ACCESS POINT DIVERSITY-BASED INTERNET ACCESS ON A HIGHLY DYNAMIC AD HOC NETWORK

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ABSTRACT

At present the internet connection is provided by cellular networks, but at comparatively higher costs. Besides, the amount of data from internet-enabled devices has proven to be insufficient. As there is a growth in the number of people using mobile data, the end users are facing severe drawback in quality performance. A group of access points (AP) is allotted to a client, and the transfer succeeds if the AP completes the delivery with the client. By configuring all APs with the same MAC addresses, IP addresses and opportunistic transmission are tracked to overcome the high packet loss ratio. This creates an illusion to a client that only one (virtual) AP exists and will always be connected with this (virtual) AP, when the end user transmits a packet to the virtual AP. During the transmission if anyone of the APs receives the packet, it is said to be successful.

Keywords : Access point, cellular networks, MAC and IP addresses, virtual, Packet.

I. INTRODUCTION

In Mobile technology, the computer or any other wireless devices is not connected directly to a fixed physical link to transmit the data, voices and videos.

The focus is on the key technical issues related to architectures, algorithm or analysis and protocol design support services. They are telecom communication systems, telecom environments, applications, components and more for mobile computing. Nowadays the mobile communication has becomes very popular and is an essential one for business people and the current generation. The use of mobile communication has spread throughout the world. In recent years the users of various cellular devices have increased rapidly. This technology provides connectivity to send and receive data across these cellular networks. The data can be transmitted through a satellite to remote locations by installing a receiver and transmitter to act as a medium.

User mobility :

User mobility can be defined as the user's ability to communicate "anytime, anywhere, with anyone". For example, the user can access his email at any location on web browsers. The user's access to the same telecommunication services at different places is defined as user mobility.

Device portability :

Device portability can be defined as the way various devices are connected anytime, anywhere to the network. The communication devices move with the help of device portability. During the movement of

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device, the communication is possible with the help of different mechanisms in the device and network.

Wi-Fi

Wi-Fi is a wireless connectivity, which enables data transfer on the network based on the connection; the frequency is between 2.4 GHz to 5 GHz. Hotspots can be defined as an area, which is enabled with Wi-Fi connectivity. For finding out and requesting of hotspot availability, one of the software wirelesses is selected.

Almost all over the world, the wireless network has spread recently. Wi-Fi (Wireless Fidelity) is a wireless connection, also named 802.11 networking, because it wraps the network IEEE 802.11. The higher advantage of Wi-Fi, for most of the devices, is that even new printers can easily get connected.

II REVIEW OF RELATED WORKS

In the world the numbers of passengers are increasing day by day, and the preferred mini devices like smart phones and tablets make them connected to a network according to the location. The cost will differ according to the networks selected. Due to an improvement in networking the amount of data provided is not sufficient for users. With a rapid increase in the number of user ids the cellular networks are distressed about the data overload, which may affect the quality of service. When the channel condition is poor the two strategies improve the downlinks and reduce unnecessary transmissions.

DRAWBACKS

▸ Cellular networks are generally expensive even though they provide wireless internet connection.

▸ Unreliable links and unstable connections issues are unavoidable.

▸ Insufficient when dealing with large amounts of data from mobile internet devices.

III SYSTEM OVERVIEW

It is an efficient and advanced Network based Internet access. In swimming APs are used to communicate with clients and transmission is completed only if one of APs is connected and exchanges data with the client. Diversity in APs and opportunistic transmission are used to reduce the high packet loss ratio, which is done by assigning all APs with the same MAC and IP address to make it look one AP exists. When a client sends a packet to the virtual AP, all the APs receive it.

The transmission is completed when one of the APs receives the packet. When a packet is received by an AP, the latter sends back an acknowledgement frame, using group Unicast mode. Unlike broadcast or promiscuous mode, ACK-based rate control mechanisms can be uniformly used for the group Unicast mode, which increases the effectiveness and reliability of the channel usage to avoid confrontation with other APs.
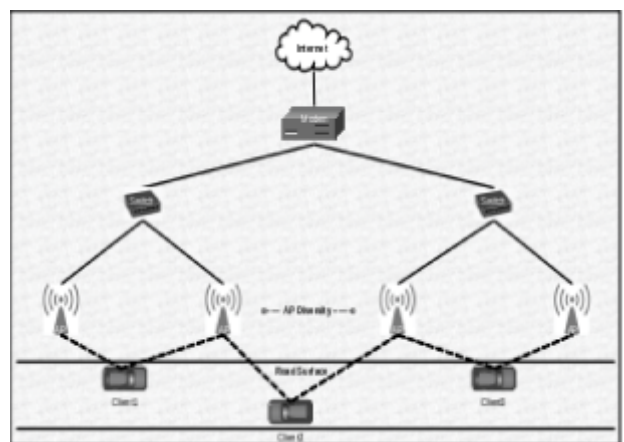
System Architecture Design

➤ A special ACK detection function is developed to avoid any chance of collisions from many APs. The main purpose being to enhance ACK decoding. At the user's side the packet is delivered in two steps. In the first step the packets are delivered using Multicast mode rather than Unicast mode. The client mobility is tracked using Multicast APs. In the second step the end user sends a timely message to APs to retrieve the packet stored in AP. This two-step technique maintains standard P-to-P downlink communications for the users during mobility.

➤ By discovering the AP diversity and opportunistic transmission, the link reliability is improved to a great extent and an end to end packet loss ratio is significantly reduced. The implementation of ACK detection function avoids the effects of multiple ACKs. The implemented function helps to increase the channel utilization to a great extent.

Initialize Virtual AP

A client predicts that only one "virtual" AP exists, when all the APs with the same MAC and IP addresses are changed. When APs have found a routing path to the gateway, the return trip is systematized into a tree topology with the gateway as the root and APs as leaves. A group of APs engaged in communicating with a client is called AP Diversity. The extermination of both IP layer and MAC layer hand off is one of the identical changes of all APs and has an advantage. The network connection will not be interrupted even if there is an AP crashes because there is no breaking of the connection made by the hand off and re-associations are prevented. When all APs work on the same wireless channel, it is known as potential requirement of AP diversity.

Client Joining

When the client needs to join the network, it is joined with this virtual AP, and sends a request on IP address through DHCP (Dynamic Host Configuration Protocol). The DHCP server running at individual AP relies upon the same hash function to compute a unique IP address for the client based on its MAC address. The DHCP is a client or server side protocol that automatically gives an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway. The DHCP is a standard network protocol used on Internet Protocol (IP) networks for dynamically transmitting network configuration parameters, such as IP addresses for interfaces and services. Using DHCP, computers request IP addresses and networking parameters automatically from a DHCP server, minimizing the need for a network administrator or a user to change these settings manually.

Uplink Communication

In a transmission range, multiple APs are able to receive a packet to a virtual AP transmitted by the client. These problems are overcome with the following ways 1) ACK Detection Scheme and 2) Transmission Redundancy.

a) ACK Detection Scheme

Multiple Access Points will transmit an ACK when it receives a packet after a short inter frame space. Copies of ACK may collide at client side, to avoid those collisions a new strategy is designed with ACK. Due to

this condition ,the strength of the signal may vary, the weak signal is dropped by using the filter and the strong signal is decoded.

b) Transmission Redundancy

The multiple APs receive a packet to backhaul and an extra overhead is introduced. To reduce TRR removal mechanism is used because same copies of the packet are forwarded to the gateway. If a packet is received by a backhaul network that is forwarded, it drops the duplicated packet; if a packet was delivered before, it is checked by a few fields of the packets:5-tuples <source_IP, source_port, destination_IP, destination_port, and transmission sequence_number>. The APs are interconnected by cables, hubs and switches in the LAN backhaul. The packet can be overheard by the nodes in the same subset. When it is transmitted to the upper layer node redundant transmissions are easily avoided by these nodes. A backhaul transmission may not be overheard by one AP for another AP in WMN backhaul. So, the upper layer node receives same packet from two APs and eliminates that redundancy.

Downlink Communication

It has two phases, in the first phase through multicast packets are delivered to a group of APs for a client. The moving client is followed by the dynamically maintained AP multicast group. In the second phase AP group receives a downlink packet requests to fetch packet by the clients. DPR has two merits, first the quality of channel is probed, second there is no uplink packets to transmit by the client it locate the moving client with Access Points. The connections of wireless links are strong. So, a client sends a DPR to the AP and receives a packet immediately. The client can receive a packet with high probability.

CONCLUSION

Hotspots are being used in many cities because of their minimum cost and maximum usage. Now, it is a challenge to provide Wi-Fi based internet to moving vehicles. By keeping the Wi-Fi based internet, the usage efficiency would be improved. The internet instantly gratifies peoples demand for connectivity. It reaches, wherever the users are, at both personal and official space, mainly during travel. In automobile industry it is the need of the hour. Though all vehicles are not manufactured with Wi-Fi it is easy for the users to have connectivity and access the internet for their regular use.

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