Chapter XVII
Electronic Money Management in Modern Online Businesses

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ABSTRACT

This chapter discusses electronic money management via modern payment processing systems. The protocols and architectures of modern payment processing systems are reviewed and the way to identify and eliminate the threats of abuse of an electronic payment system by cyber fraud is discussed. The countermeasures necessary to combat possible depredations are detailed methodically. There is also a brief presentation of the payment processing system of PayPal and the payment gateway service that is provided by VeriSign. While this chapter shows that perceptions of the Web as a dangerous place to operate a business are justified, the main objective is to help e-commerce and online businesses understand the nature of possible threats for the safeguard of their customers' financial transactions against all risks.

INTRODUCTION

In today's global marketplace, the Internet is no longer just about e-mail and Web sites. The Internet has become the vital channel powering a growing list of revenue-generating e-business activities, from e-commerce and e-supply chain management to online marketplaces and collaboration.

E-commerce transactions management has become one of the most sensitive issues in the field of information security. This chapter discusses electronic money management via modern payment processing systems. The protocols and architectures of modern payment processing systems are reviewed and the way to identify and eliminate the threats of abuse of an electronic payment system by cyber fraud is discussed. The countermeasures necessary to combat possible depredations are detailed methodically. There is also a brief presentation of the payment processing system of PayPal and the payment gateway service

that is provided by VeriSign. While this chapter shows that perceptions of the Web as a dangerous place to operate a business are justified, the main objective is to help e-commerce and online businesses understand the nature of possible threats for the safeguard of their customers' financial transactions against all risks.

BACKGROUND

Information security focuses on protecting valuable and sensitive enterprise data. To secure information assets, organizations must at the same time provide availability to legitimate users and bar unauthorized access.

To fully satisfy the security requirements of the electronic payment process, a system is necessary to provide certain security services that differ slightly from the common security ones. The most important payment transaction security requirements (Asokan, Janson, Steiner, & Waidner, 1997) are:

- **Authentication:** Authentication is critical to a payment system. It ensures that a message originates from the alleged source.
- **Confidentiality:** It safeguards the user's privacy and prevents the theft of enterprise information both stored and in transit.
- **Integrity:** Data integrity is achieved by preventing unauthorized or improper changes of data, ensuring internal and external consistency and ensuring that other data attributes (such as timeliness and completeness) are consistent with requirements.
- **Availability and reliability:** These two requirements ensure the uninterrupted service to authorized users. Service interruptions can be either accidental or maliciously caused by denial-of-service attacks.
- **Non-repudiation:** A requirement which ensures that neither the sender nor the recipient of a message can deny the transmission.

Additional payment security services (Hassler, 2001) include: user anonymity and privacy, which ensure protection against the disclosure of the buyer's identity (and the payer's, should they not be the same) and the disclosure of the buyer's network address or location. To provide these crucial protection features, information security must be an integral part of the electronic payment system, design, and implementation.

MAIN THRUST OF THE CHAPTER

E-commerce refers to the exchange of goods and services over the Internet. All major retail brands have an online presence and many brands have no associated bricks-and-mortar presence. In the online retail space, online payment has become an essential part of the e-commerce process. Electronic payment systems and e-commerce are highly linked given that online consumers must pay for products and services.

Payment System

An electronic payment system in general denotes any kind of network (e.g., Internet) services that includes the exchange of money for goods or services. The goods can be physical goods, such as books or CDs, or electronic goods, such as electronic documents, images or music. Similarly, there are "traditional" services such as hotel or flight booking, as well as electronic services, such as financial market analyses in electronic form (Hassler, 2001).

Electronic payment systems have evolved from traditional payment systems and, consequently, the two types of systems have much in common. Commerce always involves a payer (customer) and a payee (merchant)—who exchange money for goods or services—and at least one financial institution. The customer's bank is usually referred to as the issuer bank and the merchant's bank is referred to as the acquirer bank (Asokan et al., 1997). Electronic