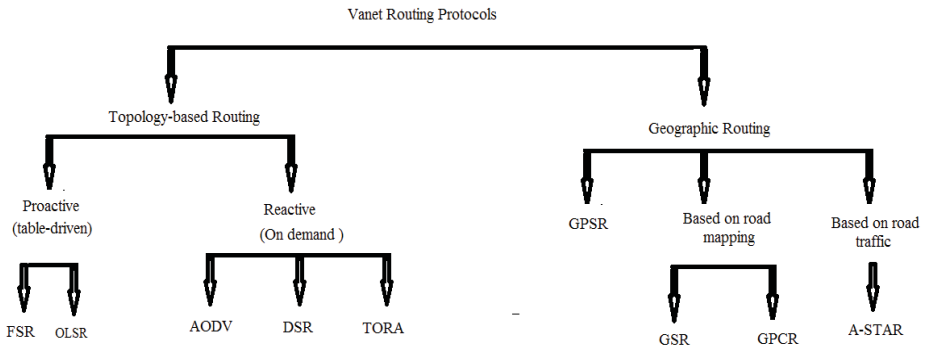
I. INTRODUCTION OF VANET

VANET is an ad-hoc network formed between vehicles as per their needs of communication. In order to develop a VANET every participating vehicle must be capable of transmitting and receiving wireless signals up to range of more than three hundred meters. VANET communications range is restricted up to one thousand meters in various implementations. The performance of a VANET remains optimum within one thousand meters and beyond that it is not feasible to communicate among vehicles because of packet loss rate is very high. Finding path of optimum is a typical task for dynamic protocols as management of vehicle movement is complex. So, there is need to update entire in the route finding nodes.

VANET is not restricted up to Vehicle-to-Vehicle communications, it also takes benefit of road side infrastructure that can also participate in communication between vehicles, but main focus is on Vehicle-to-Vehicle communications. There are different challenges for VANET such as building, high speed of vehicle, dynamic route finding, roadside objects, reflecting objects other obstacles in path of radio communication, different direction of vehicles, authorization of vehicle, concern about privacy, security of data and sharing of multimedia services. Vehicular Ad Hoc Network VANET is the special class of Mobile Ad Hoc Networks (MANET) with unique feature.

Generally routing protocols are classified into two categories:Topology Based Routing ,Geographic Routing. The topology based routing protocols are of two types proactive table driven routing protocols and reactive on demand routing protocols. Here the protocols are major concern are proactive are updated regularly. In this type of routing protocol, each node in a network maintains one or more routing tables which. Each node sends a broadcast message to the entire network if there is a change in the new Topology.

Figure 1.1 Types of VANET Routing Protocols



*AODV Route Discovery***:** Route discovery is one of the most important characteristics of any protocol in wireless communication. The need for basic route discovery arises when a source node wants to communicate with any particular destination node in order to forward data packet. AODV uses route discovery by broadcasting RREQ to all its neighbouring nodes. **Dynamic Source Routing (DSR)**The Dynamic Source routing protocol (DSR) is a on demand routing protocol based on a method known as source routing that are designed specifically for use in multi-hop wireless ad-hoc network to reduce the amount of bandwidth consumed by control packets by eliminate the requirement of periodic table update message. This algorithm provides the route on-demand and the sender node knows the complete hop by hop route to the destination.
Vehicle maintenance Event Driven notifications messages are sent to vehicles when the driver has set are minder fore call or when the raise fault in the vehicle. In case of a fault the OBU sends a message to the infrastructure using V2I communication.**Security services** Critical safety situations like major traffic congestion, weather condition, manmade or natural disasterorho stile attack can occur in any highway or urban environment. In such ha situation, multimedia content like video can be streamed from one or more cars to the vehicles following behind so that they can be visually informed about the problem. These vehicles can make a better informed decision than if they simply got alarms extra message.

II. SIMULATION ENVIRONMENT

The simulation model is based on NS 2 simulation version 2.35. The simulation scenario is designed according to the normal state of car running on a road. The position and the movement of the nodes are given in the screen scenario generator file. This simulation results are displayed in the NAM file and the routing parameters obtained from the trace file.
To evaluate the performance of the routing protocols, some parameters have been used in the TCL file for measuring the efficiency of vehicle-to-vehicle communication. The study of these parameters is analyzed by the NS 2 Trace file. Therefore the Agent Trace ON and Route Trace ON in the TCL file are activated. We use the parameter and estimate the performance of the Routing protocols DSDV, AODV and DSR.
NS-2 has many and expanding uses including:

- To evaluate the performance of existing network protocols.
- To evaluate new network protocols before use.
- To run large scale experiments not possible in real experiments.

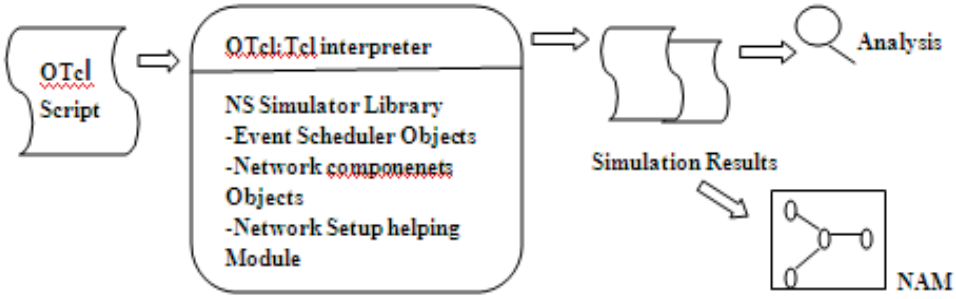


Figure 2.1 Simplified User"s View of NS-2

III. LITERATURE SURVEY

In [1] Yi wang. Krishnamachari and Konstantinos Posunis, proposed about QoS metrics for unicast routing in VANETs, what specific characteristics VANET routing protocols should possess. He shed light on the issues-proposed solutions achieves optimum performance in both urban and highway, as well as sparse and dense environment. Analyze some of the most important QoS metrics in VANET. Namely, the upper performance bound for connection duration, packet delivery ratio, end-to-end delay, and jitter for unicast communication in typical highway and urban VANET environments. According to its results, delay and jitter in VANET would be adequate for most of the envisioned unicast-based applications, whereas the packet delivery ratio and connection duration might not meet the requirements for most unicast-based applications.
In [2] Bo Xu, Aris Ouksel and Ouri Wolfson discussed about Performance evaluation of a application for VANETs using IEEE 802.11p. WAVE (wireless access in vehicular environment) is described in IEEE 80.11p and VANETs follow them. Equipped with WAVE communication devices, cars units form a highly dynamic network called a Vehicular Ad Hoc Network (VANET), which is a special kind of Mobile Ad-Hoc Networks (MANETs)..

In [3] Stuart Kurkowski, Tracy Camp, and Michael Colagrosso addresses some of the quality of service issues for ad hoc networks .It focus on QoS routing. He gave brief introduction to the new but rapidly growing area of research on guaranteeing QoS in ad hoc mobile wireless networks.
In [4] P.Agarwal et. al. have proposed a technique of establishing a backbone network of strong nodes. With the assistance of the backbone network of strong nodes, source and destination nodes carry out an end to end checking to determine if all the data packets reached the destination. If checking results in a failure, then the backbone network initiates a protocol for detecting the malicious nodes.
In [5] S.Indrasinghe et. al discussed the concept of statefull approach of IP addresses allocation in ad-hoc networks. We have used this concept of backbone nodes & designed an algorithm that is much simpler.
In [6] Poongothai T et. al their protocol analysis the various performance metrics like packet loss, packet delivery ratio and average end to end delay. It is observed that the effect on packet loss is much lower as compare to effect on delay.
In [7] Bo Sun et. al. they propose a cooperative mechanism to tackle the black hole problem. The mechanism is cooperative because nodes in the protocol work cooperatively together so that they can analyze, detect possible multiple black hole nodes in a more reliable fashion. They proposed algorithm works into two phases so that it can reduce the rate of false alarm.
In [8] Satoshi Kurosawa et. al their work compares the method proposed by various authors according to their assumptions and the corresponding simulation result inns2 demonstrates that our protocol not only prevents black hole but also improves performance.
In [9] Payal N. Raj et. al In their method they have used the RREQ, RREP, PDR, and PMIRas metrics to calculate the QoS of a link and into prediction of attacks. Their proposed scheme will be implemented by them on NS-3test bed.
In [10] Mohammad Al-Shurman et. al they present two possible solutions. The first is to find more than one route to the destination. The second is to exploit the packet sequence number included in any packet header. Computer simulation shows that compared to the original ad hoc on-demand distance vector (AODV) routing scheme, the second solution can verify 75% to 98% of the route to the destination depending on the pause times at a minimum cost of the delay in the networks.

IV. CONCLUSION

The performance evaluation is necessary for analyzing the problem of existing approaches and providing the requirement of design to VANET suitable. For providing best the simulated values for routing Protocols we use NS 2 Network simulator. Here we analyise DSDV and AODV routing Protocols for higher performance in the vehicular system of VANET environment with their higher performance value of throughput CBR and VBR.

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