Chapter XXVIII
Systems, Handheld Devices, and Payment Methods for Mobile Commerce

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ABSTRACT

The emergence of wireless and mobile networks has made possible the introduction of electronic commerce to a new application and research subject: mobile commerce. Understanding or constructing a mobile commerce system is an arduous task because the system involves a wide variety of disciplines and technologies. This chapter tries to relieve this problem by giving careful studies of three themes of mobile commerce: (1) mobile commerce systems and transactions of which a system includes six components: (a) mobile commerce applications, (b) mobile handheld devices, (c) mobile middleware, (d) wireless networks, (e) wired networks, and (f) host computers; (2) mobile handheld devices, which are the communication devices between mobile applications and users and also include six major components: (a) a mobile operating system, (b) a mobile central processor unit, (c) a microbrowser, (d) input/output devices, (e) a memory, and (f) batteries; and (3) mobile payment methods, which include macro- and micro- payment methods. Other important issues, such as mobile commerce transactions and mobile security properties, are also discussed.

INTRODUCTION

The introduction of the World Wide Web 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

Figure 1. A mobile commerce system structure

An MC System Structure   **A Typical Implemention**
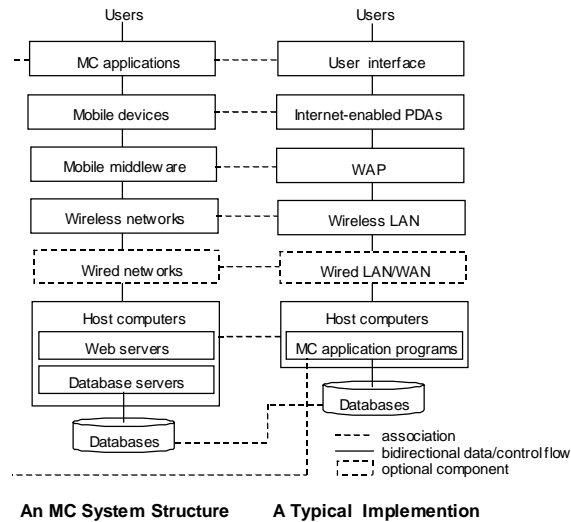
application and research area: mobile commerce. This technology allows the exchange or buying and selling of commodities, services, or information on the Internet through the use of mobile handheld devices. In just a few years, mobile commerce has become the most demanding trend in business transactions. Despite a weak economy, the future of mobile commerce is bright according to the latest predictions (Reuters, 2001). However, it requires a tremendous effort to understand mobile commerce and construct a mobile commerce application, because mobile commerce involves such a wide range of disciplines and technologies. To explain the problem, this chapter carefully studies three major subjects of mobile commerce:

1. **Mobile Commerce Systems:** Various system structures for mobile commerce have been proposed. A typical mobile commerce system generally consists of six components: (1) mobile commerce applications, (2) mobile handheld devices, (3) mobile middleware, (4) wireless net-

works, (5) wired networks, and (6) host computers.
2. **Internet-Enabled Mobile Handheld Devices:** Handheld devices provide the equipment mobile users need to interact with mobile commerce applications. A mobile handheld device includes six major components: (1) a mobile operating system, (2) a mobile central processor unit, (3) a micro browser, (4) input/output devices, (5) a memory, and (6) batteries.
3. **Mobile Payment Methods:** Mobile commerce security is defined as the technological and managerial procedures applied to mobile commerce to provide security properties. Among the many issues that arise with mobile commerce security, mobile payment methods, including macro-payments and micro-payments, are probably the most important.

BACKGROUND

This section provides the necessary background information of the three themes of this chapter: mobile commerce systems, Internet-enabled mobile handheld devices, and mobile commerce payment methods.

Mobile Commerce Systems

A mobile commerce system is inherently interdisciplinary and could be implemented in various ways. Figure 1 shows the structure of a mobile commerce system and a typical example of such a system (Hu, Lee, & Yeh, 2003). The system structure includes six components:

1. mobile commerce applications,
2. Internet mobile handheld devices,
3. mobile middleware,
4. wireless networks,

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