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# Security and Privacy Preserving with Service Consuming in Vehicular Cloud

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## ABSTRACT

This system enables vehicles in a VANET to search for mobile cloud servers and discover their services and resources. Roadside units (RSUs) act as cloud directories with which mobile cloud server's register. Traffic balancing mechanism are proposed in this CROWN framework to distribute traffic over the road network evenly, namely Bal-Traf.(Balance Traffic) This mechanism eliminates the highly congested road segment scenarios that are caused by the path recommendation protocol. Bal-Traf detects and eliminates the highly congested output road segment at each road intersection. Attacker detection in one of the challenges, to overcome this limitation can use trust based security

***Keywords*:-** VANET, Balance traffic, Attacker Detection

## I. INTRODUCTION

Today, as the numbers of vehicles are increasing which results in more traffic congestion and crashes and thus being one of the major issues in developing countries which are to be effectively addressed by improving the current transportation systems, by considering the necessary needs of reducing the road traffic congestion and improving road safety. At present there are different technologies available for road safety that are been implemented all over the world. For example, in USA like developed countries, they are avoiding the traffic congestion by maintaining a traffic geometry which is achieved by giving the capacity per lane as about 2,200 vehicles per hour and that each vehicle should maintain range of speed up to 100km/hr. The driving security and responsibility can be improved based on warning messages through GPRS or Mobile phone. There are other security measures like fixation of camera in highway for speed control and other security measures available inside the car itself, like seat belt, air bags etc. Even though these methods make road transportation system better, they are not sufficient to improve the road traffic system to a greater extend or it is not satisfactory for the current technological world. Today there are many new and more beneficial technologies coming up like VANET, which is one of the technologies related to Intelligent Transport System .Researches on VANET are on-going. VANET is a network of vehicles, used to exchange information, in which all the vehicles in the networks are interconnected through wireless technologies. According to the range and strength of the technology used, the capacity of vehicle in the network may vary and to achieve the data collection and processing, each vehicle is embedded with some On-board resources, including sensor, computer etc.

There are mainly two types of communication possible in VANET, Vehicle to Vehicle (V2V) and Vehicle to Infrastructure communication (V2I).Each vehicle collects information around the environment using sensors and processes the information using the resources inside the vehicle and exchange the information according to the requirements. Most widely used standard in VANET is Dedicated Short Range communication (DSRC).This standard is developed to support the V2V and V2I communication and pro- vides wide range of application including safety messages, traffic information etc. WAVE is another standard used worldwide which is developed by incorporating the DSRC with IEEE 802.11.The other wireless technologies which can be used in V2V communication include IEEE 802.15.1 (Bluetooth), IEEE 802.15.3 (Ultra-wide Band) and IEEE 802.15.4 (Zigbee), WiFi(802.11), WiMax(802.16)etc. VANET can't stand alone in this advanced technological world, so we need to integrate other technologies inside the VANET. Cloud is one of the advancing technologies. So a new concept called CROWN is introduced. CROWN is actually an integration of VANET and Cloud. RSU, Consumer vehicle and STAR together forms the CROWN system. Here the STAR acts as the Cloud service provider. The interested vehicles can participate as STAR. All the details of the STAR is stored in the RSU directories. Consumer vehicles can make use of the services provides by the STAR vehicles. In existing system we have done Star cloud based VANET services. Here we have done to improve the services we bring star based cloud environment to reduce the service delay .but we didn't consider about the vehicle to vehicle communication and its routing selection. To overcome this routing problem between v2v and also to balance the load due to high traffic. For this we bring this Bal-Traf method. Bal-Traf detects and eliminates the highly congested output road segment at each road intersection. And also attacker detection in one of the challenge in VANET .to overcome from the attackers we propose trust based security in VANET.

## II. RELATED WORKS AND CONTRIBUTIONS

VANET [1] has become an active area of research, standardization, and development because it has tremendous potential to improve vehicle and road safety, traffic efficiency, and convenience as well as comfort to both drivers and passengers. In order to improve traffic safety and provide computational services to road users, a new cloud computing model called VANET-Cloud [2] applied to vehicular ad hoc networks is proposed. CROWN [11] is actually an integration of VANET and Cloud. RSU, Consumer vehicle and STAR together forms the CROWN system. Here the STAR acts as the Cloud service provider. The interested vehicles can participate as STAR. All the details of the STAR is stored in the RSU directories. Consumer vehicles can make use of the services provides by the STAR vehicles

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## III. PROPOSED SYSTEM

1. In existing system we have done Star cloud based VANET services. Here we have done to improve the services we bring star based cloud environment to reduce the service delay .but we didn't consider about the vehicle to vehicle communication and its routing selection.
2. To overcome this routing problem between v2v and also to balance the load due to high traffic. For this the following methods can use.

This Paper propose a balancing traffic (Bal-Traf) mechanism that is intended to eliminate the bottleneck problem caused by the distributed path recommendation protocol, within downtown areas. In Bal-Traf, the estimated traffic density of each output road segment is compared with the saturated traffic density (Sdi) of the road segment in question. Sdi represents the acceptable density of each road that enables all vehicles to proceed smoothly (i.e., the optimal capacity). If the density of the investigated road segment exceeds Sdi, the road should be detected as an overloaded road segment. In this case, the input traffic of the road intersection is initially supposed to use this road segment as a next hop and is equitably redirected to other output road segments. This occurs even if all vehicles are heading toward the same destination. In general, Bal-Traf predicts the overwhelmed output segments and suggests that some vehicles change the next hop road segment in order to alleviate the traffic congestion conditions. Bal Traf is expected to perform well in terms of eliminating the bottleneck problem, when the downtown area is partially congested. However, in scenarios with congestion through most of the road network, there are no road segments with less congested output among which traffic can be distributed. In these scenarios, Bal-Traf decreases the number of overwhelmed road segments occurring over the road network. However, it drastically increases the traffic congestion occurring over the output road segments that remain in overloaded conditions. The traffic characteristics of each road segment are evaluated separately, over the road network. Each vehicle periodically broadcasts the basic traffic data including its speed, location, direction, and the targeted destination. Traveling vehicles on each road segment gather the basic traffic data of surrounding vehicles (i.e., located within the transmission range of the vehicle). The basic traffic data of traveling vehicles at each road segment issued to generate a real-time traffic report for such a road segment. For the scenarios in which the transmission range of traveling vehicles does not cover the entire road segment, the road segment is divided into a set of virtual adjacent clusters, and the traffic characteristics of each cluster are evaluated separately. Communication among traveling vehicles in these clusters helps to cooperatively generate a traffic report that summarizes the traffic characteristics of the entire road segment. Moreover, the traffic characteristics should be evaluated to consider each traffic direction separately.

An RSU is expected at each road intersection over the downtown grid-layout area. In general, each road segment starts from a certain road intersection and ends at the next road intersection. This means that an RSU exists at the starting point of such a road segment, while another RSU is installed at the end point as well. The starting and ending points are assigned based on the direction of traffic over the road segment. For example, in below Figure

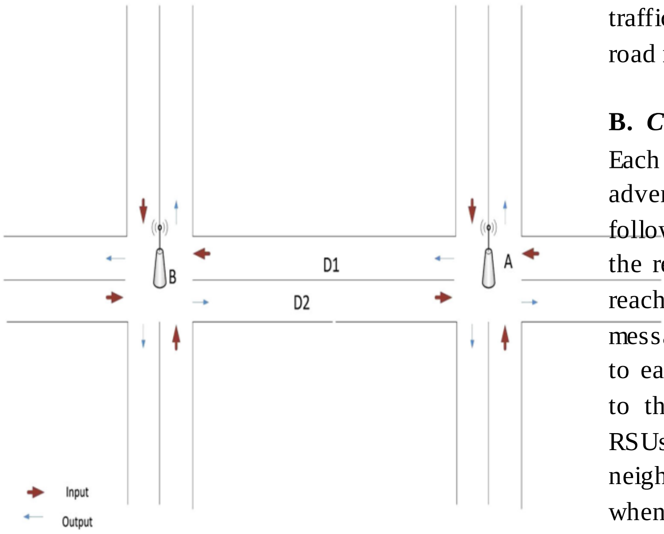

Fig -1: Input and output traffic flows at road intersections.

RSU (A) is located at the starting point of direction (D1), and RSU (B)is located at the end point. However, B is located at the starting point of D2, and A is located at the end point. The RSU at each road intersection is responsible for ranking the output road segments as an option toward each targeted destination (Dk). Ranking output road segments at each road intersection depends on the following: (i) the length of each road segment; (ii) the average speed driven on such a road segment; and (iii) the location of that road segment in respect to Dk. At the same time, these RSUs gather destination reports from traveling vehicles at each input road segment. The destination reports categorize the traffic of the road segment based on the locations of targeted destinations for traveling vehicles. Thus, an appropriately located RSU can predict the best next hop to take toward each destination based on the local gathered information. It then sends a recommendation message to traveling vehicles

**A. *Constructing the best path toward each destination*:**

The distributed path recommendation protocols construct the path toward each destination in a hop-by-hop fashion. At each road intersection, recommendations are made to each traveling vehicle for the most efficient turn option toward their targeted destinations. The path construction process starts at the location of each destination and runs toward each road intersection within the road network. RSUs are installed at road intersections throughout the road network; each RSU gathers information concerning the traffic characteristics of the surrounding road segments among these RSUs then construct the best path toward each targeted destination. This is done while considering the real-time traffic characteristics of each road segment over the entire road network

**B. *Constructing the best path toward each destination***

Each targeted destination (Di) periodically broadcasts an advertisement (ADVi) message, mainly declaring the following: its location, a time stamp for the broadcast message, the required travel time, and the required travel distance to reach Di. The last two fields in ADVi are set to zero when the message is sent by the original destination. The closest RSU to each destination updates and forwards the ADVi message to the neighbouring RSUs over the network. The receiver RSUs should then update and forward these messages to the neighbouring RSUs in only one of the following two cases: (a) when the ADVi message, originating from the destination Di, is received by the RSU in question for the first time (i.e., this RSU has never received any previous messages related to Di); (b) when the received ADVi message recommends a better path to take toward Di, in terms of travel time and/or distance. These ADV messages are updated by adding the required travel time and travel distance of the road segment that connects between the sender RSU and the receiver RSU to the last two fields in the ADVi message. Otherwise, the ADVi message should be dropped instead of being forwarded to the next RSUs and consuming the bandwidth of the communication network. This protocol allows all located RSUs within the investigated area to obtain the best path toward each destination. Communication among RSUs updates the database of each RSU to construct the best path in terms of travel time, distance, or fuel consumption metrics, to mention a few elements. The distributed path recommendation protocol considers more real-time traffic characteristics of located road segments over the road network. This happens by forwarding the updated ADVi messages, which reflect the most accurate data gathered concerning road segments connected at these intersections.

**C.*CROWN Based Balanced Traffic Path Recommendation Mechanism:***

BB_CROWN first evaluates traffic characteristics in terms of traffic speed, traffic density and estimated travel time of each road segment separately. The consideration of three different characteristics enhances the accuracy of the traffic evaluation at any road segment. In the case of inaccurate information derived from investigating any of these characteristics due to voluntarily slow-moving vehicles or inaccurate traffic density evaluations, other characteristics can help estimate the traffic situation accurately. Moreover, when BB_CROWN evaluates these characteristics, it considers the direction of traffic flow in each road segment. It is common to see high traffic congestion in one side of any road segment, while the other side experiences very low traffic density; BB_CROWN is able to detect these scenarios efficiently. The consideration of traffic direction is new in this field of research, and it is essential for accurate path recommendations and for efficient traffic light controlling applications. Finally, when considering location-based cluster mechanisms in our work, it is important to note that the level of accuracy and the efficiency level of the protocol are both enhanced when the configured clusters do not overlap with each other. In order to evaluate traffic in a certain road segment, the basic traffic data of traveling vehicles in such a road segment are considered. Each vehicle gathers the basic traffic data from surrounding vehicles. After that, a location-based cluster mechanism is applied to divide the area of interest (i.e., the road segment) into a set of adjacent, non-overlapping and manageable clusters. Relay vehicles are selected to evaluate the traffic in each cluster locally, and to forward the traffic evaluation report towards the neighbouring clusters. Finally, multi-hop communications among relay vehicles help to expand the traffic evaluation area to cover the entire road segment.

### D *Notations used in the Algorithm*

Store count1- store Count 1 is used to count of vehicles who are saying the location is present. Store Count2- store Count2 is used to count of vehicles who are denying the location is present. RREPRoute, ReplyRREQ-RouteRequest, RSU-Roadside, UnitTATrusted Authority, BS-Base Station.

### *E Computation of secure location using Vehicle Source*

vehicle floods its route request packet discovering the location among the transmission range in the network. Source vehicle gets the reply messages from the different vehicles then vehicle calculates ratio of secure information about location. If source vehicle floods request packet and obtain reply from vehicles, if ratio is better than 50% source can trust on the flood location. If ratio is smaller than or equal to 50%, vehicle will request for suggestions advance in.

### *F. Computation of secure location using RSU and STAR:*

Source vehicle requests to RSU regarding location. It will get information about secure location but if the prerecorded information is not available in RSU about specific location. Then RSU transmits Reply packet to STAR and requests for suggestions. Now TA transmits reply to RSU and then RSU will transmits message to source vehicle.

Algorithm<Secure location selection>

**CASE 1:**

```
Source vehicle floods RREQ
Receive RREQ by vehicles within communication range
Vehicles Reply with RREP
for each (RREP)
{
if (secure_ location= =true )
{
Store count1++;
}
else
{
Store count2++;
}
}
Calculate Ratio (store count1/store count2)
if (Store count1>>Store count2)
{
Path is secure
}
else if (Store count1<<Store count2)
{
Can-not follow the path
If (Store count1 ≤ Store count2)
{
Requests for suggestions about location
}
```

**CASE 2:**

```
Source vehicle request location to RSU
Receives the RREQ packet from source
If (information is present)
{
RSU transmits location information to source vehicle
}
else
{
RSU transmits reply packet to STAR and request for its suggestion it will transmits reply to RSU with the aid of reply packet RSU transmits message to the source node.
}
```

## IV RESULT AND DISCUSSION

In the following figures there are 24 nodes showing a 4 lane topology.4 nodes representing RSU and 3 nodes representing STAR and some of the nodes are broadcasting messages. Actually, it represents the communication between nodes. Last figure shows the energy completion of nodes.

Charts show the performance evaluation of the CROWN system using graph. The first graph shows the speed vs Discovering Delay using CROWN, WITHOUT CROWN (WO-CROWN) and CROWN-Load balancing. From the graph itself it is easy to understand that the delay is low in CROWN. The second graph shows the speed vs number of hits and the third graph shows the speed vs consuming delay. From the graph it is understood that CROWN with load balancing has low conception and discovering delay and has high rate of number of hits.

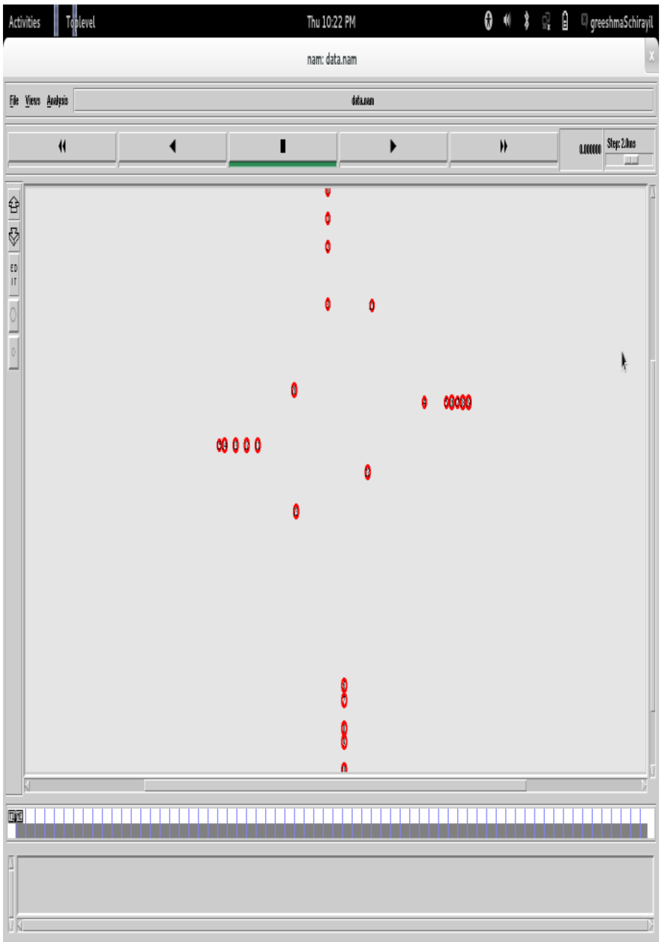


Fig-2: 4 Lane Topology

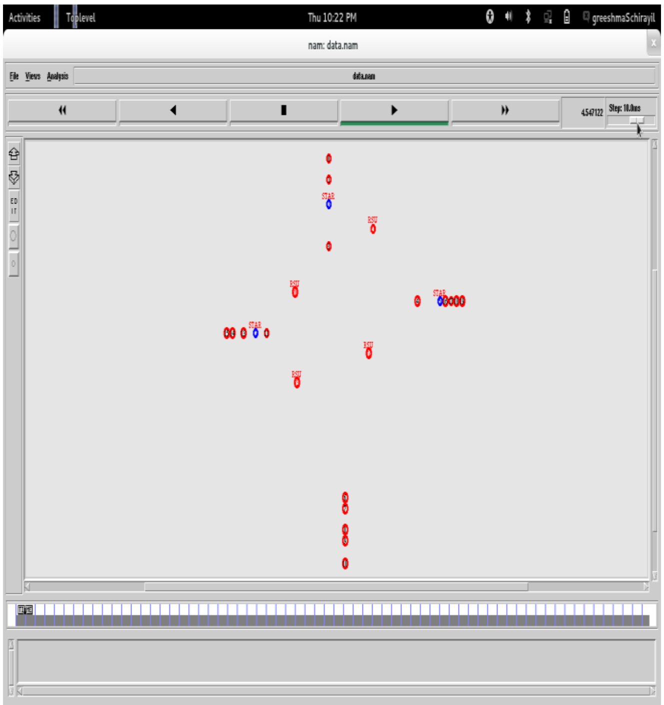


Fig-3: 4 Lane topology contain STAR and RSU

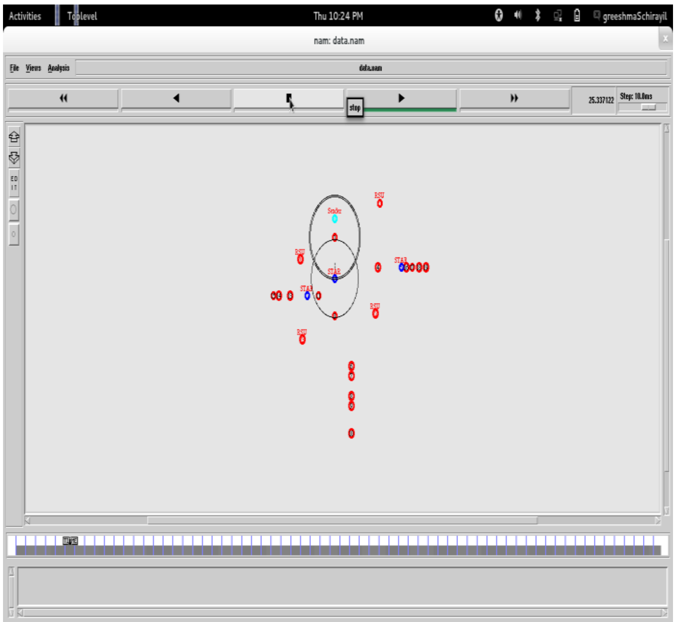


Fig-4: Communication Between RSU and STAR

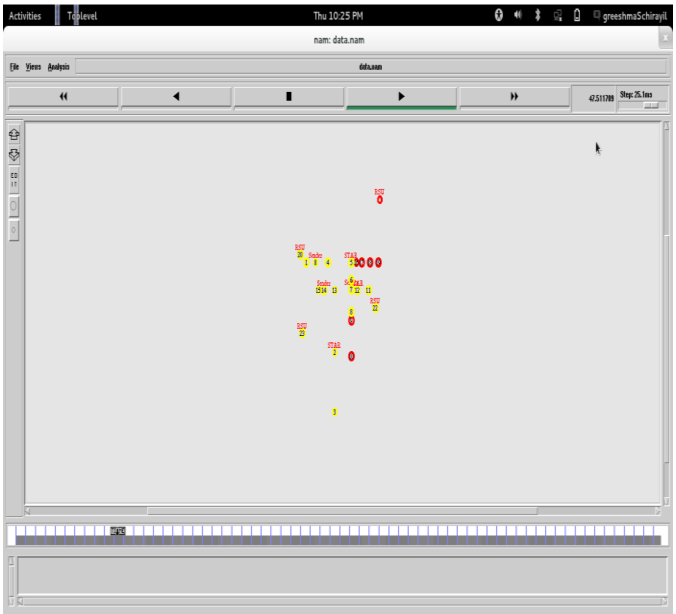

Fig-5: Energy Completed

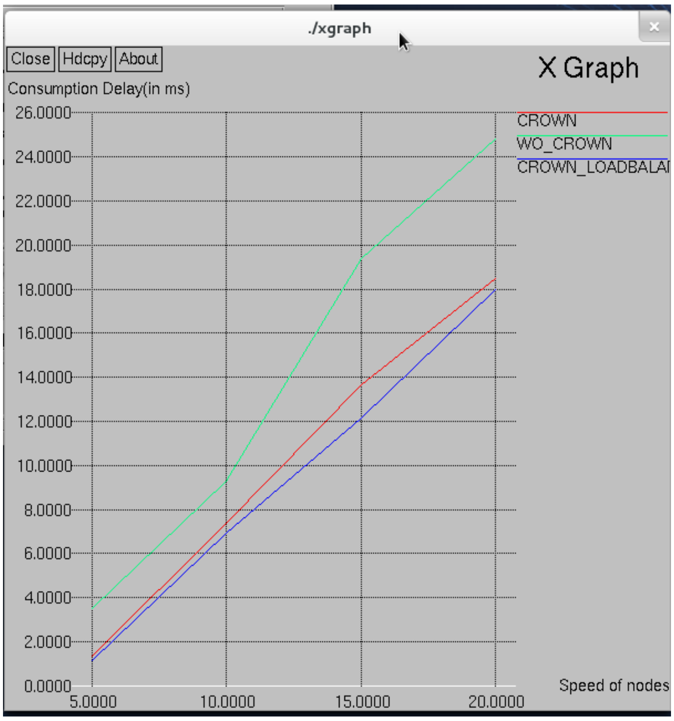


Chart-1: Graph Showing Conception Delay and Speed of Nodes

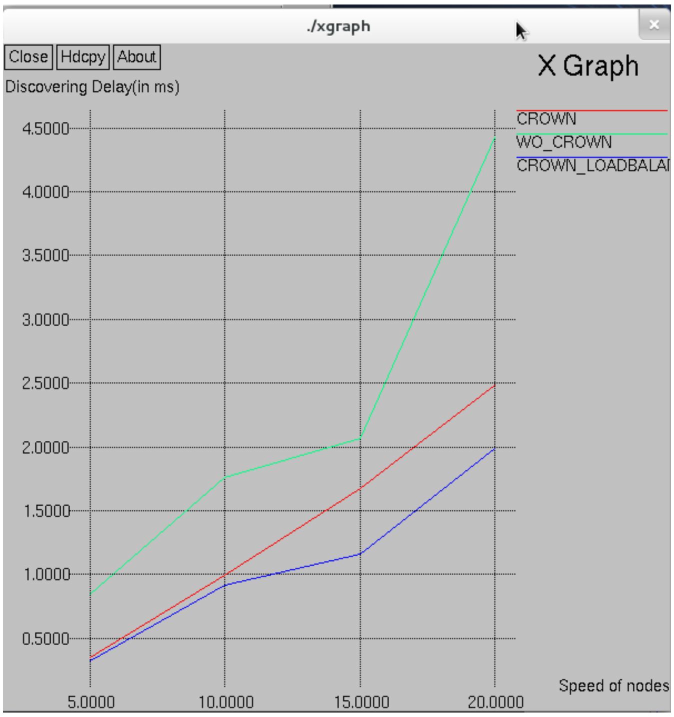


Chart-2: Graph Showing Discovering Delay and Speed of Nodes

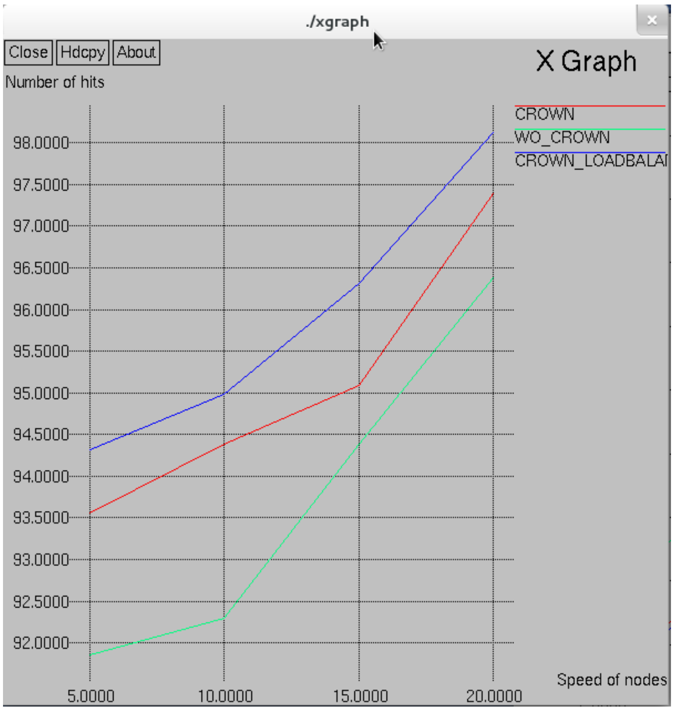


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Chart-3: Graph Showing Number of Hits and Speed of nodes

## V. CONCLUSIONS

Bal-Traf based mechanisms (Bal-Traf and Abs-Bal), for distributed path recommendation protocols in VANETs. These mechanisms are mainly intended to resolve the bottleneck problem and to enhance the smoothness mobility over the road network. The Bal-Traf mechanism detects and eliminates the expected overwhelmed output road segments at each road intersection. Typical path recommendation protocols recommend the best next hop toward each targeted destination with the least required travel time. However, Bal-Traf considers the traffic load of each output road segment; it does so while recommending the next hop for vehicles traveling toward their destinations. Some vehicles need to travel extra time and/or distance to avoid causing traffic congestion over the road network. As we can infer from the experimental results, the overwhelmed output road segments at each road segment decrease when using Bal-Traf. VANET is a type of hybrid network in which sensor and mobile both nodes included so that possibility of attacks is increases and degrades the performance of network as above discussion. Simulation results we conclude that our proposed methodology gives better result as compare to existing work in from of throughput end to end delay and packet delivery ratio.

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