Chapter one

Introduction

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1.1 Background:

Wireless networks are in full development because of the flexibility of their interfaces, which allow users to be easily connected to the Internet. Among various technologies of wireless networks, Institute of Electrical and Electronics Engineers (IEEE) 802.11/Wireless Internet for Frequent Interface (Wi-Fi) technology is becoming better known and more used to construct high speed wireless networks in areas with high concentration of users, such as airports, campuses or industrial sites. The passion for wireless networks and in particular for Wi-Fi networks has given rise to new uses of the Internet, such as moving in wireless networks while still being connected[1].

In Wi-Fi networks, the user's movement may sometimes lead to a change of Access Points (APs) to the network. This fact is generally named the handover of layer 2 because this change involves only the first two layers of the Open System Inter connection (OSI) model. If the two APs are located in different networks, the change of AP would entail a change of network for the user. This situation is generally termed, the handover of layer 3 because the user should change his network and his Internet Protocol (IP) address to maintain connection to the Internet. Therefore, this change intervenes on the network layer of the OSI model [2].

The process of the handover of layer 2 is handled by the IEEE 802.11 standard and that of layer 3 is controlled by the Mobile IP (MIP)

protocol. The MIP protocol is a protocol standardized by Internet Engineering Task Force (IETF), which allows users to change network, while maintaining their actual connection to the Internet. Consequently, users can connect to the Internet, while keep moving in Wi-Fi networks in control of the IEEE 802.11 standard and the MIP protocol. However, the delay induced by these procedures of handover is too long. As such, this generally leads to the cut-off of current communications, hence impacting adversely on the qualitative requirements of real-time applications, such as video conferencing or Voice over IP (VoIP) [3].

In the next mobile generation the IP traffic is widely used. There for the mobility is required without changing the IP address and this had been presented by the MIP.

1.2 Problem Statement:

In 5^{th} mobile generation all the traffics are IP there for when the mobile node (MN) travels from one AP into another, it takes amount of time to handover to the next available AP, in the meantime this delay causes dropping phase which means: packets lost, freezing network and hence reducing the Quality of Service (QoS).

1.3 Proposed Solution:

To solve the problem of the network dropping while user (MN) is moving through different APs we propose a mechanism based on Internet Protocol version 6 (IPv6) protocol defined as Global Mobile IPv6(GMIPv6), this mechanism consistence of giving the MN a global IP address and focusing on finding another AR.

1.4 Aims and Objectives:

The main aim is to reduce the delay time that occurs when the handover process is running.

This project seeks to:

- Prevent the packets from being lost (low packet loss).
- Low latency.
- Enhancing the Quality of Service (QoS).

All that could be served by using a new technique called: Global IP in mobile IP version 6(GMIPv6).

1.5 Methodology:

The GMIPv6 performance estimation has been evaluated in terms of the total handover latency and of the packet loss with an analytical model. This model allows us to compare GMIPv6 handover with the standard handover of the MIPv6 protocol.

When each MN use a constant MIPV6 we have no need to search about another IP in the other network we just focus about finding a free channel to path through it. When we focus about finding just a channel we reduce searching time from the case of searching about an IP and free channel. In this case there is no need to detection address duplication (DAD), Binding update and Binding acknowledgment time when the MN move through the networks.

Each router doesn't need a new IP configuration in order to adapt for MN movements without the DAD, Binding update and Binding acknowledgment phase during a handover.

To support these, OPNET simulator is used to simulate the handover procedures in networks as defined by the GMIPv6 method and by the MIPv6 protocol. The results obtained show that we can guarantee an acceptable delay.

1.6 Thesis Outlines:

This thesis consists of five chapters described as follow:

Chapter two: presents the related work and the literature review of handover and MIPV6.

Chapter three: presents the methodology and the evaluation of the Global IP in mobile IPV6.

Chapter four: Provides the Results and Discussions.

Chapter five: presents the conclusion and recommendation for future work.