Research Issues in Wireless

Communications and Networking

Farhat Anwar
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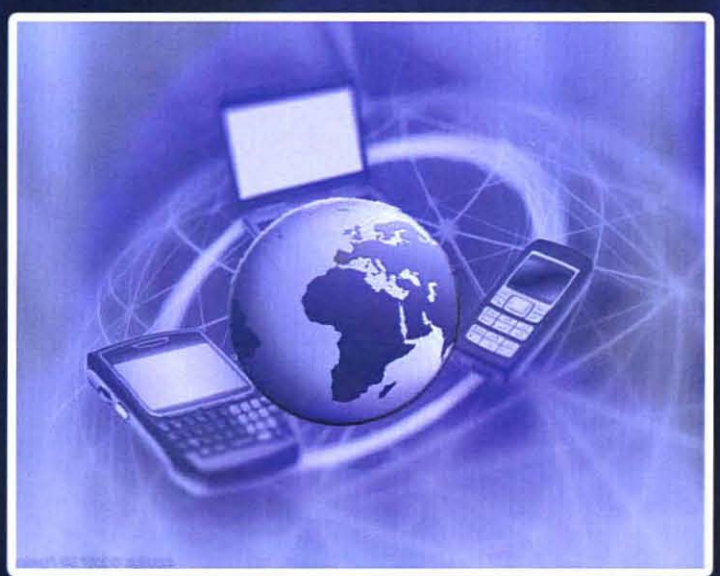

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CHAPTER 15

ANALYSIS OF HANDOFF LATENCY FACTORS FOR MIPV6 NETWORK

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15.1 INTRODUCTION

The next generation networks (NGN) will be fully Internet Protocol (IP) based to connect different technologies to the Internet for ubiquitous communications. Therefore, IP version 6 (IPv6) [1] was designed as a core network for future communications. IPv6 network has many facilities over existing IPv4 including more address spaces, better Quality of Services (QoS), enhanced security, stateless auto-configuration mechanism and so on. The mobility in IPv6 (MIPv6) [2] is one of the attractive features of IPv6 networks that was proposed in 2004 by Internet Engineering Task Force (IETF). In IPv6 network, a Mobile Node (MN) is registered to network called Home Agent (HA) and moves to other networks if it wishes. There are different network technologies for example, IEEE 802.11a/b/g or Wireless Fidelity (WiFi), IEEE 802.16 or World Interoperability for Microwave Access (WiMAX), General Packet Radio Service (GPRS), Universal Mobile Telecommunication System (UMTS) are converging their infrastructure with the core network of IPv6. The users are not concerned about different types of technologies whereas they demand seamless connectivity once they are moving. When the MN is moving from one Access Point (AP) to another AP is known as handoff. The time required to perform this handoff is referred handoff latency. There are two types of handoff latency on MIPv6 network, horizontal and vertical. If the MN moves within the same technological AP coverage area is known as horizontal handoff latency for example, WiFi to WiFi or WiMAX to WiMAX. On the other hand, if the MN moves from one technological AP to another technological AP referred as vertical handoff latency such as WiFi to WiMAX or UMTS to WiFi. The horizontal handoff is quite simple and does not take long time to be processed. However, vertical handoff is a complicated process and takes longer time to communicate seamlessly. Seamless communication is important for network-enabled applications to operate continuously at the desired quality of service in a wired or wireless IP network, especially for real time applications such as audio and video streaming. MIPv6 is not yet deployed for some limitations and researchers are working on this issue to enhance the performance of it. Several enhancements have been proffered to improve the shortcomings of MIPv6 some of will be addressed in this chapter.

15.2 OVERVIEW OF MOBILE IPV6 (MIPV6)

MIPv6 has been designed and developed to support global mobility management [2]. In MIPv6 networks, the MN has to be configured an IP address that is divided into two parts, network prefixes those changes for every movement of the MN and a host prefixes that is MAC address and it is fixed. For the first time the MN has to be registered to a network called Home Agent (HA) and the address is being used to be registered is known as Home Address (HoA) that indicates the permanent address of that MN. When an MN moves to a Foreign Network (FN) it will create a temporary Care of Address (CoA) by the combination of address prefix from visited router and the MAC address of the MN. Prior to be registered with the HA and Corresponding Node (CN), the MN has to perform Duplicate Address Detection (DAD) on the network to check the uniqueness on that network. This address