

On-line Payment and Security of E-commerce

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Abstract—Along with the information technology, the Internet high speed development, electronic commerce has caused the current distribution realm significant transformation gradually. In the electronic commerce practice, the online electronic payment is the electronic commerce essential link, also is the foundation condition which electronic commerce can smoothly develop. Not the corresponding real-time electron payment means coordinate, electronic commerce only can be does not have the practical significance "the hypothesized commerce", but is unable to realize on the genuine net the transaction. The on-line electronic payment is the electronic commerce development core, is completes on the net the transaction essential step, also is at present restricts the domestic network application development a bottleneck.

Index Terms—electronic commerce; on-line electronic payment; security; electronic payment; payment system

I. ELECTRONIC PAYMENT AND ONLINE ELECTRONIC PAYMENT

Online electronic payments are not tantamount to electronic payments. In the emergence of e-commerce, credit cards have long been represented by electronic means of payment, credit cards in shopping malls. Many hotels and other places and items could swipe of the card, POS terminals Regulations, ATM cash forms of payment. And online electronic payments, online payments also known as electronic currency, broadly speaking, refer to a transaction in the online exchange of funds; It is a network-based electronic financial, a business card transactions for all types of electronic tools and media, the electronic computer and communications technologies as a means Electronic data (binary data) stored in the bank's computer system. and through the computer network system in the form of the flow of electronic information transfer and payment. Electronic Payment System is the basis for online payments, and online payments system development is a higher form of electronic payment. It makes electronic payment may, at any time, through the Internet directly to the transfer, settlement and form e-business environment.

II. COMMON ONLINE ELECTRONIC PAYMENT SYSTEM

In online shopping online electronic payment function is the key issue to ensure the consumers are fast and convenient, we have to ensure the safety and secrecy of the parties to a transaction, which requires a complete electronic trading systems. Currently, several online electronic payment systems used for:

A. Internet Bank Card Payment System

Including online credit card, smart card (IC card) payment systems are established in accordance with the standards set shopping and payment system. Internet

users in specific ways: sending banks coast and password encryption sent to the bank for payment. And the payment process for customers, merchants and verify the legitimacy of a request for payment. At present, domestic banks had set up such a bank cards for online payments. If the Bank of China's "Great Wall Electronic Debit Card", the China Construction Bank "Brunca" The Industrial and Commercial Bank of China's "Peony credit cards," Merchants Bank's "Smart Card", is safe, convenient features, is an ideal tool for online payments, online shopping is currently in line to pay the principal means of achieving. Based on the bank card payment the following four models:

1) No security model

Its features: users complete control of the bank card business information, the transmission of messages without bank card security. See Fig. 1.

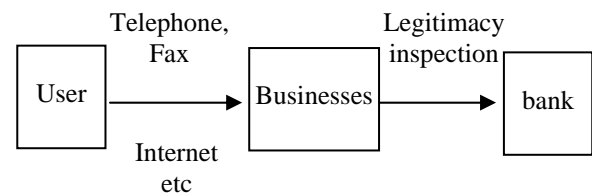


Fig.1 No security model

2) Through third-party brokers paid model

Its characteristic is as follows: Bank card information is not open to the transmission network, is paid by users. Both businessmen trusted third party (agents) to complete. See Fig.2.

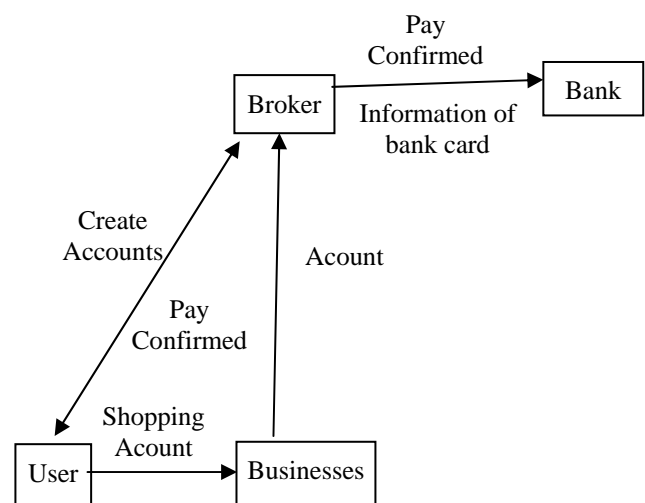


Fig.2 Through third-party brokers paid model

3) *Simple encrypted payment system model*

Its characteristic is as follows: the use of encryption technology to bank cards and other critical information encrypted digital signature to confirm the authenticity of the message. Business servers and the need for software support services. See Fig. 3.

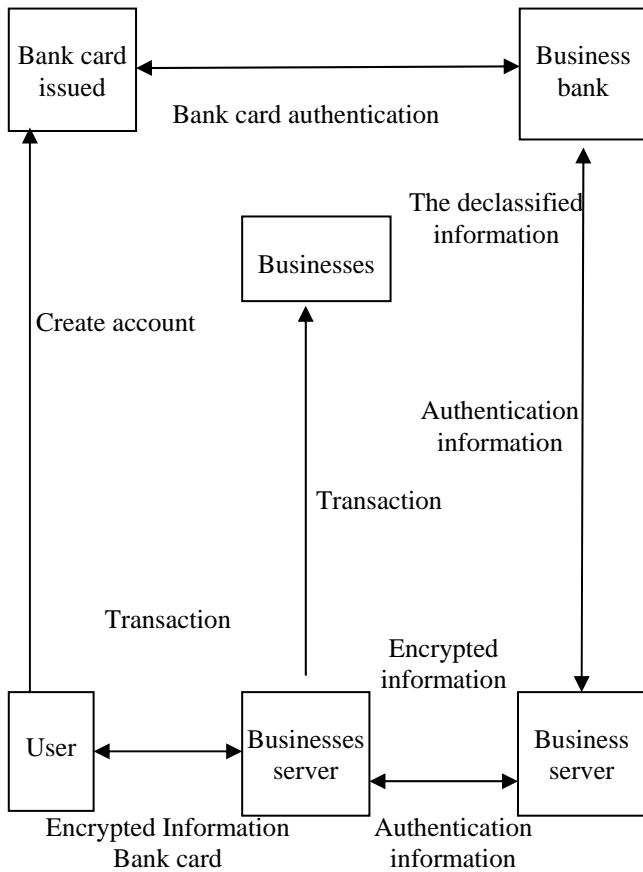


Fig. 3 Simple encrypted payment system model

4) *SET (security electronic transaction) model*

"Secure Electronic Transactions," and referred to the SET. In an open Internet is a realization of the international agreements and standards for secure electronic transactions. Their characteristics are as follows: SET transactions participants to provide

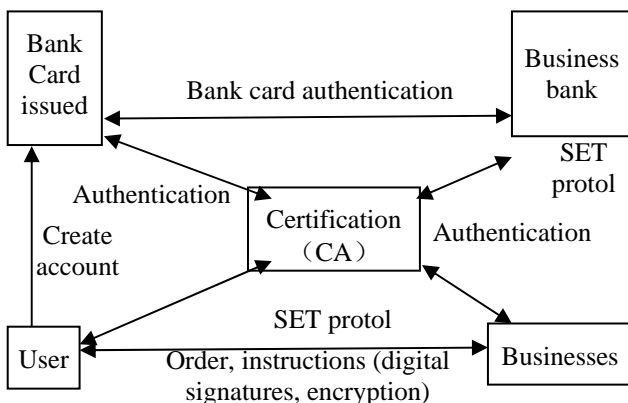


Fig.4 SET model

certification to ensure data security, integrity and non-repudiation of transactions, in particular to ensure that no information leaked to the cardholder's account for the businesses. Guarantee the safety of the SET. Such a system more suited to the B to C mode of transaction.

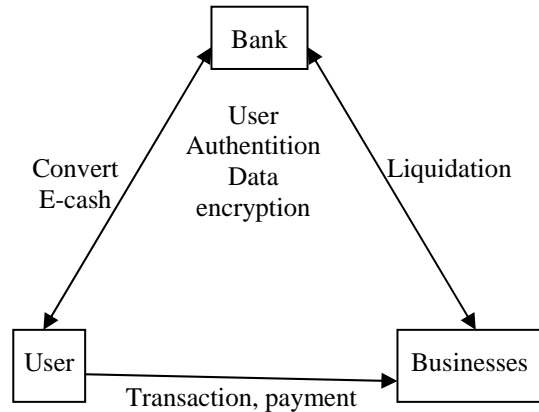


Fig. 5 E-cash internet payment system

Consumer adoption of a way to strengthen the security of the system has also lost the anonymity feature unable to protect consumer privacy.

B. *E-Cash (Electronic-cash) Internet Payment System*

E-cash is a form of data, the currency in circulation, there is electronic cash currency; it can be converted to cash a series of encrypted numerical sequence number, and then use these sequences to show the value of all sizes. Pay model is shown as Fig. 5:

Its characteristic is as follows: an agreement between the banks and businesses and authorization, identity verification by e-cash to complete it, electronic cash can be kept, admission, and transfer to smaller transactions.

E-cash and e-payment systems also have the advantage of cash, mainly as follows:

- Anonymity;
- Not shadowing;
- Savings on transaction costs;
- Savings on transmission costs;
- Poor risk;
- Pay flexibility;
- Prevent forgery and repeatability.

As electronic cash is the "cash" characteristics of China's small general merchandise purchase payment habits, it is likely to become an important means of online payments in China, but China has not yet formally started using. There are many foreign companies to offer electronic cash market. If Digit Cash the unconditional anonymous electronic cash market, Net cash can be provided by anonymous electronic cash market.

C. E-purse Internet Payment System

Users use e-purse shopping, the first in a personal bank account and users into a certain amount; then the corresponding electronic wallet service system free software to download and install an electronic purse; then download the corresponding website to apply online and access the cardholder "electronic safety certificate". Users shopping, the only direct hits "electronic wallet" icon and following the importation of their coast. corresponding information such as passwords by e-purse will pay to complete the follow-up work. Modex foreign companies such as a smart card as an e-purse to the online payment system.

E-purse is sporadic small payment transactions. always used in conjunction with bank cards to help users complete the entire shopping process.

D. Electronic check (E_check) Internet Payment System

Electronic check transfer payments from paper checks to the merits of using digital transmission to transfer money from one account to another account. These electronic check payments in businesses and banks linked to the online password transmission. Most common use encryption keys handwritten signature or personal identification numbers instead of signatures. thus ensuring the safety of this form of payment. Electronic check-cashing process is shown as in the Fig. 6.

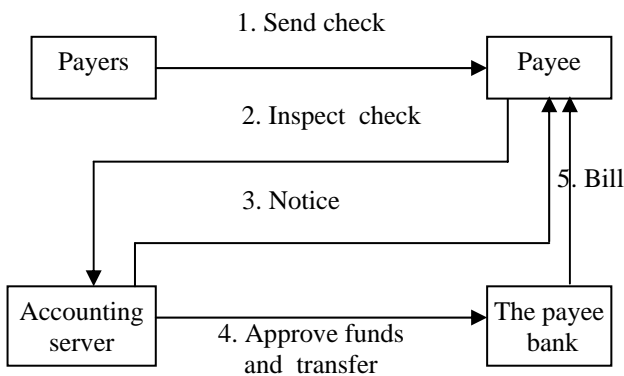


Fig. 6 Electronic check-cashing process

Electronic check system at present is an exclusive network system, the international financial institutions, through their own private networks, equipment, software and a complete set of user identification, the standard messaging, data validation and other standardized data transmission agreement completed, thus ensuring safety. In the public system will gradually transition to the future for Internet transmission. This B to B to pay mainly for the payment of transaction needs.

III. E-COMMERCE SECURITY ELEMENTS

In the use of electronic commerce process, the safety factors involved in the following six areas:

Using the network for the transaction, the sender and recipient need to ensure the confidentiality of information exchanged. E-commerce as a means of trading, its

message directly represents individuals, corporations or commercial

secrets; and the e-commerce system is based on a more open network environment promote the application of e-commerce to maintain commercial confidentiality is an important guarantee. Therefore, in order to prevent a large number of transmissions was illegal to steal information to ensure that only legitimate users will be able to see the data. Information can prevent stolen.

A. The Integrity of the Information

Since the accident data entry errors or fraud, the information could lead to trade all the difference; In addition, Data transmission of information loss, duplication of information or information that would lead to differences in the order of transmission of information the different trade sectors. Trade sectors will affect the integrity of the information to the parties to the trade transactions and business strategies.

B. The Validity of Information

E-commerce will have a direct bearing on the validity of the information to individuals, corporations or the country's economic interests and reputation. The validity of the transaction price, period, and the number of hours as part of the agreement is particularly important. Information recipient can confirm the data received is the primary side. The primary side can confirm that only the designated recipient can receive.

C. The Non-repudiation of Information

In a paperless e-commerce system, the trade through a handwritten signature or seal has been impossible to identify the parties. Accordingly, the transfer of information in the course of transactions involved in the transaction for individuals, corporations or to provide a reliable identification, made in the original data can not be denied sending, receiving data at the receiving side can deny.

D. The Authenticity of the Transaction Status

Internet transactions are geographically distant, mutual understanding, to make the transaction a success, we must trust each other, recognize each other is true, Businessmen have to consider the customer is a cheater, is not a gimmick shop for clients to consider whether there is credibility.

E. The Reliability of the System

E-commerce System is a computer system, its reliability is : to prevent computer failure, procedural errors, transmission errors. Hardware failures, software errors, computer viruses and natural disasters resulting from the potential threat, and control and prevention. Ensure system security and reliability.

IV. 3D SECURITY SYSTEM

An important feature of E-commerce is : the use of information technology to deliver information and

commercial transactions, so From the safety of e-commerce generally can be divided into two parts :computer network of its own security and the security of business information. The main contents of computer network security, computer network equipment, including safety, Computer network security and database security; Information security is centered on the business dealings of traditional commercial activities on the Internet, on security issues arising from the application. As e-commerce business on the computer network security with double security requirements This makes e-commerce security complex than most of the computer network system with higher demands.

How to ensure safe and smooth flow of commercial information flow in the network, that is, how to ensure information security and network security is a prerequisite for the normal operation of e-commerce systems. E-commerce System is the most important issue to consider. Therefore, the "three-dimensional, defense-in-depth" security system.

A. 3D model Security System Framework

3D model framework for e-commerce security system structure is shown in Fig. 7.

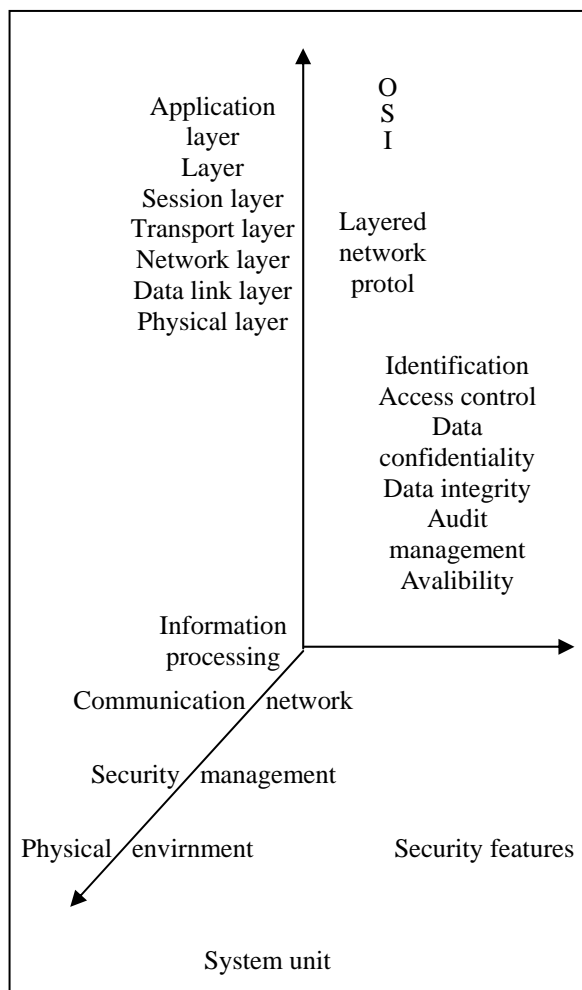


Fig.7 3D model framework for e-commerce security system structure

Dynamic: dynamic control, dynamic adjustment of loopholes in the database, and so the virus can be dynamic features and upgrading;

Real-time: real-time detection, response time, real-time recovery;

Security coordination between similar components: cooperative interaction; Synergies between the different security components; Synergies between the security systems;

Can be managed through a unified interface: Components can keep abreast of attack;

Open: scalability, integration.

B. The Three-dimensional System of Security in Five Areas

Information Protection: Source encryption, access encrypted classified material grades management, digital signatures, key management;

Network protection: access control, authentication, access proxy address filtering, NAT, Stateful Inspection;

System level (Hierarchical Control Point): the physical level, network-level, system-level, platform-level application-level, data-level and management level;

Time Domain (dynamic): intrusion detection, risk analysis, emergency response;

Space domain (security domain space division): If confidential information field, the exclusive domain of information, public information field. the domain can be divided into network and infrastructure protection, the security domain border protection, environmental protection and other terms.

V. STRATEGY OF E-COMMERCE SECURITY

As e-commerce security problems caused by many factors, to solve the security problem from different aspects, offers a variety of countermeasures.

A. Security Strategy

To ensure the safety communications must be the necessary measures to guard against them. Communications links, we can use a firewall, proxy server, Virtual Private Network (VPN) technology; in the identification and authentication, encryption and authentication techniques.

B. Legal Protection

As e-commerce activities are a commodity transaction and security issues should be protected by law. must ensure that the legal status of electronic contracts and digital signatures, electronic contracting parties to the contract approved Electronic Contract denied or modified to ensure that electronic contracts can be implemented.

C. *Social Moral Norms*

As e-commerce transactions are not direct, face-to-face features Transactions are often seen in the traditional process of e-commerce fraud is bound to have security implications. Thus, the healthy development of e-commerce depends on the establishment and perfection of social ethics.

D. *Perfect Management Strategy*

As e-commerce transaction system is a highly integrated man-machine system, in addition to network security, and management is also very important, but the factors that play a decisive role. Thus, the whole system of power distribution management and supervision, management training and assessment, ethical and professional standards must draw up complete training regulations, management jobs in order to enhance the spirit of love.

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