A Trusted Model for Information Dissemination in VANET Using Cloud Computing Technology

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Abstract : Vehicular ad-hoc network is a signifying research area, because of its specific features and applications such as efficiency in traffic management, road safety. Vehicles are the extension of mans ambulatory system, in the improvement of advanced technologies in communications, control and embedded systems have changed this model and evolved intelligent transport system (VANET CLOUD). The car or node is deployed with sensor platform, absorbing information from RSU's(Road side units) and other cars, to provide security and authentication and enhanced the safe navigation with pollution control and better traffic management. Vehicle is equipped with internet called cloud vanet(CVANET), here Cloud vanet will have the communication, storage and intelligence to establish "A Trusted model for information dissemination in VANET"

Keywords: Cloud VANET, CVANET, vanet Cloud, Secure vanet, Trusted cloud vanet.

I. INTRODUCTIONS

Vehicular Ad Hoc Networks (VANETs) are created by applying the principles of mobile ad hoc networks (MANETs) - the spontaneous creation of a wireless network for data exchange - to the domain of vehicles. They are a key component of intelligent transportation systems (ITS). VANET is particularly a challenging case of MANET, **[1]** Mobile Ad Hoc Networks is an autonomous collection of mobile users that communicate over relatively bandwidth constrained wireless links.

The development of communication technologies evolves the cloud vanet, it provides the information to the driver (Ex: GPS location, time stamp and road condition, hospitals, police station, entertainment, parking places) from the cloud through road side units (RSU's). Here in this paper we propose a model of cloud VANET architecture that integrate the concept of MANET, VANET and cloud computing technology to establish the authenticated and secure communication on road

A. Vanet and Cloud Computing

Vehicular ad hoc network: are different from other ad hoc networks because VANETs are of their hybrid architecture, dynamic in nature and node movement. Vanet is the integration of ad hoc networks, wirelesses LAN, cellular technology for intelligent transport system –all work together in VANET, address routing is the most important of all. VANET can employ vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications for advanced notification of traffic events. In support of traffic-related communications, short-range communications **[2].**

Features of VANET:

 Highly dynamic topology: The high speed of the vehicles along with the availability of choices of Multiple Paths defines the dynamic topology of VANETs.

Frequent disconnected network: The high speed of the vehicles in one way defines the dynamic topology whereas on other hand necessitates the frequent requirements of the roadside unit lack of which results a frequent disconnections.
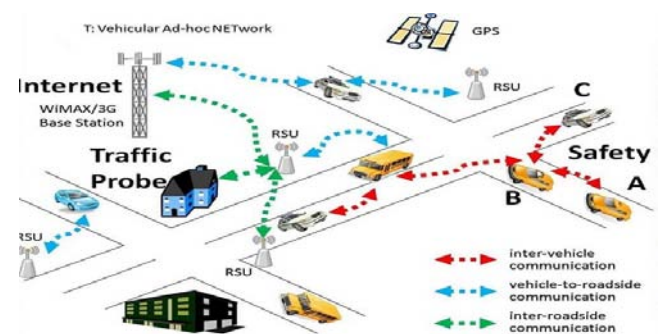

Fig 1: Vehicular Ad-Hoc Networks

Cloud Computing: Cloud computing is the pool of resources , notion of cloud computing started from the realization of the fact that instead of investing in infrastructure, businesses may find it useful to rent the infrastructure and sometimes the needed software to run their applications. One major advantage of cloud computing is its scalable access to computing resources. With cloud computing developers do not need large capital outlays in hardware to deploy their service for internet applications and services. Keeping the noble benefit of cloud computing, the idea of Vehicular Cloud (V-Cloud) comes into focus[3]

Modern cars are equipped permanently connected with internet, featuring substantial on-board unit computational, storage, and sensing capabilities which can be thought as a huge farm of computers while their substantial amount of stay on the road. As on the road most of these facilities remain idle, if we can able to use these computational facilities it will benefits the user(vehicle user).
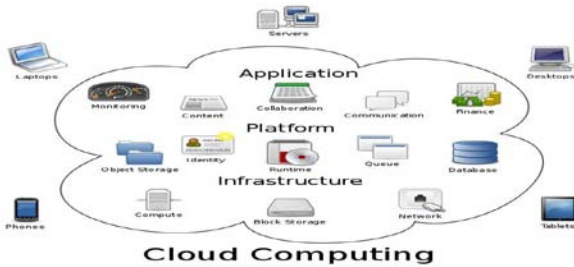
Fig 2: Cloud computing

B. Attributes of trusted vanet using cloud computing:

In vanet the cloud computing can be used as a governance as a service (GaaS), having access to internet and stay connected on road Here it is clear that node is stay connected with VANET cloud(GaaS) with internet as a medium to establish authenticity on road for secure communication[4]. In this paper we mainly are focusing upon the security of the nodes or vehicles and establishment of communication authentic.

1. Developing Authenticity(Ex: Authenticity of the users)
2. Developing secure communication (Ex: missing car or vehicle can be identified or can be traced using trusted cloud vanet)
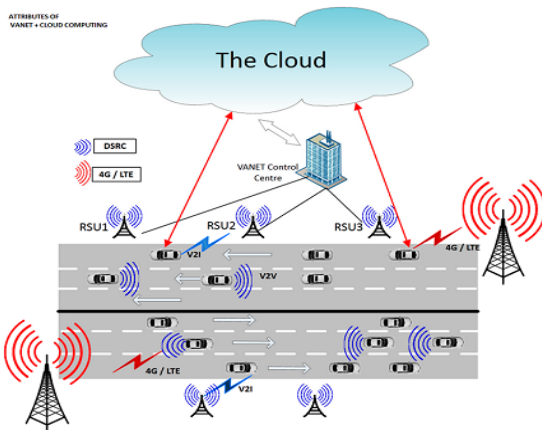3. Tracing a Pollution emitting Vehicles

Fig 3 : VANET + CLOUD COMPUTING = CVANET

II. PROPOSED IDEA FOR INFORMATION DISSEMINATION IN VANET

In this model we propose the concept of Governance as a service on integrating cloud computing technology to VANET, to provide secure authenticated **eService[5]** to nodes or vehicles on the road. In VANET node or vehicle acts as movable nodes [1]. The fixed part of infrastructure are very small in number like base stations, due to multihope routing of ad-hoc networks mobile back bone nodes networks forms multiplier structure network. Mobile nodes routs packets between personal mobile node within the ad-hoc networks and between personal mobile nodes and the internet through a small fixed base stations.

In vanet each vehicle communicates with other vehicle through V2V network in ad-hoc manner, so communication between vehicle to vehicle will be established. The communication between vehicles to vehicle is exchanged via DSRC (Dedicated short range communication) Standards[2]

A.Governance as a service(GaaS):

Governance as a service is a centralized monitoring Authority, that governs entire Cloud Vanet, GaaS is used for only monitoring the nature of the vehicles and tracing the false identity and communication misbehaving and highly pollution emitting vehicles.

- Governance as Services is not used for communication between (V2V) or (V2I)
- Here front car can able to communicate to the rear car regarding maintains of distance, warning messages in case of any violation; it enables traffic control authority to take necessary legal action.The communication between vehicles to vehicle is exchanged via DSRC (Dedicated short range communication) Standards[2]. Each vehicle can communicate with other vehicle using short radio signals DSRC (5.9 GHz) for range can reach 1km.
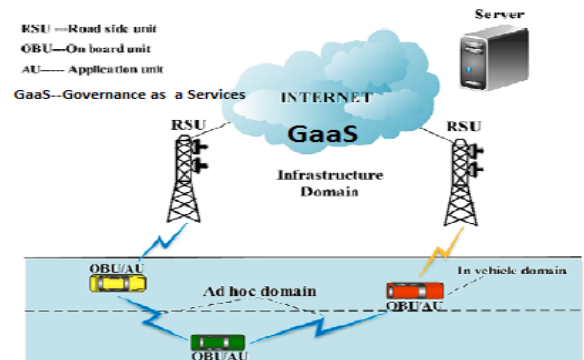

Fig 4: GaaS (Governance as a Service)

III. WORKING OF GAAS(GOVERNANCE AS A SERVICE)

C. Developing Authenticity(Ex: Authenticity of the Vehicle or Node):

Initially node or vehicle are will register in cloud VANET**(GaaS)** with their engines number and car number, **GaaS** will generate private key called **GaaSPK**, this **GaaSPK** is a sensing device ,that installed on the vehicle, For updating location and time stamp, act as a sencing mode to every (RSU) Road side unit. Vehicle or node enters into the range of road side unit (RSU1) , RSU1 will broad cast the concern information located within the range of RSU1, for example: the major information like *speed limit, speed breakers, frequent accident occurring zone, curves, speed limit one School zones, hospitals, parking places, police station etc....* likewise this thing happens in when the Node or Vehicle enters in to "RSU2" range. On broad casting authenticated information from Cloud Vanet through RSU's authenticity is established.

D. Developing secure communication:

- To develop secure communication among the users, User will get registered with **GaaS** with his driving license number his biometric key, to avail the resources of Cloud Vanet in onboard unit(OBU)[5].
- **GaaSPK** and user **biometric key** is used to enable the node or vehicle onboard unit(OBU) to avail the resources of CLOUD VANET, vehicles private key **GaaSPK** acts as its login id and user biometric key as

its password can be used, to avail CLOUD VANET resources on road.

- The vehicle or car is enabled with internet connection on road, if the car comes into the range of RSU1, road side unit '1' will broad cast the information existing with in its the range defiantly..Same scenario will be taken place by rsu2, rsu3.. so user can able to know what is the basic conditions and features of the road in certain range of road side unit.
- If any car or vehicle is missing due to some reason, user will informs to GaaS(Cloud Vanet), GaaS will trace the location of concern RSU of missing vehicle, to block GaasPK(Vehicles private key) until the block remove, vehicle cant able to access the resources of Cloud vanet. But it is mandatory for every vehicle to access CVANET on road[7].
- If any unexpected event taken place in the range of DCRC of location for Ex: in RSU1 any accident happened node "A" broadcast and updates the rsu1(timestamp and location) Accident message within the range[6].
- More over for ad-hoc communication IEEE 1609.2 trial use standard for wireless access in vehicular environment.IP version 6(IPV6) has been proposed for the use of vanet. Each vehicle can communicate with other vehicle using short radio signals DSRC[8] [9](5.9 GHz) for range can reach 1km.

E. Tracing a Pollution emitting Vehicles

- Every node is enabled with internet connection and wireless sensors connected to the nodes or vehicles for measuring fuel usage, GPS information, Road data,CO_2 emission..etc[10]
- All the information automatically updated into the Cloud VANET that monitors and controlled by traffic controlled authority(GaaS),[11][12]
- If any node or Vehicle emitting more co2, and the usage of fuel is more vehicle private key(GaasPK) will be blocked by the traffic controlling authority[13]. The vehicle remains stop until the block is released.

IV .CONCLUSION

In this paper we proposed an idea and there is lots of work needs to be done on this mode by implementing this concept more practically. The security for the node & secure traffic control can be established due to GaaS, managed by Government traffic control authority, they can generate income using this model. The vehicle will be in secure mode it cannot be stolen by any one, if it happens tracing will be in fraction of seconds, and fast moment of nodes will be

traced and action will be taken by concern traffic governing authority, And vehicles emitting more co2 and more pollution causing vehicles are easily traced.Due to incorporation of cloud computing technology the infrastructure cost will be reduced.

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