

## Chapter 2.12

# Multi-Party Micro-Payment for Mobile Commerce

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### ABSTRACT

This chapter introduces a new micro-payment scheme that is able to apply to multi-party for mobile commerce, which allows a mobile user to pay every party involved in providing services. The micro-payment, which refers to low-value financial transactions ranging from several cents to a few dollars, is an important technique in m-commerce. Our scheme is based on the hash function and without any additional communication and expensive public key cryptography in order to achieve good efficiency and low transaction costs. In the scheme, the mobile user releases an ongoing stream of low-valued micro-payment tokens into the network in exchange for the requested services. The scheme that is put forward satisfies the requirements for security, anonymity, efficiency and lightweight.

### INTRODUCTION

The remarkable development of the Internet has brought with it the need to perform commercial transactions over the network, thereby enabling electronic commerce (e-commerce). A key requirement of e-commerce transactions is the technique to allow payment to be made for any purchased item. When such a payment is effected electronically, by exchanging monetary value across a computer network, it becomes an electronic payment. Many electronic payment schemes have been proposed, and a lot of them assume the use of nowadays well-established credit card business environment. The most well-agreed and dominant electronic payment protocol is the SET (Secure Electronic Transaction) protocol (MasterCard & Visa, 1997), produced by Visa and MasterCard to be their standard for processing credit card transactions over networks like the Internet. However, electronic payment research has been largely concerned with the problem of

making payment to a single vendor across the Internet. Some of them are completely unsuitable for frequent multi-party payment systems.

Recently, mobile communication is one of the fastest growing sectors of the IT industry and the emergence of wireless and mobile network has made it possible for the admission of electronic commerce to a new application and research subject: m-commerce, which is defined as the exchanging or buying and selling of commodities, services, or information on the Internet through wireless network by mobile handheld devices. M-commerce introduces the mobile networks to e-commerce – the mobile handsets provide the users with the possibility to perform an e-commerce transaction whenever they want, wherever they are. The mobile handsets also offer the content providers an already existing infrastructure that enables the identification of the users. While some of the existing e-commerce services could properly be used on mobile devices, many of them are simply not suitable due to technical and physical restrictions.

Wireless network is susceptible to security attacks because in an open network, information can be intercepted and tampered with easily. Wireless communication suffers from threats inherited from wired networks and those that are specific in the wireless environment. On the other hand, because of its limited resource and higher channel error rate than that of wired networks, those

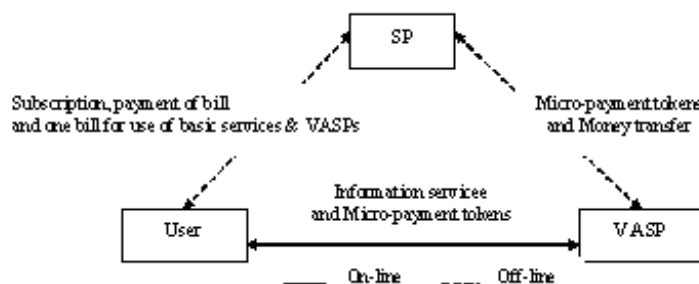
security schemes in wired network could not be used directly in wireless environment. Hence, how to build a secure and efficient environment for mobile electronic payment is a key issue in m-commerce development.

## Micro-Payment

With the rapid development of the Internet, more and more computer users rely on computer networks for information ranging from daily news and journal papers to movies and so on. Most of the information items on the Internet have low value, ranging from cents to several dollars.

A micro-payment system is a special kind of electronic payment system, which is used to purchase information goods over the computer network. The important factors in such a payment system are small amount of payment value (e.g., less than one dollar or a few cents) and high frequency of transactions on the electronic commerce network. In network business transactions, a customer uses a WWW browser to buy data, software, games, music, news, or other services, and transfers this information or services online through electronic communication networks. For a small amount of payment, the systems do not require high transaction security but have to reduce the cost of transaction. However, some security requirements are essential, such as the authentication of the customer and the merchant,

Figure 1. Basic model of micro-payment



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