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Evaluation Based On the Efficient Selection of Cloud-Assisted Gateway for VANET

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Abstract: ***Research community finds it interest to access the internet through the vehicular networks. As the wireless network makes it possible to access the Internet from VANETs. However, it finds the difficulty to deliver the cloud services to VANETs. As Cloud computing is nothing but the provision of computing resources and provides the services on demand basis on the Internet. But they find it difficult to get stable internet services on road. So for getting stable internet services on the road the scientists need the discovery of Proper Internet gateway and also to select that gateway in a appropriate way that will provide the delivery of data services and information to Vehicular Ad Hoc Network users (VANET). This paper provide the mechanism of proper gateway discovery to gain the stable internet connection having the consideration of loading parameter like to improve the packet delivery rate, reduce the end-to-end delay, and decrease the signaling load for routing to Internet in VANETs. Cloud services are endearing for vehicular ad hoc network (VANET) users.***
Keywords: Cloud; VANET; gateway; packet delivery rate; end to end delay; signaling load.

I. INTRODUCTION

As the internet access from Vehicular Ad Hoc Networks is often provided by the means of roadside gateways. To gain changing network topology, high mobility of VANETs and stable internet connection to VANET users, mobile gateways has been introduced. A Vehicular Ad-Hoc Network (VANET) is the network technology that uses moving vehicle as nodes in a network to create the mobile network. As the wireless data services and information provide a reliable and a faster mobile accessing that increases the demand of it. It is necessary to support stable Internet access in the VANET to obtain powerful services of cloud. In a computer network a gateway is nothing but a node or a key stopping point for information or data on its way to or from the other networks. Because of gateway it is easy to send and communicate back and forth. Without gateway we wouldn't be able to use the Internet. In short an internet gateway is a modem or a router or a peripheral device for accessing the internet. In present generation people are in a demand of very high speed vehicles and since the high speed of vehicles, the vehicles moves quickly into and out of the communication range of gateway. Thus, it is very hard to access the stable Internet services from the stationary gateway. To overcome the limitations of internet access through stationary gateways, mobile gateways comes into consideration to improve the services of the internet. For providing the global connectivity for all ad hoc nodes, it is essential to discover gateway to locate the gateway within the ad hoc network. Thus proper discovery and selection of Internet gateways impacts a lot on QoS of cloud services. A discovery mechanism of gateway is thus proposed to discover and select effective Internet gateway to VANETs cloud.

II. PROBLEM STATEMENT

Because of day to day increasing speed of vehicle, the vehicles quickly move from one communication range to another communication range so it gets very difficult to get stable internet services. And if the VANET users want a powerful cloud services, accessing the stable Internet is essential. So in order to obtain the significant quality of cloud services discovery of proper gateway and dispatching it is essential. Mechanisms of gateway discovery propose a discovery and selection of proper Internet gateways in the VANET environment and provide services through it

III. DESIGN MODEL

The system architecture is provided in Figure 1. The key elements present in the system are given as below:

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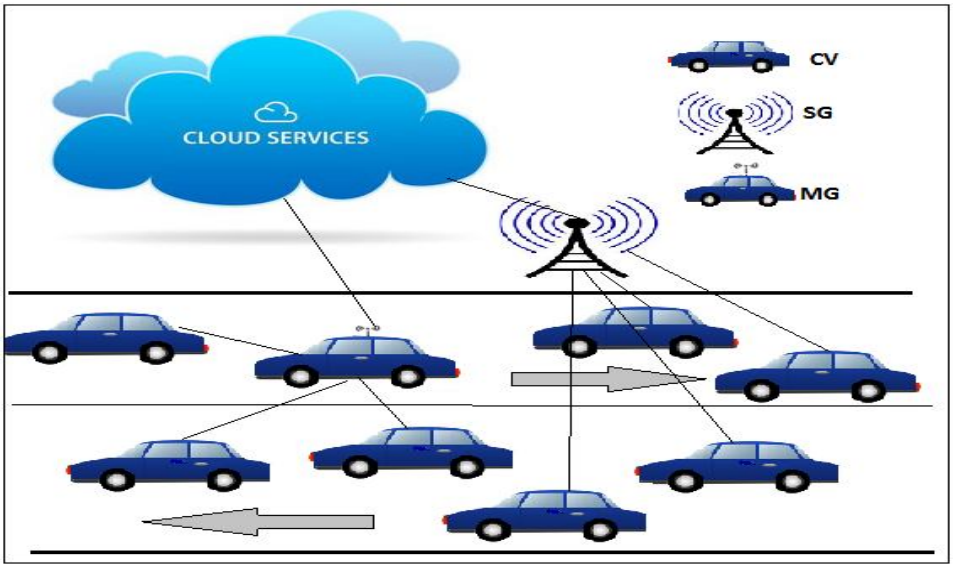


Figure 1: System architecture

A. Gateway

Gateway is a network node to connect the Internet directly through WiMAX, Wi-Fi, or cellular networks. To overcome the difficulty of stationary gateway for accessing the stable internet services mobile gateway comes into existence for imroving internet services. Depends upon the mobility of gateway, two types of the gateways are there which are considered in this paper, namely the stationary gateway and mobile gateway. Stationary Gateway (SG) is nothing but the roadside infrastructure such as access points (APs) of Wi-Fi or WiMAX, or base stations (BSs) of cellular networks. Mobile Gateways (MG) are the vehicles which can be connected directly to the Internet.

B. Client Vehicle

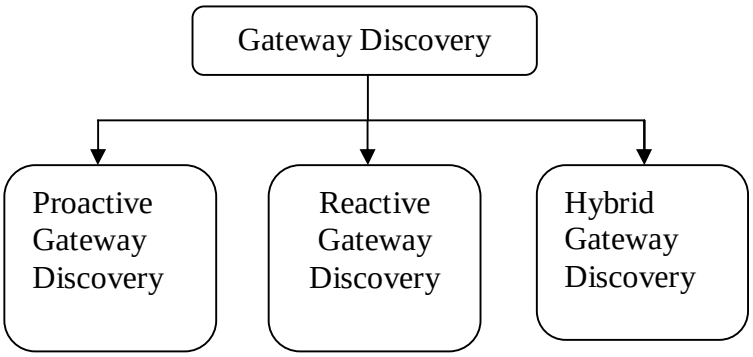
Client Vehicles (CV) are the vehicles that can connect to the Internet via Stationary Gateway(SG) or Mobile Gateway(MB) for accessing cloud services.

C. Cloud Services

Cloud service is a kind of service that made available to users on their demand through the Internet from a cloud computing provider's servers. Cloud computing uses computing resources that delivered as a service over the network. Cloud Server is the provider of service in the cloud. The cloud users are not required to maintain or manage cloud infrastructure and platform on which the application is running.

IV. APPROACHES OF GATEWAY DISCOVERY

Three approaches can be used for gateway discovery depends on who is going to initiates the discovery process are as follows.



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A. Proactive Gateway Discovery

The Gateways in the system promote their existence by periodically broadcasting its Advertisement.

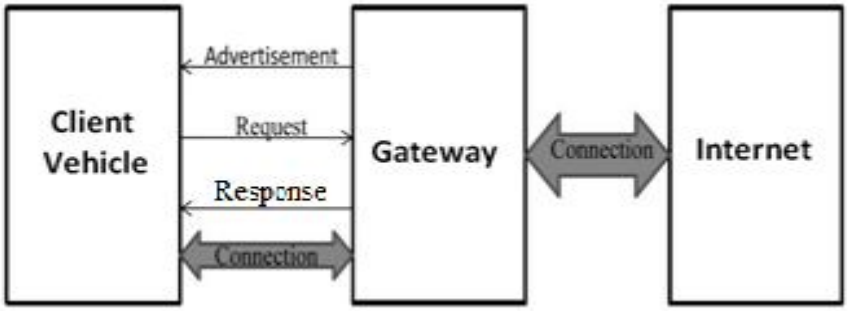

Figure 2: Proactive gateway discovery

B. Reactive Gateway Discovery

By broadcasting the Solicitation message, the client vehicle request to connect the Internet before it receives the Advertisement broadcasted by any gateway.

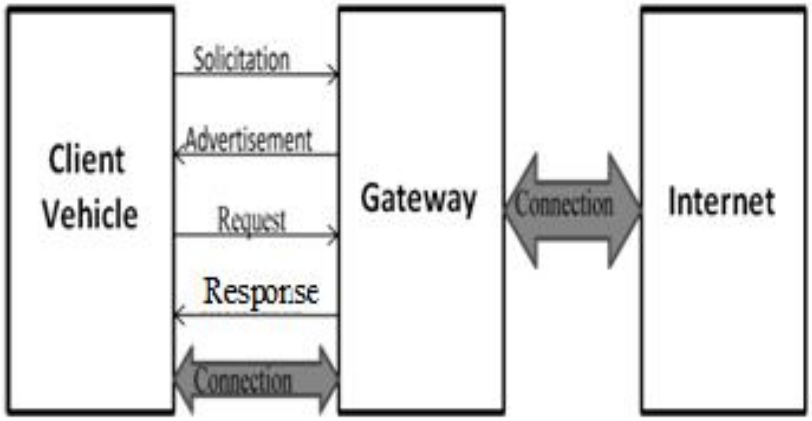

Figure 3: Reactive gateway discovery

C. Hybrid Gateway Discovery

The disadvantages that has been come in the proactive and reactive discovery of gateway, these two approaches can be combined to form the hybrid method for gateway discovery.

V. METHODOLOGY

Performance evaluation for the cloud – assisted gateway discovery system for Vehicular Ad hoc network is discussed in this paper. This system focuses for accessing cloud services from vehicular ad hoc networks and evaluated the performance based on the parameter like packet delivery ratio. The gateway discovery algorithm for selecting and dispatching best gateway using reactive approach is shown in Figure 4. The client vehicle broadcasts the request messages CV_REQ_GW to all the gateways within its hearing range. At first, Gateway which are nearest to the client vehicle respond to request and selects as the portal to internet until it becomes overloaded and send acknowledgement message GW_ACK to the requesting client vehicle. Once it gets overloaded, then the next nearer gateway is selected as best gateway to provide service to the client vehicle. The CV then requesting for data to the cloud by sending CV_REQ_DATA message through the selected gateway. Cloud sends the ACK_DATA message as an acknowledgement that whether the requesting data is available or not to requesting CV.As soon as it gets acknowledgement, client vehicle sends CV_RDY_DATA message to the cloud when it becomes ready to accept data. In this way, data is transmitted from cloud to client vehicle through proper gateway.

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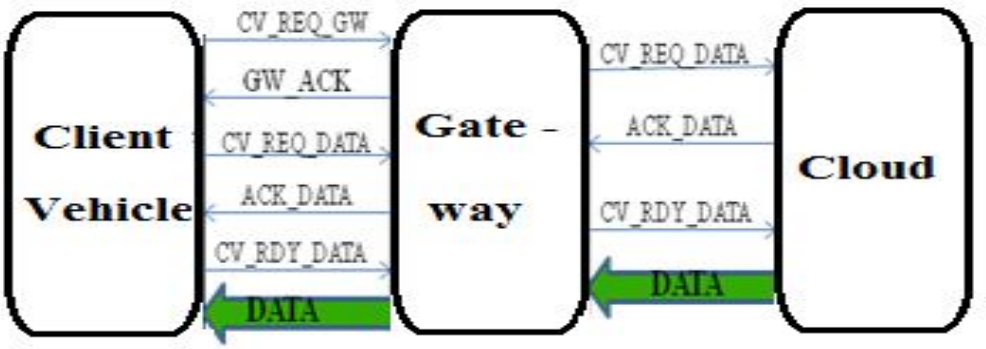

Figure 4: Sequence diagram

A. CV_REQ_GW:- Client vehicle send request for proper gateway.
B. GW_ACK :- Gateway acknowledgement of proper gateway
C. CV_REQ_DATA
D. ACK_DATA
E. CV_RDY_DATA
F. DATA

VI. CONCLUSION

This paper aims to achieve the accessing of stable internet connection of cloud services from proper gateway discovery mechanism from the vehicular ad hoc network. Out of three discovery approaches, hybrid gateway discovery approach will give the best performance as it reduce the control overhead due to the reactive discovery scheme when there are many source nodes in the VANET and also aims to reduce the overhead of the proactive protocols when the number of gateways increases.

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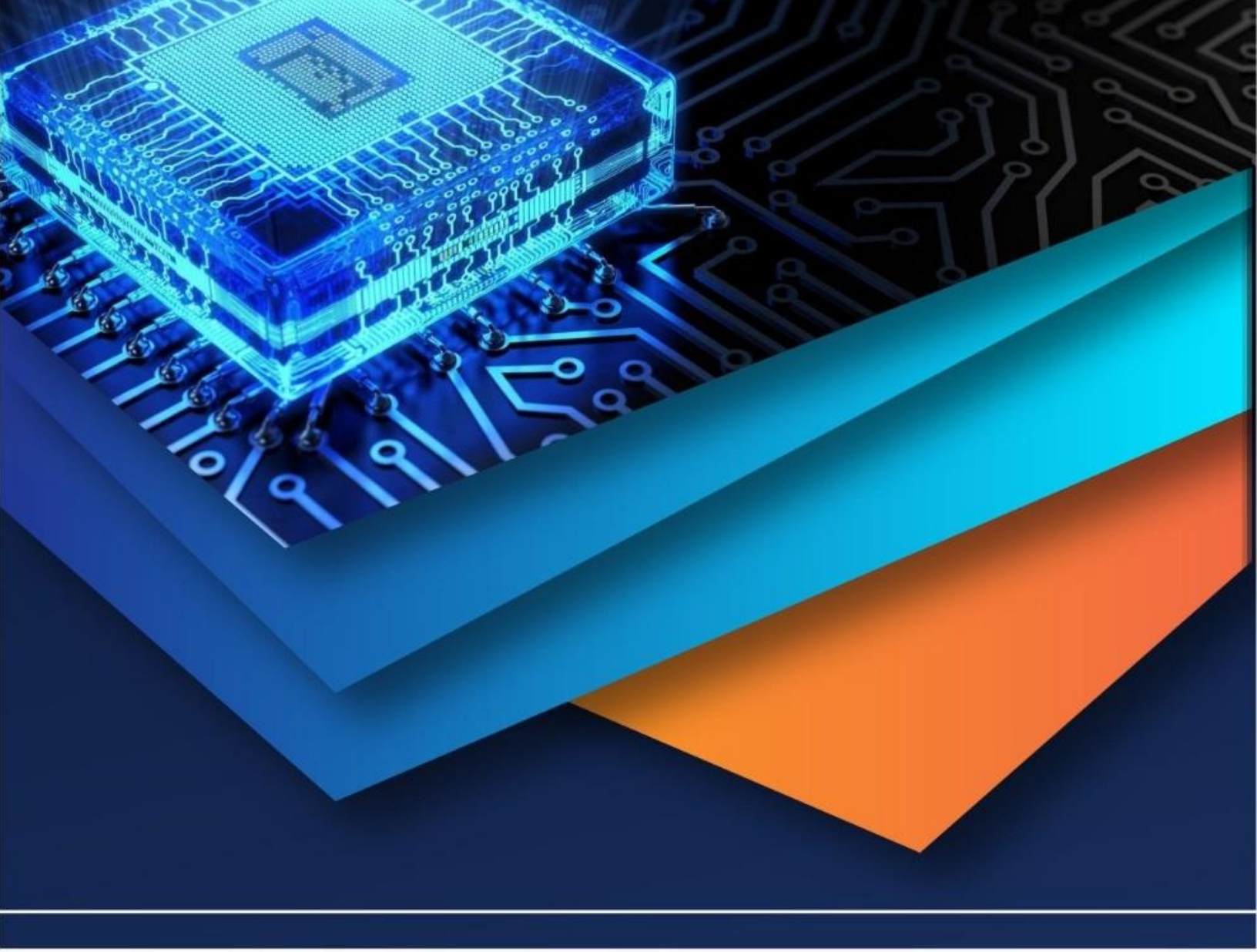

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