Chapter LVI
Mobility within Rich Multimedia Services

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ABSTRACT

Advances in technology have enabled a proliferation of mobile devices and a broad spectrum of novel and outbreaking solutions for new applications and services. Presently more and more people and companies are demanding mobile access to multimedia services such as real-time rich media. Today, it is necessary to be able to predict adaptation behavior that concerns and addresses not only the mobile usage or the infrastructure availability, but also the service quality, especially the continuity of service. Our chapter provides insight to new challenges of mobile multimedia services and applications: wifi indoor positioning system adapted to heterogeneous building, static and learning mobility prediction, predictive handover policy for multimedia cache management, mobile multimedia guide (e.g., museums), and network scalability.

INTRODUCTION

The rapid deployment and growth of multimedia applications are increasing with the appearance of new mobile services and new usages. Nowadays, by taking advantage of the arrival of large bandwidth of wireless networks, it is becoming more feasible to stream numerous rich media flows toward mobile and terminal devices. However, some bottlenecks subsist when addressing it: first, the heterogeneity of Wifi-covered territories; and second, the intrinsic rich media constraints. We compare mobility first to a continuous move within a geographical space, and second to a discrete space on a logical scale of the diffusion's network (from access point to access point).

This chapter deals with applications handling large size and continuous rich media communication (i.e., audio or video media). Continuous media require the installation of a specific infrastructure of diffusion guaranteeing the delivery periods. We are interested in mobiles implemented within a space provided with multiple access points, with a more or less homogeneous space cover. In such context, it is important that the infrastructure react rapidly or use preventive measures during the changes of access point.

In this chapter, we do not consider the dynamic flow adaptation, but rather already optimized flows dedicated to mobile devices. Thus, whatever the device nature is (e.g., PDA, tablet PC, etc.), we assume there is a suitable flow adapted to each target. The reader interested in flow adaptation may refer to Bourgeois, Mory, and Spies (2003).

To illustrate our purpose, we use GuiNuMo, a mobile numerical guide. Such guide demonstrates the accuracy and pertinence of retrieving and making use of both the visual or audio information and the localization of the pervasive device during the time-visit of scenarized museums. Within this framework, the media are suited to fit the specific device.

In the sequel, we first present the techniques of localization of the devices connected by hertzian way. We further investigate the trilateration technique and evaluate the efficiency of various methods according to several conditions of implementation.

In order to set up a preventive treatment of mobility, we show that it is necessary to deter-

Figure 1. Synthetic schema of GUINUMO's platform