Chapter 12

Agent-Based Secure E-Payment System in E-Commerce

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ABSTRACT

With the explosive growth of the Internet, mobile commerce (m-commerce) is an increasingly important segment of commercial activities on the Web. The secure agent fabrication, evolution and roaming (SAFER) architecture was proposed to further facilitate m-commerce using agent technology. In this paper, the electronic payment aspect of SAFER will be explored. The secure electronic transaction (SET) protocol was selected as the basis for the electronic payment system implementation due to its wide acceptance. The various modules of the payment system and how they interface with each other are shown. An implementation done using Java will also be elaborated. This application incorporates agent roaming functionality and the ability to conduct m-commerce transactions and carry out corresponding e-payment procedures.
INTRODUCTION

The rapid development of the Internet over a globally connected networking infrastructure has been the most influential event in the past few years. Commercial activities on the Internet have increased in tandem with the fast growth of the Internet itself. However, there is still uncertainty and lack of standardized e-commerce procedures. This has slowed down the acceptance of e-commerce activities online. The vast size of the Internet also means that it is difficult for potential customers to locate interested products at a price or terms that match his expectations. It would thus be beneficial if there can be some way to streamline and standardize e-commerce.

M-commerce arises because of the usage of so many mobile devices like hand phones, palmtops, notebooks, and in-car computers. These devices when connected to the Internet enjoy all the resources and information available under the Web. E-commerce now has these mobile, omnipresent devices as another driving factor, which can widen its base and speed up its growth.

An agent framework and administration infrastructure called SAFER (secure agent fabrication, evolution and roaming) has been proposed (Zhu, Guan, & Yang, 2000). This solution makes use of software agents to carry out product search and differentiation on behalf of human owners. The goal of SAFER is to construct an open, dynamic, and evolutionary agent architecture for e-commerce. It has the potential to allow e-commerce transactions and payment to be carried out with good security and reliability. Agent-based SAFER will be attractive for m-commerce as most mobile devices may not be online most of the time. With agents running in a computer hosted by an ISP or background machine, a mobile user can simply create an agent, delegate a task to the agent, and send it away for information collection, product shopping, price negotiation, or even product purchase. A secure payment scheme is thus required for agents.

This paper will elaborate on the design of a modularized payment system for SAFER and give an idea of the various technologies used in the implementation process. The background of the research will first be introduced, including agent technology and current payment schemes. The SET (secure electronic transaction) protocol (http://www.setco.org/download.html/#spec) is explained in detail to set the basis for the system implementation. The modular design of the implemented Java application is then given. The structure and components of the modules are also shown. The operational functionality of the Java application will also be touched upon. Finally, an analysis of the implementation is carried out. The advantages of the design are discussed while possible technical considerations are explained.
Supporting Mobility and Negotiation in Agent-Based E-Commerce
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