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Seamless Internet Access on Highly Dynamic Adhoc Network

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ABSTRACT: In wireless communication, the connections will be either unstable or dynamic. Hence the connections will be easily disturbed by the interrupts like noise. Now-a-days mobile networks provide the internet connections with expensive cost. Cellular networks suffer from offloading and overloading problem due to the explosive growth of mobile users in moving vehicles. WIFI technology is used to provide the efficient internet connectivity for the moving vehicles. WIFI technology has some advantages compared with the cellular networks, such as, low cost and high peak throughput. To avoid the offloading problem and delays in the internet access over moving vehicles, the access point diversity technique is used. For example multiple access points can be fixed in the road side. When the client can enters that environment, it can communicate with the group of access point through the uplink. Each access point may have different ranges. So, when the client is moving from one access point to another access point, the delays may be occurred due to the handoff technique. Hence the virtual access point is created in order to avoid the delays. Virtual access point is the one, in which all the access points are configured with the same MAC and IP address. If the transmission is succeed access point send the information to the client through the multicast communication. Then the access points dynamically follow the client and deliver the packets.

KEYWORDS: acknowledgement, detection, internet access, vehicle, WiFi.

I. INTRODUCTION

Cellular networks provide the internet access with the expensive cost. An increasing number of passengers prefer accessing the internet using their mobile phone and tablet computers while travelling such as browsing the web, playing the games, watching the video programs. Cellular networks are suffering from the overloading problem due to the explosive growth of subscribers. Mobile voice communication is established throughout world and had a very rapid increase in the number of users to the various cellular networks. an extension of this technology is the ability to transmit and receive the data across the cellular network. Diversity: In telecommunications a diversity schemes refers to a method for improving the reliability of message signal by using two or more channels. In the time diversity is used to transmit the same signal at different time. Access point: access point is a radio transmitter or receiver .That is most widely used to bridge wireless and wired network. Access point only provides an interface or portal for wireless clients to connect existing system. Switch: In networks a device that filters and towards packet between LAN segments. Switches operate at the data link layer and network layer of the OSI reference model. Uplink communication: ground to satellite communication. The information is transferred from ground station to satellite. Downlink communication: satellite to ground communication.

Unicast: communication between senders to receiver. Multicast contains set of senders and set of receivers. In group unicast all the access points contain s the same MAC and IP addresses. In the existing system is using the handoff technique to transfer the data. It has the two types one is hard handoff another one is soft handoff. Hard handoff use the break before make technique and soft handoff use the make before break. Wi-Fi (Wireless fidelity) is a wireless networking. It uses the radio waves for transmitting and receiving the purposes. Wi-Fi provides wireless connectivity by emitting frequencies between 2.4 GHz to 5GHz based on the amount of data on the network. It covers the 100 feet for communication. First channel condition in a vehicular environment is usually harsh owing to severe multipath fading, interference and noise, which results in high packet loss rate. Second, since a client moves at a

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vehicular speed, it is extremely difficult for it to be always associated with the most appropriate access point. Third due to the limited coverage of each single access point, a client suffers from frequent connection disruptions caused by handoffs and re- associations. In the vehicular environment packet loss is severe, so the diversity and opportunistic transmission are designed to enhance transmission reliability. The ACK detection function is designed to eliminate the adverse effect of multiple APs. Down link communication have the two stage packet delivery, to dramatically increase the portability of successful transmissions.

II. RELATED WORK

The mobile access router provides the efficient data performance for wireless data users .MAR is a wireless multi homed device. This device is used for the high speed data access in a car. This mobile access router is fixed in the moving vehicles like a bus or train. it is a cellular based solution, cost is very expensive [1]. Wi-fi connectivity is used to reduced the pressure on 3G spectrum when possible for transferring the data. Wi-fi loss rates are higher than the 3G loss rates and Wi-Fi throughput is lower than the 3G throughput. Then design a system called wiffler, to augments mobile 3G capacity. wiffler device is used to predict the wifi connectivity [2]. Omni voice is an 802.11 compliant solution that supports mobility for VoIP traffic without any modifications of the client. Non VoIP background traffic contains the handoff delays and inferences then the Omni voice is used to reduce the inferences and delays in the traffic [3].

The dynamic optimal random access algorithm (DORA) provides the internet connectivity to the mobile users. Vehicles getting the temporary internet access from the road side access points. VANET enable the data exchange between the vehicles and the road side access points. Then it supports the vehicle to vehicle communications. Unreliable and unstable connections are unavoidable [4]. The Drive-thru scenario is based on mobility of the hosts sporadically attach to network on the road. The usability of the system is providing the network connectivity and internet access to the mobile users in vehicles. It contains the poor intermittent connectivity [5]. The measurements are calculated from VANLAN to understand connectivity between moving vehicles and base stations. The data rate of 802.11a is 54 mbps. The intermittent period occur when the vehicle entering and leaving from the network. Because of the speed, loss rates and distance from the base stations the ‘gray periods’ are hard to predict [6].

Wi-Fi provides the cheap connectivity to the common applications like VoIP and web browsing. In the vehicular communications the user can communicate with the base station at a time, during this time many disturbances are occurred. If the client can communicate with multiple base stations simultaneously lot of interferences occur. To avoid this kind of situations the vifi protocol is used. Delays are occurred due to transferring of data from the base stations and improper maintenance in the connections [7]. 802.11 wireless access points are used to delivering the data from one vehicle to another vehicle through the cabernet system. To improve the performance of the data delivering, two new components are introduced. They are quick wifi and CTP (cabernet transport protocol) protocols. The capacity of cabernet is much higher than the cellular network. It suffers from high packet loss and low throughput. Delays are occurred [9]. Mob torrent contains the Meta data, Meta data reconciliation and the replication level. Scheduling algorithm is used in a framework for mobile internet access from vehicles. It has limited coverage range [8]. The internet from open wireless bas station is now commonly possible in urban and rural areas. Vehicular network can opportunistically connect to the internet for several seconds via open access points. The interactive process of web search is provided by the thedu system. Thedu has mobile nodes use an internet proxy to collect search engine results and pre-fetch result pages [11].

III. PROPOSED SYSTEM

Proposed system supports efficient Wi-Fi based internet access from moving vehicles. Here access point diversity technique is used. The group of access point can communicate with client. These access points contain the same MAC and IP address. The group of access points can communicate with client is called AP diversity. Then the transmission is succeed, if the access point can delivered the data to the client is called opportunistic transmission. This access point diversity is used to reduce the packet loss. In AP diversity a client gets graceful illusion that only one (virtual) AP exists, and will always be with this “virtual” AP. uplink communications, when the client transmits a packet to the virtual AP ,then it contain multiple APs within its transmission range are able to receive the same packet. The transmission is successful as long as at least one access point receives the packet correctly. After the uplink communications AP sends the ACK to the client. For this transmission the group unicast method is used. To avoid the

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possible collisions the ACK detection mechanism is used. For downlink communication the group multicast method is used And the advantages of proposed system is

- The link reliability is enhanced and packet loss is reduced. An ACK detection function is used to improve the efficiency of the channel utilization. The ACK based rate control mechanism is used to improve the efficiency of the channel utilization.
- The handoff delays are eliminated. The packet delivery in downlink communications is used to increase the portability of successful transmissions.
- AP diversity to overcome the issue of unreliable links and unstable connections.
- By configuring all the APs with the same setting, both layer-2 and layer-3 handoffs of the mobile client are eliminated, and seamless roaming within the coverage of the entire network is achieved.

IV. SYSTEM ARCHITECTURE

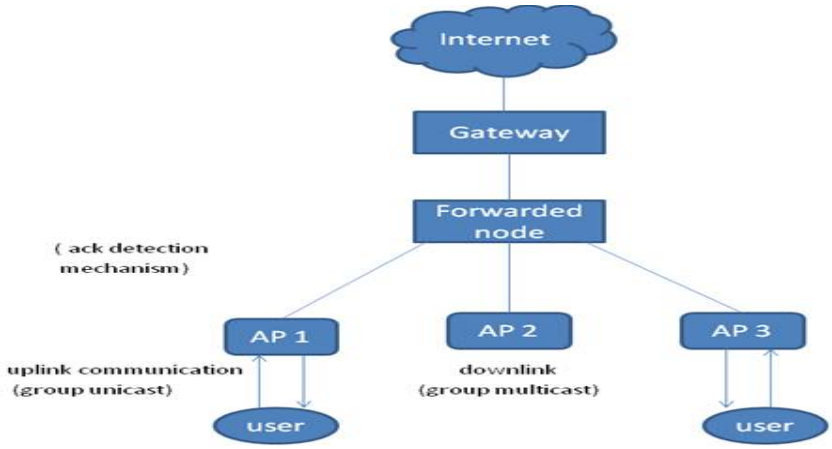

Fig. 1. System architecture

In this work, the road is completely covered by the open Wi-Fi access point (APs) and coverage of each AP may overlap with others. Each access point is equipped with two interfaces; one is for client access based Wi-Fi while other uses wired or wireless medium to form a backhaul. The user entering into the environment, it gets the new Mac and IP addresses. First user sends the request to the access point. Then the access points are receiving the requests and send the information to the gateway through the forwarded node. Finally reply will send through the nearby access points.

A. INITIALIZE VIRTUAL ACCESS POINT

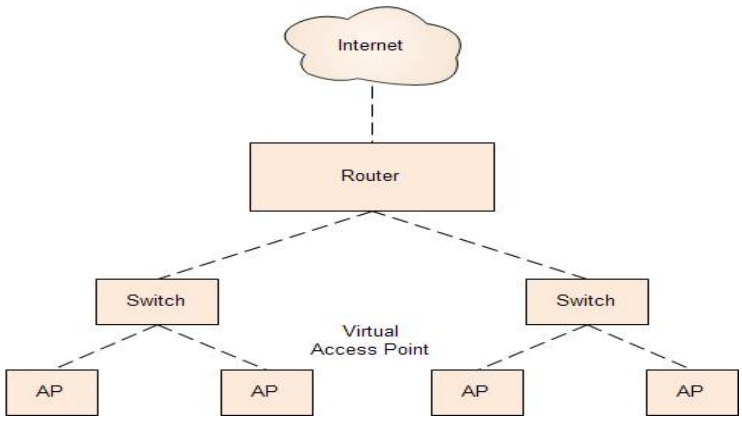

Fig. 2. Initialize Virtual Access Point

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In this network first configuring all the APs with the same IP and MAC addresses with such a configuration, a client gets only one ("virtual") AP, and will always be associated with this "virtual" AP. AP diversity is known as the group of APs can communicate with the client for send and receive the data. The handoffs are eliminated in this network MAC layer and IP layer handoff are eliminated in the identical access points. Due to the handoff disruptions can occur in the connections that are avoided. When APs have established routing paths to the gateway, the backhaul is organized into a tree topology with the gateway and APs as leaves.

B. CLIENT JOINING

The access points or base stations are fixed in the road side. When the client entering into the network, it intends to join associated with virtual AP. Then this AP gives the IP address to the client through the DHCP (dynamic host control protocol) protocol. DHCP protocol automatically provides the IP address to the clients. This information is related to the subnet and gateway. It is a standardized network protocol used on internet protocol (IP) networks for dynamically distributing network configuration parameters, such as IP address for interfaces and services. With DHCP computers request IP addresses and networking parameters automatically from a DHCP server, reducing the need for a network administrator or a user to configure these settings manually.

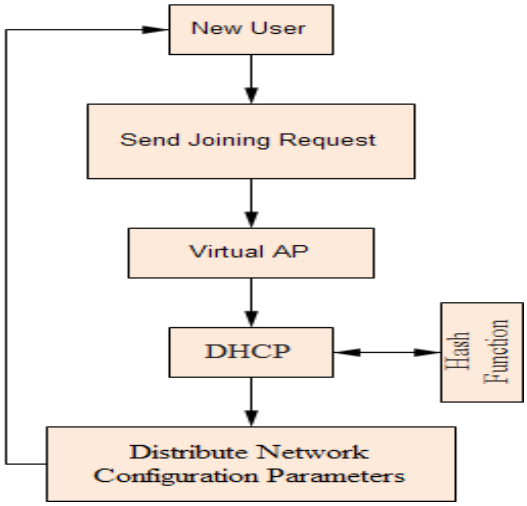

Fig. 3. Client Joining

C. UPLINK COMMUNICATION

In the uplink communication, when the client transmits a packet to the virtual AP, actually multiple APs within its transmission range are able to receive it. These problems overcome following ways a) ACK detection scheme b) transmission redundancy.

1. ACK detection scheme

If multiple APS receive a packet, each of them will transmit an ACK after a period of short inter-frame space (SIFS). These multiple copies of ACKs may collide at the client. Hence, a new scheme is designed to handle such collisions. In the new scheme, the ACK decoding is enhanced with ACK detection. In this scheme the strength of one signal is considerably higher than the strength of the other one. Under the condition, the weak signal is dropped by the filter of receiver, and only the strong signal is retained to be decoded.

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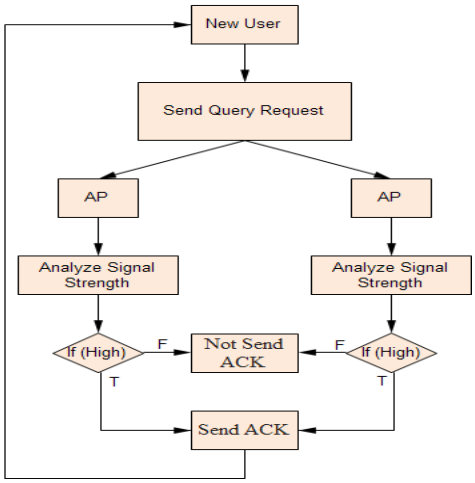

Fig. 4. ACK Detection Scheme

2. Transmission Redundancy

A packet can be received by multiple APs. If all copies of the same packet are forwarded to the gateway, extra overhead is introduced to the backhaul. In order to minimize TRR, a redundancy removal mechanism is used. It simply drops the duplicated packet, if an intermediate node in the backhaul network receives a packet. To determine whether a packet has been delivered before, the packets are checked to identify the packet. It can be identified by a 5 tuple of <source _IP, source _port, destination _IP, destination _port, transmission sequence _number>. In a LAN backhaul, the APs are interconnected by cables, switches and hubs. When a node transmits a packet to upper-layer node, other nodes in the same subnet can overhear the packet. These nodes are able to directly avoid redundant transmissions AP. Two APs may forward the same packet to an upper-layer node. Such redundancy has to be eliminated at the upper-layer node.

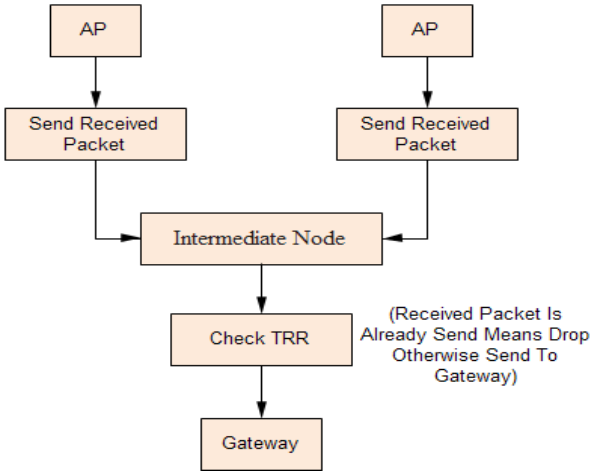

Fig. 5. Transmission Redundancy

D. DOWNLINK COMMUNICATION

The downlink communication process is divided into two stages. In the first stage, packets are delivered to a group of APs through multicast. This AP multicast group is maintained dynamically to follow the moving user. In the second

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stage, the client sends downlink packet requests (DPRs) to fetch its packets buffered in the AP group and DPR have to benefits. One is APs to locate the moving user, even if the user has no uplink packets to transmit. Second, it probes the channel quality. Due to the strong correlation of wireless links, if an AP receives a DPR from a user and transmits a packet to the client, it is with high probability that the packet can be received by the client. This two-stage significantly reduces unnecessary transmissions when channel condition is poor, and dramatically improves the downlink transmission efficiency.

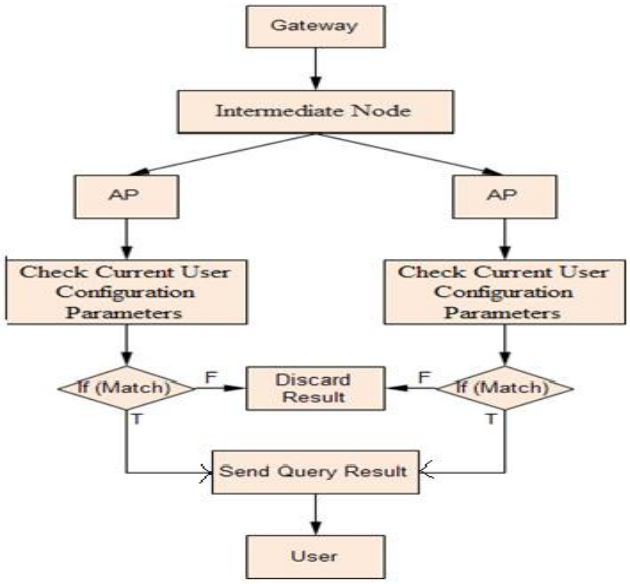

Fig. 6. Downlink Communication

V. CONCLUSION

Nowadays WIFI hotspots are deployed widely and densely in many cities and the trend continues. Compared with cellular networks, WIFI has obvious advantages: lower cost and higher peak throughput. Thus, WIFI is considered as a suitable solution for cellular traffic offloading. However, it is still challenging to provide WIFI -based Internet access for users in moving vehicles. The above problem can be solved by our proposed access point diversity concept. It supports efficient WIFI-based Internet access for moving vehicles. The roaming of clients was gracefully achieved, while channel utilization efficiency was improved. It has high performance compared to existing system.

VI. FUTURE ENHANCEMENT

In order to avoid the collisions by reducing the duplicate requests from the client, bloom filter algorithm will be used. This algorithm is using the indexing method. This method is save all the requests from the client and the duplication can be avoided. Hence, by using this type of algorithm, the delays can be considered to be reduced.

REFERENCES

[1]. I. Banerjee, R. Chakravorty, J. Chesterfield, I.Pratt and P.Rodriguez "Mar: A commuter router infrastructure for the mobile internet," in Proc. ACM2nd Int. Conf.Mobile Syst., Appl Services, pp. 217–230,2004,.
[2]. N. Ahmed, S. Keshav, and K. Papagiannaki, "Omnivoice: A mobile voice solution for small – scale enterprises," in proc.12th ACM Int . symp.mobile adhoc netw.comput., pp. 1-11,2011.
[3]. M. cheung. F. Hou, V.Wong, and J. Huang, "Dora: Dynamic optimal random access for vehicle-to-roadside communications," IEEE J. Sel. Areas Commun.,vol. 30,no.4, pp.792-803,May 2012.
[4]. D. Kutscher, and Ott, "Drive thru internet:IEEE 802.11b for 'automobile'users," in proc. IEEE INFOCOM,2004,pp. 362-373.
[5]. R. Mahajan, J. Zahorjan, and B. Zill, "Understanding wifi-based connectivity from moving vehicles," in proc.7 th ACM SIGCOMM conf. Internet Meas. pp.321-326, 2007.

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[6]. A. Balasubramanian, B. Levine, R. Mahajan, V. Venkataramani, and J. Zahorjan , "Interactive wifi connectivity for moving vehicles ," in proc .ACM SIGCOMM, pp. 427-438 ,2008.
[7]. B. Chen and M. Chan," Mobtorrent: A framework for mobile internet access from moving vehicles," in *proc*. IEEE INFOCOMM, pp. 1404-1412, 2009.
[8]. H. Balakrishnan, J. Erikssion, and S. Madden, "Caberenet: Vehicular content delivery using wifi," in proc. ACM 14th ACM Int. Conf. Mobile Comput.Netw.,pp. 199-210, 2008.
[9]. H. Balakrishnan, V. Bychkovsky, B. Hull, A. Miu and S. Madden, " A measurement study of vehicular internet access using in situ wifi networks," in proc. ACM 12th Annu. Int. Conf. Mobile Comput. Netw. pp. 50-61, 2006.
[10]. A. Balasubramanian, W. Croft, B. Levine, And A. Venkataramani, Y. Zhou, "Web search from a bus," in poc. ACM 2nd ACM Workshop Challenged Netw., pp. 59-66, 2007.
[11]. K. Tan, H. Wu, Y .Zhang, and Q. Zhang, "Proactive scan: fast handoff with smart triggers for 802.11 wireless lan," in proc. IEEE INFOCOMM, pp. 749-757, 2007.
[12]. Y. Amir, C. Danilov, M. Hilsdale, R. Musloiu-Elefteri, and Rivera, "Fast handoff for seamless wireless mesh networks," in Proc. ACM 4th Int. Conf. Mobile Syst., Appl. Services, pp. 83–95, 2006.
[13]. Pin Lv, Xudong Wang, Xiuhui Xue(MAY 2015), and Ming Xu, "SWIMMING: Seamless and Efficient WiFi-Based Internet Access from Moving Vehicles", IEEE Transactions On Mobile Computing, Vol. 14, NO.5, 2015.