Chapter 8

Network Mobility Management in the ITS Context:
Protocols for Managing Vehicle-to-Infrastructure Communications

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ABSTRACT

This chapter presents the most significant approaches developed so far for addressing vehicle-to-infrastructure communications by means of NEtwork MObility (NEMO) management, including the most outstanding solution (NEMO Basic Support, NEMO BS), and highlights their most interesting features. The demanded key features to the NEMO protocols to be applied in the ITS context are also defined, and an analysis of the fulfillment of these key features by the NEMO protocols is provided.

The proposals suggested so far can be classified in two different categories: on the one hand, NEMO solutions that consider MIPv6 as the base host mobility management protocol, and on the other hand, solutions that consider alternative base host mobility management protocols like SIP, LIN6, or HIP. Besides, a taxonomy on MIPv6 based NEMO protocols classifying them by considering which characteristics they aim to enhance is provided. It is important to point out that the selection of the base host mobility management protocol is fundamental to have as many demanded key features satisfied as possible by the NEMO protocol to be applied in the Intelligent Transportation System (ITS) context.

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INTRODUCTION

The provision of internet services while traveling is a flourishing market that should be covered by means of emerging mobile computing and communication techniques. This scenario presents specific challenges that current communication architectures do not cover. Indeed, Intelligent Transportation System (ITS) standardization bodies are currently defining a dedicated communication architecture that satisfies the scenario necessities and the increasing demands.

ITS communication standards are being designed to support multiple classes of applications including those that assist in vehicle operation and internet-based applications (European Telecommunications Standardization Institute [ETSI], 2010). In fact, internet-based applications are considered to be beneficial for safety, and fundamental for non-safety purposes (Baldessari, Festag, & Lenardi, 2007b). Furthermore, the ITS communication architecture should not only focus on the vehicle communication needs, but also in the demands of users onboard. On the other hand, it is assumed that an ITS-compliant vehicle is a moving network, where a set of nodes should obtain anytime-anywhere connectivity to the internet through one or more Mobile Routers (MR). Figure 1 shows the network mobility scenario.

Figure 1. Network mobility management scenario