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Chapter XII

Extensible Platform for Location-Based Services Deployment and Provisioning

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Abstract

Location-based services can be considered the most rapidly expanding field of the mobile communications sector. The proliferation of mobile-wireless Internet, the constantly increasing use of handheld, mobile devices and position-tracking technologies, and the emergence of mobile computing prepared the grounds for the introduction of this new type of services with an impressively large application domain and use range. The combination of position-fixing mechanisms with location-dependent, geographical information can offer truly customised, personal communication services through the mobile phone or other type of devices. In this chapter, motivated by the technology advances in the aforementioned areas, we present a generic platform for

delivering Location-based services (LBSs) to the nomadic user. The platform features a modular architecture, which can be easily extended. Although the overall architecture of the platform is discussed, the focus is on the technical specifications, the design, the functionality, and the prototype implementation of its central component, the kernel. The kernel is responsible for coordinating communication with the various pluggable components in order to provide the full range of operations involved in the LBS delivery chain (i.e., from initial deployment to invocation, execution, and delivery of results).

Introduction

During the early '90s, the introduction of the Internet signaled the beginning of a new era in the sectors of telecommunications and networking. The idea of a whole world interconnected in a global network accessible at anytime by anyone (La Porta, Sabnani, & Gitlin, 1996) had such allurement that it gave a tremendous boost to the Internet right from the beginning of its existence.

Nowadays, over 10 years after this landmark point, things are once more changing in warping speed. A new concept, that of "wireless Internet" has emerged and constantly gains significant support. The rapid evolution of wireless and mobile telephony during the last decade has played a significant role in the evolution of the Internet towards its wireless or even mobile form. However, wireless Internet is still in its infancy, and many issues remain to be addressed in order to form a competitive solution in the area of telecommunications and a strong complement to the wireline infrastructure.

One of the most crucial points in the adoption of every new technology is what it has to offer to its potential users. Practically, people will not be interested in the technology itself, no matter how advanced it may be, but will care for the new services introduced by the technology, as this is what they actually use and pay for. Location-based services (LBSs) is an example of new-generation services that can be developed and offered within this wireless Internet framework along with the traditional Internet services that will also be ported to the wireless domain. An important aspect for providing new services is to develop means and tools that will assist both their creation and provisioning but other aspects as well, such as management and billing.

This chapter presents a new middleware and service-provisioning platform which facilitates location-based-services provisioning toward the public with minimum effort from the involved actors (e.g., service provider, mobile operator, etc.) and with no impact to the standardized wireless Internet framework. Moreover, the platform adopts an open architecture so that it can accommodate future technologies as well as be integrated in telecommunication infrastructures yet to come.

The rest of the chapter is structured as follows. First, we provide a brief overview of research and achievements in technologies strongly coupled with the concept of LBS provisioning. The next section presents a detailed description of the PoLoS architecture. The functionality of the various software components comprising the platform is extensively discussed. Subsequently, we introduce the service specification language