Chapter 2
IOTP and Payments Protocols

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ABSTRACT

E-Business is a very progressive area of communication network's usage. As business processes are especially security sensitive, e-business supporting solutions have to emphasize security issues.

This chapter is based on the protocol specification of the Internet Open Trading Protocol (IOTP) and the different solutions of digital wallets and payment schemes. IOTP attempts to reproduce trading processes of the real-life in a virtual electronic environment. It defines trading partners and components, and supports payment and the delivery process of goods or services. IOTP also supports several different payment methods. The introduction of those is the other main part of the chapter. Based on their main functions, architecture and the realized business process, the authors analyze SET (Secure Electronic Transaction), PayWord, MicroMint, Netpay, Millicent, DigiCash, CyberCash, PayPal, and the Google Checkout.

The purpose of this chapter is that an enquirer in the topics of e-commerce and e-business should get introspection into the protocol aspects of electronic business technology.

INTRODUCTION

Nowadays, more and more users stay in their living room and do shopping or bank transfers while sitting in the armchair in front of their computer or television. Based on the security requirements of these kinds of applications and the need of the realization of trading in the electronic way, special protocols were developed for e-business.

This chapter intends to introduce e-commerce and e-business, and presents the protocols which were developed to support electronic business pro-

cesses. It is mainly based on a successful protocol of e-trading, the Internet Open Trading Protocol (IOTP). In the first part, the chapter intends to present the basics of e-commerce and e-business, and the electronic solutions of a usual business process. Next to the business processes the reader may get to know with the most important digital payment solutions highlighting the IOTP's methods. Both general business processes and concrete solutions are covered in this chapter.

We will introduce the IOTP protocol structure as well as the protocol's XML-based message structure. We will see that the protocol covers all phases of a regular trading process: offer, authentication, payment, and delivery. IOTP offers trading methods for two unknown parties of the commerce, and intends to make these processes successful and secure. Besides IOTP, different payment methods will be discussed supporting electronic trading processes.

This chapter targets different domains. It should help students to understand the realization of e-business solutions, as well as protocol developers by demonstrating solutions for problems of e-business protocol technology. Finally we collect future trends of e-business based on the present direction of this topic.

BACKGROUND

Trading has been part of the everyday life of the humanity since ancient times. Groups of people had surplus from one or more products, and at the same time, they needed something what they could not produce or make. Therefore they started to do barter. Initially this was only local character, but the extension of this activity increased rapidly. During this time the great trade routes have been established.

As trading developed, the method of payment was also improved and it is still evolving. The first step was the exchange of products, but this kind of trade has several problems. For example, it did not manage the problem of seasonal fruits. Therefore the commodity money has been introduced. This kind of paying method used an "intermediate" commodity as money. For example, these were cowry shells, koku (a unit of rice), or shekel. Coins became common stand as trading developed, and the standardized coinage was created. Many coins were made of special materials like gold or silver, and the value of the given coin was determined by its material. After this period, a commercial bank initiated the first paper money in England in 1694. Today, this process is controlled by the governments. The value of the banknotes depends on the economic performance of the issued country. Nowadays, besides banknotes, there are several alternative paying methods from the credit/debit card to the mobile payment technology. All of them are based on the modern "virtual" money that is registered by banks.

The Internet is a new opportunity for trading. Initially the sellers used only simple Web pages to show their product or to give some information about the company selling the product. In the next phase, medium and large companies built up their Web or other Internet based support solutions for their effective supply chain. These systems concentrated only on the following activities:

- Relationship between the Companies
- Ordering/Purchasing Process Expansion
- Transport Administration
- Servicing Administration

Finally, e-commerce and e-business was born. E-commerce manages only the outgoing processes like customers, suppliers, external partners, trade, marketing, taking orders, transport, customer service, procurement, and factory supply. E-business includes all activity of e-commerce and extends it with internal operations. These operations may be, for instance, production, inventory management, product development, risk management, finance,

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