Chapter 2.11
Mobile Commerce Security and Payment Methods

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ABSTRACT

Without secure commercial information exchange and safe electronic financial transactions over mobile networks, neither service providers nor potential customers will trust mobile commerce. Various mobile security procedures and payment methods have been proposed and applied to mobile commerce, and this chapter attempts to provide a comprehensive overview of them. A secure mobile commerce system must have the following properties: (i) confidentiality, (ii) authentication, (iii) integrity, (iv) authorization, (v) availability, and (vi) non-repudiation. This chapter discusses the security issues related to the following three network paradigms: (i) wireless local area networks, (ii) wireless wide area networks, and (iii) WAP. Among the many themes of mobile commerce security, mobile payment methods are probably the most important. A typical mobile payment process includes: (i) registration, (ii) payment submission, (iii) authentication and authorization by a content provider, and (iv) confirmation. This chapter also describes a set of standards for mobile payments.

INTRODUCTION

With the introduction of the World Wide Web, electronic commerce has revolutionized traditional commerce and boosted sales and exchanges of merchandise and information. Recently, the emergence of wireless and mobile networks has made possible the extension of electronic commerce to a new application and research area: mobile commerce, which is defined as the exchange or buying and selling of commodities, services, or information on the Internet through the use of mobile handheld devices. In just a few years, mobile commerce has emerged from nowhere to become the hottest new trend in busi-

Figure 1. Forecast of demand for mobile handheld computing devices (not including smart cellular phones)
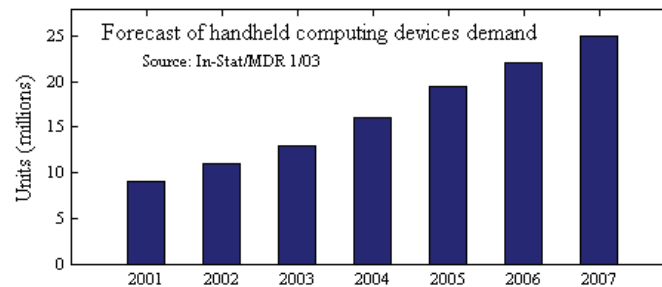
ness transactions. Despite a weak economy, the future of mobile commerce is bright according to the latest predictions:

- Figure 1 shows the growth in demand for handheld computing devices (not including smart cellular phones) through 2007, as predicted by the research firm In-Stat/MDR (PalmInfocenter.com, 2003).
- It is estimated that 50 million wireless phone users in the United States will use their handheld devices to authorize payment for premium content and physical goods at some point during the year 2006. This represents 17% of the projected total population and 26% of all wireless users (Reuters, 2001).
- Mobile commerce is an effective and convenient way of delivering electronic commerce to consumers from anywhere and at any time. Realizing the advantages to be gained from mobile commerce, companies have begun to offer mobile commerce options for their customers in addition to the electronic commerce they already provide (The Yankee Group, 2002).

Regardless of the bright future of mobile commerce, its prosperity and popularity will be brought to a higher level only if information can be securely and safely exchanged among end systems (mobile users and content providers). Applying the security and payment technologies for electronic commerce to mobile commerce has been proven to be a futile effort because electronic commerce and mobile commerce are based on different infrastructures (wired vs. wireless). A wide variety of security procedures and payment methods, therefore, have been developed and applied to mobile commerce. These technologies are extremely diverse and complicated and a comprehensive discussion on them is still absent. This chapter attempts to provide a comprehensive overview of mobile commerce security and payment methods. It is organized into four sections. The first section introduces the fundamentals of mobile commerce security and payment methods. Mobile commerce security and payment methods are detailed in the second and third sections, respectively. The last section summarizes the discussions in this chapter.

Security and Payment Methods

Foremost, the theme of this chapter, mobile commerce security, is defined as the technological and managerial procedures applied to mobile commerce to provide the following properties of mobile commerce information and systems:

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