

QoS AND MOBILE TECHNOLOGIES

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CHAPTER 9

NESTED MOBILE NETWORKS

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9.1 INTRODUCTION

Mobile IP aims to maintain Internet connectivity while a host is moving. Similarly, a group of nodes in a single moving entity (i.e., a car) may also need to be connected to the Internet. Extending from MIPv6 [1], Internet Engineering Task Force (IETF) proposed Network mobility (NEMO) basic support protocol [2] to support network mobility management of an entire network that is viewed as a single unit, which changes its point of attachment to the Internet. In addition, such a network should ensure communication continuity for nodes in the mobile network [3].

9.2 OVERVIEW OF NEMO

A mobile network (as shown in Fig. 9.1) includes one or more mobile routers (MRs) that provides access to the Internet. Basically, an MR has two interfaces; for egress and ingress. An MR can access the Internet through the egress interface and detect movements (by listening for router advertisement messages) and registers its location (by sending binding update messages) using the egress interface. The MR also provides accessibility to its own mobile network nodes (MNNs), which are attached to its ingress interface that has its own network prefix [4].

There are two types of MNNs: local fixed nodes (LFNs) and visiting mobile nodes (VMNs). An LFN belongs to the subnet of an MR and is unable to change its point of attachment, while a VMN is temporarily attached to the MR's subnet by obtaining its CoA and it is independent of the NEMO basic support protocol and only uses the Mobile IPv6 protocol [2].

If the current Mobile IP protocol is used for the mobile network, a packet from a CN to the MR is successfully delivered but a packet destined for an MNN behind the MR is dropped at the HA of the MR, since the HA has no information about the MNN, only about the MR. To extend Mobile IP to support network mobility, the HA should have binding information about the mobile network prefix of the MR's ingress interface [4].

Moreover, the MR performs the binding update (BU) to the home agent (HA) without additional registration such that NEMO can reduce the signaling overhead. When an MR is in its home network, it is connected directly to its HA, so that all traffic to and