

# Advances in Mobility Management for IP Networks

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**Editors:**

**Aisha Hassan Abdalla Hashim**

**Othman Khalifa**

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# NS2 SIMULATION ENVIRONMENT IN M-HMIPV6

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## 17.1 INTRODUCTION

NS Simulator is an object oriented simulator. It is based on C++ language, and OTcl language. OTcl is an object oriented extension of Tcl (Tool Command Language) interpreter, is used to execute user's command scripts. NS is like a network library, consists of many protocol objects. It also has the ability of defining a particular network topology, the specific protocols and can be redesign for a desired network topology. NS2 wireless model was a Monarch University (MU) group's mobility extension. The wireless model includes the mobile nodes, routing mechanisms and network components that are used to construct the network stack for a mobile node [1].

## 17.2 NS2 SIMULATION

NS2 major components are Channel, Network-interface, radio propagation, MAC protocols, Interface Queue, Link layer and Address Resolution Protocol (ARP). In this chapter the developed Hierarchical Mobile Ipv6 (HMIPv6) [2] model is used to simulate the multicast network.

The mobility features includes node movement, periodic position updates and maintaining topology boundary. The network components like classifiers, demultiplexer, Link Layer, Mac, and Channel are implemented in OTcl. The topology configures for a mobile node with all the given values of routing protocol [1].

The traffic in NS2 can be used to generate Constant Bit Rate (CBR) and Transmission Control Protocol (TCP) traffic. In chapter the simulation traffic used is CBR. The CBR connections are created instead of TCP connections because TCP offers a conforming load to the network. This means that it changes the times at which it sends packets based on its perception of the networks ability to carry packets. As a result, both the time at which each data packet is originated by its sender and the position of the node when sending the packet would differ between the protocols, preventing a direct comparison between them [1].

The HMIPv6 codes are extended under NS-2 to support Multicast HMIPv6 (M-HMIPv6) [3], Context Transfer Protocol (CXTP) [4], and Multicast Listener Discovery (MLD) [5]. The code is also extended to evaluate the parameter chosen. The topology of the simulation was created using 10 nodes which consist of a Home Agent (HA), a Corresponding Node (CN), four Access Routers (RA), two Multicast Mobile Anchor Points (M-MAP), and an internet node and a Mobile Node (MN). The topology can be referred to Fig. 17.1.