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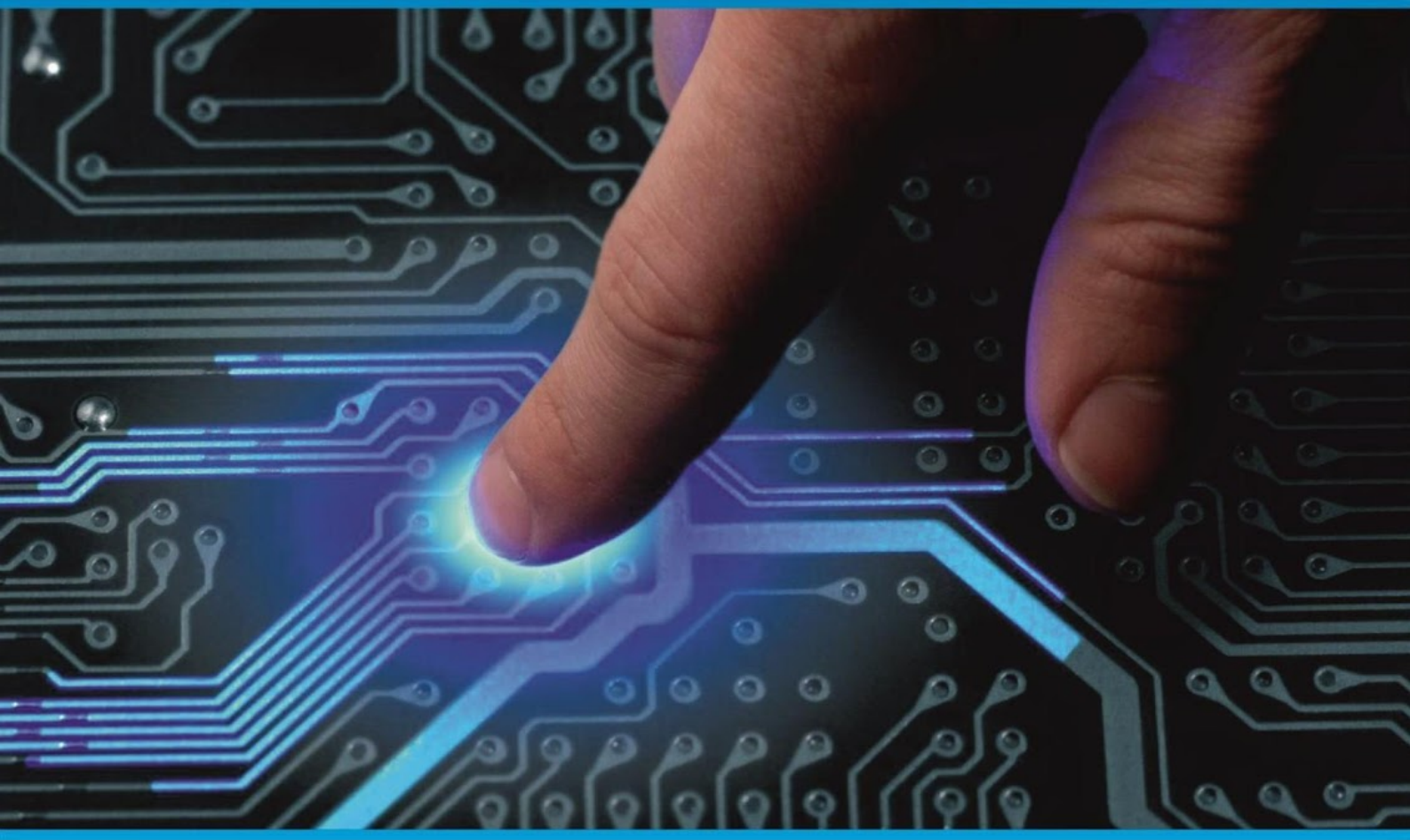

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Intelligent Transportation System Using VANET

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ABSTRACT: Vehicular ad-hoc networks (VANET) technology has emerged as a crucial area over the Vehicular communication system. Vehicular ad-hoc networks(VANET) helps to speak between vehicles and road-side unit stations or another vehicle and supply Trafficless and Intelligent transportation. VANET is been employed by many researchers and networkers to offer better vehicular communication within the highways an d road stations. They are often characterized by different topology, mobility, one-time interactions. we analyze the delay and therefore the different characteristic performance of the vehicle to vehicle communication using VANET in Simulation of Urban Mobility (SUMO) and Network Simulator(NS3).In this paper, we use the different routing protocols like OLSR,AODV and DSDV and obtain the key performance indictor like delay,packets ,message delivery speed..etc to form the better VANET Network.

KEYWORDS: Wireless Communication, Vehicular Ad-hoc Network (VANET), Delay, Vehicular Communication, Routing protocol, Mobility, Network Simulator

I. INTRODUCTION

A Vehicular Ad-Hoc Network (VANET) is the same as a mobile network which is been formed by the moving vehicles as nodes. VANET changes every vehicle into a node and forms a network range where they will be tested with different routing protocols. When a car changes its direction or road form then the range of the signal get drop and a replacement network is going to be formed by the mobile Internet are often created. it's assumed that the primary systems during which it'll be integrated are police vehicles to vehicles, speak with each other to supply safety. it's utilized in endless sort of connected nodes . Traditional applications emerge in many various sorts of VANET connections. They are often characterized by different topology, mobility, one-time interactions. VANETs are characterized by the nodes and therefore the direction and form a mini-hub.

–Vehicle to Vehicle (V2V) is communication between vehicles with no external source.
–Vehicle to Infrastructure (V2I) provides communication between the vehicle and therefore the infrastructure.
–Infrastructure to Infrastructure (I2I) provides communication between different infrastructure.

II. LITERATURE SURVEY

2.1 SECURITY CHALLENGES IN VANET

VANET is a rising technology with an amazing future & also has great challenges, especially in its security. we specialise in VANET inter security which is presented in the upcoming three parts. The primary of these paper gives an in-depth overview and idea of VANET security characteristics and requirements. The requirements are taken to enable the security of VANET infrastructure and also with efficient communication between the parties. We give the small blueprint of the updated security architecture and then well-known security standard protocols. The third part may be a comparison between the solutions supported by well-known security criteria in VANET.

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2.2 DELAY PERFORMANCE IN VANET

Jin Tian has suggested that delay plays the important role in the message transfer of the VANET network .The efficiency is been marked by the every single message of the VANET network transfer.Lower the delay will be forming the changes in the theoretical deriving of the system and the architecture of the reliable communication system.The different simulation of the VANET using the different protocol provided that the better performance characteristics.

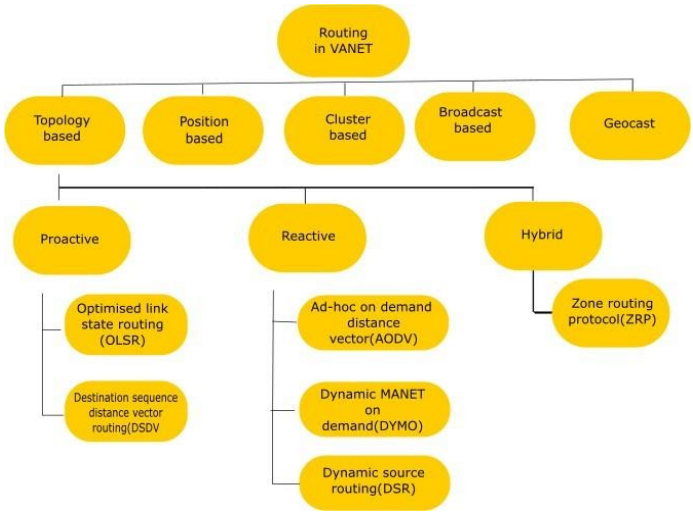

Fig.1 Routing in VANET

III. PROPOSED METHODOLOGY

3.1 Simulators used for VANET

Simulation is the easy way to implement on the real-life activities especially in networks like VANETs, the implementation is quite hard. Network simulators is used to easily analyse the performance of network protocols which is under different network topologies. Though many types of simulators are there in existing the commercial and open-source ones are mainly concentrated on simulation modelling for VANETs. In this paper, we have mainly focused on simulators that supports IEEE 802.11p standard for VANETs. Based on the literature, NS-2 is one of the foremost used network simulators,but in recent times, OMNET++ and NS-3 simulator rapidly grown like anything. NS-3is a single language simulator which is written in C++, introduces several advantages that provides more reliable results than NS-2. Eventhough it's a completely new simulator, it has inherited NS-2 popularity, so that it's not surprising that the everyday number of NS-3 users is increasing and many researchers choose it for his or her research. An analysis of the suitability of using the NS-3 simulator in evaluating the performance of VANET, it is concluded that the NS-3 simulator is a good start line for the simulation of VANET.

3.2 Routing protocols for VANETs

Choosing an adequate routing protocol is the main challenge in VANETs due to often changes within the topology caused by the fast movement of the vehicles. Routing protocols utilized in VANETs might be divided into five categories to perform packet forwarding, the topology-based routing protocols use link information that exists within the network. With the topology-based protocols, all sort of packets might be sent, unicast, multicast and broadcast. The small amount of resources and fewer bandwidth consumptions are needed than other protocol types. (Fig 1)On the opposite hand, these protocols provide more overhead due to the route discovery mechanism. Sometimes, the protocol fails to get a route due to the frequently moving nodes. it will be divided into three subgroups: proactive, reactive and hybrid. Proactive routing protocols are protocols during which all nodes have routes before the packet must be sent. These are table-driven protocols that attempt to keep a record of updated network routes all the time. The nodes exchange topology information so all of them have an equivalent view of network. This helps to detect topology changes. Whenever a node send a message, it search the routing table for trail to destination. REO routing protocols generate route discovery only it's needed. while node have data to send the nodes are established between route to

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destination. Source node initiates a route discovery mechanism. Compare to other protocols, reactive protocol is reduced; however, the route searching process that happens before data packets are continuous forwarded may cause source node to suffer long delays. Two widely used reactive protocols are AODV & DSR in highway & city scenario by vary the no.of vehicles in both city & highway scenario.AODV protocol can be found the efficient can be improved in the lecture . as an example, Urban-AODV protocol is for VANETs in urban environment.

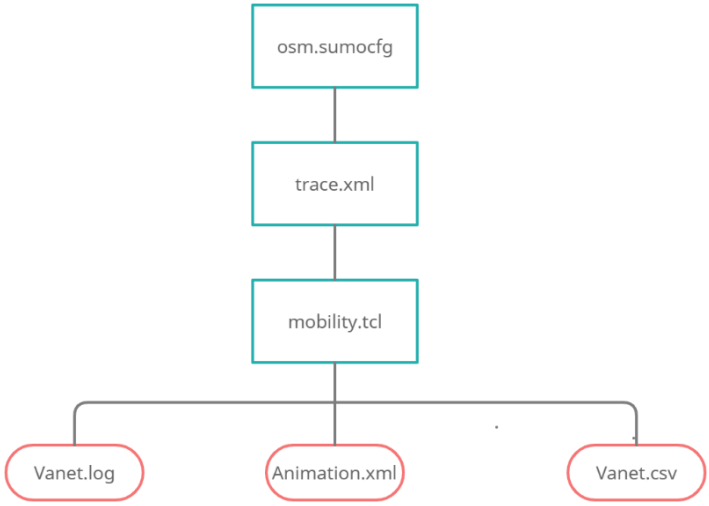

Fig 2 SUMO-NS3

3.3 NS-3 EXTENS IONS FOR VANET PERFORMANCE EVALUATION

In developing and evaluating new network protocols NS-3 simulator is used in many recent research studies. Though it is a very popular tool, NS-3 is a new simulator so it is still lagging back in some protocol models and features that are most essential for VANET simulations. NS-3 does not support routing metrics, so we developed a model for ETX metric inside the AODV protocol. Also, the NS-3 simulator does not give correct tools for the calculation of basic network KPIs like packet loss ratio,throughput, E2E delay, jitter, etc. Therefore a research person must develop and implement the solution to KPI calculations to know the understanding. This will lead to implementation differences and potential errors that will be difficult to compare with other research outputs. So, we have developed a framework for gathering simulation data which performs necessary statistical data processing and calculating KPIs, to efficiently analyse the performances of VANET networks.

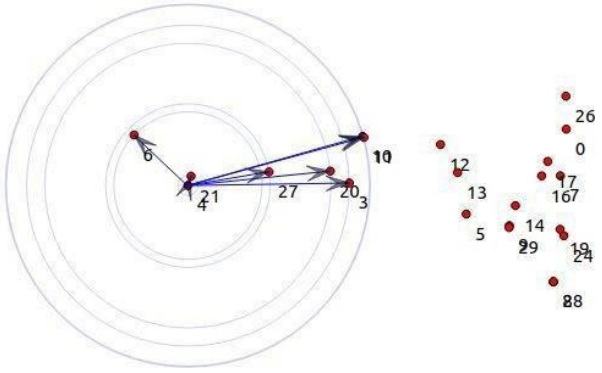

Fig 3 NetAnim Output of NS3

3.4 VANET FRAMEWORK AND PERFORMANCE

Regardless of the network type, the simulated scenario with reliable output statistics of basic network KPIs. is the important part of simulatoin. Many of them have opposite requirements. So, network can ’t able to

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achieve the best results for all KPIs. KPIs network must be realistic and the network should be acceptable results in all KPIs. As of now, simulation data collected from NS-3 can be verified using plenty of methods. – The first method is Flow Monitor. This tool gives performance metrics on the network layer instead of the application layer and it is used only for unicast IP flows over TCP/UDP.Flow Monitor cannot be used properly if the user does not use TCP/UDP or uses broadcast packets. if there are one or more issues regarding the Flow Monitor then it does not work for all routing protocols, such as DSR. To export data from the simulator General trace mechanism uses trace sources and trace sinks. Trace sources which are embedded in NS-3 models provides a source of relevant information for simulator users. Simulation data can be processed by the Data Collection Framework(DCF) tool.Probes,Collectors,Aggregators are the elements which are in the DCF it gets embedded with the NS-3 Models and provide output of the generate graphics.Generate graphics collects the files from the store data in the aggregators.Network analysis can be used for the collector mechanism which provided the better KPI's.Even though the flow monitor can handle the some of the packets while broadcasting it is very slow and both the efficiency methods can be used for the concepts of analysis.DCF easy for the NS3 user can be made for tracing the flexibility of the different networks.

Spec\Protocol	OLSR	AODC	DSDV
Total sent packets	3942	10568	5936
Total Received Packets	3527	8171	3504
Total Lost Packets	415	2397	2432
Packet Loss ratio	10.00%	22.00%	40.00%
Packet delivery ratio	89.00%	77.00%	59.00%
Average Throughput	2.55059kps	4.07215kbps	1.72772kbps
End to End Delay	13404257631	411298944083	14604725191
End to End Jitter delay	11357784759	149552736351	11563819227

Tab 1 Different Routing Protocols

IV. CONCLUS ION

The goal of the paper is to get the key performance indicators of the VANET and analyze the different routing protocols.NS3 helps in obtaining the required end-to-end delay and other indicators(Tab 1) of the network created using the SUMO simulator. The framework of the VANET helps in providing a better network of nodes to get the occurred output. The KPI's found using the NetAnim can be used for the formation of the hub(connecting different nodes in the network with a single node), this will be further used for the development path of nodes, traffic management, ambulance freeway.This tool can be used with the Google Map for the real time traffic and accident message is possible.

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