

Research on Union-Bank Online Payment Model System Design

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Abstract Along with the rapid development of Internet, e-commerce has become an integral part of life. It owns most of its success to online payment. Nevertheless, some problems of the online payment are becoming the largest restricts in the development of e-commerce. The proposed Union-Bank Online Payment mode effectively solves these problems. Applying empirical research approach and model research approach, Union-Bank Online Payment Model System Design proposes payment mode combined with the secondary settlement payment mode and the credit-based payment mode. This paper designs the structure supported by interface layer, business function layer, logic system layer and database layer, and sets up the model system. Union-Bank Online Payment Model System can effectively reflect Union-Bank online payment mode, which verifies the theoretical study, in order to provide a practical leading online payment mode.

Key words Union-bank; Online payment; System; Design

1 Introduction

Along with the rapid development of Internet, e-commerce has become an integral part of life. It owns most of its success to online payment. Nevertheless, some problems of the online payment are to become the largest restricts in the development of e-commerce. Recently, domestic and overseas advanced online payment modes have the following kinds.

(1) Online payment mode with e-banking payment gateway. E-banking payment gateway mode is a kind of mode that the client or merchants transfer the payment instruction to the payment gateway, then it complete the payment by the facilities of the bank^{[1][2][3]}. In this mode, the online payment technology effectively guarantee safety, however, due to various commercial banks develop a separate payment gateway, it makes this pattern expose some problems, such as the disunity of transaction process, the disunity of payment protocol and interface standard, disunity of authentication and digital certificate and so on. Pan Huini pointed out that at present many domestic banks have set up enclosure to defend others, developing an internal system of e-banking and authentication center. Banks cannot achieve interworking, and our country does not have a national unified and authoritative center. In order to be convenient in the trade, enterprise and customers have to install a number of computer digital certificates, register more e-bank. It no doubt leads to cross authentication, repetitive construction and resource wasting^[4].

(2) Online payment mode with third-party platform. Third-party platform payment mode is a kind of mode that the third-party platform set up connections among buyer, seller, business and bank, and it provides trade management, currency payment and service of clearing^{[1]-[3]}. In this mode, both credits are guaranteed, but with the scale of the third-party platform expanding gradually, some problems come out, such as tremendous transit funds, risk of crime, subject qualification, the legal status and so on. Luo Xiaomeng pointed out that as an intermediary of Internet consumes engaged in paying and gathering, the subject qualification and the business behavior of the third-party payment platform are lack of adequate legal basis^[5].

(3) Online payment mode with unified payment gateway (Union-Pay mode). Unified payment gateway runs by financial service Co., Ltd. specialized in electronic business online payment^{[1]-[3]}. This company is similar to commercial banks, which central bank offer for its liquidation and which provide an inter-bank transfer payment online service. Its main function is to transmit and record the information of trade among buyer, seller, logistics companies and banks. Although Union-Pay electronic payment services Co., LTD. (ChinaPay) succeeded in the field of electronic payment CARDS, but it also has similar puzzles like third-party payment platform. If you don't develop it in the online payment advantages, integrating the information flow and solving synchronization problem, and make full use of the supervisory position, then, it is difficult to become Chinese leading online payment mode. Xi Peng points out that online banking exists many problems of anti-money-laundering, such as difficult in executing "know your customer", discovering suspicious clues, supervising online payment transactions

and ^[6]. Shen Bing, Chen Meimei noted that there is no special domestic supervision about online banking laws and regulations, if the relevant bank supervision system is not enough of judicial district registered, there would be various regulatory troubles about the security interests of local customers ^[7].

Union-Bank online payment mode effectively solves the existing problems of the above three online payment modes. UB is short for Union-Bank. It emphasize that it is a bank. It has two aspects: on the one hand, it is one of the subordinate for Chinese central bank, executing online payment policies, and responding for online payment areas of financial supervision; on the other hand, it is a bank with liquidation ^{[8][9]}. Therefore ①with the special executive function of online payment, it unified the pay process, unified payment protocol and interface standard, unified the authentication and digital certificate, and so on, solved the existence problems of e-banking payment gateway mode; ②with the status of bank, it reduces the risk of huge transit funds and crime, and confirms subject qualification and legal status, solving the third-party payment platform for online payment mode of existence of the huge traveling funds, crime subject qualification; ③with the official status of financial supervision, it exert its advantages in online payment, integrating synchronization of capital flow and information flow. In order to improve this mode, this paper will design Union-Bank Online Payment Model System to verify the mode.

2 Theory of Union-Bank Online Payment Model System

2.1 Object

Objects of Union-Bank Online Payment Model System are commercial banks and business enterprises.

2.2 Basic theory

Union-Bank Online Payment applies the secondary settlement payment mode and the credit-based payment mode. The secondary settlement payment mode refers to one settlement at the time buyer pays and the other settlement at the time seller receives the money. During the time, Union-Bank keep the money until buyer confirms that buyer has received the goods. As a third-party keeping the money, Union-Bank reduced the risk of the lack of credit faced by buyers and sellers in the process; Credit-based payment mode refers to provide the credit of buyer to the seller. If seller agrees, seller delivers the goods to buyer. Buyer pays in a certain days after receiving the goods. As a third-party Union-Bank makes credit rating, objectively and fairly. This settlement mode can reduce the credit risk appeared in the process of trading.

2.3 Payment process

Main flow: ①The buyer sends in the order through the joint of the enterprises and the Union-Bank's online payment system. ②Union-Bank sends the order to the seller through the joint of the enterprises and the Union-Bank's online payment system. ③When the Seller has confirmed the order, The Bank informs the buyer to pay. If the seller does not agree with the order or the seller will give buyer a discount, Orders will be revised back to the Union-Bank. Then the bank sends the order back to the buyer and repeat step 1. ④Buyer confirms the payment. ⑤The Bank online payment system estimates the payment transaction way and deal with it according to the appropriate way. ⑥When the payment process is completed; both sides make an evaluation of the transaction. ⑦Transaction Closed.

The secondary settlement payment process: ①The buyer pays. ②The Bank withholds the money. ③The seller delivers the goods. ④The buyer receives them. ⑤The seller collects the money. Through the above process, the secondary settlement payment mode is achieved.

The credit-based payment process: ①The Union-Bank offers the buyer's credit. ②The Bank withholds the money. ③The seller delivers the goods. ④The buyer pays. ⑤The seller collects the money. Through the above process, the credit-based payment mode is achieved.

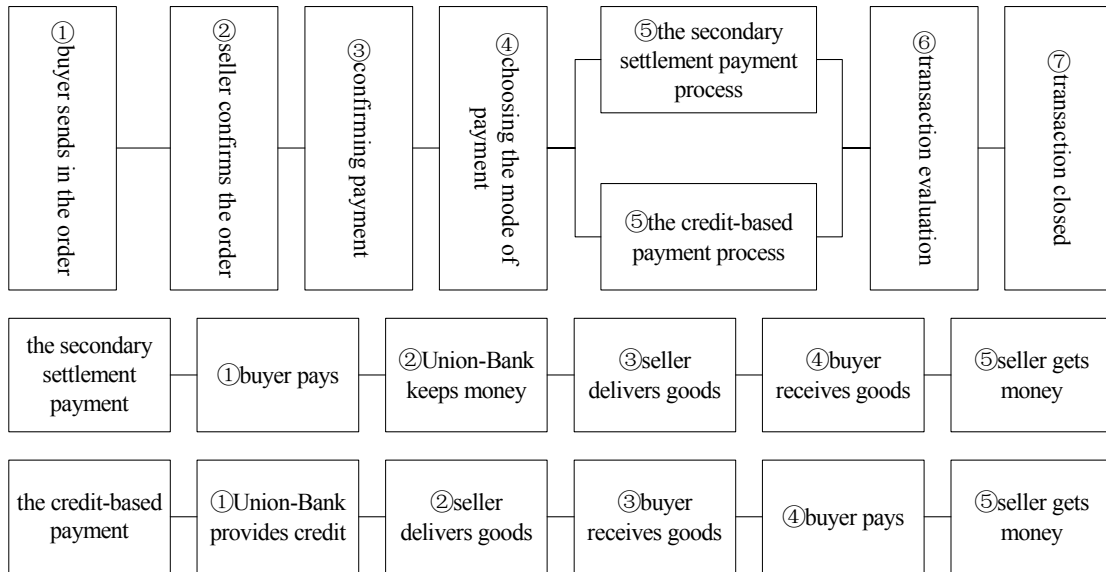


Figure 1 Payment Process

3 Structure of Union-Bank Online Payment Model System

3.1 Interface layer.

This layer supplies three main functions. First, provides interactive interface to enterprises and achieves the information transmission to enterprise, mainly in order to realize the orders transmission so that data for transaction management can be transmitted. Second, provides interface to commercial bank, realize the customer sharing between Union-Bank and commercial banks, makes system to realize the transmission of data for customer management center. Finally, provides the interface to Chinese National Advanced Payment System, achieving the transmission of data for inter-bank transfer.

3.2 Business functions layer.

This layer mainly completes business functions involved in online payment, including the business transaction management, the customer management, the inter-bank transfer payments and settlement. Transaction management function mainly depends on the data transferred by enterprise interface to record the trading order, to update business state, and to adjust trading conditions to meet the requirement of trade information in the function of settlement, Customer management function mainly depends on data transferred by commercial bank to record the customer information and to update customer information, in order to meet the requirement of account information in settlement. The inter-bank transfer function mainly depends on data transferred by the Chinese National Advanced Payment System interface to achieve the transfer of account between Union-Bank and commercial banks, and makes record, in order to meet the requirement of transfer information in settlement. Finally, the main function of payment settlement is using the e three types of business information mentioned above to finish transfer in transaction, which means that achieve the transfer among accounts and record information for inquiry.

3.3 Logical system layer.

This layer mainly realizes the function of business functions layer and record information in database, including the payment and settlement subsystem, transaction management subsystem, account management subsystem, Union-Bank liquidation subsystem. Payment and settlement system is mainly used in adjusting the remaining balance in the account through account management subsystem when transaction management subsystem sends out a transfer instruction. If it is transferred between different places, the Payment and settlement system liquidates the capital through Union-Bank liquidation subsystem and records every operation. The main function of transaction management subsystem is disposing the order transferred and recording the information about orders. Depending on the process about transactions, this subsystem can change the state and conditions to promise the transaction can be finished safely and this subsystem can record every operation and save it in the transaction details. The main function about the account management subsystem is managing the information about account and adjusting the balance of trade in account file table, in order to protect the funds is safely circulation. When needs audit, the corresponding accounting entries can be viewed and each operation can be

recorded and stored in account file table. Union-Bank liquidation subsystem's main role is liquidating the capital of different branch banks, ensuring capital circulation and records every liquidations in Union-Bank subsidiary bank table.

3.4 Database layer.

This layer is mainly used in recording all data in Union-Bank online payment system. Transaction detail database mainly records transaction details, transaction states and transaction conditions and supports the running of transaction management subsystem. Account file database mainly records the information about customers, customer accounts and day-books and supports the running of accounts management subsystem. Union-Bank information database mainly records enterprise's information and information about other collaborated commercial banks, branch banks and supports the running of Union-Bank liquidation subsystem.

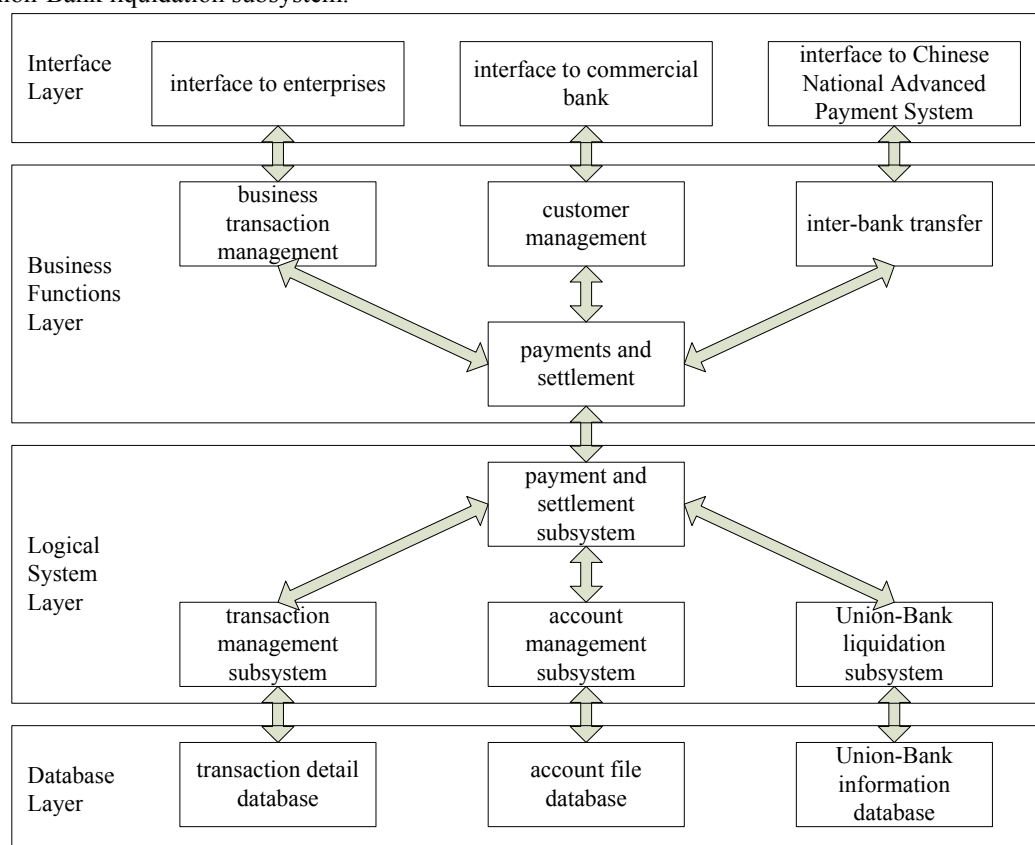


Figure 2 Structure of Union-Bank Online Payment Model System

4 Key Technologies

4.1 Design of the secondary settlement payment mode

(1) After both the seller and the buyer have confirmed the order, buyer pays the money. Then the payment system reduces the buyer's account balance and adds it to the payments transaction account. Accounting entries to debit the seller account, credited to The Union-Bank between transaction accounts.

(2) The system informs the seller to deliver the goods. The buyer may request a refund within 24 hours.

(3) When the seller has confirmed the delivery, the system notify the buyer to receipt. The buyer can request for a refund within 7×24 hours before the confirmation of receipt and after shipping.

(4) After receiving the confirmation that the buyer has agreed to pay, if the buyer neither asks for a refund 7×24 hours after the delivery nor does he confirm the receipt, the system will default the payment. Then it reduces the bank account balance of payments transactions, accounting entries to debit payments between bank accounts and credit seller accounts.

(5) Payment is completed.

4.2 Design of the credit-based payment mode

(1) When both seller and buyer are confirming the order, the Union-Bank provides the seller the

buyer's credit. The credit is evaluated by the Union-Bank customer credit rating system. The seller can deliver after he confirms the order.

(2)When the seller has confirmed delivery, the system will notify the buyer to receipt. The buyer can request for a refund within 7×24 hours before the confirmation of receipt and after shipping.

(3)After receiving the confirmation that the buyer has agreed to pay, if the buyer neither asks for a refund 7×24 hours after the delivery nor does he confirm the receipt, the system will default the payment. The buyer should complete the payment within the credit period

(4)The buyer pays the money and the seller receives it. System reduces the buyer's account balance, accounting entries to debit the buyer account and credit seller accounts. Then the system increases the seller's account balance.

(5)Payment is completed.

4.3 Design of the tables in databases

(1)Transaction detail table (id, account_buyer, account_seller, id_order, amount, mode, state, time_start, time_end, evaluation_buyer, evaluation_seller, credit_buyer, credit_seller)

(2)Trading flow table (id, account_debit, account_credit, amount, time)

(3)Transaction state table (id, time_buyer_pay, time_seller_deliver, time_buyer_getmoney, time_seller_getgoods)

(4)Transaction condition table (id, buyer_pay, seller_deliver, buyer_get, buyer_getgoods, seller_getmoney, refund_apply, refund_agree, evaluation_buyer, evaluation_seller, closed)

(5)Account file table (account, name, balance, bank_certificate, account_certificate, credit_buyer, credit_seller)

(6)Union-Bank subsidiary bank table (id, name, address)

(7)Corporate bank table (id, name, address)

5 Conclusions

Above all, the Union-Bank Online Payment Model System is designed according to the Union-Bank online payment mode. In the system, payment process is designed to unify the existed different payment process, structure of the system, which involves interface layer, business function layer, logic system layer and database layer, is designed to develop the system. As the key technologies the secondary settlement payment mode, the credit-based payment mode and tables in databases are design to solve the problems in the development.

The Union-Bank online payment mode, which has distinctive features differently from of the existing studies, may become the leading on-line payment mode in our country. Combining the modern payment system of People's Bank of China and payment gateway of integrated commercial banks, you can share all bank application system of commercial banks, payment gateway, network resources and customer resources, use an extension of pay and supply chain to realize cross-bank online payment service. Meanwhile, using a unified online payment gateways well as a process of a unified information interface standard to unit and to achieve interoperability with the systems of some institutions such as the buyers and sellers, certification center, logistics center, the modern payment systems of People's Bank of China, mobile communication systems, 315 consumer association, quality Supervision, Bureau of Industry and Commerce Administration and Public Security Bureau, you will effectively solve the bottleneck of healthy development of electronic commerce. Based on the establishment of e-commerce infrastructure payment data resource library of online payment based on Union-Bank and the reference of domestic and overseas research in related fields, we integrate the relevant research of computer science, operations research, industrial engineering, business strategy, management science and law science. Hence, we study the intelligent technology based on users' experience, case-based reasoning technology, ontology technology, forecasting and warning methods, CRM methods and technology, SCM methods and techniques and credit assessment techniques and methods. By studying the innovative service linking to the online payment service, it will provide of theory and method for development of e-commerce economic, at the same time, it will create values for the online payment service providers and customers. The establishment of the Bank online payment system prototype can effectively reflect the joint bank on-line payment mode. And constant improvement of its function in practice will verify the correction of the theory in this research, promote the progress of paid media, and provide a practical oriented online payment mode for our online payment area.

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